SECTION 3
SAFE DRINKING WATER

This fact sheet addresses the importance of protecting your drinking water sources from contamination and how *you* can make a difference with ***Best Management Practices*** *(BMPs).* BMPs are actions you can take to protect our natural resources. **The ultimate goal of this information is to prevent drinking water contamination.**

1. Read the facts and information in the following pages.
2. Fill out the risk assessment worksheets (p. 3-8) in order to analyze your property's specific needs.
3. Fill out the action worksheet (p. 3-11), then **take action!**

Is Your Drinking Water Safe?

Most people take a safe drinking water supply for granted. We assume the water coming out of the faucet is safe. Unfortunately, this assumption is not always correct. Households located near surface water should have their private water supply tested regularly to confirm it is safe to drink. If your water is treated by a municipal water treatment plant, it is still important to protect surface and groundwater to prevent the risk of contamination.

The most obvious concern with an unsafe drinking water supply is the health risk to your family and guests. Contamination from ***wastewater***, a septic system, or an outhouse is a potential source of bacteria, viruses, and parasites that can cause gastrointestinal problems or transmit contagious diseases. Wastewater also contains high levels of ***nitrate*** that can present a serious health risk to infants.

Drinking water wells should be tested annually, especially if you own an infrequently-used vacation home or draw from shallow groundwater. Additionally, many vacation dwellings use surface water for the household water supply. Surface water presents a different set of risks; information on safety considerations and testing for surface water is available from the Panhandle Health District (PHD) or Idaho Department of Environmental Quality (IDEQ).

Property and resale values are other reasons to make sure your water supply is clean. During property transfers, most lenders will not provide financing for the purchase of property without a well test that meets the U.S. Environmental Protection Agency's Primary Drinking Water Standards for several contaminants.

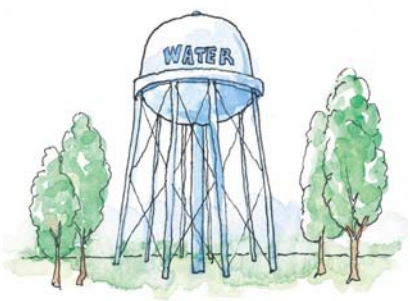
Drinking Water Sources

Public water systems are community systems that have at least 15 service connections or regularly serve an average of 25 individuals for at least 60 days per year. These public systems are regulated by IDEQ following the "Idaho Rules for Public Drinking Water Systems" (***IDAPA*** 58.01.08) established through the federal Safe Drinking Water Act. Public systems are governed by a community board of directors and have a licensed system operator. Typically, water is from drilled wells, but sometimes the drinking source is from surface water. Testing for contaminants is done on a regular basis and includes a wide array of compounds.

Non-community public water systems are regulated by PHD with required water testing and include facilities such as restaurants, motels, schools, and office buildings.

Non-public (private) water systems serve fewer than 25 people and have fewer than 15 service connections. Water is typically from drilled wells. Private systems do not have a regulating agency and do not rely on a water provider to ensure that water is safe to drink. Ensuring a safe private water supply is the responsibility of the individual home owner or the owners of a small cluster of homes serviced by the well.

Surface water is extracted from the lake or streams into individual homes and cabins. This water is not recommended for drinking unless treated.



Protect Your Drinking Water

If your home is served by a source other than a public water system, either by an individual well or extraction from surface waters, then **it is your responsibility to provide a safe drinking water supply**.

Surface Water

IDEQ does not recommend using surface water as a drinking water supply unless it is treated, but a significant number of homes and cabins do extract water from the lake or nearby streams for household use. Besides bacteria, surface waters can also contain single-cell protozoa, Giardia and Cryptosporidium, whose cysts are intestinal parasites and are considered a waterborne disease. The cysts reside in the digestive tract of mammals and are transmitted through the fecal-water-oral route. Ingestion of the cysts by humans can lead to severe intestinal disorders.

Use of surface water for drinking should go through a two-step treatment process. The water should be filtered to 1 micrometer (µm or micron) to remove most of Giardia and Cryptosporidium cysts. Water should then be disinfected to kill bacteria and viruses. Water can be disinfected by boiling, using chlorine, or with ultra-violet light. Contact PHD or IDEQ for more information on using surface water for drinking (see Resource Directory, p. 3-7).

