

# A Guide For The Private Well Owner



**El Dorado County  
Environmental Management Department**  
*[www.co.el-dorado.ca.us/emd](http://www.co.el-dorado.ca.us/emd)*



In Association with the El Dorado County  
Surveyors, Architects, Geologists and Engineers (S.A.G.E)  
*[www.edc-sage.org](http://www.edc-sage.org)*

**March 2004**

# **A Guide for the Private Well Owner**

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**February 2004**

# Introduction

This brochure is intended to make private well ownership a little easier. It is designed to:

- Alert private well owners to the potential for contamination and the need for water-quality testing;
- Introduce well owners to the basics of proper well construction, destruction and maintenance;
- Inform well owners of their responsibilities in El Dorado County.

The majority of all water produced in El Dorado County wells comes from underground fracture zones. The fracture zones provide natural storage for this underground water source.

In addition to being an extraordinary storage facility, the fracture zones also serve as an inexpensive and efficient treatment and distribution system: as water percolates down,

it is naturally purified and spreads out for miles to serve a wide area.

The thousands of water supply wells that draw water from the county's groundwater resources have traditionally produced very high quality drinking water.

In recent years, however, our drinking water fracture zones have been threatened by toxic chemicals from industrial spills, leaking underground storage tanks, and agricultural applications, as well as biological pathogens from sewers, septic systems and animal facilities.

These contaminants can find their way through the natural protective layers of clay and silt and into our drinking water fracture zones.

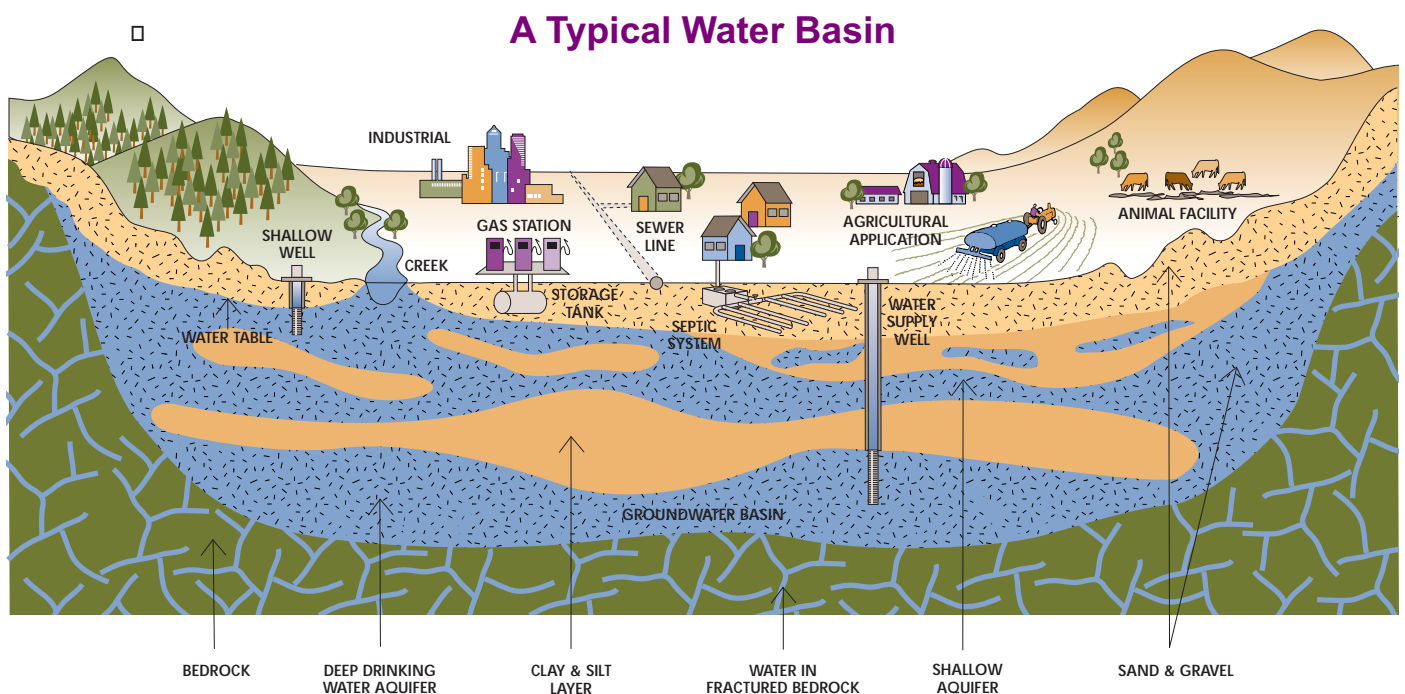
This problem can be exasperated by the presence of improperly constructed wells, abandoned wells, or wells located too near a potential contaminant source like

a septic system. These wells can act as vertical pathways, allowing chemicals and pathogens on the surface or in shallow fracture zones, to migrate into our deep drinking water fracture zones.

To help control and prevent the contamination of our groundwater storage basins and to protect public health, we need the cooperation of private well owners.

We have produced this pamphlet to help you help us protect our groundwater resources and your health.

This pamphlet is meant only as a guide for well owners. We do not claim that the recommendations made in this document will work in every situation. Nor do we claim to have covered every possible scenario or contaminant. Any reference to trade names and companies does not constitute an endorsement.



# Well Owner Responsibilities

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To protect public health and to maintain the high quality of water in our drinking water fracture zones, well owners are required to adhere to various state and local laws relating to wells. In general, well owners are required to:

- Obtain permits from the El Dorado County Environmental Management Department (EMD) for any well construction, destruction, or modification.

- Complete any well construction, destruction, or modification according to EMD and State Well Standards. Wells must be constructed so that they do not allow poor quality surface water or water from shallow fracture zones to migrate into drinking water fracture zones. There are specific well construction practices that must be followed to ensure that wells are constructed properly.

*Note: all well construction, destruction, or modification activities must be completed by a C-57 licensed contractor.*

- Properly maintain the well so that it remains in compliance with EMD and State Well Standards. Wells must be maintained so that they do not allow the introduction of surface waters or other materials into them through improperly sealed well casings or gravel fill/sounding tubes. Wells must be secured so that children or animals cannot enter them.
- Properly destroy any wells that are not being used.

When no longer in use, wells must be destroyed so that they can never act as vertical conduits or endanger public health. Generally, wells must be completely filled with impervious sealing materials.

For more information on your responsibilities as a well owner, contact the EMD's Environmental Health Division at 530-621-5300 or in South Lake Tahoe, 530-573-3450, or visit the EMD's web site at [www.co.el-dorado.ca.us/emd](http://www.co.el-dorado.ca.us/emd).



# Well Construction & Maintenance

## Well Construction

The typical domestic well in El Dorado County is constructed by drilling a hole in the ground to various depths, up to 1,000 feet.

