



## **Assessing and Reducing the Risk of Groundwater Contamination from HOUSEHOLD WASTE MANAGEMENT**

### **Why should I be concerned?**

Kentucky's groundwater is one of its most vital resources. It supplies drinking water for hundreds of thousands of Kentuckians. Groundwater is the source of water for drinking water wells, springs, and some municipal, or "city," water supplies. All of us do things at our homes every day which can possibly pollute the groundwater. Nobody wants to pollute the groundwater, but if we are not careful and educated about how we manage our day-to-day home or farmstead activities, we can do just that—pollute the groundwater that serves as drinking water for many families. Even if nobody in your community uses groundwater for drinking water, you need to be concerned. This is because groundwater that underlies your home may travel a long way and eventually end up as another family's drinking water.

Waste that is generated from every one of our homes can eventually contaminate the groundwater if it is not managed correctly. The products of greatest concern are those which may be considered hazardous. Examples of these hazardous wastes are paints, solvents, oils, cleaners, wood preservatives, batteries, glues, and pesticides. If they are not used and stored properly, these products may cause toxic health effects. This publication will focus on things you can do to prevent the contamination of the groundwater through your household waste disposal practices.

Small, unusable amounts of these products often wind up spilled, buried, dumped, or flushed onto the

homeowner's property. Minimizing the amounts of these products used on the home or farmstead, along with practicing proper disposal practices, can reduce both health risks and the potential for groundwater contamination.

Many other household wastes are not necessarily considered hazardous, but should still be disposed of properly. Examples include yard waste, newspapers, plastics, food wastes, etc. Many of these wastes can either be recycled or composted. Recycling or composting will allow us to reuse these products and avoid turning them into waste.

**The goal of KY•A•Syst is to help you protect the groundwater that supplies drinking water for many families.**

### **How will this publication help me protect the groundwater?**

Part I of this publication will help you protect the groundwater by asking you questions about your household waste management practices. These questions will help you identify activities or structures on your property which may put groundwater at a high risk of being contaminated. Part II of the publication will give suggestions on how to reduce the risk of groundwater contamination by improving the management of your household waste.

**The KY•A•Syst program is for your benefit only. No information from this publication needs to leave your home. KY•A•Syst does not attempt to offer legal advice or solutions to individual problems but rather to raise general awareness about groundwater protection strategies. Questions about individual problems should be addressed to the appropriate professional.**

# Part I. *Assessing* the Risk of Groundwater Contamination from Household Waste Management

## Instructions:

Circle the number in front of the appropriate item that **best** describes your home or farmstead. (Skip and leave blank any categories that don't apply to your home or farmstead.)

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## HOUSEHOLD WASTE DISPOSAL

### How do you dispose of your household trash?

- 4 All waste that can be recycled is recycled (newspapers, plastics, aluminum and tin cans, etc.). The remainder is disposed of at a municipal landfill or transfer station. Organic materials (food waste, lawn waste) are composted.
- 3 All household trash is disposed of at a municipal landfill or transfer station. Nothing recycled or composted.
- 2 All trash/land refuse is burned on site in a burn barrel, and ash and other waste from burn barrel is brought to a municipal landfill or transfer station.
- 1 All trash burned on the ground and ash dumped on the ground or into water (field, ditch, sinkhole, stream, etc.). Unburned trash dumped on the ground or into water (field, ditch, sinkhole, stream, etc.). These practices violate Kentucky regulations.

## MAINTENANCE PRODUCTS

### How do you dispose of solvent-based materials (stripper, thinner, mineral spirits, cleaners)?

- 4 Everything which is bought is completely used up, or leftover product is shared with someone else.
- 3 Community hazardous waste collection service is used if available, or waste stored until service becomes available in the future.
- 2 Waste solidified by mixing with kitty litter or sawdust and disposed of at a municipal landfill or transfer station, **OR** liquid is evaporated and leftover solid is disposed of at a municipal landfill or transfer station.
- 1 Waste is dumped on the ground or into water (field, ditch, sinkhole, stream, etc.). This practice violates Kentucky regulations.

### How do you dispose of paints or stain?

- 4 Everything which is bought is completely used up, or leftover product is shared with someone else.
- 3 Community hazardous waste collection service is used if available, or waste stored until service becomes available in the future.
- 2 Waste solidified by mixing with kitty litter or sawdust and disposed of at a municipal landfill or transfer station, **OR** liquid is evaporated and leftover solid is disposed of at a municipal landfill or transfer station.
- 1 Waste is dumped on the ground or into water (field, ditch, sinkhole, stream, etc.). This practice violates Kentucky regulations.

