Clemson University
Department of Pesticide Regulation

Keeping Your Ground Water Safe from Pesticides

A Guide for Farmers and Pesticide Applicators

Department of

Pesticide Regulation

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Bulletin 8

Is our ground water safe from pesticides? A statewide groundwater study by Clemson University's Department of Pesticide Regulation (DPR) says yes—South Carolina's water is safe to drink. Detections of pesticides in South Carolina wells are infrequent and usually below health advisory levels in concentration. Highlights of the study are on page 2.

What Determines if a Pesticide is Likely to Reach Ground Water?

The factors that control whether a pesticide will reach ground water vary greatly depending on the location, overall climate, current temperature, weather conditions, and soil properties at the application site. For example, properties such as soil type and the pesticide's solubility in water can determine if the pesticide will run off, bind to the soil, or soak into the ground during a rainfall event after application. Each property owner is responsible for evaluating the conditions on his or her property to determine the best pesticide choice. If you are concerned that a pesticide may leach into your ground water, you can contact your local Cooperative Extension Office, the pesticide manufacturer or the Department of Pesticide Regulation for further information on pesticide use and water quality issues.

How Can Pesticide Contamination be Prevented?

To protect your well water, carefully consider your choice of pesticides, mixing/loading sites and application practices, and the timing of your applications. Scout fields and crop areas frequently to determine the best time to apply pesticides to control a given pest, and time pesticide applications to the life cycle of the pest for more effective control. This will help reduce the number of applications needed to product a crop, and it can also save the property owner money. When possible, choose pesticides which are less likely to cause groundwater contamination. The pesticide label often gives warnings about the product's potential to leach to ground water.

Pesticide and fertilizer spills are most likely to occur at mixing/loading sites and in storage areas. This type of contamination is very serious, because concentrated pesticide or fertilizer products can quickly soak into the soil and begin downward movement to the ground water. Pesticide labels provide information on proper handling, storage and disposal of pesticides. Storage and mixing activities for agricultural chemicals should be kept a minimum of 100 feet from wells and water sources. Water hoses should have check valves or other back-flow protection devices between the mixing site and the well. Check valves are an inexpensive way to prevent pesticides from back-siphoning through supply hoses into wells.

By following these sound practices for storing, handling and mixing pesticides, you can help prevent direct pesticide contamination of your property's water and soil.

Advances in chemical detection technology have raised questions about the presence of agricultural chemicals in ground water. How safe is our state's well water in relation to agricultural chemicals?

To find out, the Department of Pesticide Regulation conducted a statewide well water study. Water samples were collected and tested from over 2600 of the state's rural home and community wells to determine the extent of pesticide and nitrate contamination in well water. These well studies represent the most extensive evaluation of agricultural chemicals in ground water ever undertaken in South Carolina.

Why Sample for Pesticides and Nitrates?

Every state in the nation has been mandated by the Environmental Protection Agency (EPA) to develop groundwater protection and monitoring programs for pesticides and agricultural chemicals. The Department of Pesticide Regulation at Clemson University is South Carolina's lead agency for enforcing the laws and regulations that govern the registration and use of pesticides. DPR began its groundwater sampling program in 1991 as the first phase in developing a groundwater protection plan for pesticides. The goal of the plan is to determine if pesticide and nitrate contamination of ground water exists in South Carolina, and if it does, to take steps to prevent further contamination. To achieve this goal, our department collects approximately 75 to 80 samples each year.

The South Carolina Survey of Pesticides in Drinking Water

Spanning over two decades, the South Carolina Survey of Pesticides in Drinking Water has obtained information about each tested well's condition and characteristics as well as nearby use of pesticides and fertilizers. Water from golf courses, nurseries, farms, and rural domestic wells was tested. In most cases, these tests can detect the presence of pesticides at many times *lower* than the lifetime safe consumption levels determined by the Environmental Protection Agency (EPA). From this study, DPR estimates that only about 3 percent of wells tested contain traces of pesticides. In addition, about 63 percent of South Carolina's rural domestic wells have measurable traces of nitrates.

Most importantly, our department estimates that less than one percent of all wells tested in the state contain pesticide levels exceeding the EPA standards for safe drinking water. For nitrate, about 3 percent of the wells tested have nitrate levels that might pose a risk to human health.

As part of the study, DPR established Preventative Action Levels (PALs) for nitrate and the 22 pesticides tested as part of the groundwater program. PALs are contamination levels at which DPR has concluded that the well owner or responsible parties should modify their fertilizer or pesticide use practices to ensure that the chemical concentration does not exceed the EPA Maximum Contaminate Level (MCL). The MCL is the chemical concentration level at which water is considered unsafe for long term human consumption. For pesticides and nitrates, PALs are established at 50 percent of the MCL or at the laboratory detection limit for the pesticide (if 50 percent of the MCL is lower than the laboratory's detection limit).

The result of this ongoing study has been the establishment of a statewide database for pesticide concentrations in ground water. From this, we are able to identify pesticides that may leach into ground water during normal use.