If surface water is left untreated, Giardia protozoa may contaminate a water supply.

New Wells

New wells are good investments for the future. Getting the most from such an investment means locating the well away from contamination sources and working to maintain the quality of the well. Simple BMPs include the following:

- Use a licensed well contractor for installing new wells or sealing unused wells.
- Prior to drilling, make sure groundwater is not already contaminated.
- When planning development on your lot, leave enough room for future expansion to avoid crowding the well. Let your well contractor know your future plans.
- Follow at least the required minimum distances from potential contamination sources that are set by PHD and local ordinances when locating your new well (Figure 3-1).

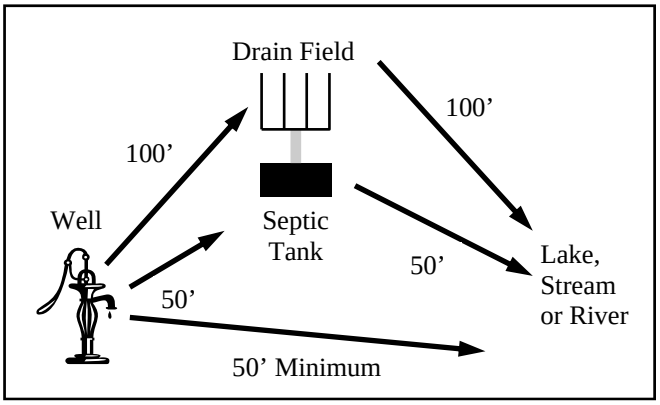


Figure 3-1. *Panhandle Health District minimum separation distance requirements between drinking water wells and possible sources of contamination.*

Well Location

Whether a well taps water just below the ground surface or hundreds of feet deep, its location at the ground surface is a crucial safety factor. A well down-slope from a leaking fuel tank or a failing septic system runs a greater risk of contamination than a well on the uphill side of these pollution sources. **The general rule for protecting the water supply is to keep a well up-slope and far from potential sources of contamination.** When determining the proper well location, consider soil type, slope, surface drainage, groundwater flow, and potential contaminants. PHD, IDEQ, and the Idaho Department of Water Resources (IDWR) are all available to assist you with proper well location.

Separation Distances

IDWR "Well Construction Standard Rules" (IDAPA 37.03.09) require that constructed wells must meet all site and distance requirements set forth by PHD and IDEQ. IDAPA 37.03.09 requires a minimum distance of 100 feet from a septic drainfield to a well (Figure 3-1). This separation distance allows for natural protection provided by the soil. Soil type will ultimately determine a safe distance. For more information contact PHD (see Resource Directory, p. 3-7).

Any condition likely to cause groundwater contamination should be improved, even if your well is far away from the potential source. Whether or not drinking water is affected, groundwater and surface water contamination is a violation of Idaho law. Consider all possible contamination sources on adjacent property.

No specific distance will guarantee that the well will not be affected. Keep in mind that separation distances listed by the state are minimums. You may want to choose greater separation distances, depending on factors at your well site.

Well Construction and Safety

Proper well design reduces the risk of contamination by sealing the well from anything that might enter it from the surface (Figure 3-2). Poor design can allow a well to become contaminated by letting rain or snowmelt reach groundwater without filtering through the soil. All surface runoff should be diverted away from the well (Figure 3-3). Wells located in pits, or constructed without grout or a sanitary well seal, can allow surface water to carry bacteria, pesticides, fertilizer, or petroleum into your drinking water supply.

Casing Safety

The well driller installs a steel pipe (casing) during construction to prevent collapse of the borehole. All openings in the casing should be sealed, and if water pipes exit through the side of the casing, they must do so through an approved fitting called a ***pitless adapter.***

The space between the casing and the sides of the borehole provides a direct channel for surface water and contaminants to reach groundwater. To seal off that channel, the driller fills the space with grout (cement or a type of clay called bentonite). The grout seal should extend a minimum depth of 18 feet from the ground's surface, and possibly deeper, depending on your local hydrogeology. The ground surface needs to slope away from the well in all directions to ensure that surface water will flow away from the well (Figure 3-3).