As the well driller is drilling the hole, he/she notes the type and depth of materials that the bit passes through. This information is recorded on the Driller Log that is submitted to the permitting agency and given to the homeowner.

The well is constructed once the driller finds a fracture zone that produces enough water to meet the well owner's needs. To construct the well, the driller installs a length of plastic or steel pipe called the well casing into the hole.

The well casing keeps the hole from collapsing and allows pumping equipment to be installed. By regulation, the well casing must have a diameter at least four-inches smaller than the diameter of the hole.

In cases where the hole intersects water producing fracture zones, the driller installs well casing with thin cuts or perforations. The perforations allow water to pass into the casing but keeps out sand and gravel.

Where the hole intersects layers of clay or fine silt (layers that don't typically produce significant quantities of water), the driller installs un-perforated pipe called blank casing.

To protect the water quality in the deeper, drinking water

zones from poor quality surface water and shallow fracture zone water, the driller also installs a concrete or cement seal (annular or sanitary seal) between the blank casing and the hole.

In El Dorado County, the minimum annular seal depth is 20 feet for domestic wells and 50 feet for public use water wells.

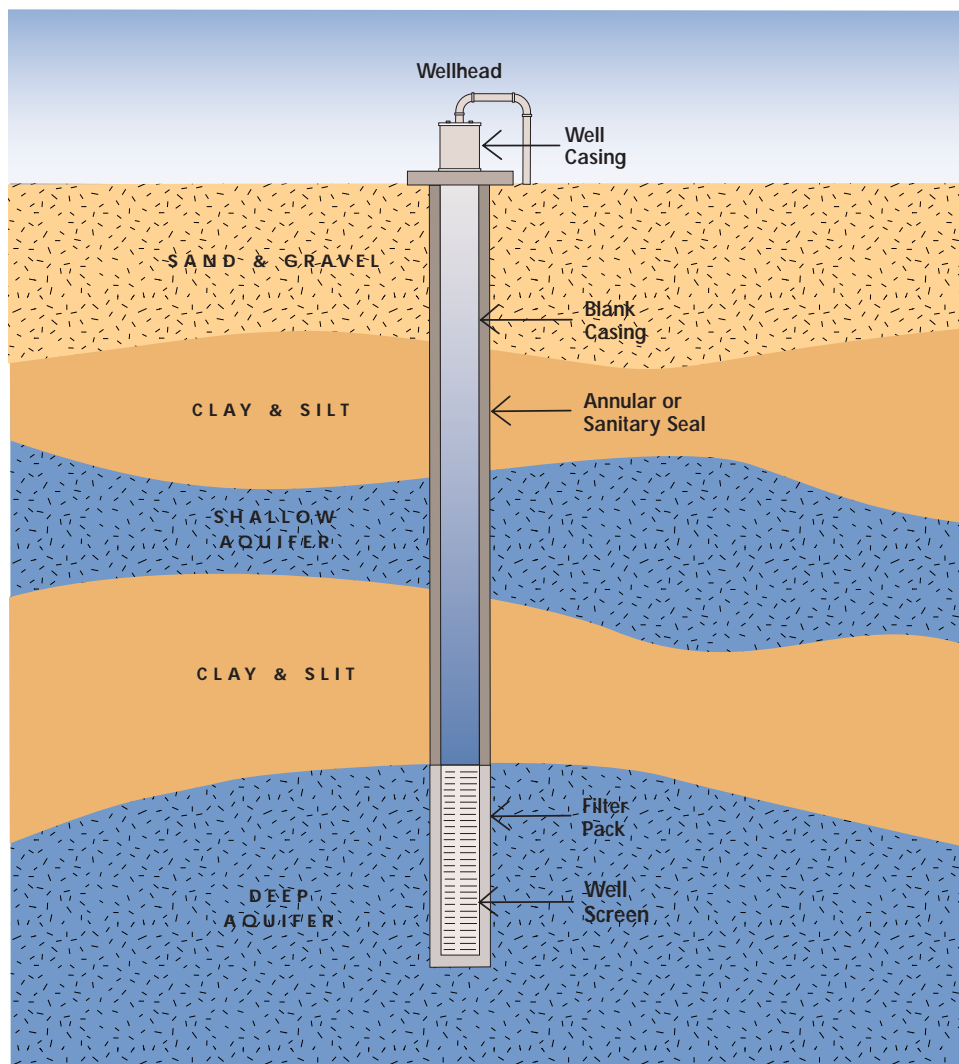
The annular seal extends to the surface of the ground where it may be extended out to create a concrete pad with the well casing

extending out of the middle of it. These surface features are called the wellhead.

At the wellhead, the casing extends at least one foot above the ground surface and is securely capped to prevent anything, including surface water, from entering the well.

The concrete pad or surrounding soil is sloped away from the casing to protect the well from damage and from surface water contamination.

**Typical Well Construction**



## Well Maintenance

A poorly maintained well can lead to a variety of problems including poor water quality and reductions in the amount of water your well can produce. To minimize these potential problems, a well maintenance program is an important part of a well owner's responsibilities.

### Inspect Your Wellhead

Get in the habit of doing a visual check on your well at least once a year. More often is better. See below for some of the things to look for.

## Maintain Complete Well Records

Effective maintenance programs begin with complete records on the construction, testing, and maintenance of your well. You should work with your Water Well and/or Pump Contractor to establish inspection and routine maintenance schedules based on the specific characteristics of your well and water supply needs. Complete well records should include:

- **The Driller Log:**

The document describing the construction of the well—how deep it is, what depth it draws water from (the perforated