### How do you dispose of unused wood preservatives?

- 4 All preservative bought is completely used up, or leftover is used up by someone else.
- 3 Preservative returned to retailer or manufacturer (check with retailer or manufacturer first).
- 2 Preservative mixed with kitty litter or sawdust and disposed of at a municipal landfill or transfer station.
- 1 Preservative dumped on the ground or into water (field, ditch, sinkhole, stream, etc.). This practice violates Kentucky regulations.

### How do you dispose of waste motor oil?

- 4 All waste motor oil re-used (for lubrication, burned for heat in approved residential space heater).
- 3 Taken to used-oil collection site (service station, community collection site).
- 2 Disposed of at a municipal landfill or transfer station. This practice violates Kentucky regulations.
- 1 Dumped on the ground or into water (field, ditch, sinkhole, stream). This practice violates Kentucky regulations.

### **How do you clean up vehicle maintenance drips and spills?**

- 4 Drips and spills are confined on paved area with absorbent material (kitty litter, sawdust) and contaminated absorbent disposed of at a municipal landfill or transfer station.
- 3 Drips and spills fall onto the ground and contaminated soil brought to a municipal landfill or transfer station.
- 2 Drips and spills absorbed with absorbent material (kitty litter, sawdust) and contaminated absorbent dumped on the ground or into water (field, ditch, sinkhole, stream, etc.). This practice violates Kentucky regulations.
- 1 Drips and spills are flushed onto the ground or into water (nothing contained with absorbent materials such as kitty litter, sawdust), or drips and spills left (no action taken). This practice violates Kentucky regulations.

### **How do you dispose of used antifreeze?**

- 4 Used antifreeze is filtered and used as water in other radiators.
- 3 Used antifreeze is saved and taken to antifreeze recycling facility (service station, etc.).
- 2 Used antifreeze is poured down the drain.
- 1 Used antifreeze is dumped on the ground or into water (field, ditch, sinkhole, stream, etc.). This practice violates Kentucky regulations.

### **How do you dispose of lead acid batteries?**

- 4 Recycled/taken to store which accepts used batteries.
- 3 Properly stored (in a building, garage, barn, etc.).
- 2 Stored outside.
- 1 Dumped on the ground or into water; disposal at municipal landfill or transfer station. This practice violates Kentucky regulations. Battery retailers are required by law to accept used batteries.

## **PESTICIDES**

### **How do you dispose of unused or unwanted (not banned) pesticides?**

- 4 All pesticide bought is completely used up, or leftover is used by someone else on labeled crop.
- 3 Pesticide returned to retailer or manufacturer (check with retailer or manufacturer first).
- 2 Pesticide mixed with kitty litter and disposed of at a municipal landfill or transfer station.
- 1 Pesticide dumped on the ground or into water (field, ditch, sinkhole, stream, etc.). This practice violates Kentucky regulations.

### **How do you dispose of banned pesticides?**

- 4 Banned pesticide taken to EPA buyback program, retailer, or manufacturer (check with retailer or manufacturer first).
- 3 Banned pesticide stored in protected area until EPA buyback or other banned pesticide collection service becomes available.
- 2 Banned pesticide mixed with kitty litter and disposed of at a municipal landfill or transfer station.
- 1 Banned pesticide dumped on the ground or into water (field, ditch, sinkhole, stream, etc.). Banned pesticide used on crop or shared with neighbor. These practices violate Kentucky regulations.

### **How do you dispose of plastic pesticide containers?**

- 4 Triple or pressure rinsed and recycled at "rinse and return" program **OR** returned to retailer (check with retailer first).
- 3 Triple or pressure rinsed and taken to a municipal landfill or transfer station.
- 2 Triple or pressure rinsed and disposed of on site according to product label.
- 1 Not triple or pressure rinsed. Dumped on the ground or into water (field, ditch, sinkhole, stream, etc.). Container burned or reused for other purpose. These practices violate Kentucky regulations.

### **How do you dispose of empty paper/cardboard pesticide containers?**

- 4 Disposed of at a municipal landfill or transfer station.
- 3 -----
- 2 -----
- 1 Empty containers dumped on the ground or into water (field, ditch, sinkhole, stream, etc.). Empty containers burned or reused for other purpose. These practices violate Kentucky regulations.

