

## Rainbarrel Workshop Recap & Step-by-Step Instructions

This recap provides a review of Acterra's workshop of Saturday, Oct. 31, 2009 and offers instructions on how to set up your own rainbarrel system. We encourage people to work together to provide technical and moral support! Sign up for a workshop and/or check out our installation at Pearson-Arastradero Preserve in the Palo Alto foothills, behind the office. If you're interested in rainbarrels & rainwater harvesting you should consider joining the mailing list: [water\\_harvesting@sanfranciscuito.org](mailto:water_harvesting@sanfranciscuito.org). Send subscription request to [info@sanfranciscuito.org](mailto:info@sanfranciscuito.org).

### Things We Learned

Here are some general tips we discovered during the process along with things to remember when setting up your system. A lot of this advice and wisdom was shamelessly stolen from various publications, websites and installations: special thanks to SFPUC, Santa Cruz RCD, City of Palo Alto and Greywateraction.org.

- ⇒ Size your system – this depends mostly on how much room you have and the size of your budget. Figure on about 3' diameter and \$65-70 per barrel if you buy all the parts and build the system yourself.
- ⇒ Set up the system on the north side of a building or other shady spot if possible. Many barrels are less than 100% opaque, which means they can admit algae-promoting sunlight. Some growth must be expected, but shade will help minimize it.
- ⇒ Hunt around for free or cheap recycled materials. Used pallets for example can be obtained for free from building supply stores or a variety of merchants.
- ⇒ Plan your downspout assembly(s) in advance. If you can situate the lead barrel close to an existing downspout, this makes installation less complicated. We elbowed our downspout several inches to the right so that we could hide the barrels behind the building.
- ⇒ Plan your overflow carefully. Where do you want the excess water to go? Generally the excess will flow back into the existing stormwater system or it will flow to the ground somewhere. When directing the overflow to the ground, you'll need to make sure it doesn't cause erosion, pool around a foundation or unexpectedly flow onto neighboring property.
- ⇒ Apply caulk to your seals during assembly. We initially used o-rings that came with the fittings, but these leaked slightly and our resident technical expert and perfectionist demanded a leak-proof installation. We removed the o-rings from inside the barrels and refitted the bulkheads with caulk. Any

waterproof caulk should suffice; follow the directions for the recommended curing times, usually 2-3 days.

- ⇒ Test fit the parts together at the hardware store(s). If you buy the same parts on our parts list you should be OK, but it's always good to test it for yourself.
- ⇒ Put mosquito netting on/under/over the water inlet, pressure relief holes, overflow tubes or any other openings to prevent mosquitoes from breeding. Mosquito abatement may be required per your municipal code.
- ⇒ Fit everything together before applying any cement. This will make it much easier to re-arrange fittings if needed.
- ⇒ Expect at least one aspect to prove challenging. For us it was setting up a level base, although we expect this will be much easier in most locations.
- ⇒ This doesn't require the precision of Mars mission and there is no single "right way" to build a rainbarrel setup; your mileage may vary somewhat depending on the availability of parts. Design your own fittings if you like and let us know how they work!

### Installation Steps

1. Start with a firm, level platform. Uneven surfaces can result in overturned barrels or may reduce capacity. We constructed ours out of reused pavers, bricks, pressure-treated lumber, other lumber and pallets. Use a carpenter's level to make sure the platform provides a level base.
2. Drill drain holes about 4" up from the bottom of the barrels. We used a 1-3/16" hole bit, but your diameter might vary if you use different hardware. Leaving 4" on the bottom gives sediment a place to settle out. In the summer after the rainwater is used up, we can disconnect the barrels and dump out any sediment and/or stale water. An alternative would be to install drain plugs at the very bottom of barrels.
3. Install the bulkhead fittings. It really helps to have two people for this job, and slip-joint pliers make the job a lot easier. Use the pliers to hold the nut on the inside of the barrel and have the person on the outside screw the male end into the nut. For our last barrel we used a bulkhead fitting with a 90° bend for easier connection with the conduit. The fittings should be snug but not overly tight or you'll risk breaking them. We applied waterproof caulk to the fittings during assembly to reduce the chance for leakage.
4. Connect tees to the bulkhead fittings. There are various way to do this, and we chose to use 2-3" pieces of unlined electrical conduit for the tees and

bulkheads we had that day. Other tees may fit right onto the bulkheads, as we found during our follow-up workshop in Menlo Park.

