GEORGIA
FARM *A*SYST/HOME *A*SYST

FARM ASSESSMENT SYSTEM

IMPROVING DRINKING WATER FOR THE RURAL RESIDENT

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PRE-ASSESSMENT:

Why Should I Be Concerned?

About 95 percent of Georgia's rural residents depend on *ground water* to supply their drinking water and home needs. Wells are designed to provide clean water. If improperly constructed and maintained, however, they can allow bacteria, nitrates, *pesticides*, or petroleum products to contaminate *ground water*. These contaminates can put family health at risk.

Pesticides, fertilizers and water play an important role in maintaining a successful landscape. *Pesticides* control undesireable weeds, insects, diseases and rodents; fertilizers increase the fertility of the soil to enhance the growth of the plants. Water is essential for the very life of the plants. However, if *pesticides* and fertilizers are not used properly there is potential for ground and surface water to be contaminated. Malfunctioning *septic tanks* can also cause substantial risk to drinking water. Preventing contamination of your well is very important. Once the *ground water* supplying your well is contaminated, it is very difficult and costly to clean. The only options may be to treat the water, drill a new well or obtain water form another source. A contaminated well can also affect your neighbor's wells and pose a health threat to your family and neighbors.

Stormwater is the water from the rain runoff that does not soak into the ground. If flows from rooftops, over paved areas and bare soil, and through sloped lawns. As it flows, this runoff collects and transports soil, animal waste, salt, *pesticides*, fertilizer, oil and grease, leaves, litter, and other potential pollutants. Stormwater can have a major impact on drinking water that comes from surface water, such as a river or lake. It is carried by water runoff from every street, parking lot, sidewalk, driveway, yard and farm.

How Does This Assessment Help Protect Drinking Water and the Environment?

- This assessment allows you to evaluate the environmental soundness of your well.
- You are encouraged to work through the entire document and use all eight areas when completing the assessment.
- The assessment asks a series of questions about your well condition, location and landscape management practices.
- The assessment evaluation uses your answers (rankings) to identify practices or structures that are at risk and should be modified to prevent pollution.
- No information from this assessment needs to leave your home.
- The well condition facts provide an overview of sound environmental practices that may be used to prevent pollution caused directly by well condition or location.
- You are encouraged to develop an action plan based on your needs as identified by the assessment.
- Farm *A*Syst/Home *A*Syst is a voluntary program.
- The Assessment should be conducted by you for your use.

** Words found in italics are defined in the glossary.*

ASSESSMENT:

Assessing Risk to Well and Drinking Water

For each category listed on the left, read across to the right and circle the statement that best describes conditions on your home and/or property. If a category does not apply, for example, it asks about the separation distance of animal enclosures and you don't have any pets, then skip the distance question. Once you have decided on the most appropriate answer, look above that description to find your rank number (4,3,2 or 1) and enter that number in the "RANK" column. The entire assessment should take less than 30 minutes. A glossary is on page 13 to clarify words found in italics throughout this assessment.

ASSESSING RISK TO WELL AND DRINKING WATER					
	Low Risk (rank 4)	**Low-Mod Risk (rank 3)**	**Mod-High Risk (rank 2)**	**High Risk (rank 1)**	**Rank**
GROUND WATER/WELLHEAD PROTECTION					
WELL LOCATION					
Position of drinking water well in relation to potential pollution sources	Upslope from all pollution sources. No surface water runoff enters well. Surface water diverted from well.	Upslope from most pollution sources. No surface water runoff enters well.	Downslope from most pollution sources. Some surface water runoff may enter well.	Well is in low area where surface water runoff from lawn, gardens, animal enclosures or driveways collect.	
Separation distances between well contamination sources	Meets or exceeds all state minimum required separation distances.	Meets most minimum separation distances.	Meets minimum separation distances only for sources required to be at least 100 feet from well.	***Doesn't meet all minimum separation distances for sources required to be at least 100 feet from well.*** **	
CONDITION					
Condition of casing and well cap (seal)	No holes or cracks visible. Well cap (seal) tightly secured. Screened vent.	No defects visible. Well cap vented but not screened.	No holes or cracks visible. Well cap (seal) loose.	Holes or cracks visible. Well cap (seal) loose or missing. Can hear falling water in well.	
Casing depth	Cased more than 50 feet below water level in well.	Cased 31-50 feet below water level in well.	Cased 10-30 feet below water level in well.	Cased less than 10 feet below water level in well or no casing.	
Casing height above land surface	More than 12 inches above grade.	8-12 inches above grade.	At grade or up to 8 inches above.	Below grade or in pit or basesment.	
Concrete curbing	Four inch thick concrete curbing extending at least 2 feet in all directions from well casing and sloping away from casing.	Four inch thick concrete curbing extending at least 2 feet in all directions. Curbing may contain cracks but no more than 1/2 inch wide.	Four inch thick conrete curbing extending at lease 2 feet in all directions. Curbing may contain cracks wider than 1/2 inch and/or water channeling under curbing.	No concrete curbing around well casing.	