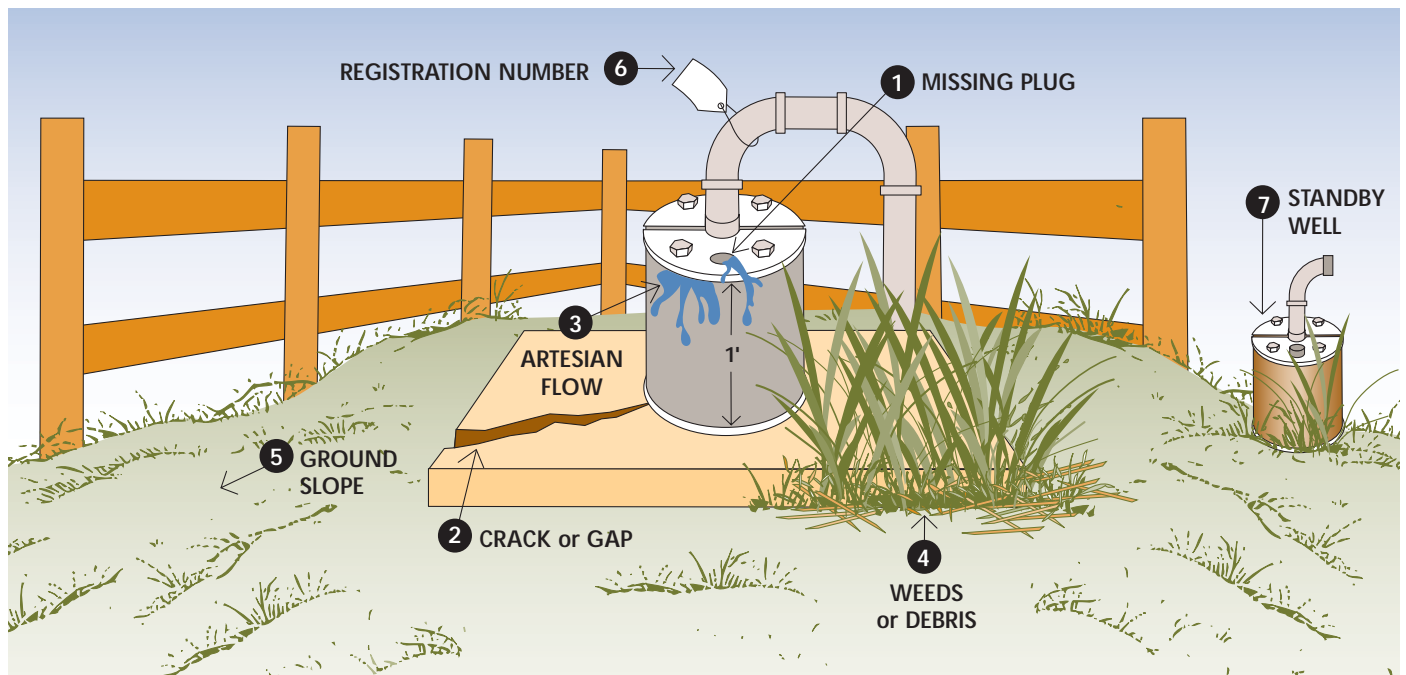
interval), and the soil types encountered while drilling. This is important information to help troubleshoot problems, should they arise. The drilling contractor should provide you with a copy of the Driller Log following completion of the well construction and testing.

- **Pump Test Data:**

The pump test gives information on how much water the well can produce. This information is also useful to assess well performance as the well ages.

- **Distribution Map:**

Draw a map showing the location of all the buried water



- 1 Look for openings that insects, rodents, water, or anything else can enter. Cap, seal, or otherwise plug them.
- 2 Look for cracks in the concrete pad that would allow water, and any contaminants it may be carrying, to follow the well casing down into your drinking water fracture zone. Seal cracks, or re-pour a new concrete pad.
- 3 If water is flowing out the top of the well, call a licensed well contractor to stop the flow. In addition to being a waste of water, if water can leak out, contaminants can seep in.
- 4 Remove weeds, leaves, and other debris from around your well. These can create great homes for rodents and other pests. Remember, do not use herbicides or any other chemical near the well.
- 5 Make sure the ground slopes away from your well and that your well casing extends at least one foot above the ground to ensure that surface water does not collect or flow near the well.
- 6 Some counties require a well registration number. El Dorado County DOES NOT.
- 7 If you have an inactive well, turn the pump on several times during the year to make sure that everything is functioning properly. Inspect and maintain your inactive well following the same guidelines as for your active well. If you never plan to use the well again, you are legally required to properly destroy it. Properly destroying the well will prevent it from being an accidental pathway of contamination into your active well, your neighbor's well, or the groundwater.

pipes connected to the well. If you share a well with adjacent properties, it is a good idea to have a map of all the plumbing on your neighbors' property as well. This information can be invaluable as the properties change hands and repairs need to be made, or as new wells are added.

- **The Physical Location of the Well:**

Measure the distance to the well from permanent structures (e.g. the centerline of the road or corner of the house).

- **Maintenance Records:**

Record whenever you have any maintenance done, such as replacing the pump or check valves. This is important information to keep track of how old the various components are and who repaired them last.

- **Water Quality Data:**

Keep all your past water quality testing information in one place. By comparing results from one year to the next you will be better able to detect changes which may indicate problems.

- **Disinfection History:**

If you disinfect your well, keep track of when, why and how it was done.

### **Deteriorating Well Performance**

The performance of all wells will deteriorate over time, but proper well construction and maintenance can delay this problem.

The typical causes of performance deterioration include: mineral encrustation or biofouling (bacteriological encrustation) of the well screen, physical plugging of the well screen, filter pack, and surrounding soils by fine particles, corrosion of the well casing, and pump problems. Many of these problems can be prevented by proper well design and construction, proper pump sizing, proper operation and maintenance, or preventative well maintenance. If not allowed to progress too far, most well performance problems can be corrected.

To prevent or correct performance problems, you should work with your Water Well and/or Pump Contractor.

### **Well Destruction**

Any well that is no longer being used for its intended purpose is required by law to be properly destroyed.

Because unused, abandoned wells can act as pathways that allow poor quality surface water or shallow groundwater to move into deeper drinking water zones, it is very important that they are properly destroyed. This is especially true if other water supply wells are operating in the area.

When a well is being used in the vicinity of an abandoned well, the pumping activity in the operating well can actually pull poor quality water down the abandoned well, into the drinking water zones, and then into the operating well.

To eliminate these vertical pathways for contaminant migration, abandoned wells must be destroyed by filling the entire well casing with impervious sealing materials.

As with all well construction, modification, or destruction, any well destruction work must be completed by a C-57 licensed contractor and under permit from the EMD.

# Water Quality Protection

## Why Should I Protect The Groundwater?

For most well owners, groundwater is their only source of water and should, therefore, be protected. Groundwater moves very slowly, often only a few feet per year, and because it moves so slowly, once it becomes polluted, it takes years for it to be naturally flushed clean. Removing pollutants from groundwater can be extremely costly and difficult. Often, the only solution is to find a new source of water.

