Sports Turf Storm Water Quality Procedures

Equipment Wash Off

Blow off any clippings in grass before washing machine.

If possible was machine off in grass area on top of C16 parking lot, or in grass area behind Softball field.

Do not was equipment in an area that can feed to storm drain.

Pesticides

All Pesticides and Liquid Fertilizers will be stored in locked pesticide storage at Kroger Field

Pesticides may move from the targeted application site in several ways: in air, in water, attached to soil particles, and on or in objects.

Most off-site pesticide movement in water is either by **runoff** (surface movement) or by **leaching** (downward movement through the soil).

Runoff and leaching may occur when:

- Too much pesticide is applied or spilled onto a surface.
- Too much rain or irrigation water moves pesticide through the soil offsite or into groundwater.
- Highly water-soluble or persistent pesticides are used.

Runoff water may move pesticides into drainage systems, streams, ponds, or other surface water, where they can travel great distances. Pesticides that leach downward through the soil may reach groundwater. In a greenhouse, pesticides may leach through the soil or other planting medium and contaminate other greenhouse surfaces. Look for special instructions on the label that warn of pesticide hazards caused by the movement of pesticides in water. Sometimes labels require buffers or setbacks from water and wells. *(Runoff water photo: treehugger.com)*

Sources of Water Contamination

Surface water or groundwater contamination results from either point-source or nonpoint-source pollution. Nonpoint-source pollution from pesticide applications is usually blamed for pesticide contamination. However, studies show that water contamination may also result from point-source pollution.

Point-source pollution comes from a specific, identifiable location:

- A pesticide spill entering a storm sewer.
- Back-siphoning of pesticides into water supplies.
- Contaminated surface water entering sinkholes.
- Repeated pesticide spills at mixing and loading sites.

- Careless spilling of wash water at equipment cleanup sites.
- Improper handling of spills and leaks at storage sites.
- Improper disposal of containers, rinsate from containers, and excess pesticides.

Potential point source pollution: **Do not leave granular herbicides and pesticides where they can enter storm drains.**

Nonpoint-source pollution comes from a widespread area. An example is the movement of pesticides into streams or groundwater after broadcast applications to large agricultural fields, rights-of-way, or turf areas.

Pesticide Contamination of Surface Water

Surface water is often a source of drinking water. Therefore, pesticide contamination of surface water (such as ditches, streams, rivers, ponds, and lakes) is a health concern. Pesticides that move in runoff water or with eroded sediment may contaminate plants and animals located downslope and reach sources of surface water.

Factors affecting runoff and erosion rates include slope, vegetative cover, soil characteristics, volume and rate of water moving downslope, temperature, and rainfall amount and intensity. These factors influence how much water runs off and how much moves into the soil (infiltration). In urban areas, runoff may occur on hard surfaces when pesticide granules are left on sidewalks and streets.

Runoff is a potential problem at most application sites. It is critical that runoff does not carry the pesticide into water sources or other vulnerable areas. Generally, runoff risk is greatest when heavy rains immediately follow pesticide applications or when the ground is saturated or frozen. Although surface waters are most likely to be contaminated by runoff, groundwater may also be affected when surface streams connect with shallow groundwater.

Pesticide Contamination of Groundwater

Nationally, groundwater provides 70% of the water used for public and private water supplies, irrigation, and industry. Like surface water, groundwater must be protected from contamination. **Once groundwater is contaminated, correcting the problem is difficult or even impossible. Groundwater** is found underground in cracks in the bedrock and in the spaces between soil particles, gravel, and rocks. It is the source of water for wells and springs. The layer of soil, sand, gravel, or fractured bedrock in which all available spaces are filled with water is the **saturated zone**. The boundary between the saturated zone and the overlying unsaturated rock and soil is known as the **water table**. The overall geologic formation from which groundwater can be drawn is called an **aquifer**.

Kentucky water statistics

- **Approximately 49 inches of precipitation falls on Kentucky every year. About 40% of this water runs off into streams, 60% evaporates or is transpired by plants.**
- **Kentuckians use more than 4.3 billion gallons of water every day. About 95% of this is from surface water, the rest is from groundwater**

- **More than 1.5 million Kentuckians are served by 185 public water-supply systems that rely on groundwater; 416,000 Kentuckians use water wells or springs**
- **Non-point sources pollute about 3.5 times as many miles of streams as point sources.**
- **Primary nonpoint sources of pollution are: - Mining, 31%- Agriculture, 29% - Land disposal/septic systems, 20% - Urban runoff, 10%**
- **Karst topography refers to areas with sinkholes, springs, caves, and underground streams. Approximately 38% of Kentucky is underlain by limestone exhibiting some karst development, and 25% has well-developed karst features**

Karst is a terrain with distinctive landforms and hydrology created from the dissolution of soluble rocks, principally limestone and dolomite. Karst area (yellow to dark brown on the map below) is characterized by springs, caves, sinkholes, and a unique hydrogeology that results in aquifers that are highly productive but extremely vulnerable to contamination. In the United States, about 40% of the groundwater used for drinking comes from karst aquifers.

