Spring Water Collection System

by kentdvm

Water is the most valuable commodity in the world. No water, no life. Clean, fresh water is even more precious and a spring is an excellent source. If you have a spring on your property, or ground which is persistently wet, this instructable will help you collect that spring water for your house, farm or garden.

Step 1: What Type of Spring Do You Have?

In general, there are two types of springs from which you can collect water. Usually we think of springs on the side of a hill where water emerges from a fissure in the rock. This type of spring is the easiest as water can be collected at its source by building a small collection basin or a spring box. There is another type of spring which occurs at lower elevations called a seep. Seeps are simply where water filters up through the ground from the aquifer and forms a small pool or a soggy, wet area. Developing a seep spring is significantly more work since you must dig to find the water source.

This instructable is about how to collect spring water from a seep.

1. A seep pool.

Step 2: Equipment & Materials

Here's a list of the basic equipment and materials you'll need.

Old clothes, work gloves and rubber boots

Shovels, including a hand trowel

Pick mattock (2nd pic)

Buckets and pails

#57 gravel

Plastic sheeting - 6ml

2' x 4' piece of 1/4" thick plastic for the headwall

1" PVC pipe and fittings

1" Uniseal gaskets & 1 3/4" hole saw

4 ft long level

Plastic barrel or box

Mess screen & hose clamps

Water testing kits

Advil

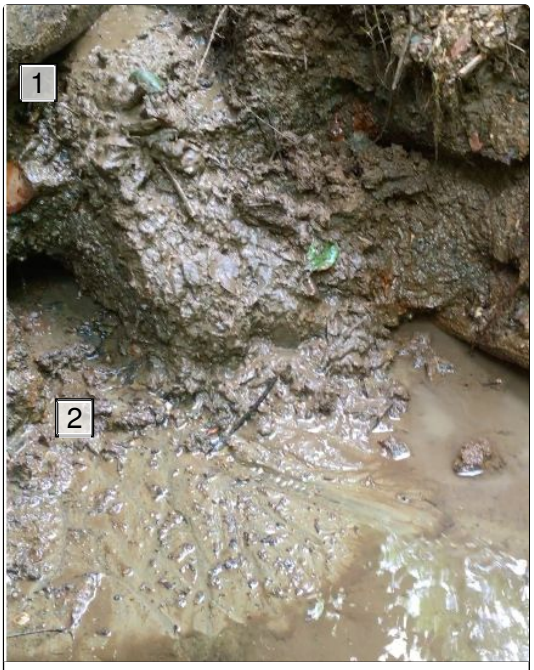
Step 3: Digging Out the Seep

One of the problems you'll encounter in digging a wet seep is that it is wet, very wet. The ground is saturated with water and you may not be able to use excavation equipment. Hand digging in the mud is the resultant task if the ground is too soft. It can be a bit like shoveling dry sand; throw one scoop out and two slide in. Determination and persistence are required, however, the reward is discovering new springs in your seep and watching the water flow increase.

Your experience will vary depending on your soil type and how much water is present. If your soil has more clay in it then you will have fewer problems as your soil is more stable. The area I was working in had water running on top of the ground and the top layer of soil was 18" thick silt. Lots of mud and muck.

As a newby I expected to dig a 3 ft diameter hole and hope I found enough water for my needs. The truth is that water within the soil (silt) began pushing behind the side walls of my dig causing them to cave in. "New" water would then flow into the hole and the size of my dig grew until I reached stable soil. This is maybe the worse case scenario although a lot of water is produced in the end. You may also encounter objects such as buried tree trunks and roots which obviously need to be removed. Dig and clean out your seep until you reach a stable clay bottom.

1. Drainage trench



1. Collapsing wall
2. Muck, mud & water

1. Buried tree trunk

1. Rock and clay bottom

https://youtu.be/y8ucPe4LFl4

Step 4: Dig a Discharge Trench

As you dig your hole it will fill with water and you will need to create a discharge trench lower than your dig. Not only does this drain the collected water it also carries a good deal of mud & silt with it. As your dig deepens continue to deepen the discharge trench as well. I found moving watery mud down the trench to be easier than scooping it out of the hole. While this requires continual cleaning of the trench you are standing on solid ground which is a bonus.

To save time, dig your trench along the line where you plan to place your discharge pipes. In this way you do not have to dig a 2nd trench for the pipe. This didn't work well at my site as the water was running in a different direction than I planned to run my piping and I dug 2 trenches in the end.

https://youtu.be/8rw37SsMNcA

Step 5: Encouraging Water Flow

Water moving through soil will continue to move downwards until it finds an impermeable layer and then runs on top of that layer. In a seep this is the clay layer where you will find trickles of water entering your dig. Removing the soggy soil around the water veins will typically encourage greater flow. Do not be too aggressive as it is theoretically possible to disturb the flow and lose it. In the second picture you can see the multiple small springs entering my dig and the holes I enlarged to increase water flow. Note some veins are opening in the walls while other are coming up through the clay bottom.

