

Good evening and thanks for inviting me out to talk about Rain Water Systems.

I'm here to talk about Rain Water Systems and rainwater in general.

I'm going to talk about some general things and describe what these systems are, share some of my experiences and save time for some questions at the end.

I got in to this as sort of a side project for our gutter business. I had a popular custom raingutter business in Orange County and for some reason Google always liked our website so a large local manufacturer of rain barrels contacted me and asked me to put their product on my website and be their designated installation company when people called asking them for installation resources.

Sounded great, but there was a catch; I was asked to do the first system for free as a demonstration. I balked and at first said no. I had a well established business and while I wanted to diversify I didn't need to, and the thought of working for free didn't seem like a good way to start.

The representative from the company said to me, “ Look in to it. I guarantee you that there will be a revenue stream you step in to. “

I liked the sound of that!

So, I did the demo at a upscale nursery called Rodgers Gardens in Corona Del Mar, and it was there that I had my first epiphany about rainwater.

It was this; I hung a fifty foot piece of gutter and came back a few days later to hook up the rain tank and...the gutter was completely filled with water, even though no rain had fallen whatsoever.

I started thinking about what had been the primary driver of rain gutter sales over the years and realized that it had not been the rains in Southern California; it was the constant morning drip of condensation from the roof. Here now I had visible, measurable proof that there was a substantial water yield coming from an ordinary roof rain or shine. The yield from roof condensation is seldom if ever factored in to the R.O.I. Of a system. It's not factored in to our estimated rain yields when we do an estimate, but it's real; the morning dew yields a LOT of water on an annual basis.

The more I learned the more excited I got and suddenly rainwater harvesting became the primary focus of my business.

WHAT IS RAINWATER HARVESTING?

Rainwater harvesting is the accumulation and storing of rainwater for a later use before it hits the ground.

But before I get in to the types of residential systems we've been doing in San Diego the last few years I want to touch on why this is such a passion for me. Forgive me in advance if the mention of God or religion is something that annoys you; its part of the story and it's brief and hopefully painless.

I was introduced to Larry and Carolyn McBride that had started a NGO called No

Thirsty Child. They heard from somebody who knew me and that I had a business involving water and they suggested we meet.

I received a link to this short video in my email.

<https://www.youtube.com/watch?v=YtBC3uY-r3M>

My family had a rain gutter business in Salt Lake City and I remember a lot of winter days where the gutter would fill up with water as fast as you could hang it from the snow melt. You'd have to cut the holes in to the bottom of the gutter with it full of icy slush water and one arm sleeve would sometimes crust over with ice. Needless to say, California is a outdoors workers paradise and under no circumstances would I subject myself to working outdoors in winter.

Fast forward to 2008 and, lets just say...the nature of our business changed along with the rest of the construction economy. People started to think and look less for RAIN GUTTERS, but, the tide was turning towards “ green “ building. The old fashioned way of advertizing, being the yellow pages changed, and suddenly it was all about the internet. Way back when you had all these companies starting with the letter “ A “, like AAA Plumbing, Acme Sheetmetal, Ace Hardware. The reason was simple; the yellow pages had free listings in alphabetical order and people had short attention spans back then like they do now, so A.B. Raingutters would sometimes do better than Spencers Raingutters, just by a combination of peoples inherent laziness with not reading the full listing and the phone books mandate to list everybody that had a land line.

Expand on Africa

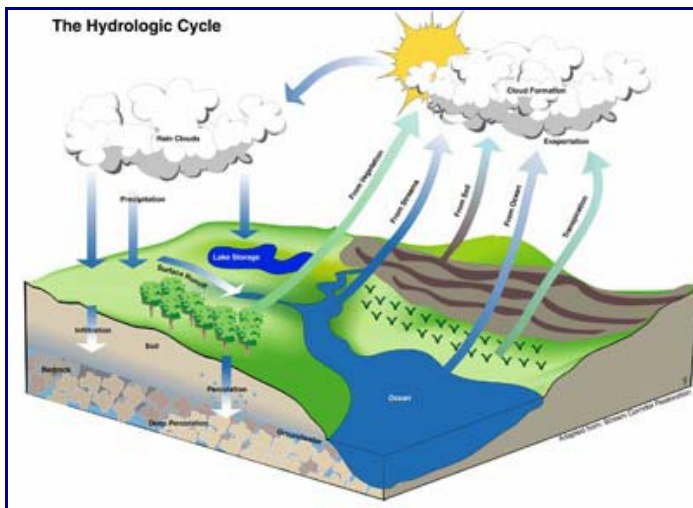
water testing

U.S. Quality Standards

(SERENITY SLIDES)