Inspect the condition of the well casing for holes or cracks at the surface, or look down inside the casing with a light or mirror. If the casing can be moved by pushing against it, you have a problem with your well casing's ability to keep out contaminants.

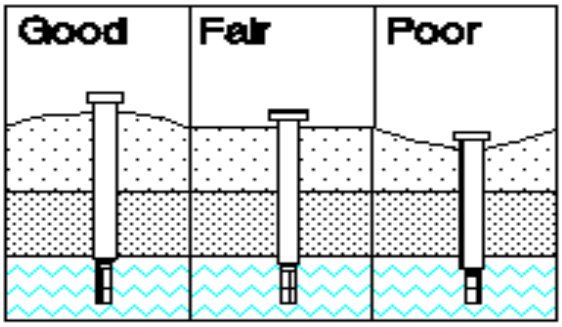


Figure 3-3. *Comparison of well placements at ground surface. With proper placement, ground surface will slope away from well.*

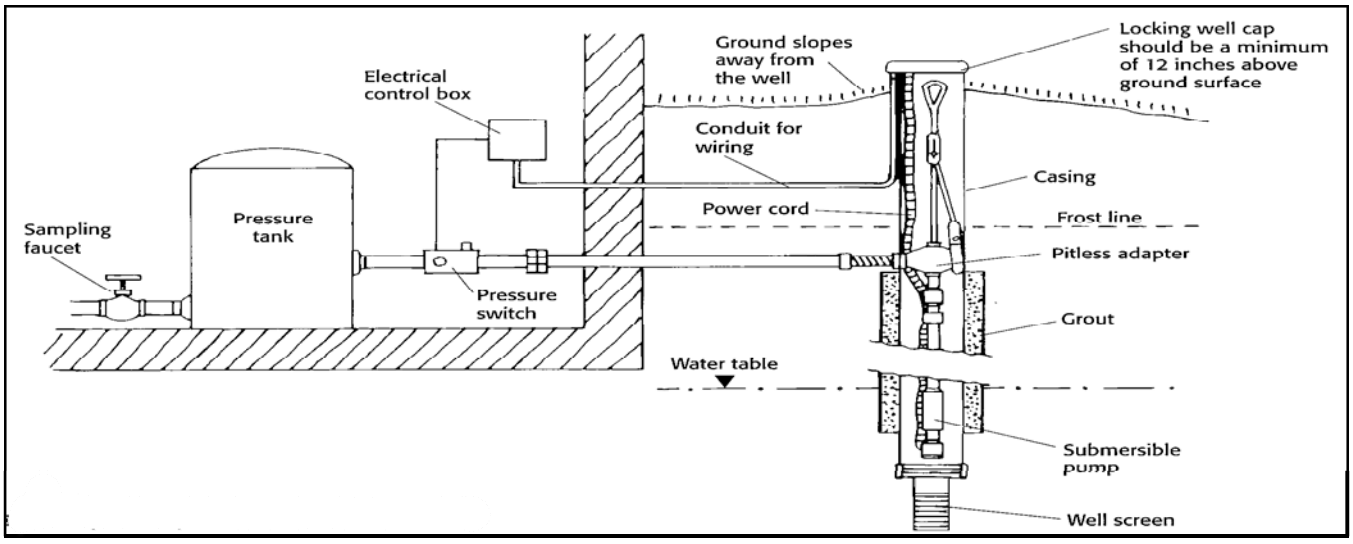


Figure 3-2. *A properly constructed well.*

Check the condition of the well casing by listening for water draining down into the well (pump should not be running). If you hear water, either the casing has a crack or hole, or the casing does not extend down to the water level in the well. Both situations could put your drinking water safety at risk.

To prevent contaminants from getting down inside the well casing, the driller installs a tight fitting, vermin-proof well cap to prevent easy removal by children or entry of insects or surface water. Well regulations require a vermin-proof seal for all private wells (not all wells have caps; some may have pumping equipment attached at the surface). The cap should be firmly installed, with a screened vent incorporated into it so that air can enter the well. If your well has a vent, be sure that it faces the ground, is tightly connected to the well cap, and is properly screened to keep insects out. Check the well cap to see that it's in place and tightly secured. Electrical wires entering the well should be in an approved conduit.