5. Place the barrels in their desired locations. Generally they'll be touching one another but they don't necessarily have to, and in fact can be around a corner for instance. For maximum storage capacity though, they should be as level with one another as possible.
6. Measure the distance between the tees and cut appropriate lengths of connector material. We used more of the flexible electrical conduit, but rigid PVC pipe or other material can also work fine.
7. Connect the barrels together. Don't cement until you've connected all the barrels and made sure they're placed properly. You may need to adjust the lengths of your connections. Depending on the snugness of the fittings, cement might not be needed – you'll find out after the first good rainstorm!
8. Prepare the water inlet on the lead barrel. You'll want an inlet roughly the same size or larger than the dimensions on your downspout so that water doesn't spill over the top of the barrel because it can't get in fast enough. We took a two-piece top and drilled three 3" holes in the lid and sandwiched mosquito netting between the ring and the lid. This gives plenty of space for water to get in and air to get out, provides good support for the mosquito netting, contains splash nicely, and is easy to clean! Trim excess mosquito netting with scissors for a tidy appearance.
9. Install the hose bibb. Insert the  $\frac{3}{4}$ " x  $\frac{1}{2}$ " bushing to the open end of the tee on the end barrel. Wrap some Teflon tape around the hose bibb and screw it into the bushing. When using Teflon tape, wind the tape two or three turns around the hose bibb, in the direction of the threads.
10. Drill pressure release holes in the lids of the 2<sup>nd</sup> through n<sup>th</sup> barrels. We drilled three small holes close together then used a bead of caulk around the hole(s) on the underside of the lids to attach a piece of mosquito screen.
11. Install the overflow pipe. The type of overflow pipe you install will vary depending on where you're directing the overflow. Make sure the overflow can handle anything that might come down the downspout; if it can't then you'll have water spilling over the top of your barrel. 3" drainage pipe worked well for us because it's cheap and easy to manipulate. We drilled a 3" hole near the top of the inlet barrel and inserted the narrow end of a 3" snap adapter into the barrel and secured it with some caulk. Once the caulk was dry, we covered the barrel end of the drainage pipe with a roughly 5" x 5" piece of mosquito netting and jammed the whole thing into the wide end of the snap adapter. We dropped about one foot of the other end of the drainage pipe down the existing storm drain. We installed another overflow

pipe on the last barrel, but instead of directing it to a storm drain we attached it to a 10' perforated piece of drainage pipe that will allow water to percolate into the soil.

## Resources

[Greywater Action](#) holds greywater workshops throughout California.

<http://greywateraction.org/>

Santa Cruz Resource Conservation District guide to stormwater:  
“[Slow it! Spread it! Sink it! A Homeowner’s Guide to Greening Stormwater Runoff.](#)”

<http://www.rcdsantacruz.org/PDF/Resources/Brochures/HomeDrainageGuide.v25.pdf>

[City of Palo Alto stormwater rebate page:](#)

[http://www.cityofpaloalto.org/depts/pwd/flood+\\_storm/stormwater\\_rebate/default.asp](http://www.cityofpaloalto.org/depts/pwd/flood+_storm/stormwater_rebate/default.asp)

[San Francisco PUC stormwater program](#) page:

<http://stormwater.sfwater.org>

Our mailing list is:

[water\\_harvesting@sanfranciscuito.org](mailto:water_harvesting@sanfranciscuito.org).