## What Can I Do To Protect The Quality Of My Water?

Always keep in mind that you live on top of your drinking water. The layer of earth between you and the water provides some protection

from contamination, but it is not perfect. The safest way to protect your water supply is to teach your family, friends and neighbors: *If You Don't Want To Drink It, Don't Put It On or In The Ground!*

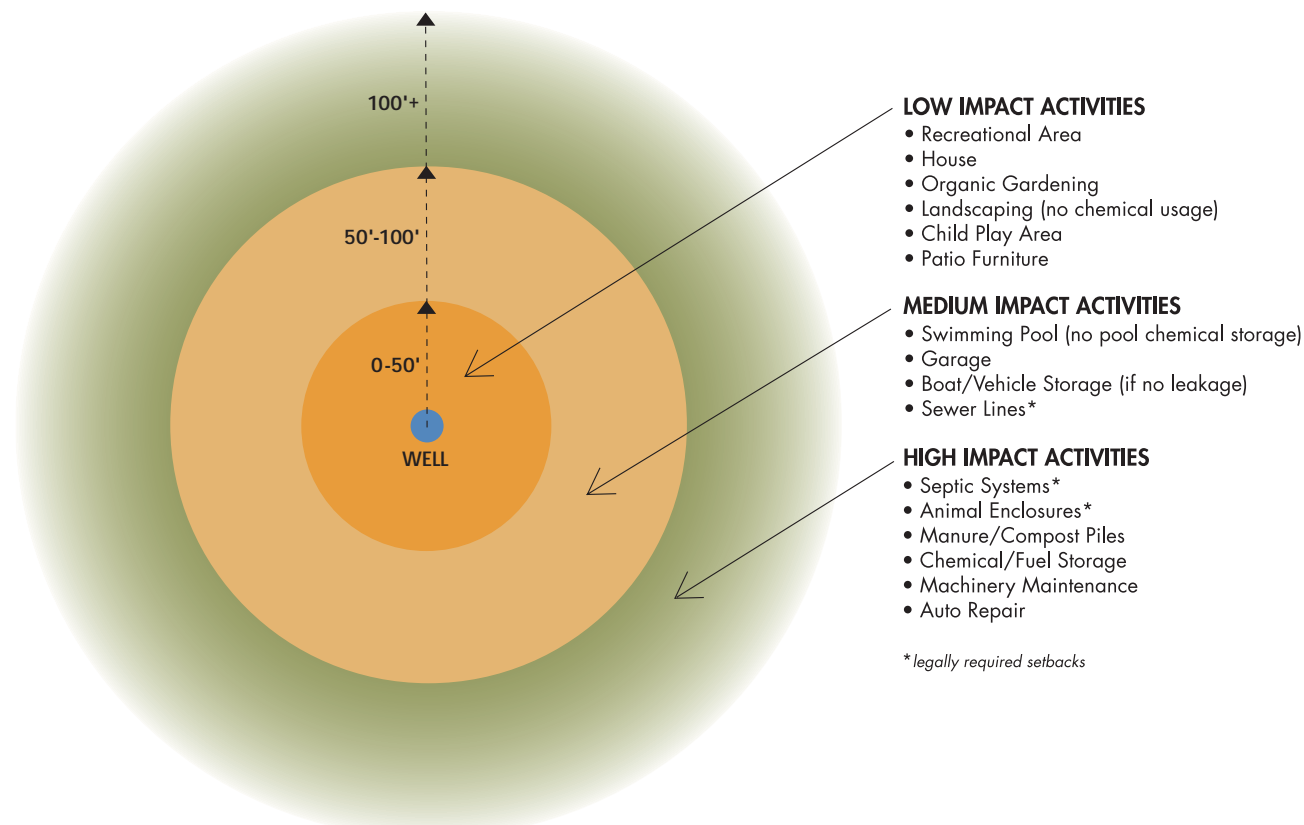
## Create A Zone Of Protection Around Your Well

Your well is a direct connection between you and your water supply. Contaminants can flow down your well as easily as water flows up it. The farther away from your well you are, the more sand, gravel and clay there is to filter out contaminants before they reach your water supply. So create a circle at least 50 feet in diameter around your well where you don't store, mix, spray, spill, bury or dump anything that you don't

want to drink. Don't forget to look out for your neighbor's well if it is near your property line. Any contamination in your neighbor's well can travel into your well.

Some activities legally require more than a 50-foot zone of protection. For example, septic tanks, leach fields, and animal enclosures need to be at least 100 feet away from any well to ensure that no waste products reach your drinking water. There are many activities that do not have formal, legal setback requirements. Use your common sense. For example, don't tie your dog or goat to the well structure—not only do you risk breaking the casing, piping or electrical connections, you risk contamination from urine and feces.

## Well Setback Distances





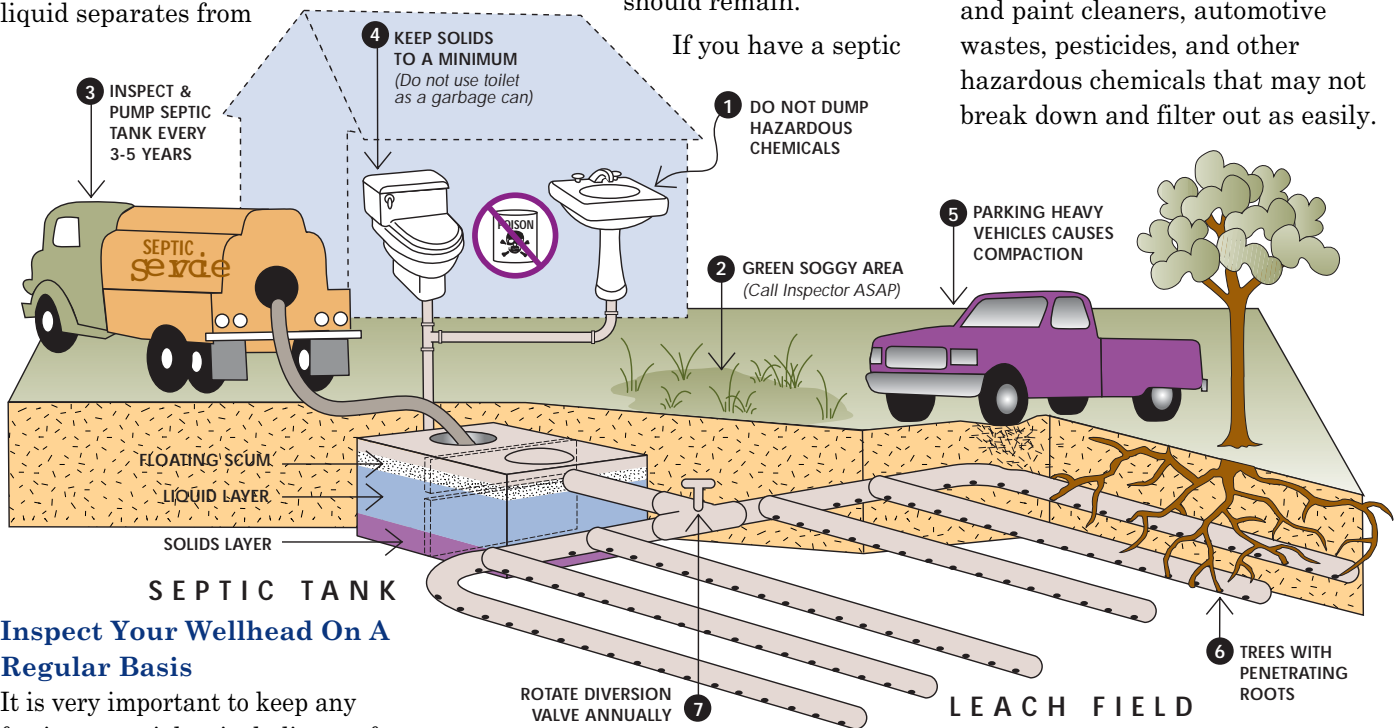
## Maintain Your Septic System

A septic system consists of a tank and a leach or drain field. All the solid/liquid waste from inside the home flows into the septic tank. The septic tank is composed of two compartments. The waste is deposited in the first compartment where the solids settle to the bottom and the liquid and scum float above it. Bacteria and other microorganisms break down the solid material. As the liquid separates from