## **SITE EVALUATION**

### **What type of soil is on your property?**

- 4 Fine-textured or "heavy" soils (clays).
- 3 Medium-textured soils (silt loam).
- 2 Medium- to coarse-textured soils (loam, sandy loam).
- 1 Coarse-textured soils (sands).

### **After a 1-inch rain in April, how long do you (or farmers in your area) have to wait to get into the field?**

- 4 More than four days.
- 3 Four days.
- 2 Three days.
- 1 Zero to two days.

### **How sensitive is your region of the state to groundwater contamination (see map at end of publication)?**

- 4 Low sensitivity.
- 3 Moderate sensitivity.
- 2 High sensitivity.
- 1 Very high sensitivity.

### **Does your property lie above or near any active/abandoned underground coal mines?**

- 4 No underground mining is being done below or near your property.
- 3 Underground mining is currently being done.
- 2 An underground mine was abandoned underneath or near your property more than ten years ago.
- 1 An underground mine was abandoned underneath or near your property more than twenty years ago.

### **If your property does lie above or near any active/abandoned underground coal mines, what type of mine is it, and how deep is the mine? (See Part II for more information.)**

- 4 No underground mining is being done below or near your property.
  - 3 Underground mine is more than 400 feet deep.
  - 2 Underground mine is 200 to 400 feet deep.
  - 1 Underground mine is less than 200 feet deep. Mine is a "longwall" type mine.
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## What do I do with these rankings?

Take a look at your rankings for the individual questions you answered.

For Questions Where You Received A:	The Risk of Contaminating Groundwater Is:
4	Low
3	Low to Moderate
2	Moderate to High
1	High

Use this table to list any questions from Part I where you received a "1" (high risk activity or structure), or that were identified as being against Kentucky regulations. Next, write down the first step that can be taken to better the situation. Then read Part II of this publication, "Reducing the Risk of Groundwater Contamination by Improving Household Waste Management." This will help you to improve any problem areas (1's or 2's) which were identified.

<b>Activity or structure identified as high risk ("1")</b>	<b>What is the first step that can be taken to solve the problem?</b>
<i>Example: no household waste is recycled.</i>	<i>Begin to recycle aluminum cans; eventually recycle all waste that can be recycled.</i>

## Part II. *Reducing* the Risk of Groundwater Contamination by Improving Household Waste Management

Every household in Kentucky produces garbage every day which is either taken to a municipal landfill or transfer station, taken away by the garbage collector (who brings it to a municipal landfill), burned in a burn barrel, or, all too often, illegally dumped. Whatever the disposal method, this garbage will eventually make its way into the environment. This means it will hopefully end up in a municipal landfill, but may end up being dumped on the ground or into water. Garbage that is dumped on the ground or into water is obviously a problem because it pollutes our natural resources, as well as ruins the natural beauty of Kentucky. But even garbage that is properly disposed of (at a municipal landfill) is a problem. Landfill space is being used up quickly, and we are straining the landfills with too much garbage. This heightens the chance that the landfill will pollute the groundwater.

States/cities with large populations are looking to bring their garbage to landfills in less populated states because their landfills are all filled up. While this angers people in states like Kentucky, we must use this as a lesson. As our state population grows and produces more garbage, we will also have trouble finding places to properly dispose of our garbage without polluting the land and water.

This problem is in the hands of every citizen of Kentucky. We must change our lifestyle by consuming less and being smart about what we do consume. Finally, we must properly dispose of the waste from the products we all use every day.

These practices will be good for everybody. Consuming less means saving money because you spend less. It will also help keep taxes down if we put less strain on our landfills. Consuming less also helps conserve our natural resources (oil, metals, water, and forests) that are used to make the things we buy. Finally, consuming less means we produce less garbage and lessen the risk of polluting our land and water resources.

If we think about it, this was the same way things were done in the "old days." Our parents and grandparents knew they had to conserve what they had because they didn't have a lot. They were careful about how they spent their money and didn't waste anything.

### **What can we do?**

We must try to live by the "3 R's." This means **Reducing** the amount of waste we produce by buying less,

while **Reusing** and **Recycling** whatever products we can. The garbage we do throw out must be disposed of properly.

Many communities now have recycling centers that accept newspapers, plastics, aluminum and tin cans, as well as other products. Check your yellow pages under Recycling Center or contact your garbage collector to find out more information about recycling efforts in your community. Your county Extension office may also have information about recycling as well as the composting of kitchen waste/lawn refuse.

