



Protecting your well system – Before the flood

FACT SHEET SWP-113

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Spring flooding happens throughout Montana. Other than being on high ground there is often little you can do to avoid having your well system submerged by flood waters. There are no guarantees, but the following are actions you can take that should reduce the costly damage that a flood can cause to your water system, that ensures you have water to drink and that your family's (or other water consumers') health is protected.

Store up drinking water before the flood

Many municipalities will pump water to all of their water storage tanks, filling them to capacity in anticipation of having their wells off-line during the flood. On a smaller scale a homeowner or small business can rent a poly tank (cistern) and have it delivered. This tank can be filled with drinking water for a family or business. The tank should be thoroughly cleaned before filling and the water should probably be chlorinated (while in the tank) to prevent bacterial growth. If large volume storage of water is not an option (such as utilizing a water storage tank), a small household can get by using water purchased from a retail outlet or water bottler. Commercial bottled water will often come with some sort of dispenser for household use. Similarly, a homeowner can use their own water cans and fetch water from neighbors or other water sources that are not impacted by flooding.

Protect your well system equipment

Electrical power shutoff - Water well pumps almost all operate using electrical power. Regardless of whether a pump is a submersible pump down in a well or it's a turbine or jet pump mounted at the surface, the electrical supply to this water system needs to be turned off at the nearest high-and-dry breaker switch. This is both a safety issue (due to the potential for electrocution) and to protect electrical equipment. This switch may be in your well house, home, business, or it may be on the electrical power pole located near your property. If the switch is on the power

pole, disengaging the switch requires you to contact your electrical power company.

Equipment removal - Many community water supplies that face periodic flooding will actually remove all of their surface mounted turbine pumps from the wellheads in anticipation of the oncoming flood. These pumps will be taken to a safe (dry) location for storage until after the flood event passes. It is recognized that all floodwater contains fine suspended sediments (clay and silt) that will deeply penetrate into anything submerged in that water. No matter how thoroughly a pump motor is cleaned after a flood, its service life has been dramatically shortened by the fines that couldn't be removed. For a small business, farm, or home using a turbine pump or jet pump mounted on the well head, it is suggested that the pump be disconnected and removed to a dry location until after the flood. Note: you should turn the power off before removing any electrical equipment from service. Likewise, any electrical powered pumps used to regulate pressure in lines, lift water to distribution points of use, or other uses should also be removed to higher ground. This should probably include any electrical pressure switches or other similar devices that can and would be impacted by water and/or fine sediment penetration.

Protect your water quality

Any flood water that enters a well or water system will contaminate that system with bacteria, protozoan's, or other serious pathogenic organisms. These organisms are a health risk and can be difficult and costly to eliminate from a water system. As such, it is best to take careful steps to prevent floodwater entry into the water system.

Sealing pipes, lines, or other openings - The Equipment removal section above discusses removing electrical equipment to protect it from floodwater damage. Any pipe, drain, electrical conduit, or other opening that remains after equipment is removed should be carefully sealed off as floodwater may use any or all of these to enter the distribution lines and the well. Detailed protocols have not been established for sealing these openings, but there is tricks-of-the-trade or suggested ways to keep flood water from entering the water system and the well through these apertures. The ends of these lines or pipes should be plugged and covered with multiple layers of plastic sheeting. Garbage or other household plastic bags are common and available for this use. A watertight seal should be made by affixing the bags to the line ends by generously wrapping the pipe and bag with electrical tape followed by duct tape.

Protecting the well – According to the well drillers rules detailed in the Administrative Rules of Montana, well casings are supposed to stand at least 18-inches above the established 100-year floodplain elevation or capped with a watertight seal and vented above flood level. In the event that your well is on low ground and doesn't have a watertight seal, DEQ provides the following suggestions.

If a surface mounted turbine or jet pump has been removed from the top of a wellhead, the well casing will have openings and/or pipes extending above the casing or well cap. If the well cap has been removed, some sort of well cap should be placed back on the casing (preferably a water tight well cap). The casing, the openings in the well cap or any pipes that stick up out of the well need to be sealed off. As with the sealing of water lines or conduits, the well casing can be plugged and sealed off using multiple layers of plastic that are affixed to the casing using electrical and duct tape. Large lawn bags are probably suitable for this job. Care should be taken to ensure that the multiple plastic layers have the strength to endure the head pressure of several feet of water above the wellhead. Plugs or caps may be employed on pipe/line ends or openings in the well cap prior to covering the well casing with plastic.

If you already have a sanitary well cap (gasket) on the well, it is likely that this well cap has a screened vent that allows the well to breathe during pumping and recharge. The screened vent protects the well under normal circumstances, but won't keep floodwater out of the well when the wellhead is submerged. It is suggested that the vent hole be plugged and the wellhead (well cap and all) be sealed with plastic as described above. Note that many or most wells have an electrical line and its conduit that enters the well through the well cap. These electrical conduits may only extend a few inches underground with the electrical wire directly buried below that. Many of these electrical conduits are separated from the well caps. Both of these situations will allow floodwater to quickly enter the conduit or enter the well cap through the conduit opening. The electrical conduit and the conduit opening in the well cap should be sealed by any and all means practicable. With the conduit effectively sealed against water entry, the wellhead can then be sealed with plastic as described above.

There are well caps designed to be used in wells located in subsurface vaults that are prone to flooding or where the wells are located in areas periodically covered by floodwater. Although no particular manufacturer or model of well cap is promoted by DEQ or in this bulletin, a good example of this well cap is one manufactured by Monitor. It is designed for use on their Monitor well caps (called a Monitor Snorkel Well Cap Vent). Under normal operating conditions; the Snorkel Vent will allows air to flow into

the well. When a flood occurs, the flood water pushes a precision float ball in a finely machined sealing surface, closing off passageway into the well. This air vent is rated for up to 25 feet of head (depth of water above the well cap). This well cap or one that operates in a similar manner during submersion should protect the well.



Ensure your water quality, after the flood

Always remember to have your water system tested for bacteria after a flood. Disinfection of the well and water system is also an excellent precaution to protect your health.