Idaho wells are required to have a durable, watertight casing that extends to a minimum depth based on local hydrogeology and in compliance with IDAPA 37.03.09. This ensures that water is filtered through soil and geologic materials before entering the well. Since most contamination comes from the surface, grouting and casing the well deeper can provide greater protection. The casing should exceed the minimum casing depth.

IDAPA 37.03.09 requires that at least 12 inches of casing pipe extend above the final grade of the land to prevent surface water from running down the casing, or through the seal and into the well. Siting a well in an area subject to flooding is strongly discouraged. Check with IDWR for regulations concerning casing construction and minimum specifications (see Resource Directory, p. 3-7).

Well Age

If you have an older well, have it inspected by a licensed well driller. Older well pumps are more likely to leak lubricating oils, which can contaminate the groundwater. Well construction information may be available from the previous owner or the well construction report (well log). IDWR has copies of well logs on file and online.

Additionally, older wells are more likely to have a thinner casing that has corroded through. Even wells that are 30-40 years old with modern casings are subject to corrosion.

Backflow Prevention and Cross Connections

Anti-backflow devices should be placed on all faucets with hose connections (Figure 3-4). Air gaps should be maintained between hoses or faucets and the water level during all activities. Otherwise, contaminated water from laundry tubs, sinks, washing machines, pressure washers, outside hydrants, livestock tanks, and hot tubs can flow back through the plumbing contaminating your water supply. Water supplies with cross-connections (connections between two otherwise separate pipe systems, such as potable and non-potable) also put your drinking water at risk.

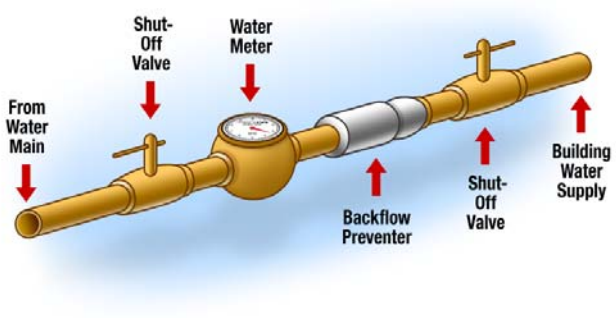


Figure 3-4. *Schematic drawing of a typical backflow prevention device.*

Home Water-Treatment Systems

If you are a waterfront homeowner responsible for the safety of your drinking water, use caution when choosing from the multitude of available home water-treatment systems. Two of the most common home water treatment systems are granular activated carbon and membrane filtration. Make sure any treatment unit is certified by the National Sanitation Foundation (NSF). Home systems can be expensive, and you may be sold a system that treats water for compounds that are not a concern in your watershed. Conversely, your system may not treat a compound that may be of specific concern. If you are drinking surface water, make sure your system is NSF-certified for cyst reduction. For specific concerns in your area, contact PHD or IDEQ (see Resource Directory, p. 3-7).

Well Maintenance

You wouldn't let a car or tractor run too long without an oil change, and likewise, your well deserves the same attention. Good maintenance means testing the water every year, keeping the well area clean and accessible, keeping potential contaminants as far away as possible, and annually having a qualified well driller check the well mechanics.

- Locate your well on ground higher than contamination sources, such as fuel tanks, livestock lots, septic systems, and pesticide mixing areas.
- Establish a *well protection zone*. Keep hazardous wastes such as paints, fertilizers, pesticides, oil and gasoline far away from your well. Keep livestock operations at least 50 feet from your well.
- Build soil up around well so that all surface water drains away.
- Avoid areas that are prone to flooding.
- Avoid diverting surface drainage to well areas where it may seep into your drinking water.
- Make the well accessible for pump repair, cleaning, testing, and inspections.
- Disinfect the well and plumbing system following maintenance on the well or pump and after appliances or plumbing fixtures are repaired or replaced.
- Maintain septic systems properly, and pump septic tanks regularly (see Section 4, Household Wastewater Treatment).
- Immediately replace or repair wells in which the casing is no longer watertight because of damage or corrosion.
- If you have an older well, have it inspected by a licensed well driller. Older wells are more likely to leak lubricating oils and become corroded.
- Keep your well records in a safe place.
- Test the water annually for nitrate and ***coliform*** bacteria.
- Test your water anytime a change in taste, odor, or color is noticed. For assistance contact PHD or IDEQ (see Resource Directory, p. 3-7).