Garbage that is thrown out should be brought to a municipal landfill or transfer station, or picked up by a garbage collector (who would bring it to the municipal landfill). Kentucky regulations prohibit the burial or dumping of household wastes. This practice will pollute both the land and water.

Many households burn their household garbage. Kentucky regulations prohibit the burning of household "garbage," while allowing the burning of household "rubbish." In general, the Kentucky Division for Air Quality encourages families to stop burning any household waste. At the least, the burning of plastics should stop. Burning plastic releases toxic compounds, including carcinogens, that create a health risk to family members and the general public. The burning of other solid waste can also create a health risk. If any garbage is burned on your property, make an effort to at least dispose of the ash and leftover waste at a municipal landfill or transfer station. Once again, the best option is to recycle or compost what you can and bring the rest of your garbage to a municipal landfill or transfer station, or have it picked up by a garbage collector who would bring it to a municipal landfill.

Under no circumstances should garbage be dumped into a sinkhole. Sinkholes are directly connected to the groundwater.\* Garbage that is dumped into a sinkhole will contaminate the groundwater which serves as drinking water for many families. If you have a sinkhole on your property with garbage in or around it, clean it up. Lenders and buyers are now requiring environmental audits, and any property that has a sinkhole dump will probably be rejected by either buyers or lenders. Read the final section of Part II, "A FEW WORDS ABOUT YOUR SITE," for more information about your site's ability to protect the groundwater.

*\* Areas with many sinkholes are called "karst" and are very sensitive to groundwater contamination.*

In general, household wastes can be classified as solid waste or household hazardous waste.

## SOLID WASTE

Solid waste includes yard wastes, kitchen wastes, refuse, paper, plastics, glass, metal, and other discarded waste materials. Most of these products can either be recycled, reused, or composted.

- Yard wastes: In some municipalities, leaves, grass clippings, and tree branches, make up as much as 20 to 25 percent of the yearly land fill. Mulching and composting of this material provides an alternative that enhances yard and garden productivity.
- Kitchen wastes account for as much as 10 to 15 percent of our waste entering landfills. Most of this can be placed into the same compost pile with grass and leaves.
- Paper accounts for another 25 to 35 percent of the waste filling landfills. Many new recycling opportunities are emerging to make good use of recycled paper.
- Plastics now account for about 15 to 20 percent of all waste entering landfills. It is possible to recycle farmstead plastic to make products ranging from insulation to drain tile. Encourage and support recycling efforts in your community.
- Glass accounts for about 5 percent of all waste entering landfills. Glass is recyclable and should be reused.
- Metal accounts for another 10 to 15 percent of waste entering landfills. Many landfills are separating metal from other garbage and are recycling it. More and more municipal garbage collectors require households to separate metal from other garbage to ensure less expensive recycling.

## HOUSEHOLD HAZARDOUS WASTE

Although many people may not realize it, almost all households produce hazardous wastes. Even everyday personal care products like nail polish and remover, spot removers, moth balls, shoe polish, and some medicines produce potentially hazardous wastes when they are thrown out. Other examples are pest strips, pesticides, drain and oven cleaners, furniture polish and wax, paints, stains, wood preservatives, and used motor oil and anti-freeze. Key words to look for on all household products are *caution*, *warning*, or *danger/poison*. They tell you the product is hazardous. If these products and their containers are not disposed of properly, they can contaminate the groundwater as well as pose a threat to your health. This section will focus on ways to minimize the risk of contaminating the groundwater with household hazardous waste.

In order to minimize the pollution potential from household hazardous wastes, we must buy fewer products that can be considered hazardous waste and dispose of left-over product and containers properly.

Take some time to examine your activities that produce waste materials, to make sure that you really need all the products you are using.

One way to reduce the amount of products you buy that are considered hazardous is to use alternative products that are not hazardous. In the "old days" people had to deal with many of the same dirt, grease, and stain problems that we have today. Back then they cleaned things up with products found around the home that were usually much less toxic than those we use today. The difference between the cleaners used in the past and those used today is a little "elbow grease."

Making use of alternative home cleaners, disinfectants, and polishes can drastically reduce the amount of hazardous products in your home as well as save you money. For example, instead of buying air fresheners, open your windows (when you can) to air things out, and use baking soda in odor-producing areas. Recipes using vinegar, bleach, or baking soda serve to clean many things around the home. Contact your county Extension office for the publication *Hazardous Household Substances: Alternatives that Are Relatively Free of Toxic Effects*. This publication contains various recipes for cleaners that can be made from relatively toxin-free products.