***These conditions are in violation of State and/or Federal law.**

ASSESSING RISK TO WELL AND DRINKING WATER					
	Low Risk (rank 4)	**Low-Mod Risk (rank 3)**	**Mod-High Risk (rank 2)**	**High Risk (rank 1)**	**Rank**
Well age	Less than 20 years old.	21-50 years old.	51-70 years old.	More than 70 years old.	
Well type	_____	Drilled.	Driven-point (sand point) or bored.	Dug well.	
WELL MANAGEMENT					
Unused well	No unused, unsealed wells within 500 feet.	Unused wells within 500 feet capped and protected.	Unused well 200-500 feet away. Not capped or protected.	Unused well within 200 feet. Not capped or protected.	
Water testing	Consistent satisfactory quality. Bacteria, nitrate, and other tests meet standards.	Bacteria, nitrate, and other tests occasionally below standards.	Bacteria, nitrate, and other tests rarely meet standards.	No water tests done. Water discolored after rainstorms. Noticeable changes in color, clarity, odor, or taste.	
Maintenance	Well is inspected regularly. Leaks are immediately repaired.	Well is inspected occasionally. Leaks are repaired when needed.	Well is not regularly inspected. Only large leaks are repaired.	Well or piping is leaking.	
GROUND AND SURFACE WATER					
LANDSCAPE (LAWNS AND GARDENS) MANAGEMENT					
Lawn and/or garden area where pesticides or fertilizers are used	Most of the area is down slope from the well. Surface water is diverted from the well.	Area is at the same grade as the well. Surface water is diverted from the well.	Most of the area is up slope from the well. Surface water runoff may reach the well.	Area is up slope from the well. Surface water runoff reaches the well.	
Storage/mixing of pesticides and fertilizers	Purchase pesticides and/or fertilizers as needed. No pesticides or fertilizers are stored on the property.	Pesticides and fertilizers are stored 100 feet or more from the well in a secured area.	Pesticides and fertiliziers are stored 100 feet or more from the well in an unsecured area.	Pesticides and fertilizers are stored less than 100 feet from the well in an unsecured area.	
Use of chemicals to control pests around the well (within 25')	No application of chemicals. Use nontoxic solutions to problems.	Use mostly non-toxic solutions to problems. Some careful spot use of chemicals.	Limited use of chemicals, but more than spot use.	Regular use of chemicals on large areas.	
Use and application of pesticides and fertilizers around well	Application rates are based on soil tests. Recommended amounts as indicated on the label are calculated, measured, and applied accordingly.	Application rates are based on soil tests. Amounts are extimated and applied.	No soil tests. Amounts are estimated and applied.	No soil tests. Amounts are applied at an unknown rate.	

***These conditions are in violation of State and/or Federal law.**

ASSESSING RISK TO WELL AND DRINKING WATER					
	Low Risk (rank 4)	**Low-Mod Risk (rank 3)**	**Mod-High Risk (rank 2)**	**High Risk (rank 1)**	**Rank**
Timing of pesticides and/or fertilizer application	Calculated total plant fertilizer needs. Made several applications during the growing season, according to plant requirements. Never apply pesticides or fertilizers before a rain to avoid runoff. Avoid watering the area after application unless directed on the label.	Calculated total plant fertilizer needs. Entire amount is applied in one application. Never apply pesticides or fertilizers before a rain to avoid runoff. Avoid watering the area after application unless directed on the label.	Plant fertilizer needs not determined. Entire amount is aplied in one application. NO consideration is given to the weather conditions. May water the area regardless of label directions.	Plant fertilizer needs not determined. Entire amount is randomly applied. No consideration is given to the weather conditions, water area after application regardless of label directions.	
Pesticide disposal	Pesticides are completely used and containers are properly discarded. Pesticides are mixed carefully to minimize left over pesticide mixture. Excess pesticide mixture is applied according to label directions. Rinsate left from cleaining pesticide application equipment is applied to a site on label.	Excess pesticide and containers are properly discarded. Left over pesticide mixtures are applied according to the label. Rinsate from cleaning pesticide application equipment is applied over a large area more than 100 feet from the well.	Excess pesticide and containers are properly discarded. Left over pesticide mixtures and rinsate from cleaning pesticide application equipment is poured onto the ground more than 100 feet from well.	Excess pesticides are poured down the drain or into the toilet. Pesticide containers are buried or otherwise improperly discarded. Left over pesticide mixtures and rinsates poured on ground near well.	
Irrigation	Application of water based on plant needs and soil moisture levels. Use few heavy applications rather than frequent light applications. Never irrigate to the point of runoff.	Application based on plant's needs or when soil appears dry.	Applications based on convenience or when time permits.	Use regularly scheduled irrigations not based on needs or frequently over irrigate.	
SEPTIC SYSTEM					
Pumping out septic tank	Check scum and sludge levels each year or pump out every 3-5 years.	Check scum and sludge levels every 2 years or pump out every 4 to 6 years.	More than 6 years between pumpouts.	Don't know if ever pumped out or don't remember the year it was done.	
Septic system location in relation to well	System is down gradient more than 75 feet from well.	Tank at grade or up gradient more than 75 feet from well.	Tank down gradient less than 75 feet from well.	Tank at grade or upgradient less than 75 feet from well.	