Our business name became Rain Water Systems when we started to make capturing the water from the roof our focus about five years ago.

Now, something cool happens when you get rid of the artificial environment of grass and tropical vegetation and replace it with native plants, wild flowers and edibles; your yard attracts hummingbirds, butterflies and adds to the ecosystem rather than taking resources out of it.



Rainwater is much better than potable water for irrigation, because of the lack of chlorine and other chemicals used in potable water treatment. Plants thrive with irrigation using stored rainwater and may grow 20%-30% more using rainwater than traditional municipal water or ground water.

Rainwater is valued for its purity and softness. It has a nearly neutral pH, and is free from disinfection by-products, salts, minerals, and other natural and man-made contaminants. Appliances last longer when free from the corrosive or scale effects of hard water, laundries use less soap and vehicles do not need to be dried to eliminate spotting.

Rainwater is much cleaner than the surface water we store in our lakes. By collecting it before it hits the ground or soaks into the ground most of the non-source pollution is eliminated.

Rainwater Harvesting



Rainwater Harvesting is a more environmentally correct solution to extend our water

supply then building new reservoirs or expanding current reservoirs. Its a very clean water. Much of our surface water is collected in reservoirs after washing all the pollution off the ground, [non point pollution](#). It then must be treated and pumped back to us for use. Rainwater harvesting collects the water before most of the pollution gets to it making it much easier to clean.

By storing rainwater you help reduce the initial stormwater runoff from impervious surfaces, which helps reduce the strain on our infrastructure, save energy and provide you with your own water to use as you please.

Rain water comes from the heavens. What could be better then that?

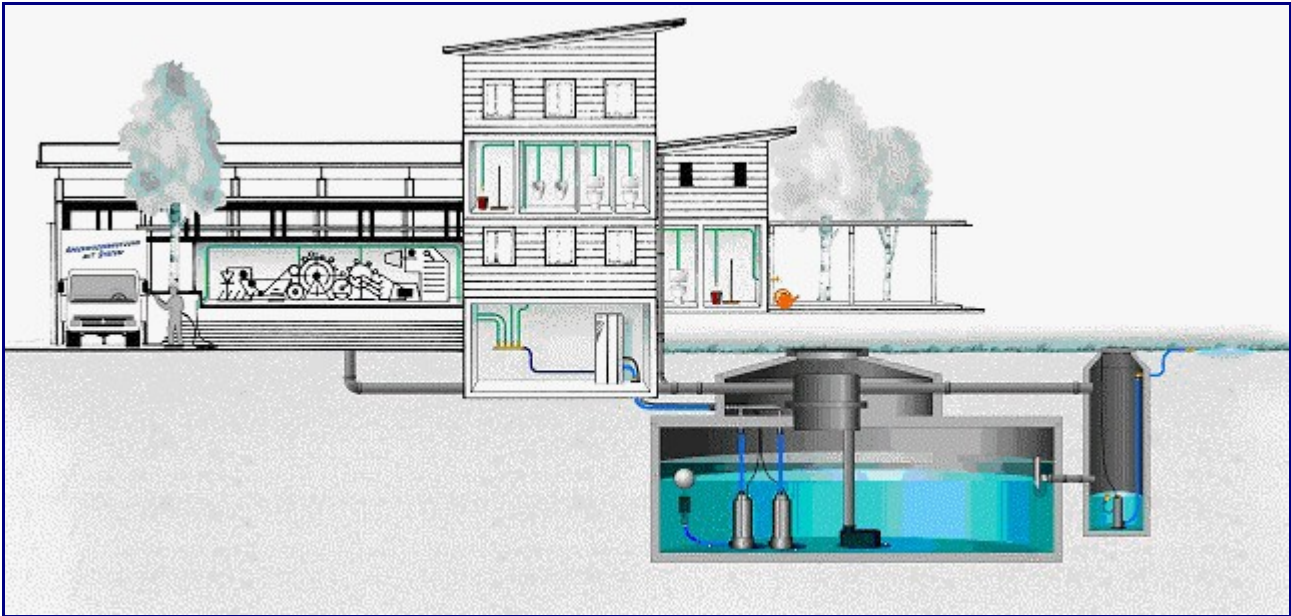
The quantity of rainwater collected can be estimated. From each square foot of the foot print of the building .642 gallons of water will land on the roof per inch of rain. Of that about 15% will be lost to wind, deflection and evaporation. By using a simple formula of 1/2 gallon per square foot of roof area for each inch of rain you can estimate your water capture. For example a 2,000 square foot roof will collect over 1000 gallons of water per 1 inch rain event and a 250,000 square foot roof will collect over 125,000 gallons of water.