When you are certain that you are purchasing and using only essential products, carefully consider how to use the products safely, recycle or reuse them when possible, and dispose of remaining products in a way that will not pose a risk to you, your home or farmstead, or the groundwater. A few simple management principles apply in every situation.

- Do not use hazardous products within 150 feet from any well, spring, sinkhole, or stream, even if all your spills and drips will be contained.
- Return excess product, spills, or drips to their intended use. For example, consider reusing filtered waste antifreeze as water in other radiators; contain oil or grease drips and use for future lubrication needs; dispose of pesticide container rinse water by spreading on labeled field sites at the proper application rate for the pesticide.
- Contain any unusable products, waste, spills, and drips for appropriate disposal.
- Do not dump leftover products down the drain or toilet. This will most likely contaminate the groundwater as well as damage your septic system.

Read the following sections for information about the proper handling and disposal of household hazardous products found in most homes.

## Maintenance products

Maintenance products include solvent-based strippers; thinners, mineral spirits, cleaners; wood polishes/cleaners; paints and stains; products used when working on cars, tractors, or other equipment; and wood preservatives.

The best way to handle all of these products is to be sure to use up everything you buy or give the leftovers to someone who will be able to use them for their intended purpose.

If you can't do this, make use of any community hazardous waste collection service. If no service is available in your area, store the products until one does become available. Community hazardous waste collection days are events sponsored by local groups where people can bring in leftover household hazardous waste and be sure it is used by someone else or disposed of properly. Contact your county Extension office to see if a collection day is ever offered in or nearby your county.

At the least, be sure household hazardous waste that is thrown out ends up at a municipal landfill or transfer station. It is against Kentucky regulations to dispose of any liquid in a municipal landfill or transfer station. This is because liquids are more likely to leach to the groundwater. If you must dispose of these products at a municipal landfill or transfer station, follow the recommendations given below:

- **Solvent-based materials** (strippers, thinners, mineral spirits, cleaners) should be solidified by mixing with kitty litter or sawdust, or by evaporating the liquid. Leftover solid should be sent to the municipal landfill or transfer station.
- **Paints and stains** should be evaporated, with the leftover solid disposed of at the municipal landfill or transfer station.

Use the following recommendations for the disposal of vehicle maintenance products:

- **Waste motor oil** should be reused for lubrication or burned for heat in an approved residential space heater. If it can't be completely reused, take the leftover to a used oil collection site. Many service stations will now accept waste motor oil and be sure it is dealt with properly. Do not use waste oil to keep dust down or to kill weeds. Waste oil contains metal shavings and other impurities that may contaminate water or crops.

- **Used antifreeze** can be filtered and used as water in a radiator. If you do not reuse it, try to find a service station that will accept and properly dispose of or use it.
- **Lead acid batteries** should be taken to the store where they were bought. Battery retailers are required by law to accept used batteries.
- Use up **old fuels** (leftover quantity stored for several months) whenever possible. Dilute one part old fuel with five parts new fuel to protect your engine.
- **Drips and spills** from working on cars, tractors, and other equipment should be confined on a paved area with absorbent materials such as kitty litter or sawdust. This material can then be brought to a municipal landfill or transfer station. Keep drips and spills off the soil. If the soil is contaminated, bring it to the municipal landfill or transfer station. Be sure to avoid future soil contamination.

Maintenance on cars, tractors, and other equipment should be done at least 150 feet from any well, spring, sinkhole, or stream.

**Wood preservatives** can be pesticides, and leftovers should be treated with extreme care. Once again, try to use everything you have bought for its intended purpose, or give the leftovers to someone who will use the product for its intended purpose. If not, call the retailer where you bought the product to find out if they (or the manufacturer) will accept the leftovers. If you do throw any leftovers away, mix them with kitty litter, and be sure they end up in a municipal landfill or transfer station.

## Pesticides

This category of potentially hazardous substances includes all types of pesticides and pesticide containers, including those used for indoor plants and yard care.

Handle all categories of pesticides as directed on the label to prevent health and environmental problems. Pay particular attention to pesticides classified as "restricted use." Pesticide labels and regulations describe the proper and legal use of regulated compounds. Remember that older pesticides might not have current warning labels, and some may have even been banned since the time of purchase.

The only acceptable disposal practice for unused or unwanted (not banned) pesticide is to use the pesticide according to current label directions. If you have no use for the pesticide, give it to someone who will use it according to its current label directions. If that is not an option, contact the retailer where you bought the pesti-



cide to see if they (or the manufacturer) will accept it. Your best option is to buy only the amount of pesticide you need and avoid having leftovers.