*****These conditions are in violation of State and/or Federal law.***

ASSESSING RISK TO WELL AND DRINKING WATER					
	Low Risk (rank 4)	**Low-Mod Risk (rank 3)**	**Mod-High Risk (rank 2)**	**High Risk (rank 1)**	**Rank**
Septic system age	Less than 10 years old.	10-21 years old.	21-30 years old.	Over 30 years old.	
Surfacing of sewage	Never notice.	Notice 1-2 times yearly.	Notice more than 2 times yearly.	Green grass, septic smell, and wet soil conditions exist around absorption field nearly all the time.	
OTHER AREAS OF CONCERN					
Disposal of used motor oil	Oil is stored in sealed approved container in a secure building until taken to a collection or recycling center.	Oil is stored in non-approved container in an unsecured building and periodically taken to a collection or recycling center.	*Oil is disposed ofwith household waste through a collection service or at a county dump.***	*Oil is drained directly on the ground.***	
Animal Waste	Animal waste is flushed down the toilet or buried away from wells and surface water.	Animal waste is left to decompose on grass and is scattered over a wide area.	Animal waste is left to decompose on bare soil in a confined area.	Animal waste is left on paved areas or dumped down a storm drain.	

These conditions are in violation of State and/or Federal law.

Number of Areas Ranked _____
(Number of questions answered. There are a total of 24 questions.)

Ranking Total _____
(Sum of all numbers in the "RANK" column)

ASSESSMENT EVALUATION:

What Do I Do with These Rankings?

Identify Areas That Have Been Determined to be at Risk

Low risk practices (4s) are ideal and should be your goal. Low to moderate risk practices (3s) provide reasonable protection. Moderate to high risk practices (2s) provide inadequate protection in may circumstances. High risk practices (1s) are inadequate and pose a high risk for causing environmental, health, economic, or regulatory problems.

Read the Risk to Well and Drinking Water Facts Section

While reading, think how you could modify your practices to address some of your moderate and high risk areas. If you have any questions that are not addressed in the well condition facts portion of this assessment, consult the references in the back of the publication or contact your county Extension agent for more information.

RISK TO WELL AND DRINKING WATER FACTS:

WELL LOCATION

Well location is very important in avoiding drinking water contamination. A well's location is crucial whether it taps water from just below the ground surface or from several hundred feet deep. Locating a well in a safe place takes careful planning and consideration of factors such as the flow of surface water and ground water. A well downhill from animal enclosures, a leaking fuel tank, or a failing septic system is at greater risk of contamination than a well located uphill from these pollution sources.

Surface slope does not always indicate the direction a pollutant might flow once it gets into the ground. In shallow aquifers, ground water flow is often in the same direction as surface water flow. If the aquifer supplying water to your farm well is deep below the surface, its surface slope may not be an accurate indicator of ground water flow direction. Finding out about ground water movement on your farm may require special monitoring equipment (see Contacts and References).

Separation Distance

Requiring minimum separation distance from potential pollution sources encourages good well location, thus using the soil as natural protection. In sandy soils with low organic content, these separation distances may not offer adequate protection. State well codes may not mention all farm activities and structures. For example, in Georgia, the Water Well Standards Act of 1985 does not specifically acknowledge such potential pollution sources as pesticide mixing, pesticide and fertilizer application, vehicle maintenance and waste-disposal areas. For animal husbandry operations, the only specified requirement is that the well shall be not less than 100 feet from an animal or fowl enclosure. Other required setbacks are listed in Table 1.

Greater setback distances may be required based on hydrogeology and soil type. When no distances are specified, provide as much separation as possible between your well and any potential contamination source. This is especially important if your farm is on highly permeable soils or thin soil overlying limestone bedrock, or if the contamination source or activity presents high risk of contamination.

Minimum separation distances are regulated for new well installation. Existing wells are required by law only to meet separation requirements effective at the time of well construction.

Both soil and slope can make siting a well a tricky business. Keep in mind that separation distances required by the state are minimums. You may want to choose greater separation distances depending on factors at your site. This and proper well construction help provide reasonable assurance that your well will not be polluted by farm activities in the near future. Also consider contamination sources on adjacent properties.

Changing the location of your well in relation to contamination sources may protect your water supply, but not the ground water itself. Any condition likely to cause ground water contamination should be addressed, even if your well is far away from the potential source. Ground water contamination is a violation of Georgia law, even if the drinking water is not immediately affected.

Simply separating your well from a contamination source may reduce the chance of pollution, but it does not guarantee that the well will be safe. Storm water and ground water can carry bacteria, nitrates, oil products, pesticides, and other contaminates from one place to another. Wells located in the path of polluted water may be contaminated by surface water washing into an improperly sealed well. Although less likely, some wells may become contaminated through polluted recharge at great distances, depending on the depth of the aquifer and the well intake.

Table 1: Minimum Separation Distance Between Well and Potential Sources of Contamination

Separation Distances Required by Georgia Water Well Standards Act of 1985

Distance from Well	
10 feet	Sewer Line
50 feet	Septic Tank
100 feet	Septic Absorption Field
100 feet	Animal Enclosure
100 feet	Pesticide and/or Fertilizer Storage
150 feet	Cesspool or Seepage Pit