How Vulnerable is YOUR Ground Water?

Take this quiz to help determine if your ground water is at risk for contamination by agricultural chemicals.

1. Are fertilizers and pesticides stored less than 100 feet from a well?

Yes___No___

2. Are septic tanks, animal feedlots, barns, stables, and tile fields less than 50 feet away from any well?

Yes___No___

3. Is there a hand-dug well or a well without a sealed and grouted casing within 100 feet of agricultural fields or pesticide mixing/loading areas?

Yes___No___

4. Does runoff water stand or pool around your well?

Yes___No___

5. Are fill pipes and hoses kept below the fluid level in fertilizer and pesticide tanks during mixing?

Yes___No___

6. Are pesticides or fertilizer applied to shallow/thin soil over bedrock?

Yes___No___

7. Do you use chemigation without an interlock between the water pump and the pesticide/fertilizer supply?

Yes___No___

8. Do you rinse fertilizer or pesticide tanks, containers, or application equipment within 50 feet of a well?

Yes___No___

9. Do you dispose of unused pesticides or chemicals by pouring them into your septic system?

Yes___No___

10. Do you use chemigation to apply fertilizer or pesticide without check valves to prevent back siphoning?

Yes___No___

Check your answers on page 4!

11. Are nitrate fertilizers applied at levels higher than the Cooperative Extension Service's recommended guidelines for your soil and crop demands?

Yes___No___

12. Do you own a well that does not have a concrete pad poured around the well casing?

Yes___No___

13. Are used pesticide containers allowed to pile up at mixing/loading sites?

Yes___No___

14. Does your well's casing stick up less than 12 inches above the ground surface?

Yes___No___

15. Is nitrate being applied to your crops without having the soil tested?

Yes___No___

16. Are terraces, contour farming, or other means being used to reduce runoff and soil erosion from treated fields?

Yes___No___

17. Do you calibrate pesticide application equipment to ensure that the proper amount of chemical is delivered to the target area?

Yes___No___

18. Do you leave pesticide- and fertilizer-free zones around ponds, lakes, and streams to help prevent contamination by runoff and soil erosion?

Yes___No___

19. Are cover crops planted between crop rotations and during fall months to recover nitrogen from fertilizers in unused fields?

Yes___No___

20. Are applications of pesticides timed to correspond to the appropriate pest's life cycle?

Yes___No___

Protecting Ground Water Now for Our Future

Traditionally, farmers and other pesticide applicators have been good stewards of our nation's water resources. However, pollutant discharges from point sources (those coming from pipes or spills) and non-point sources (such as pesticide leaching and runoff from agricultural fields) have put our water supply at risk in some areas. It is imperative that we preserve this resource so that future generations will have a clean source of drinking water. With much of the rural population in South Carolina dependent on well water for drinking water, ground water is a precious natural resource that cannot be taken for granted.

Test Results for "How Vulnerable is YOUR Ground Water?

- For every "yes" answer to questions 1—10, give yourself 3 points.
- For every "yes" answer to questions 11—15, give yourself 1 point.
- For every "no" answer to questions 16—20, give yourself 1 point.

0 Points: You are taking good precautions to prevent the contamination of your water supplies.

0—4 Points: Some pesticide and fertilizer practices need to be revised. Even with a low score, the danger of contaminating your water supplies still exists.

5—12 Points: Several minor or major practices need to be revised. Your property's groundwater resources may be in danger.

Greater than 12 Points: Your property's ground water is in danger of becoming contaminated by pesticides or fertilizer from improper use practices or unsafe well conditions. These conditions need to be corrected to protect your property's water resources and the health of people who live and work in the area.

Where Can I Get More Information?

The Clemson University Department of Pesticide Regulation and the Cooperative Extension Service have produced a series of handouts on wellhead protection, chemigation, disposal, and handling of pesticides and groundwater protection practices. Contact your county's Cooperative Extension office or call DPR at 864.646.2150 for more information.

For information on the Groundwater Protection Program at the Clemson University Department of Pesticide Regulation, contact Jerry Moore, Hydrogeologist for DPR.

864.646.2150

As part of Regulatory and Public Service Programs at Clemson University, the Department of Pesticide Regulation has been serving the State of South Carolina for over a century. We license pesticide dealers, private and commercial applicators, and pest-control businesses. We register pesticide products for use in the State and perform quality assurance analyses of pesticide formulations. DPR protects farm workers from pesticides by administering the Federal Worker Protection Standard in South Carolina.

The Department of Pesticide Regulation administers the State Groundwater Protection Plan for Pesticides, the Pesticide Container Recycling Program, and the Integrated Pest Management in Schools Initiative. The Federal regulations that protect endangered species from pesticides have also been assigned to the DPR.

We are the enforcement and investigative authority in the State for pesticide use, alleged pesticide misuse, substandard termite treatments, and the Wood Infestation Report required in most real estate transactions.