When the EPA cancels the registration of a pesticide (pesticide is banned), it may provide a "buy-back" and disposal program for a period of time. Contact the Kentucky Division of Pesticides (502-564-7274) for more information on buyback and disposal programs. Once again, if no program is available, contact the retailer where you bought the pesticide to see if they (or the manufacturer) will accept it. If that is not an option, properly store the pesticide (see the KY•A•Syst publication *Assessing and Reducing the Risk of Groundwater Contamination from Agricultural Chemical Storage and Handling* for information about the proper storage of pesticides) until a buy-back or other banned pesticide collection service becomes available. Again, the best way to avoid these problems is to purchase only the amount of pesticide needed for one growing season.

Pesticides purchased in minibulk tanks or returnable containers may allow the return of excess chemical to the chemical dealer. For leftover pesticides that cannot be disposed of in any of these ways, store them safely until they can be properly disposed of through an organized waste pesticide program or through a community hazardous waste collection and disposal program approved to accept waste pesticide.

Empty pesticide containers are also considered pesticide waste. Pesticides come in minibulk tanks and plastic, metal, glass, and paper containers. Minibulk tanks are returned to the place of purchase when application has been completed. Some five-gallon plastic containers can be returned to the place of purchase for disposal. Empty paper containers should be bundled and taken to a municipal landfill or transfer station.

Plastic pesticide containers should be immediately triple or pressure rinsed, punctured, and recycled at a "rinse and return" program. If no "rinse and return" program is offered in your county, contact your retailer to find out if they will accept the empty containers. Contact your county Extension agent to find out if a "rinse and return" program will be offered in your county or a nearby county. If no program is available, make sure the triple- or pressure-rinsed, punctured containers end up at a municipal landfill or transfer station.

## **FARM BUSINESS WASTE**

Hazardous waste produced from the farm business may be regulated differently than waste produced from the home. This is because much higher amounts of hazardous waste can come from the farm business. At the least, farmers should follow all the recommendations

given in this publication regarding their hazardous waste disposal, but should be aware that large quantities of hazardous waste produced from the farm may be regulated more stringently than hazardous waste produced from the home. Once again, farmers should follow the recommendations given in this publication and do their best to limit the amount of hazardous waste coming from their farm. Contact the Kentucky Division of Waste Management Field Office nearest you if you have questions regarding the regulation of hazardous waste from the farm.

## **A FEW WORDS ABOUT YOUR SITE**

The way home or farmstead practices such as home wastewater treatment or pesticide handling affect the groundwater depends in part on the type of soil and bedrock that is on your property.

### **How do soils affect the potential for groundwater contamination?**

Soil characteristics are important in determining whether a contaminant breaks down to harmless compounds or leaches into groundwater. In general, the soil on your property may act as a filter that prevents contaminants from reaching the groundwater. Different soils have different abilities to "filter" contaminants. Areas with soils that let water flow through them quickly have a greater risk of groundwater contamination. This is because the soil doesn't get a long enough chance to absorb or "grip" the contaminant, and it may flow to the groundwater with leaching rainwater. On the other hand, soils that allow water to flow through slowly will do a better job of protecting the groundwater, but pose a higher risk of contaminating streams because the water will run off and may carry pollutants with it.

Sandy soils have large spaces between individual particles and therefore let water pass through quickly. Contaminants from your property can flow with this water. Because of this, sandy soils have a greater potential to pollute groundwater than clays.

Clay soils, on the other hand, have smaller spaces between individual particles and therefore water passes through slowly. Slower-moving water allows contaminants a greater chance to be absorbed by or "grip" onto the soil. Because of this, clays do a better job of protecting the groundwater. Since water moves through a clay soil slowly, there is a higher chance of runoff. This can result in surface water (stream) contamination. In other words, there is a tradeoff between groundwater and surface water protection. If your site has a clay soil, it will do a better job of protecting the groundwater, but you must also look out for surface water contamination.

In Kentucky, the type of bedrock on your property is more important than the type of soil in determining your site's ability to protect the groundwater.