the solids, it overflows into the second compartment where more separation and decomposition occur before it flows into the leach/drain field. The leach/drain field is a network of perforated pipes within a trench of washed drain rock buried about two to three feet deep. The liquid waste flows out of the perforated pipe and into the soil where more pollutants are removed. By the time the wastewater reaches the groundwater, few impurities should remain.

system, keep in mind that whatever goes down the drain may find its way into your drinking water. The required 100-foot setback between your well and your septic system provides relatively good protection against bacteria and viruses when it is working properly.

However, this setback was not designed to protect against things like photographic processing chemicals, hazardous art supplies, hazardous household cleaners, paint and paint cleaners, automotive wastes, pesticides, and other hazardous chemicals that may not break down and filter out as easily.



## Inspect Your Wellhead On A Regular Basis

It is very important to keep any foreign materials – including surface water – out of your well. It should be free from openings and your concrete well pad should be structurally sound. Annual inspections help assure there are no openings in the wellhead or cracks in the well pad. Any openings or cracks should be secured or sealed.

## Protect The Well Structure

Many well repairs can be very costly, so it pays to protect your well from any physical damage. The safest way to protect your well from being damaged is to build a small structure or fence around it. If you

don't have a structure around your well, then clearly mark it so when the weeds grow up in the spring, it doesn't become buried and lost. Also, lock the well enclosure to minimize the chance of vandalism.

- 1 Do not dump hazardous chemicals down the drain. If your drain is plugged try using boiling water or a drain snake instead of chemical drain cleaners. Use less toxic cleaning supplies whenever possible. Take all hazardous chemicals to a hazardous waste drop-off for disposal.
- 2 If you notice a sewage smell, a continuously wet area in your yard, lush vegetation around the septic tank or leach field, or liquid waste backing up through your drains, then something is not working properly. Call a licensed septic tank inspector immediately.

- 3 Have your septic tank inspected and pumped every three to five years (more often if you have a garbage disposal). If the solid waste in the tank builds up too high, it can flow into the leach lines, plug them and cause your system to fail.
- 4 Keep the solids in your system to a minimum. Do not use your toilet as a garbage can. Food wastes, feminine hygiene products and other household solids are better placed in the garbage.
- 5 Do not park or drive heavy equipment over your leach lines. This may compact the soil around the lines and prevent adequate percolation of the

- liquid waste, causing your system to fail.
- 6 Do not plant trees near your leach line. Tree roots often seek the moist environment inside your leach lines and plug them, causing your system to fail.
- 7 If you have a dual leach field system, change the diversion valve setting once a year.
- 8 Do not use septic tank additives, yeast, bacteria, enzymes, or other products to enhance the system. None of these products have been proven to be beneficial and some can cause permanent damage.

# Water Quality Sampling & Treatment

As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and can pick up substances resulting from the presence of animals and human activity. Contaminants that may be present include:

- Microbial contaminants, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- Inorganic contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, animal facility waste generation, mining, or farming.
- Pesticides and herbicides, that may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.
- Organic chemical contaminants, including synthetic and volatile organic chemicals, that are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application, and septic systems.
- Radioactive contaminants that in our area are typically naturally occurring.

Drinking water, including bottled water, may reasonably be expected to contain small amounts

of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with



cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants, can be particularly at risk from infections. These people should seek advice from their health care providers about their drinking water supply.

The most common groundwater contaminants of concern are bacteria and nitrate.

Bacteriological quality of drinking water is determined by analyzing for coliform bacteria. These bacteria occur naturally in the intestinal tracts of humans and animals and in soil. Although coliform bacteria normally do not cause illness, they should not be present in drinking water. The presence of these bacteria in the drinking water indicates that the water may be contaminated with other organisms that can cause disease. Disease symptoms may typically include diarrhea, cramps, nausea, and any associated headaches and fatigue. Bacteria levels can fluctuate seasonally with wet and dry periods.

Nitrate is a naturally occurring compound, but high amounts of nitrate in groundwater are typically due to human activity such as fertilizer applications, septic systems, and animal enclosures. Nitrate in drinking water at levels above 45 milligrams per liter (mg/L)  $\text{NO}_3$  or 10 mg/L  $\text{NO}_3\text{-N}$  is a health risk for infants of less than six months of age, pregnant women and people

with certain specific enzyme deficiencies. Nitrate concentrations in groundwater may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant or are pregnant, you should seek advice about your drinking water from your health care provider.

# Water Quality Sampling

## What Should I Test My Water For?

There are dozens of tests that can be performed on drinking water and no one analysis can assure that your water is “safe to drink.” We have tried to compile the most commonly performed tests and their recommended

testing frequencies BELOW. This table should be used for general guidance only. Since coliform bacteria and nitrate are the most commonly found contaminants of concern, we recommend testing for them most frequently.

Electrical conductivity (EC) is a measure of all the dissolved ions in your water. By itself, EC does not tell you if your water is safe to drink. However, since the

electrical conductivity test is the cheapest and easiest, it can be used as an indicator of changing conditions that may require further testing.