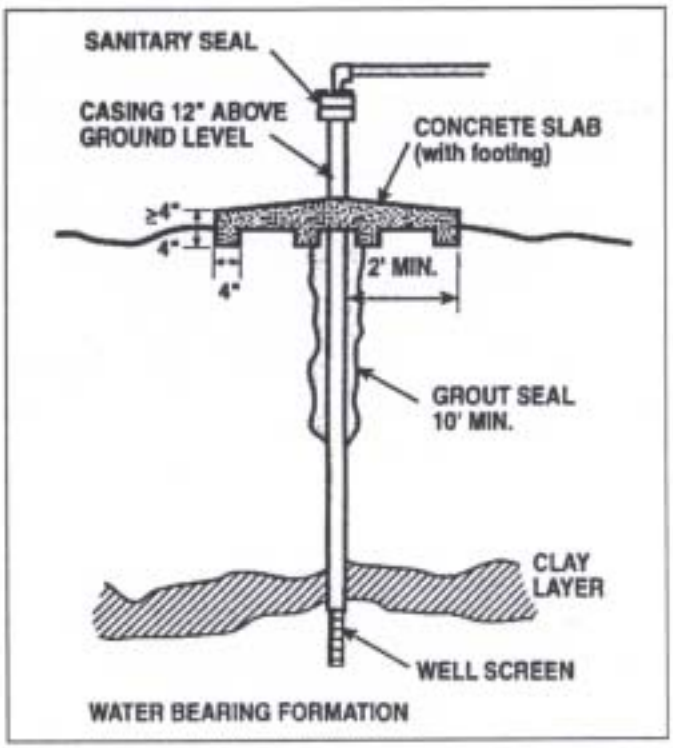
WELL CONSTRUCTION

Poor well design can allow ground water contamination by surface water reaching the water table without filtering through soil. Wells located in pits, or constructed without grout or a cap, can allow surface water to carry bacteria, nitrates, pesticides, fertilizer, or oil products into the drinking-water supply. Proper well design and construction reduce pollution risk by sealing the well from anything that might enter it from the surface. (Figure 1)

The way in which a well is constructed, even when the design is sound, affects its ability to keep out contaminates. You should check the casing and cap, casing depth and height; and well age, type and depth.

The following overview of well construction and inspection can help you understand your drinking water contamination risk ranking.

Figure 1: Typical Well Showing Proper Construction to Prevent Contamination



Casing and Well Cap

The licensed water well contractor installs a steel or plastic pipe called casing during construction to prevent collapse of the borehole. Left unsealed, the space between the casing and the sides of the hole provides a direct channel for surface water (and pollutants) to reach the water table. To seal off that channel, the licensed water well contractor fills the space with grout (i.e., cement, concrete or a special type of clay called bentonite, or a mixture of Portland cement and water, depending on the geologic materials encountered). Both grout and casing prevent pollutants from seeping into the well.

Georgia law requires that, "A well having an open annular space between the casing and bore hole shall be grouted and shall be filled with neat or sand cement or other impervious materials to prevent the entrance of pollutants or contaminates." The minimum depth of seal for individual wells is 10 feet. It is preferred, however, that the well grout extends all the way from the ground surface to the water-bearing formation.

With a light you can visually inspect your well casing for holes or cracks at the surface or down the inside of the casing. If you can move the casing around by pushing against it, you may have a problem with your well's ability to keep out contaminates. You can check the well casing by listening for water running down into the well when the pump is not running. If you hear running water, there could be a crack or hole in the casing, or the well may not be cased down to the water level. Either situation is risky and reasons not to drink the water until the situation is corrected.

To prevent contaminates from flowing into the top of the well casing, the licensed water well contractor installs a tight-fitting, tamper-resistant, vermin-proof well cap. This also prevents the entry of insects, small animals or surface water. The cap should be firmly installed and include a screened vent so that air can enter the well. Vents should face the ground, be tightly connected to the well cap or seal, and be properly screened to keep insects out.

Casing Height and Concrete Curbing

In order to prevent surface water contamination from entering the well the upper terminal of the well casing should extend at least 12 inches above ground level. All Georgia wells located in areas subject to flooding shall have a well casing that extends at least two feet above the level of the highest known flood of record.

The Georgia Water Well Standards Act of 1985 also states that "All individual and non-public wells shall be curbed at the surface by the owner with a watertight curbing of concrete at least four inches all directions from the well casing and sloping away from the casing."

Well Age

Well age is an important factor in predicting the likelihood of contamination. A well constructed more than 70 years ago is likely to be at the center of the farm; it may be shallower and is probably surrounded by many potential contamination sources. Older well pumps are more likely to leak lubricating oils, which can get into the well. Older wells are also more likely to have thinner casings, which may be corroded through or improper grouting. Even wells with modern casings that are 30 to 40 years old are subject to corrosion and perforations. If you have an older well, you may want to have it inspected by a water well specialist or a licensed water well contractor.

Well Type

- **Dug wells** - pose the highest risk of allowing drinking water supply contamination because they are shallow and often poorly protected from surface water. A dug well is a large diameter hole (usually more than 2 feet wide), which is often built by hand.

- **Bored wells** - are constructed using an earth auger, usually up to two feet in diameter. Concrete is the most common casing material. These wells are typically shallow (less than 60 feet) and thus tend to be susceptible to surface contamination. These wells pose a moderate to high risk of contamination.

- **Driven point (sand point) wells -** which pose a moderate to high risk, are constructed by driving assembled lengths of pipe into the ground. These wells are normally smaller in diameter (2 inches or less) and less than 50 feet deep. They can only be installed in areas of relatively loose soils, such as sand.