Pesticides can enter groundwater quickly through sinkholes. Follow label directions concerning buffer zones to reduce the chances of contamination.

Some pesticides reach groundwater by moving through the soil in a process called **leaching**. A pesticide that leaches into groundwater must move down through the soil in water and resist binding to soil particles and breaking down into nontoxic compounds. **Pesticides that have high solubility, low adsorption, and/or are persistent are more likely to leach.** They typically have a label statement describing these concerns. A pesticide that adsorbs or binds itself strongly to soil particles will not leach as easily. Besides the characteristics of the pesticide, soil properties and environmental conditions also affect whether and to what extent a pesticide will leach.

Four soil properties affect a pesticideâ€™s potential for leaching:

- **texture and structure**
- **organic matter**
- **depth to groundwater**
- **geology**

Soil texture is the relative proportions of sand, silt, and clay-sized particles. Percolating water moves faster in sandy soils. Sand also has fewer binding sites available for the adsorption of dissolved chemicals than do clay or silt soils. Though sandy soils are more prone to pesticide movement, leaching may also occur in clay or silt soils .

Soil textures (image: soils4teachers.com)

Soil structure is the shape or arrangement of soil particles. It plays a big role in determining the size and shape of the pores through which water moves. Small amounts of pesticides may also move through soil cracks, worm holes, and root channels. These features are called **macropores**.

Organic matter consists of decaying plant material. The higher the soil organic matter content, the greater the ability of the soil to hold both water and adsorbed pesticides. Pesticides held in the root zone are less likely to leach into groundwater and may be taken up by plants.

Depth to groundwater - **Areas with a shallow water table have a greater chance for groundwater contamination** because less soil is available to act as a filter. There are fewer opportunities for pesticide degradation or adsorption. When using pesticides in areas where the groundwater is close to the surface, choose a product with a low leaching potential. Take extra precautions during mixing, application, and cleanup.

The **permeability of the geologic layers** lying between the surface of the soil and the groundwater is also an important factor. Highly permeable materials (such as gravel deposits) allow water and dissolved pesticides to move freely downward to groundwater. Layers of clay, which are much less permeable, can inhibit and slow the downward movement of water.

Preventing Surface Water and Ground Water Contamination

To help prevent surface water and groundwater contamination, EPA requires all pesticide products labeled for outdoor uses to include the following environmental hazard statement on the label: â€œ***Do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water supplies when cleaning equipment or disposing of equipment wash waters.***â€

Pesticides that could contaminate groundwater must bear **groundwater warning statements** on their labels. When such statements appear on product labels, choose pesticides appropriate for use in sandy soils or where extra precautions are needed to reduce the risk of water contamination. You can minimize the risk of point or nonpoint-source contamination by following best management practices (BMPs). BMPs are effective, commonsense procedures that emphasize proper mixing, loading, application, and disposal of pesticides. **Following BMPs reduces the chance that pesticides will harm the environment.**

Use Integrated Pest Management Principles

Apply pesticides only when and where necessary, and only in amounts adequate to control pests. Use nonchemical control methods whenever possible. When using pesticides:

- Determine the type of pest, the density of the pest population, and the proper control method.
- If a pesticide is necessary, choose the least toxic product that will do the job.
- Calibrate pesticide application equipment regularly.
- Use spot treatments or band applications, if possible, to reduce pesticide use.

Identify Vulnerable Areas

The presence of **sandy soil, sinkholes, wells, streams, ponds, and shallow groundwater increases the chance of groundwater contamination**. Never dispose of empty pesticide containers in sinkholes, or dump or rinse sprayers into or near sinkholes. Avoid contaminating drainage ditches and other potential

sources of runoff to streams and waterways. Never clean tanks or intentionally discharge water from a tank of any vehicle into a street, along a road, or into a storm drain.

Do Not Mix and Load Near Water

Mix and load as far as possible (at least 50 feet) from wells, lakes, streams, rivers, and storm drains. When possible, do so at the application site. Consider using a sealed permanent or portable mixing and loading pad to prevent seepage into soil.

Back-siphoning is the reverse flow of liquids into a fill hose. It sucks tank contents back into the water supply. Back-siphoning starts with a reduction in water pressure and **can draw very large quantities of pesticide directly into the water source**. This happens when the end of the water hose is allowed to extend below the surface of the spray mixture when filling a spray tank.

he simplest way to prevent backflow is to maintain an air gap between the discharge end of the water supply line and the pesticide solution in the spray tank. An air gap prevents contamination of the hose and keeps pesticides from back-siphoning into the water source if a drop or loss of water pressure occurs. **Keep the air gap at least twice the diameter of the discharge pipe.** Another method to prevent back-siphoning is to use a backflow prevention device or check valve.