1. Spring
2. Spring
3. Spring
4. Spring
5. Spring
6. Spring
7. 2 springs in this corner
8. Multiple springs under this bank

Step 6: Install a Headwall and Collection Piping

Now that the digging is over it's time to fill in the hole you just dug. Makes sense, right? Before adding too much gravel, however, you'll want to install the headwall and water collection piping. I learned this technique from Engineer775 on YouTube https://www.youtube.com/channel/UCpDl4WPpgvvOeZFp... He has many videos on developing water sources including hillside & seep springs. You can even purchase a collection system by visiting his website. https://www.practicalpreppers.com

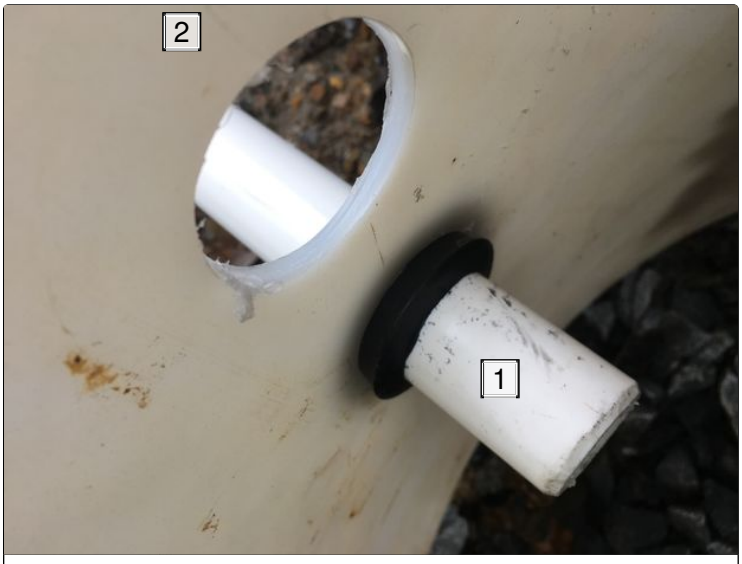
For the headwall you will need a hefty piece of plastic around 18-24" tall and 36-60" wide depending on your site. I recycled a piece of scrap plastic from a previous project, installed it and then packed clay on the bottom and sides, inside and out. Although it worked, the clay at my site was poor and I later replaced it with red clay I purchased.

Add 2 outflow pipes using 1" Uniseal gaskets. The 1" uniseal gasket requires a 1 3/4" diameter hole which is easily made with a hole saw. Soapy water can be used to push the PVC pipe through the gasket. Tapering the end of the pipe makes it easier to insert as shown in pic 3. The bottom pipe is the discharge outlet and the upper pipe is an overflow pipe.

Uniseal gaskets can be purchased here. https://smile.amazon.com/UNISEAL-Flexible-Tank-Ada...

Behind the headwall and laying within the gravel is a dual water collection pipe (goalpost shaped) with arms roughly 30" long. Multiple 1/4" holes are drilled through both sides of the 1" PVC pipe 3/4" apart on center. This double pipe connects and passes through the bottom hole. Above the collection pipes is a single overflow pipe in case the lower pipe is unable to handle all the water. The overflow pipe has holes drilled in it in the same fashion as the other pipes. As you add gravel beneath and over both pipes keep them as level as you can.

1. Uniseal gasket for 1" PVC pipe



1. Tapered end for easier installation
2. 1 3/4" hole

Step 7: Adding Gravel and Plastic

Due to the silty soil I added 36" wide plastic on the walls of my dig in an attempt to reduce silt entering my spring. This is not typically done but I thought it would be beneficial in my situation. Before installing the gravel, wash it to remove as much stone dust as possible. Keeping dirt and stone dust out of the spring is important.

Now get to shoveling! The gravel works to allow water to flow through it and acts as a filter to remove sediment. In the end I installed 2 1/2 tons of #57 gravel in my spring. Hopefully yours is less. Remember to keep your collection & overflow pipes as level as possible and place sufficient gravel under them for good support. Lastly cover the entire spring with 6ml plastic to prevent ground water and dirt from contaminating the spring.

https://youtu.be/ko6QoSKmKjc

Step 8: Enjoy Your Progress!