Unused Wells

Many rural homesteads have unused wells. It is not uncommon to visit a homestead and find three or four wells, with only one or two currently in use. No one knows how many of these wells are in Idaho, although estimates are in the thousands.

If not properly filled and sealed, these wells can provide a direct conduit for surface water carrying contaminants to enter groundwater without filtering through soil, or they can allow contaminant movement from one aquifer to another. In addition to these wells being a threat to groundwater, large open wells pose safety hazards for people and animals. The landowner, under IDAPA 37.03.09, is responsible for properly abandoning wells and test holes.

Locating Unused Wells

Old well locations may not be obvious. Pipes sticking out of the ground around the homestead or under an old windmill are the most common places for finding unused wells. A depression in the ground may indicate an old well. Also, wells were often drilled in basements of houses, under front steps, or near old cisterns.

Proper Well Abandonment

IDWR administers the laws regulating well abandonment (see Resource Directory, p. 3-7). Well drillers and landowners are required to follow these laws so that the potential for aquifer contamination can be reduced. Knowledge of the geology of the well site and special equipment is often required to remove old pumps and piping and to properly install sealing material inside the well. Use of inappropriate materials and methods can lead to well settling, collapse, and continued groundwater contamination. Costs for well abandonment will vary with the well depth, diameter, and area geology.

You may perform proper well abandonment work on your own land, or an Idaho-licensed well driller can also be hired to close these wells. Regardless of who does the work, the minimum regulatory requirements must be met. Local well drillers can be helpful given their experience with well construction materials, and typically they have a working knowledge of the geology of the well site.

Water Testing

Keep an eye on ***water quality*** in existing wells by testing them annually. Wells should be tested immediately after construction and then at least once annually for nitrate and coliform bacteria. Well testing is particularly important for shallow wells, dug wells, sand-point wells, and wells that have shown contamination.

The water should also be tested:

- Before using a well that has not been used for a long time.
- When family or guests experience recurring or unexplained stomach illness.
- If there are individuals who may be at increased risk like infants and pregnant or nursing women.
- If your neighbors find a particular contaminant in their water.
- If you note a change in water taste, odor, color, or clarity.
- If you have a spill or back siphon of chemicals or petroleum products near your well or on your homestead.
- When there has been a significant change in land use in the area.
- If the presence of an old landfill has been discovered nearby.

What Do I Test For?

A good initial set of tests for a private well includes hardness, pH, conductivity, corrosivity, chloride, nitrate, coliform bacteria, and sometimes lead, arsenic, zinc, copper, and other metal contaminants.

Nitrate occurs naturally in many watersheds. Nitrate levels above the federal drinking water limit of 10 milligrams per liter (mg/L or parts per million) should not be consumed by infants under one year of age or pregnant women. High nitrate in groundwater often stems from agricultural activities such as fertilizing and manure from animal feed lots.

Lead in drinking water can be a health concern particularly for children and pregnant women. The lead level should not exceed 15 micrograms per liter (µg/L or parts per billion). Sample for lead if you have lead pipes or copper joints with lead solder, or if you draw from surface water. Soft or acidic water can accelerate lead leaching from the plumbing system.

Annually test for total coliform bacteria, which is the standard bacteriological test conducted on drinking water supplies. Total coliform bacteria are a group of closely related bacteria genera, where some species are found in fecal matter, and some species are found in soil and plant material. The presence of total coliforms is an indicator of system vulnerability. If your drinking water sample shows the presence of total coliforms, many laboratories will automatically test for the presence of fecal coliforms. Presence of fecal coliforms indicates fecal contamination of the water source, either through an animal source or from septic systems. **If fecal coliforms are present, the water does not meet drinking water standards**. Certain bacteria and viruses from fecal sources are pathogens that, when ingested, can cause intestinal disorders and diseases (e.g., hepatitis). A short-term fix for coliform contamination is boiling water; a long-term solution is disinfecting the supply (chlorination or ultraviolet light).