- **Drilled wells -** cover all other types of wells, including those constructed by a combination of jetting and driving. Drilled wells for farm use are commonly 4 to 8 inches in diameter and when properly constructed pose a relatively low to moderate risk of contamination.

Well Depth

Shallow wells draw from the *ground water* nearest the land surface, which may be directly affected by farm activities. Depending on how far the well *casing* extends below the *water table*, rain, surface water, and irrigation water soak into the soil and may carry pollutants with them.

Local geologic conditions determine how long it takes for well contamination to occur. In some places, this process happens quickly (i.e., in weeks, days or even hours). Areas with thin soil over limestone or sand and gravel aquifers are particularly vulnerable. Even thick sands over limestone represent a site vulnerable to contamination.

On the other hand, thick clay soils retard the movement of contaminates. These soils prevent contamination, delay the day when a well "turns bad" or change the problem to runoff. If you have a deep well (more than several hundred feet below the *water table*), the *ground water* supplying your well may have traveled a considerable distance underground over a long time, offering greater protection to the well.

MANAGING AND MAINTAINING EXISTING WELLS

Good maintenance means testing the water every year, keeping the well area clean and accessible, keeping pollutants as far away as possible, and periodically having a licensed water well contractor check the well's mechanics.

Existing wells were most likely located according to traditional practice or regulations in place at the time of construction. While these wells are still legal, you may want to consider the degree to which your well water conforms to current drinking water standards. Current standards incorporate new knowledge about *ground water* contamination and well water.

In Georgia, well repair and abandonment and new well construction requires a licensed water well construction contractor.

Water Testing

Keep an eye on water quality in existing wells by testing them annually. Although you cannot have your water tested for every conceivable pollutant, some basic tests can indicate whether other problems exist.

At a minimum, test your water annually for bacteria and nitrate. Testing once for corrosivity is also important. A good initial set of tests for a private well also includes hardness, pH, chloride, and other minerals such as iron and manganese.

The results may not include contaminates that could be near your farm, such as commonly used *pesticides* in your area, Test for contaminates that are most likely at your farm. Test for lead if you have lead pipes or soldered copper joints. If possible, replace lead pipes. Test for *volatile organic chemicals (VOC's)* if there has been a nearby spill or storage of oil, petroleum or solvent.

Test for *pesticides* if you feel your property may have had an excessive amount applied during landscaping or landscaping maintenance.

While testing for pesticides can be very expensive (often $80-$100 per compound analyzed) the expense may be justified if:

- A pesticide spill has occurred near the well.
- Your well is shallow, has less than 15 feet of *casing* below the *water table*, or is located in sandy soil and downslope from landscaped areas where *pesticides* are used.
- Get further advise on appropriate tests to run from your county Extension office or health department.

You should test your water more frequently if:

- There are unexplained illnesses in the family.
- There are pregnancies in the family.
- There are noticeable changes in livestock or poultry performance.
- Your neighbors find a particular contaminate in their water.
- You note a change in water taste, odor, color or clarity.

You can have your water tested by either public or private laboratories. Contact you local county Extension office or health department for water testing information. Follow the lab's instructions for water sampling to assure accuracy of results. Use only the container provided and return samples promptly. Bacteria sample bottles are sterile and must be returned within specified time limits.

Because many materials, including bacteria and nitrate-nitrogen, are naturally present in minor amounts in *ground water* or can vary seasonally, you may want to contact a specialist for help in interpreting test results.

Bacteria and nitrates are two important indicators of *ground water* contamination. At excessive levels, they can cause health problems themselves and also may suggest problems with the well's location or construction. Hardness and pH indicate how corrosive the water may be to our plumbing system.

The chloride level may also indicate other problems. In Georgia, chloride in wells may indicate saltwater intrusion into the *aquifer*.

Keep in mind that activities off your farm can affect your *ground water*. Chemical spills, changes in land use, and the presence of landfills can increase the chance of pollutants getting into your water. If your water has a high nitrate or bacteria level, you may want to talk with a specialist about the need for additional testing.

It is also important to record test results and note changes in water quality over time. In addition to water analysis test results, you should keep records of a few other things to determine what is happening with your water system. These records would include well construction details, and dates and results of well and pump maintenance.

WELL MAINTENANCE

Well equipment doesn't last forever. Every 10 to 20 years, your well may require mechanical

attention from a licensed well contractor. Follow these additional maintenance practices:

- Do not use gasoline or lawn chemicals near your well.
- Do not mix *pesticides*, rinse sprayer equipment, or discard empty pesticide containers near your well.
- Protect wells from household wastewater treatment systems that may back up.
- Never store fuel, *pesticides*, empty containers, fertilizers or other potential pollutants near your well.

New Wells

New wells are expensive, but they are a good investment for the future. Getting the most from such an investment means locating the well away from contamination sources and maintaining the quality of the well.

Some simple principles:

- Follow the state-recommended minimum separation distance from potential contamination sources. **See Table 1.**
- Locate your well on ground higher than surrounding pollution sources such as animal enclosures. **See Table 1.**
- Where practical, locate the well as far as possible from pollution sources, but no closer than the minimum separation distances listed above.
- If necessary, build up soil around the well so that all surface water drains away from it and install concrete curbing.
- Avoid areas that are prone to flooding, or extend well *casing* at least two feet above the highest water level on record.