The minerals tests are recommended in order to establish a baseline understanding of the water quality in your well and as a mechanism to indicate water quality changes.

| Recommended Test  |   |   | Interpreting Your Results   |  |
|---|---|---|---|--|
| Test  | Recommended Frequency   | Cost  | If the lab report shows:  | Then you may want to consider one or more of the following options:  |
| Total Coliform Bacteria   | Twice per year:<br>Wet season<br>Dry season   | \$20 – 50   | Present   | Eliminate cause, disinfect and retest (see page 13).<br><br>Increase testing frequency<br><br>Install a treatment system such as distillation, chlorination, ozonation, or ultraviolet radiation. Consult a water treatment professional for more advice.                              |
| Nitrate   | Annually  | \$25 – 45   | ≥ 45 mg/l NO <sub>3</sub><br>or<br>≥ 10 mg/l NO <sub>3</sub> -N   | Install a treatment system or find an alternate water supply. Reverse osmosis, distillation, or anion exchange, will remove some of the nitrate. Consult a water treatment professional for more advice.<br><br>Increase testing frequency   |
| Electrical Conductance (EC)   | Annually  | \$12 – 20   | ≥ 1600 µmhos/cm<br>or significantly different from previous year result   | Conduct further testing, such as nitrate and/or minerals to determine the cause of the high EC, or the change in EC.   |
| MINERALS<br><br>Aluminum (Al)<br>Arsenic (As)<br>Barium (Ba)<br>Cadmium (Cd)<br>Chromium (Cr)<br>Fluoride (F)<br>Iron (Fe)<br>Lead (Pb)<br>Manganese (Mn)<br>Mercury (Hg)<br>Selenium (Se)<br>Silver (Ag) | Every 5-10 years,<br>or<br>If EC changes significantly,<br>or<br>If taste, color, odor or surrounding land use change | Package<br>\$250 – 300<br><br>Individual<br>\$20 – 30<br><br>Mercury<br>\$30 – 40 | Al ≥ 0.2 mg/l<br>As ≥ 0.05 mg/l<br>Ba ≥ 1.0 mg/l<br>Cd ≥ 0.005 mg/l<br>Cr ≥ 0.05 mg/l<br>F ≥ 2.0 mg/l<br>Fe ≥ 0.3 mg/l<br>Pb ≥ 0.015 mg/l<br>Mn ≥ 0.05 mg/l<br>Hg ≥ 0.002 mg/l<br>Se ≥ 0.05 mg/l<br>Ag ≥ 0.1 mg/l | Compare to previous results<br><br>Install a treatment system or find an alternate water supply. The appropriate treatment system is dependent on your overall water chemistry and what constituents you would like to remove. Consult a water treatment professional for more advice. |

≥ is greater than or equal to

mg/l is milligrams per liter. 1 mg/l = 1 part per million (ppm). 1 mg/l = 1000 microgram per liter (µg/l). 1 µg/l = 1 part per billion (ppb)

## What Do I Test For When My Water Has Specific Taste, Odor, Or Appearance Problems?

Below is a guide for some potential problems in drinking water and substances you can test for (in bold). Not all of the problems and possible causes pose a health risk to the consumer.

| Problem   | Possible Cause   | Health Risk Category* |
|---|--|-----------------------|
| Water is orange or reddish brown                                  | This may be due to high levels of <b>iron (Fe)</b> .   | 1                     |
| Porcelain fixtures or laundry are stained brown or black          | This is commonly a result of high <b>manganese (Mn)</b> and/or <b>iron (Fe)</b> levels. As little as 50 parts per billion (ppb) manganese and 300 ppb iron can cause staining.   | 1                     |
| White spots on the dishes or white encrustation around fixtures   | High levels of <b>calcium (Ca)</b> and <b>manganese (Mn)</b> can cause hard water, which leaves spots. <b>Hardness</b> can also be measured directly.  | 1                     |
| Water is blue   | Blue water or blue deposits may be due to high levels of <b>copper (Cu)</b> , especially if coupled with corrosive water.  | 2                     |
| Water smells like rotten eggs                                     | This is most likely caused by <b>hydrogen sulfide (H<sub>2</sub>S)</b> .   | 1                     |
| Water heater is corroding   | Water can be corrosive, neutral, or noncorrosive. Water that is very corrosive can damage metal pipes and water heaters. The lab can calculate the corrosivity of your water by measuring <b>calcium</b> , <b>pH</b> , <b>total dissolved solids (TDS)</b> , and <b>alkalinity</b> . | 1                     |
| Water appears cloudy, frothy or colored                           | <b>Suspended particulates</b> , measured directly or as <b>turbidity</b> , can cause the water to appear cloudy, frothy or colored. <b>Detergents</b> and/or <b>sewage waste</b> may also be the culprit.  | 2                     |
| Home's plumbing system has lead pipes, fittings, or solder joints | <b>Corrosive</b> water can cause <b>lead (ppb)</b> , <b>copper (Cu)</b> , <b>cadmium (Cd)</b> , and/or <b>zinc (Zn)</b> to be leached from lead pipes, fittings, and solder joints.  | 2                     |
| Water has a turpentine odor                                       | This may be due to <b>methyl tertiary butyl ether (MTBE)</b>   | 2                     |
| Water has a chemical smell or taste                               | This may be due to <b>volatile</b> or <b>semivolatile organic compounds (VOCs)</b> or <b>pesticides</b> .  | 2                     |

## Are You Concerned That A Nearby Activity May Be Contaminating Your Well?

Below are some land uses and possible contaminants you may want to test for.

| Land Use   | Possible Contaminants   | Health Risk Category* |
|--|---|-----------------------|
| Landfill, industry, or dry cleaning operation        | Consider testing for <b>volatile organic compounds (VOCs)</b> , <b>pH</b> , <b>total dissolved solids (TDS)</b> , <b>chloride (Cl)</b> , <b>sulfate (SO<sub>4</sub>)</b> , and <b>metals</b> .  | 2                     |
| Agricultural crop production                         | Consider testing for <b>pesticides</b> commonly used near the well (consult the farmer or Department of Agriculture for a list), <b>nitrate (NO<sub>3</sub>)</b> , <b>pH</b> , and total <b>dissolved solids (TDS)</b> .              | 2                     |
| Livestock enclosure, manure, or compost storage area | Consider testing for <b>bacteria</b> , <b>nitrate (NO<sub>3</sub>)</b> , and total <b>dissolved solids (TDS)</b> .  | 2                     |
| Gas station or automobile repair shop                | Consider testing for <b>total petroleum hydrocarbons (TPHg)</b> , <b>total oil and grease (TOG)</b> , <b>benzene</b> , <b>toluene</b> , <b>ethylbenzene</b> , <b>xylenes (BTEX)</b> , <b>MTBE</b> , <b>ethylene dibromide (EDB)</b> . | 2                     |

\* 1 No known health risk at commonly found concentrations

2 Some of the possible causes can have a detrimental effect on health even if present in low concentrations

# Water Quality Treatment

## What If My Total Coliform Test Results Are Positive?

**Step 1.** First, try to determine where the contamination came from. The table below lists some possible problems and some recommended corrective actions. Some problems you may be able to fix yourself; others – marked by an asterisk (\*) – legally require the assistance of a C-57 licensed well contractor.