Laboratory tests for other possible contaminants can be expensive so you will probably not have them done unless you suspect a specific problem. For example, you may want to test for volatile organic chemicals (VOCs) if a nearby spill or deposit of oil, petroleum, or solvent has occurred.

A high concentration of iron in groundwater will cause stained porcelain and may be unpleasant to taste, but it is not harmful.

Follow the laboratory's instructions for water sampling to ensure accurate results. Use only the container provided, and return the samples promptly. Bacteria sample bottles are sterile and must be returned to the lab within a short, specified time limit. Request that drinking water methods be used to test your water. Contact PHD or IDEQ for assistance in interpreting test results (see Resource Directory, p. 3-7).

If your property is within the Institutional Controls Program (ICP) Boundary, it may be under the Basin Property Remediation Program. IDEQ contractors can sample private well water at the tap for lead and arsenic. Refer to the ICP boundary website to see if you qualify, or contact the IDEQ office in Kellogg at (208) 783-5781 (also see Section 11, Heavy Metals).

Call PHD or IDEQ
to learn more about having your drinking water tested
(see Resource Directory page 3-7)

Resource Directory
Safe Drinking Water

Panhandle Health District 1 (PHD)

Kootenai County, Environmental Health
8500 N. Atlas Road
Hayden, ID 83825
(208) 415-5200

Kellogg Office
114 W. Riverside Avenue
Kellogg, ID 83837
(208) 783-0707

Institutional Controls Program (ICP)
114 Riverside Avenue
Kellogg, ID 83837
(208) 0707
www.phd1.idaho.gov/institutional/institutionalindex.cfm

Idaho Department of Environmental Quality (IDEQ)

Coeur d'Alene Regional Office, Drinking Water
2110 Ironwood Parkway
Coeur d'Alene, ID 83814
(208) 769-1422

Kellogg Superfund Office
1005 W. McKinley Avenue
Kellogg, ID 83837
(208) 783-5781

Idaho Department of Water Resources (IDWR)
Coeur d'Alene Regional Office
7600 N. Mineral Drive, Suite 100
Coeur d'Alene, ID 83815
(208) 762-2800

Other Resources

Well Construction Standards Rules
IDAPA 37.03.09
http://adminrules.idaho.gov/rules/current/37/0309.pdf

U.S. Environmental Protection Agency (USEPA)
www.epa.gov/safewater/

Risk Assessment Worksheets
Safe Drinking Water

Assessment Worksheet 1 - Drinking Water Well Location

The assessment worksheet below will help you identify potential environmental risks related to your drinking water. For each question, indicate your risk level in the right-hand column. Some choices may not correspond exactly to your situation. Choose the response that best fits. When finished, turn to the Safe Drinking Water Action Worksheet on page 3-11 and record your medium and high-risk practices. The goal is to lower your risks. Use the BMP recommendations provided in this section to help you decide how to best reduce your risks.

	LOW RISK	MEDIUM RISK	HIGH RISK	YOUR RISK
Position of well in relation to contamination sources	My well is upslope from all potential pollutant sources. No surface water runoff reaches the well. I divert surface water from the well area.	My well is level with, or downhill from, potential pollution sources. Some surface water runoff may reach the well.	My well is downhill from pollution sources or in a depression. Surface water runoff reaches the well.	☐ Low ☐ Medium ☐ High
Separation distances between well and pollution sources (suggested minimum separation distance is 100 feet)	Distances from potential pollution sources for my well meet or exceed all minimum requirements.	Some but not all distances from potential pollution sources for my well meet minimum requirements.	Distances from most or all potential pollution sources for my well do not meet minimum requirements.	☐ Low ☐ Medium ☐ High
Soil type	My soil type is primarily Class C soil, which is fine-textured, like clay loams or silty clay.	My soil type is primarily Class B soil, which is medium-textured, like silt or loam.	My soil type is primarily Class A soil, and is coarse-textured, like sand, sandy loam, or gravel.	☐ Low ☐ Medium ☐ High

Assessment Worksheet 2 - Well Construction and Maintenance

Use the worksheet below to rate your risks related to well construction and maintenance.