### **How does the bedrock on your site affect the potential for groundwater contamination?**

Bedrock is the rock that lies underneath the soil on your property. Like the soil, different types of bedrock have different abilities to protect (or not protect) the groundwater from pollution. Knowing the bedrock which underlies your property is therefore important because it can tell you if you live in an area that is sensitive to groundwater contamination. Earlier in this publication the sensitivity of karst areas to groundwater contamination was discussed. These areas are especially sensitive to groundwater contamination because the bedrock is dissolved by water, and large conduits and caves are formed underground. These conduits and caves allow pollution to flow very quickly from the surface to the groundwater. Basically, karst areas may act like a sewer system which connects your home or farmstead to the groundwater. Look at the map at the end of this publication to see if you live in a region of the state which has a low, medium, high, or very high sensitivity of groundwater contamination. If you live in an area which has a high or very high sensitivity (karst areas), you need to be especially careful with how you manage your home or farmstead pollution sources. This means being very careful around sinkholes and water resources (wells, springs, streams, etc.). **Do not dump garbage into sinkholes, or you will contaminate the groundwater that serves as drinking water for many families.**

### **Potential effects of underground mining**

Underground coal mining done underneath or near your property may result in the subsidence, or settling, of your property. This settling may cause damage to structures as well as put groundwater at risk of being contaminated. The settling causes cracks in the land that can then allow pollution from the soil surface to enter the groundwater. The chance of subsidence occurring on your property depends on when the underground mining occurred, the depth of the mine, and what type of mining was done.

Depending on the type of underground mining done, different precautions are taken by mining companies to prevent subsidence. "Room and pillar" mining leaves pillars in the mines that support the land above when the mine is abandoned. As time passes, there is a greater risk that these pillars can degrade and result in the subsidence, or settling, of the land above. Certain types of "longwall" mines do not provide pillars. Therefore, these mines have a greater chance of resulting in subsidence. The depth of the mining also affects the chance that subsidence will occur. Deeper mines (greater than 400 feet) are less likely to cause subsidence than shallow mines (less than 200 feet). Information regarding the type and depth of underground coal mines may be obtained from the Department of Mines and Minerals at 606-254-0367 (ask for the Map Room). Be prepared to describe the location of your property in as much detail as possible (use a topographical map if possible).

## CONTACTS AND REFERENCES

### *Who to call about...*

**Enviroshopping** (shopping with the environment in mind)  
Ky. Cooperative Extension Service . . . . . 606-257-7775  
(Linda Reece Adler)

**Hazardous waste**  
Ky. Division of Waste Management . . . . . 502-564-6716  
EPA Hazardous Waste Hotline . . . . . 1-800-424-9346

**Home waste management** (recycling)  
KY Cooperative Extension Service . . . . . 606-257-7775  
(Linda Reece Adler)  
KY Division of Waste Management . . . . . 502-564-6716

**Pesticide container recycling**  
For questions about starting county-wide program  
The Agricultural Container  
Research Council . . . . . 703-836-2283  
KY Dept. of Ag., Division of Pesticides . . . . . 502-564-7274  
KY Fertilizer and Ag. Chemicals Assoc. . . . . 606-263-1679

For county-wide (bulk quantities) recycling of empty, rinsed containers  
Tri-Rinse, Inc. . . . . 314-647-8338

For general information or educational materials  
The Agricultural Container  
Research Council . . . . . 410-757-9448

### **What is KY•A•Syst?**

KY•A•Syst is a series of publications which will help you assess *and improve* how effectively your home or farmstead practices protect the groundwater. The publications ask you about your home or farmstead structures and activities. Your answers will help you see how your practices might be affecting the groundwater. Each publication then gives suggestions about things you can do to improve your home or farmstead practices to better protect the groundwater.

The topics of the program include:

- Drinking Water Well Condition
- Agricultural Chemical Storage and Handling
- Petroleum Product Storage
- Household Waste Management
- Household Wastewater Treatment
- Livestock Waste Storage
- Livestock Yards Management
- Silage Storage
- Milking Center Wastewater Treatment

Some of these topics apply only to people who have farms, and others apply to both farm-owners and non-farm owners. ***This program is a completely voluntary program: it is an assessment you can perform in the privacy of your own home. No information from the publications needs to leave your home. The goal of KY•A•Syst is to help you protect the groundwater that supplies drinking water for many families.***