For a list of C-57 licensed professionals, visit the EMD website, [www.co.el-dorado.ca.us/emd](http://www.co.el-dorado.ca.us/emd).

| Problem  | Recommended Corrective Action   |
|--|---|
| The well is newly constructed, or maintenance or repair was recently done.<br><br>The pump was primed with impure water. | Go to step two below.   |
| There is standing water around the well or water draining toward the well.   | Re-grade around the well so the ground slopes away from your well.  |
| The concrete well pad is cracked or separated from the well casing.  | Re-pour pad or fix and seal all cracks and gaps.  |
| The well is not completely sealed against surface water, insects, or other foreign matter.                               | Replace any missing plugs, cap any open pipes, and seal any openings, gaps or cracks.<br><br>Contact a licensed well contractor to replace or install a new wellhead gasket.  |
| The storage tank is dirty or unprotected.  | Contact a water system contractor to clean and seal.  |
| There are cross-connections in the plumbing system.  | Make sure that your plumbing is not connected to another source of water that may be contaminated (e.g. a defunct community water system).  |
| There is not adequate back-flow protection.  | Install a back-flow prevention device on every outdoor faucet (available at most hardware and plumbing supply stores).<br><br>Contact a licensed well contractor to ensure that there is proper back-flow protection within the well. |
| There are dead-end or unused water lines connected to your plumbing system.  | Flush lines regularly or<br><br>Remove any unused lines or sections of the water system.  |
| The well casing is corroded.<br><br>There is sediment at the bottom of the well.   | *Contact a licensed well contractor to assess and repair.   |
| The well casing is perforated too high or the sanitary seal is not adequate.   | *Contact a licensed well contractor to drill a new well and to properly destroy the old well.   |

**Step 2.** Once you have located and eliminated the source of the bacteria, disinfect the system. For instructions on how to properly disinfect your well and distribution system, visit the El Dorado County Environmental Management Department web site at [www.co.el-dorado.ca.us/emd](http://www.co.el-dorado.ca.us/emd) or, call 530-621-5300 or in South Lake Tahoe, call 530-573-3450, or call a licensed water system contractor.

**Step 3.** **IMPORTANT:** before drinking the water, test a new sample for total coliform bacteria. If the results are still positive, start at **Step 1** again.

## What Can I Do About Other Problems With My Drinking Water?

Most groundwater does not require any treatment. If you have had your water tested and found a problem that you want to treat, there are many different types of treatment available. Not all water treatment systems work for every contaminant or for every water type.

Once installed, most systems require routine maintenance to continue performing properly. Improperly maintained systems can cause more damage than having no system at all.

You need to know what you want to remove and if you will be able to perform the routine maintenance before you invest any money in a system. See the guide on the right for the options available for your particular problem(s).

Some options remove a greater percent of the concentration than other options listed for the same substance.

We highly recommend that you talk with the manufacturer or a water treatment professional to get a guarantee that the system you are considering will work in your situation. Some water may need to be softened or pre-filtered or the pH may need to be adjusted prior to treatment.

| Contaminant                       | Activated Alumina Filters | Activated Carbon Filters <sup>7</sup> | Air Stripping | Anion Exchange | Cation Exchange/Water Softener | Chlorination   | Distillation   | Mechanical Filtration | Oxidizing Filters | Ozonation      | Reverse Osmosis | Ultraviolet Radiation |
|-----------------------------------|---------------------------|---------------------------------------|---------------|----------------|--------------------------------|----------------|----------------|-----------------------|-------------------|----------------|-----------------|-----------------------|
| Arsenic                           | X                         |                                       |               | X              |                                |                | X              |                       |                   |                | X               |                       |
| Asbestos                          |                           | X                                     |               |                |                                |                | X              |                       |                   |                | X               |                       |
| Atrazine                          |                           | X                                     |               |                |                                |                | X              |                       |                   |                | X               |                       |
| Benzene                           |                           | X                                     | X             |                |                                |                | X              |                       |                   |                | X               |                       |
| Chlorine                          |                           | X                                     |               |                |                                |                |                |                       |                   |                |                 |                       |
| Coliform bacteria                 |                           |                                       |               |                |                                | X              | X              |                       |                   | X              |                 | X                     |
| Color                             |                           | X                                     |               | X              | X                              |                |                |                       | X                 | X              |                 |                       |
| Flouride                          | X                         |                                       |               |                |                                |                | X              |                       |                   |                | X               |                       |
| Hardness                          |                           |                                       |               |                | X                              |                |                |                       |                   |                |                 |                       |
| Hydrogen sulfide                  |                           | X                                     | X             |                |                                | X <sup>1</sup> |                |                       | X                 | X <sup>1</sup> |                 |                       |
| Inorganics, minerals (some)       |                           |                                       |               |                |                                |                | X              |                       |                   |                | X               |                       |
| Iron/manganese — dissolved        |                           |                                       |               |                | X <sup>2</sup>                 | X <sup>1</sup> |                |                       | X                 | X <sup>1</sup> |                 |                       |
| Iron/manganese — insoluble        |                           |                                       |               |                |                                |                |                | X                     | X                 |                |                 |                       |
| Lead                              |                           |                                       |               |                |                                |                | X              |                       |                   |                | X               |                       |
| Mercury                           |                           | X                                     |               | X              |                                |                | X              |                       |                   |                | X               |                       |
| Nitrate                           |                           |                                       |               | X              |                                |                | X              |                       |                   |                | X               |                       |
| Odor and taste                    |                           | X                                     | X             | X              | X                              | X              | X              |                       | X                 | X              | X               |                       |
| Pesticides (some)                 |                           | X                                     | X             |                |                                |                | X              |                       |                   | X              | X               |                       |
| Radium                            |                           |                                       |               |                | X <sup>5</sup>                 |                | X <sup>4</sup> |                       |                   |                | X <sup>4</sup>  |                       |
| Radon gas                         |                           | X <sup>6</sup>                        | X             |                |                                |                |                |                       |                   |                |                 |                       |
| Salt                              |                           |                                       |               |                |                                |                | X              |                       |                   |                | X               |                       |
| Sand, silt, clay (turbidity)      |                           |                                       |               |                |                                |                |                | X                     |                   |                |                 |                       |
| Volatile organic chemicals (some) |                           | X                                     | X             |                |                                |                | X <sup>3</sup> |                       |                   |                | X               |                       |

<sup>1</sup> When followed by mechanical filtration or an activated carbon filter

<sup>2</sup> When present in low concentrations

<sup>3</sup> Only for volatile organic chemicals with high boiling points

<sup>4</sup> Other water quality problems may interfere with treatment

<sup>5</sup> With zeolite softening

<sup>6</sup> Often requires pretreatment system

<sup>7</sup> There are several different types of activated carbon filters (e.g. granular, block, powder, etc), not all types work on all substances listed.

Table adapted from the Water Quality Association and from 1996. Rick Weinzierl, et.al (1996). "57 Ways to Protect Your Home Environment (and Yourself)," University of Illinois at Urbana-Champaign, North Central Regional Extension, Publication 583.