This is a very rewarding moment. With all that digging and gravel scooping done you get to see the results of your labor. Cold clean water! To find out how much water your spring is producing simply time how long it takes to fill a 5 gallon bucket. This spring is producing 4 gallons a minute which is more than I can possibly use.

1440 minutes in a day x 4 gallons/min = 5,760 gallons a day.

That's over 46,000 16 oz bottles of water a day. All that work was definitely worth it.

https://youtu.be/uGH_ZD1IL-g

Step 9: Cover the Spring

Inspired by your fresh water source it's time to grab your shovel again and cover up the spring. Avoid displacing the plastic cover as you backfill. If your site is flat you will want to mound dirt up on top of the spring to promote run off. Water standing on top of your spring could enter the spring and contaminate it.

My site has enough slope and is deep enough that I didn't create a mound initially. When I landscape the area more I plan to use excess dirt to enhance the slope and create a mound over the spring.

1. The headwall will eventually be covered completely

Step 10: Test Your Water

Spring water is usually fresh and pure, but not always. It is a very good idea to have your water tested for minerals, pH, hardness, and contaminants. It is also important to have the water cultured for bacteria, especially coliforms such as E. coli. Testing + culture cost me $68. In Georgia we are able to pick up testing kits at our county extension office. Your state may be similar. There are also commercial labs which are certified by the EPA to do water testing. https://www.epa.gov/dwlabcert/contact-information-...

Here is an excellent handout on water testing if you'd like to learn more. http://aesl.ces.uga.edu/publications/watercirc/Te...

Step 11: Add an Access Pipe

Following Engineer775's guidelines you should add a pipe for access to your spring. Via a tee fitting in the overflow line this pipe will allow you shock the spring with bleach if it is ever contaminated. After backfilling is complete the top of the access pipe will be the only thing left uncovered and visible. Leave this standing pipe a little long so you can trim it later to the proper height. To be honest, I don't think I can shock such a large seep spring through a single access hole. It does mark the location of the headwall however, and that may prove beneficial if a leak occurs.

1. Spring box
2. Access pipe for shocking spring with bleach through overflow pipe if ever needed.

1. Tee fitting in overflow line
2. Beautiful red clay. Excellent for stopping water

Step 12: Add a Spring Box

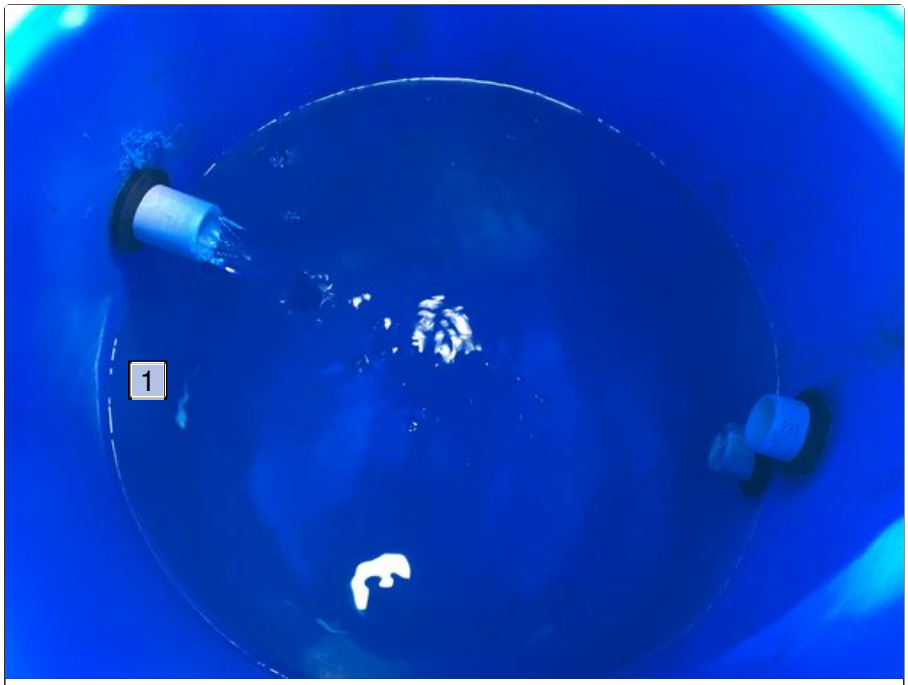
A spring box serves as a sediment basin where any impurities can settle out in the bottom. The box also allows access to water near the spring which may be important if you have the outflow pipe buried. At a minimum it provides an inspection port to evaluate the water being produced. Your spring box can be any accessible food-grade plastic container that's more than a few gallons in size. The blue barrel I used is 20 gallons and I used it only because I had it on hand. It also required more digging to bury which seems to be something I enjoy!