	LOW RISK	MEDIUM RISK	HIGH RISK	YOUR RISK
Well age	My well was constructed since Idaho well guidelines were enacted in 1987. I have it inspected annually.	My well is about 20 years old and is inspected every 2 or 3 years.	My well was installed over 50 years ago, and I don't remember the last time it was inspected.	☐ Low ☐ Medium ☐ High
Casing height above land surface	The casing extends 12 or more inches above the surface. If the area floods, the casing is above flood levels.	The casing is at the surface or up to 12 inches above the surface.	My well has no casing present. My well is hand-dug. The pump is at or below ground surface.	☐ Low ☐ Medium ☐ High
Condition of casing and well cap	No holes or cracks are visible. The cap is tightly attached. A screened vent faces the ground. There is no space around the pitless adapter.	My casing is showing visible stress fractures. The cap is loose, and no screen is present.	My casing has visible holes or cracks. The cap is loose or missing. I can hear or see running water. Sunken ground around the casing is evident.	☐ Low ☐ Medium ☐ High
Casing depth and surface seal (see well log for this information)	The casing extends below water level in well and is more than 18 feet below surface. At least 18 feet of surface seal is in place, or into the confining layer above the aquifer in which the well is completed.	My surface seal is less than required depth.	There is no surface seal.	☐ Low ☐ Medium ☐ High
Backflow protection	I have installed anti-backflow devices (such as check valves). There are no cross-connections between water supplies.		I have no anti-backflow devices. An air gap is not maintained. There are cross-connections between water supplies.	☐ Low ☐ Medium ☐ High
Water testing	My water is tested annually, and records indicate consistent, satisfactory water quality. Bacteria, nitrate, and other tests meet standards.	I test my water regularly. Bacteria, nitrate, and other tests do not meet standards some of the time, but I monitor them closely.	I do not have my water tested. Water taste, clarity, and smell change throughout the seasons.	☐ Low ☐ Medium ☐ High
Unused wells	There are no unused wells on my property, or there are unused wells that are properly sealed.	There are old wells on my property, but they are maintained to keep out contaminants.	There are unused, unsealed wells on my property, near the lake or drinking water well.	☐ Low ☐ Medium ☐ High

Assessment Worksheet 3 - Drinking Water Source and Conveyance System

Use the worksheet below to rate your risks related to drinking water sources from the lake and its tributaries. *IDEQ does not recommend drinking from lakes or any other surface water source without an approved treatment process.*

	LOW RISK	MEDIUM RISK	HIGH RISK	YOUR RISK
Drinking water source	My water comes from a deep groundwater source (over 20 feet deep), with a properly constructed drilled well.	My water comes from shallow groundwater source (under 20 feet) and a hand-dug or driven-point well.	My water comes from the lake or another surface water source (streams, creeks, ponds). My pump and pipe extend into the water.	☐ Low ☐ Medium ☐ High
Separation distances from surface water to pollution sources (suggested minimum separation distance is 100 feet)	The distance of my water source from potential pollution sources meets or exceeds all minimum requirements.	There are some potential pollution sources for my surface water drinking source that do not meet minimum separation requirements.	The distances from most or all potential pollution sources to my drinking water source do not meet state minimum requirements.	☐ Low ☐ Medium ☐ High
Home water-treatment system for surface water	I use a two-step treatment system. My water is fine-filtered through a membrane filter certified by the NSF for Giardia and Cryptosporidium cysts. My water is disinfected by boiling, using chlorine, or by ultraviolet light.	I use a granular-activated carbon filter (generally a good filter, but water should be disinfected).	I have no treatment, system, or I use a screen wrapped around the end of the pipe.	☐ Low ☐ Medium ☐ High
Water testing	I test my water annually. My records indicate consistent, satisfactory water quality. Bacteria, nitrate, and other tests meet standards.	I have tested my water once in the last 5 years. Bacteria, nitrate, and other tests do not meet standards some of the time, but I am monitoring it closely.	I do not have my water tested. My water's taste, clarity, and smell change throughout the seasons.	☐ Low ☐ Medium ☐ High

Action Worksheet
Safe Drinking Water

Write all high and medium risks below.	What can you do to reduce the risks?	Set a target date for action.
Sample: Water hasn't been tested for 5 years. Does not taste like it used to.	Contact IDEQ or PHD for information on water testing.	One week from today.