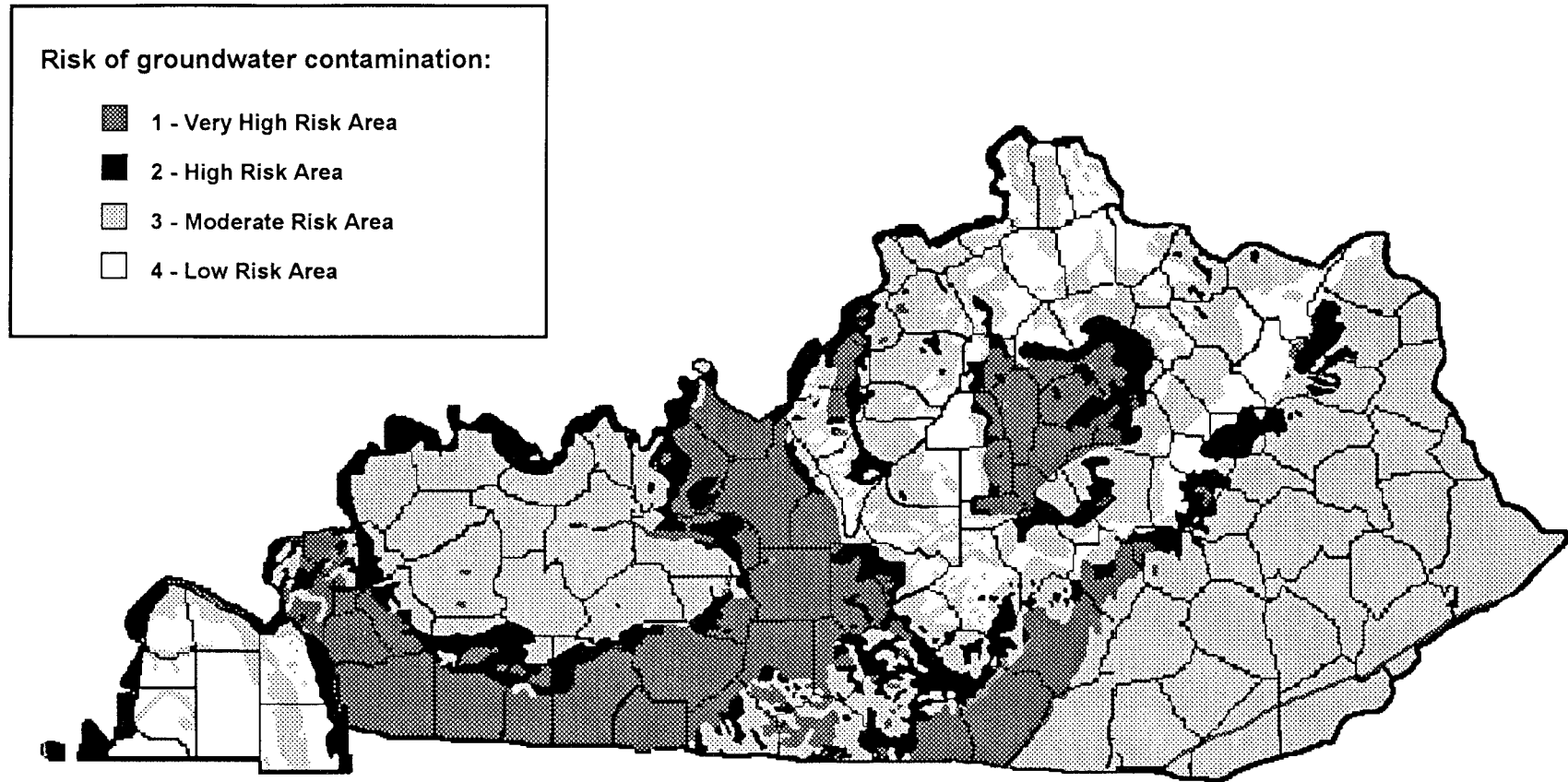
Edited and compiled by Mark Dravillas, former Extension Associate for Water Quality, and Tom Ilvento, former Associate Extension Professor in Sociology, University of Kentucky Cooperative Extension Service. Based on materials from the National Farm•A•Syst Program, University of Wisconsin (author: Elaine Andrews, University of Wisconsin, Madison). Special thanks to the Kentucky Cabinet for Natural Resources and Environmental Protection, Division of Waste Management, for technical review and comments.

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KY•A•Syst publications can be obtained at your county Cooperative Extension Service office. For additional information on the KY•A•Syst program, contact Marla Barnett at (606) 257-2735 or Dr. Curtis W. Absher at (606) 257-1846.

# Groundwater Sensitivity Map



Reproduced from a map created by Division of Water - Groundwater Branch : Frankfort, Ky.

This map shows the potential for groundwater contamination in the different areas of Kentucky. Find the county you live in to determine how sensitive your region is to groundwater contamination.