As you bury your pipe remember to slope it downhill so water will run away from the spring. Water must be able to flow freely without pressure towards the spring box so it does not backup behind the spring headwall. 1/8" per foot drop is sufficient, however, I increased that to 1/4" per foot as I figured that would get me somewhere between an 1/8" & a 1/4" per foot. Laying a 4 foot long level on your pipe, the end of the level closest to the spring box should be 1/2"-1" above the pipe. 1" divided by 4 ft = 1/4" per foot (1/2" = 1/8" per foot). Fill the trench under the pipe with gravel first to keep it at the proper slope.

Use 3 Uniseal gaskets and a 1 3/4" hole saw to install an inlet pipe, a discharge pipe and an overflow pipe in the spring box. The inlet pipe must enter the box above both the discharge pipe and the overflow pipe to prevent back pressure. Water will exit through the lowest pipe, the discharge pipe, and if that pipe were to become obstructed the overflow pipe would take over. Even when all the water is flowing out of the overflow pipe, the inlet pipe is still bringing water into the box unencumbered. This arrangement again keeps back pressure off of the spring.

https://youtu.be/Qbg--0HZIHE

1. Inlet pipe
2. Overflow pipe
3. Discharge pipe.



1. Reflection not tadpole or something similar

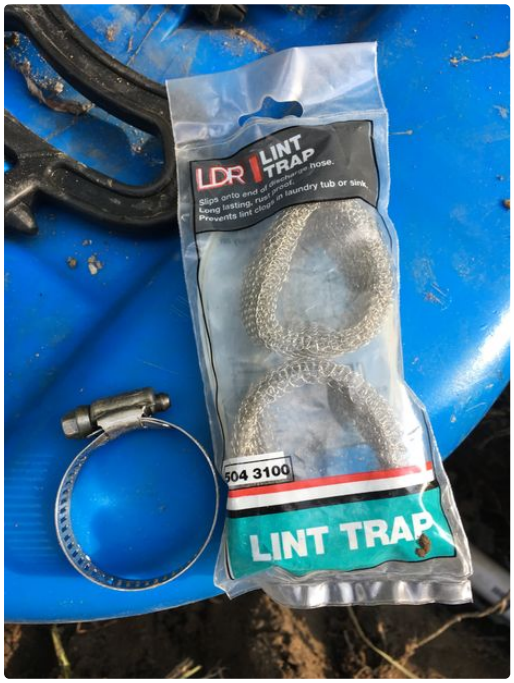
Step 13: Finish Laying the Overflow Pipes

Lay the overflow pipes using the same slope as before (1/8-1/4" per foot). Again place gravel under it for support. Add mesh or screen to the end of both overflow pipes (spring & spring box) to prevent critters and debris from entering. I found stainless steel mesh used for laundry sinks at Home Depot ($2.50) and it worked nicely with a hose clamp.

White plumbing PVC is not UV resistant and will become brittle overtime if left exposed to sunlight. Electrical conduit is PVC for running wires and is UV resistant. I used grey electrical conduit at the ends of the overflow pipes as I will not be drinking from them. Hopefully the grey electrical conduit will last longer in the sun.

Painting white PVC with latex paint is supposed to protect it from UV light and I plan to paint the exposed discharge pipe. If anyone knows of a better way, please comment.

1. Overflow pipe from headwall.



1. Electrical PVC
2. Plumbing PVC

1. Electrical conduit. AKA UV resistant PVC
2. SS mesh on overflow pipe to prevent critters and debris entering spring.

Step 14: Fill in Your Trenches & Landscape

More shoveling! Time to fill the trenches and do some landscaping. I used the red clay I purchased to cover the pipe with a stable soil. Further down from the headwall the ground is still very wet and the clay will hopefully protect the pipes a little. Next I will be seeding grass and covering the area with straw.

1. Water seeping up through the ground
2. This water is moving due to springs in the side of trench.

Step 15: Finishing Touches

During my digging I made a rock pile and decided to put those rocks to good use. I stacked rocks around the discharge and overflow pipes making sure not to put weight on top of them. My general technique was to use big stones on the perimeter and fill the center with small filler rocks. I also tried to alternate the direction of the stones to tie the stack together. At a minimum it's a nice place to sit and listen to the water.

Step 16: All Done.

This video shows the completed spring water collection system. Other than planting grass I don't plan on doing anymore work on it this fall. In the spring I may add a walk and a couple steps down to the bottom. I am also considering adding a hand pump to the spring box for filling larger containers.

Thank you for taking time to read about this project. I hope you found it helpful & informative. I look forward to your comments and questions.

https://youtu.be/lJD3RPNrPrw