Time Pesticide Applications According to the Weather Forecast

Pesticides are most susceptible to runoff from heavy rains or irrigation during the first several hours after application. Do not apply to saturated or frozen ground. To avoid over-spraying an area and causing drift, check the pesticide label for application precautions or restrictions during windy conditions. Wind speed, temperature, and humidity all affect the off-target movement of pesticides.

Select Products Wisely

Whenever possible, use pesticides that are less likely to leach. Read labels for such warnings.

Handle Pesticides Safely

Follow these guidelines to prevent surface water or groundwater contamination:

- **Immediately contain and control pesticide spills.**
- **Check application equipment regularly for leaks or damage.**
- **Mix and load pesticides away from water sources.**
- **After the pesticide application is complete, follow label directions for proper equipment cleanup and container disposal.**
- **After applying granular pesticides, sweep or blow any granules from sidewalks, driveways, or patios onto the treatment area.**

Whenever possible, clean sprayers at the application site at a safe distance from wells, ponds, streams, and storm drains. Spray the rinsate on the treated area or on another site listed on the pesticide label, or use in the next tank mix. Be sure not to exceed label rates.

Preventing Harmful Effects on Sensitive Areas and Non-target Organisms

Be aware of sensitive areas, non-target plants and animals (especially endangered species), and damaging effects on habitat. In addition to water sources, sensitive areas include sites where living things could easily be injured by a pesticide.

Outdoor sensitive areas include:

- School grounds, playgrounds, and recreational areas.
- Habitats of endangered species.
- Apiaries (honey bee sites), wildlife refuges, and parks.
- Areas where domestic animals and livestock are kept.
- Ornamental plantings, public gardens, and sensitive food or feed crops.
- Indoor areas where ornamental or other sensitive plants are grown or maintained (such as in malls and buildings).

Sometimes pesticides must be deliberately applied to a sensitive area to control a regulated pest (such as mosquito abatement or gypsy moth forest treatments). Only well-trained applicators should perform these applications. At other times, the sensitive area may be part of a larger target site. Whenever possible, take special precautions to avoid treating the sensitive area.

Leaving an untreated buffer zone around a sensitive area is a practical way to avoid contaminating it. In still other instances, the sensitive area may be near a site used for mixing and loading, storage, disposal, or equipment washing. Be very careful to avoid contaminating the sensitive area. Check the label for statements that alert you to special restrictions around sensitive areas.

Wash out Procedures

After Spraying Fill tank with fresh water

Spray out water in grass area behind softball or on the back baseball infield to insure tank is clean for next use.

Mowing

Inspect equipment prior to use and maintain the mower as needed.

Inspect area prior to mowing and remove any objects that could become a projectile(such as stones and woody debris).

Pick up all litter (paper, cardboard) prior to mowing area.

Separate unknown wastes and wastes requiring special management from lawn litter during pickup operations.

Clean debris and litter from storm

water structures to improve drainage and reduce storm water pollution.

At the shop, litter should be placed in the solid waste dumpsters.

After application of the proper rate of granular herbicide, pesticide, or fertilizer, all residues are to be blown or swept from all hardscape.

Fertilizer Storage and Use

Store bags of fertilizer, dry calcium chloride or other bulk materials indoors, on pallets, inclean, dry, weather-tight facilities.

Use a storage area with a concrete or paved floor.

Keep brooms, shovels, bags or other containers, in the work area to clean up spills.

Bulk materials not in bags are to be applied when purchased.

After application of the proper rate of granular herbicide, pesticide, or fertilizer, all residues are to be blown or swept from all hardscape.

Fertilizer should be stored in Cliff Hagan shops

Paint

Wash equipment in the paint room that drains to a collector or sanitary sewer. (Kroger Field)

Outside washing areas must be in designated areas only. Designated area should be reviewed by UK Environmental Management and approved by the facility supervisor.

Keep equipment in clean and good working order.

Repair equipment leaks of oil and other fluids promptly.

Collect waste wash water and place it in containers for removal and proper disposal if an approved drain is not nearby (Soccer/Softball)

Used Oil

Main Cliff Hagan shop only

Maintain a 250 to 660 gallon used oil storage tank above ground, indoors protected from weather, in good condition, on an asphalt or concrete base and clearly labeled.

Provide extra used oil storage containers.

Provide a drum for used oil filters.

Carefully pour used oil into the Used Oil containers without spilling.

Waste fuel from fuel filters may be added if allowed by the recycling vendor.

Drain oil filters on the drain rack for 24 hours and place in the Used (Waste) Oil Filter drum.

Notify the Equipment Technician (Dave) when the tank reaches 80% full.

Record the date and volume of waste removed, hauler and treatment facility receiving the waste.

Label all used oil containers, filter racks, and collection vessels with the words "Used Oil".

Topdressing Sand

Attempt to use day that is delivered to reduce movement of sand.

If rain is forecasted, cover with a tarp and use Sand bags to dam area around pile to reduce the movement of sand.