Shallow *ground water* flow generally follows surface drainage patterns. Unless you know the exact direction of *ground water* flow on your property, locate the well so that pollution sources are between the well and the nearest creek, river or lake. Groundwater generally flows from upland areas and discharges into a surface water body. In all cases, locate your well on ground higher than surrounding pollution sources such as fuel tanks, livestock yards or pesticide using areas.

- Make the well accessible for pump repair, cleaning, testing and inspection.
- Hire a licensed water well contractor. Make sure the contractor disinfects the well with chlorine after construction, testing the water for bacteria after drilling and gives you detailed information about the well's depth and construction.

Unused Wells

The "Water Well Standards Act of 1985" requires that all abandoned wells in the state must be "filled, sealed and plugged." In order to legally seal and abandoned well, the work must be performed by a licensed water well contractor.

GROUND AND SURFACE WATER

Some of the things we do outside our homes can have an affect on both ground and surface water. *Ground water* is water found underground that us usually pumped to the surface for use. To contaminate *ground water* there must be a link between the contaminate location and the *aquifer* where the water is being drawn from.

Surface water is the water that we can see above ground. This includes lakes, rivers and streams. These water bodies are not protected by the soil between the *aquifer* and the surface. Contaminates occurs as either point source or non-point source contamination.

A point source is a contaminate that is being released directly into the body of water. Non-point pollution usually occurs when contaminates build up and are carried to water bodies though stormwater runoff. Many of the things homeowners do can contribute to stormwater pollution. Because of this we have included additional information taken from the nation publication "*Home *A*Syst, and Environmental Risk-Assessment Guide for the Homeowner.*"

STORMWATER

Stormwater is water from rain that does not soak into the ground. It flows from rooftops, over paved ar-

eas and bare soil, and through sloped lawns. As it flows, this runoff collects and transports soil, animal waste, salt, *pesticides*, fertilizer, oil and grease, leaves, litter, and other potential pollutants. You don't need a heavy rainstorm to send pollutants rushing toward streams, wetlands, lakes, and oceans. A garden hose alone can supply enough water.

Even if your house is not on a waterfront, storm drains and sewers efficiently convey runoff from your neighborhood to the nearest body of water. Contrary to popular belief, storm sewers do not carry stormwater to wastewater treatment plants.

Polluted stormwater degrades our lakes, rivers, wetlands, and ocean bays. Soil clouds water and degrades habitat for fish and water plants. Nutrients such as phosphorus promote the growth of algae, which crowds out other aquatic life. Toxic chemicals such as antifreeze and oil from leaking cars, carelessly applied *pesticides*, and zinc from galvanized metal gutters and downspouts threaten the health of fish and other aquatic life. Bacteria and parasites from animal waste can make nearby lakes and bays unsafe for wading and swimming after storms.

As many people have discovered, stormwater can be a problem closer to home. It can flow into basements and cause damage that is difficult and costly to clean up. Stormwater can also flow down a poorly sealed well shaft and contaminate drinking water. In areas with very porous soils or geology, pollutants in runoff may reach groundwater.

PESTICIDE AND FERTILIZER STORAGE PRACTICES

If stored safely in a secure location, *pesticides* and fertilizers pose little risk to ground water. Common sense suggests keeping them dry and out of the way of activities that might knock over a jug or rip open a bag. Short-term storage poses a lesser risk than year-round storage, but **any** storage, regardless of length of time stored, poses a risk to *ground water*.

If a spill does occur an impermeable (waterproof floor, such as concrete, should virtually eliminate any seepage of chemicals into the ground. Secondary containment, such as a large plastic pail or container provides an impermeable area around the product. This will minimize the amount of pesticide or fertilizer seeping into the ground.

When storing *pesticides* and fertilizers keep the following in mind.

- The risk of pesticide contamination of *ground water* is influenced by properties of both the pesticide chemical and soil type.
- Never store *pesticides* or fertilizers in your well house.
- Never store *pesticides* or fertilizers under a sink.
- In the event of a fire, contaminated surface water should drain to a confined area.
- A locked storage cabinet or building provides security. Preventing unauthorized use of *pesticides* or fertilizers reduces the chance of accidental spills or theft. Provide signs or labels identifying the cabinet or building as storage areas.
- Keep *pesticides* separate to prevent cross-contamination. Keep herbicides, insecticides and fungicides on separate shelves or in different areas.

The cheapest alternative you may have is to cut back on the amounts and types of *pesticides* stored. If that's not practical, consider how you can protect the *pesticides* you keep in storage. Sound containers are your first defense against a spill or leak and can save you money by preventing pesticide losses. If a container is accidentally ripped open or knocked off a shelf, confine the spill to the immediate area and clean up promptly.

Anticipate Emergencies

You can reduce the degree of damage by anticipating emergencies. Fires in a storage area present a special hazard to people and the environment. If containers are damaged, the stored chemicals may be carried away by water and spread over a large area.

Label storage areas to alert firefighters to the presence of *pesticides* and other products stored in the structure. It's a good idea to keep a separate list of the chemicals and amounts stored. Keep a copy of the list away from the storage area.

MIXING PRACTICES

Small quantities spilled regularly in the same place can go unnoticed, but the chemicals can build up in the soil and eventually reach *ground water*. By mixing and loading on an impermeable surface, such as sealed concrete, you can contain and reuse most spilled *pesticides*.