# Resource Guide

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## Local Resources

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### El Dorado County Environmental Management Department

The El Dorado County Environmental Management Department (EMD) is responsible for protecting public health. The EMD ensures that all newly constructed wells comply with state standards for well construction. As the Local Primary Agency, the EMD inspects and permits all wells and water systems with 5 to 200 service connections. The EMD is also the permitting agency for septic systems.

Contact the EMD if you have a question about:

- Septic Systems
- Well Construction, Destruction, Permitting, or Protection
- Dry Wells—Storm Water Infiltration Devices
- Underground Storage Tanks
- Methyl Tertiary-Butyl Ether (MTBE)
- Nitrate (NO<sub>3</sub>)
- Solvent Spills
- C-57 Licensed Well Contractors
- State Certified Laboratories

530-621-5300, or,  
in South Lake Tahoe,  
530-573-3450

[www.co.el-dorado.ca.us/emd](http://www.co.el-dorado.ca.us/emd)

### Household Hazardous Waste Drop-Off Facilities

Household Hazardous Waste drop-off facilities provide the community with practical pollution prevention strategies for the use, recycling, and disposal of products containing hazardous substances. Contact the EMD for information on the proper disposal of household hazardous waste including a list of facilities in El Dorado County accepting household hazardous waste.

530-621-5300

[www.co.el-dorado.ca.us/emd](http://www.co.el-dorado.ca.us/emd)

For spills, hazardous materials accidents, or illegal dumping contact local law enforcement at 9-1-1, and they will page our Haz Mat response team.

### Other Local Resources

#### South Tahoe Public Utility District

1275 Meadow Crest Drive  
South Lake Tahoe, CA 96150  
530-544-6474  
[www.stpud.us/](http://www.stpud.us/)

#### Georgetown Divide Public Utility District

6425 Main Street  
Georgetown, CA 95634  
530-333-4356

#### El Dorado County Surveyors, Architects, Geologists & Engineers

[www.edc-sage.org](http://www.edc-sage.org)

## Regional and State Government

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### California Department of Health Services

The Division of Drinking Water and Environmental Management (DDWEM) is responsible for ensuring that all public water systems are operated in compliance with state and federal regulations.

916-449-5600

[www.dhs.gov/ps/ddwem](http://www.dhs.gov/ps/ddwem)

### California Department of Water Resources

The Department of Water Resources has information on groundwater management issues throughout California. The web

page has a list of publications on ground water. In addition, there is statewide and local information on water levels and groundwater management and quality.

(916) 227-7590

[www.water.ca.gov](http://www.water.ca.gov)

### Department of Toxic Substances Control

The Department of Toxic Substances Control can help answer questions about what is a hazardous waste, how to reduce household hazardous waste, where to report spills and illegal dumping, as well as provide information on specific hazardous waste disposal or handling facilities.

916-255-3745

[www.dtsc.ca.gov](http://www.dtsc.ca.gov)

### State Water Resources Control Board (SWRCB)

The mission of the State Water Resources Control Board is to preserve and enhance the quality of California's water resources and ensure their proper allocation and efficient use for the benefit of present and future generations. Through the Regional Water Quality Control Boards, the State Board oversees all the Waste Discharge Requirements (WDR) and National Pollution Discharge Elimination Service (NPDES) permits.

916-341-5254

[www.swrcb.ca.gov](http://www.swrcb.ca.gov)

### Regional Water Quality Control Board— Central Valley Region (RWQCB)

The Central Valley Region is the state's largest, encompassing 60,000 square miles, or about 40% of the state's total area. Thirty-eight of California's 58 counties are either completely or partially within the Region's boundaries,

which are formed by the crests of the Sierra Nevada on the east, the Coast Ranges and Klamath Mountains on the west, the Oregon border on the north, and the Tehachapi Mountains on the south.

916-464-3291

[www.swrcb.ca.gov/rwqcb5](http://www.swrcb.ca.gov/rwqcb5)

### **Regional Water Quality Control Board—Lahontan Region**

The jurisdiction of the Lahontan Regional Water Quality Control Board extends from the Oregon border to the northern Mojave Desert, and includes all of California east of the Sierra Nevada crest. Most of the waters of the North Lahontan Basin drain into closed basins which were previously part of Lake Lahontan. Waters of the South Lahontan Basin also drain into closed basin remnants of prehistoric lakes.

530-542-5400

[www.swrcb.ca.gov/rwqcb6](http://www.swrcb.ca.gov/rwqcb6)

## **Federal Government**

### **USEPA's Safe Drinking Water Hotline**

The U. S. Environmental Protection Agency's Safe Drinking Water Hotline is available to help the public, state and local officials understand the regulations and programs developed in response to the Safe Drinking Water Act. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline. The hotline and web page also provide information on testing and protecting private well water and where to find more information.

800-426-4791

[www.epa.gov/safewater/pwells1.html](http://www.epa.gov/safewater/pwells1.html)

### **Food and Drug Administration**

Among other things, the Food and Drug Administration (FDA)

regulates the bottled water industry. Contact the FDA if you have questions about the safety or regulation of bottled water.

888-463-6332

[www.fda.gov](http://www.fda.gov)

## **Private Organizations**

### **California Groundwater Association**

The California Groundwater Association (CGA) is a non-profit organization. Its members include water well drilling and pump contractors, suppliers and manufacturers, geologists, engineers, hydrologists, government employees and others working in the groundwater field throughout California. Contact CGA for information on the quantity, quality and availability of California's groundwater resources.

707-578-4408

[www.groundh2o.org](http://www.groundh2o.org)

### **National Sanitation Foundation (NSF)**

The National Sanitation Foundation is a not-for-profit organization that tests products relating to health and the environment. NSF certifies that home treatment units meet the manufacturers' performance claims. Contact the NSF for a list of treatment units that are certified to remove your contaminant of concern.

800-673-8010

[www.nsf.org](http://www.nsf.org)

### **National Small Flows Clearinghouse**

The National Small Flows Clearinghouse (NSFC) is funded by the U.S. Environmental Protection Agency to provide small communities with technical assistance on wastewater issues. Contact the NSFC if you have

questions about septic system design, installation or maintenance.

800-624-8301

[www.ndwc.wvu.edu](http://www.ndwc.wvu.edu)

### **National Well Owner Association**

An online organization, the National Well Owners Association (NWOA) provides comprehensive and up-to-date information on the purchase and maintenance of water wells. Created by the NGWA, the NWOA site features information on owning a private water system, maintaining a well, and protecting the water supply. Visitors to the site can also find a searchable list of water well contractors.

[www.wellowner.org](http://www.wellowner.org)

### **Water Quality Association**

The Water Quality Association (WQA) is an international trade association representing the household, commercial, industrial, and small community water treatment industry. WQA is a resource of information, product testing, and professional certification for water users. Contact the WQA for more information on home treatment systems.

800-749-0234

[www.wqa.org](http://www.wqa.org)



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