- Avoid mixing *pesticides* and/or fertilizers near your well.
- Avoid mixing *pesticides* and/or fertilizers on gravel driveways or other surfaces that allow spills to sink quickly through the soil. A clay surface is better than sand.
- When mixing liquids spray the last rinsate on the lawn.

Spill Cleanup Procedures

For dry spills, promptly sweep up and reuse the pesticide as it was intended. Dry spills are usually very easy to clean.

For liquid spill, first stop the leakage, and then recover as much of the spill as possible and reuse as it was intended. Spills on impermeable surfaces may be cleaned up with an absorbent material such as kitty litter or sawdust. This material should then be spread over a site specified on the pesticide label.

CONTAINER DISPOSAL PRACTICES

Unwashed and improperly stored containers can lead to ground and surface water contamination by allowing chemical residues to leak onto the ground or runoff into streams and rivers.

Some basic guidelines can help avoid similar problems:

- Pressure-rinse or triple-rinse plastic containers immediately after use, since residue can be difficult to remove after it dries. Pour rinse water into the spray tank. Puncture containers and store them in a covered area until you can take them to a permitted landfill or to be recycled.
- Recycle plastic and metal containers whenever possible.
- Shake out bags, bind or wrap them to minimize dust, and take them to a permitted landfill.
- Do not bury or burn pesticide containers or bags.

Proper disposal practices are essential to avoid risking contamination that could affect the water supplies and health of the people and pest that live in your home.

Other Management Practices

Reducing pesticide wastes make financial as well as environmental sense, but it means more than just reducing spills. It also means not buying more than you need to apply, keeping records of what you have on hand, and using older products first.

- Buying only what you need makes long-term storage unnecessary. In addition, you avoid cold weather problems which can make some *pesticides* useless.
- Record keeping may seem to be a task unrelated to *ground water* contamination, but knowing what you've used in the past and what you have on hand allows you to make better purchasing decisions.
- Records should include information such as the manufacturer's name and address, chemical types and handling precautions. This information can be important if you must respond quickly to an accident.
- Using older products first keeps your inventory current and effective. Before using chemicals that have been stored for a few years, check with your county Extension agent about possible restrictions on their use.

SEPTIC SYSTEM

A properly installed and maintained system for treating and disposing of household wastewater minimizes the impact of that system on *ground water* and surface water. State and local codes specify how wastewater systems must be designed, installed and maintained. For example, Chapter 290-5-26 of the Rules of the Georgia Department of Human Resources, Division of Public Health sets fourth the rules for siting, design, installation, and management of onsite wastewater treatment and disposal (septic) systems. At a minimum, follow the code,

but also consider whether the minimum requirement is sufficient for your site.

For detailed information on home septic systems consult the Georgia Farm *A*Syst/Home *A*Syst, Improving Household Waste Treatment assessment.

Motor Oil

Oil stains on your driveway and outdoor spills of antifreeze, brake fluid, and other automotive fluids are easily carried away by a rainstorm. An oily sheen on runoff from your driveway is a sure sign that you need to be more careful. Pans, carpet scrapes, and matting can catch drips. Routine maintenance can prevent your car from leaking and help identify potential leads. If you change your own oil, be careful to avoid spills and collect waste oil for recycling. Oils car parts and fluid containers should be stored where rain and runoff cannot reach them.

To dispose of used motor oil that contains hazardous petroleum products, drain the oil through a funnel into a clean container that can be tightly sealed. Oil filters must be punctured and/or crushed and hot drained. Some auto service and repair stations or oil change facilities will accept used motor oil and oil filters for recycling.

For a complete list of Georgia businesses that collect used motor oil or a list of Georgia companies that process and recycle used motor oil, contact the Pollution Prevention Assistance, Department of Natural Resources at 800-685-2433.

Animal Waste

Georgia Law requires that all animal enclosures be at least 100 feet from a well. The same distance is also recommended for surface water.

Droppings from dogs and cats and from other commonly kept animals like exotic birds, rabbits, goats, and chickens can be troublesome in two ways. First, pet wastes contain nutrients that can promote the growth of algae if they enter streams and lakes. Second, animal droppings are a source of disease. The risk of contamination increases if pet wastes are allowed to accumulate in animal pen areas or left on sidewalks, streets, or driveways where runoff can carry them to storm sewers. Droppings that are not mixed with litter or other materials should be flushed down the toilet or buried or wrapped and put in the garbage for disposal.

NOTES:

GLOSSARY:

Risk to Well and Drinking Water

Air gap: An air space (open space) between the hose or faucet and water level, representing one way to prevent backflow of liquids into a well or water supply.

Aquifer: A subsurface zone or strata of sand, gravel, or fractured rock that is used as a water source.

Casing: Steel or plastic pipe installed while drilling a well, to prevent collapse of the well bore hole and entrance of contaminants, and to allow placement of a pump or pumping equipment.

Cross connection: A link or channel between pipes, wells, fixtures, or tanks carrying contaminated water and those carrying potable (safe for drinking) water. Contaminated water, if at higher pressure, enters the potable water system.

Drain field: An absorption field system for the final treatment of the *septic tank effluent* and return of the treated wastewater to the hydrologic cycle. The drain field system includes the lateral lines or sewage disposal line, the perforated pipes, the rock or other aggregate material, and the drain field trenches or bed.

Effluent: Liquid discharged from a *septic tank* or other treatment tank.

Ground Water: Subsurface water in a zone of saturation.

Grout: Slurry of cement or clay used to seal the space between the outside of the well casing and the borehole, or to seal and abandoned well.

Pesticides: Any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any insects, rodents, nematodes, fungi, or weeds.

Scum: The accumulated floating material, including grease and other light solids, in a septic tank.

Septic tank: A single tank or series of tanks in which two processes take place: settling of the solids and the digestion of some of the accumulated solids.

Sewage: Any liquid wastes containing animal or vegetable matter in suspension or solution, including liquid wastes from toilets, kitchen sinks, lavatories, washing machines, and other plumbing fixtures.

Sludge: The settled solids that have separated from the liquid in a septic tank.

Water Table: The upper level of *ground water* in a zone of saturation. Fluctuates with climatic conditions on land surface, and with *aquifer* discharge and recharge rates.

Well cap (seal): A device used to cover the top of a well *casing* pipe.

Volatile organic compounds (VOC): Chemical release of vapors that escape into the air from certain activities such as burning fuels or opening paint cans. These chemicals contribute to air quality problems and respiratory related illnesses.

ACTION PLAN:

An action plan is a tool that allows you to take the needed steps to modify the areas of concern as identified by your assessment. The outline provided below is a basic guide for developing an action plan. Feel free to expand your plan if you feel the need for detail or additional areas not included. Consult the list of references on the next page if additional assistance is needed to develop a detailed action plan.

Area of Concern	Risk Ranking	Planned Action to Address Concern	Time Frame	Estimated Cost

REFERENCES:

CONTACTS AND REFERENCES			
Organization	**Responsibilities**	**Address**	**Phone Number**
Geologic Survey, Environmental Protection Division	Regulations concerning water well drinking standards.	Georgia DNR 19 Martin Luther King Jr. Dr., Suite 400 Atlanta, GA 30334	404-656-3214
Water Resource Management, Environmental Protection Division	Questions regarding public drinking water.	Georgia DNR 205 Butler St, SE, Floyd Towers East, Suite 1152 Atlanta, GA 30334	404-651-5168
Biological & Agricultural Engineering Department University of Georgia	Questions related to septic systems and drinking water quality.	Extension Unit Landrum Box 8112, GSU Statesboro, GA 30460	912-681-5653
Safe-Drinking Water Hotline U.S. Environmental Protection Agency	General drinking water questions. 8:30 a.m. till 5:00 p.m. EST.	401 M Street SW (Mail Code 4604) Washington D.C., 20460	800-426-4791
Pollution Prevention Assistance Division	Pollution prevention references.	Georgia DNR 7 Martin Luther King Jr. Dr., Suite 450 Atlanta,GA 30334	404-651-120 or 800-685-2443

PUBLICATIONS:

Environmental Protection Agency (EPA)
Information Center
401 M Street SW
Washington, DC 20460

- Drinking from Household Wells, EPA 570/9-90-013
- LEAD in Your Drinking Water, EPA 810-F-93-001
- Protecting Our Ground Water, EPA 813-F-95-002
- Citizens Guide to Pesticides, EPA

University of Georgia
Cooperative Extension Service
Athens, GA 30602

- Water Quality for Private Water Systems, Bulletin 939
- Water Quality Problems: Health and Household, Circular 819-A
- Your Drinking Water: Lead, Circular 819-4
- Your Drinking Water: Pesticides, Circular 819-6
- Well head Protection for Private Domestic Wells, Circular 819-12
- Wellhead Protection for Farm Wells, Circular 819-13
- Water Resource Management in Georgia, Bulletin 206
- Georgia's Ground Water Resources, Bulletin 1096
- Shock Chlorination of Home Wells, Springs and Cisterns, Miscellaneous Publication ENG93
- Ornamental and Turf Pest Control, Special Bulletin No. 10
- Right-of-Way Pest Control, Special Bulletin No. 13
- Public Health Pest Control, Special Bulletin No.11

Northeast Regional Agricultural Engineering Service, Cooperative Extension
152 Riley-Robb, Ithaca, NY 14853-5701

- Home *A*Syst, and Environmental Risk-Assessment Guide for the Home
- Home Water Treatment, NRAES-48. Includes water-treatment basics, physical and chemical treatments, USEPA Primary Drinking Water Standards and health advisories, and pesticide products that contain USEPA drinking-water contaminants. (120pp.)

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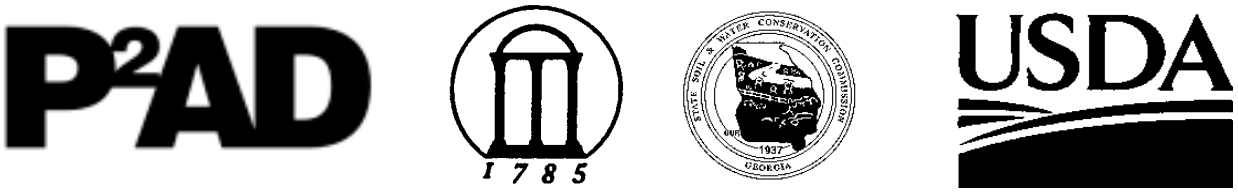

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