Rainwater Harvesting is a more environmentally correct solution to free water then a well. Well water can contain minerals that may have to be treated before use and the cost of energy to pump water sometimes hundreds of feet to the surface can be significant. Wells draw down the water table which can lower rivers and lakes, as well as run dry. Ground water can be from decades to hundreds of years old. How long will it take to replenish that water?

Price is the biggest issue in purchasing a rainwater harvesting system and tanks are what makes up the bulk of the price. We price our systems by the gallon. Systems start at 300 gallons above ground and 1500 gallons underground. Systems usually run from \$1.50 to \$5 per gallon. Tanks can be installed up to 700,000 gallons or more. The smaller the system generally the higher the price per gallon. Installation, integration, access to site and aesthetics are factors considered when pricing a system.

This seems like a lot of money, but our systems should last 20 years or more only requiring maintenance to keep them clean and working. Water seems to be relatively cheap and plentiful, even here, in the Cadillac Desert where most of our water is pumped or imported. But how much does it cost you by the time it goes through your building and back to the utility. Clean rainwater can pay for itself quickly when considering the amount saved in water treatment.

Wells can cost thousands of dollars and the water usually contains minerals and salts. The quality of rainwater is what plants thrive on. Rainwater can increase plant growth more then 20-30% municipal and well water. The life cycle cost and the piece of mind knowing your plants are protected from drought with quality water and environmental stewardship should be reward enough for your investment.



If I could, I'm going to play some slides as I talk so you can get some visuals.

First up I thought I would show some examples of residential systems I've been involved with here in Southern California. I wished that I had kept track of the total numbers of storage capacity I've installed. It would be interesting as it's got to be in the hundreds of thousands of gallons now. At least I have these pictures as mementos.

EXPAND ON RESIDENTIAL APPLICATIONS (show overview slide).

The main misconception about rainwater harvesting is this; under-estimation of yield. The Math. People don't get it. They think its a sales pitch.

Our “ pitch “ starts with, where on your property do you have to store tanks? However big that is, we general sell the customer tanks to fill it because a) a roof always yields more than a customer can store and b) the larger the system the less the cost per gallon and the more practical it is to have a system that makes a difference in a bill. The dreaded R.O.I. Is mitigated by larger systems.

EXPAND ON THE MATH

We divide the capacity by 180 days (or six months) and get a per day yield if the tanks were full after a rain. For example a Bushman 1,100 gallon tank that is full to the overflow in March will yield 6.11 gallons per day for six months.

The chemistry in the cisterns (or as I call it, nutrients) are generally well absorbed by the landscapes and my customers report plant growth that is 40% higher than with city water. I know for certain the bean counters aren't factoring in plants that die from fluoridated water when the talk about R.O.I. On Rain Water Systems.

Contrary to popular belief, a well designed rainwater system will not go stagnant. The Chemistry is good for the plants as, they are what they eat too.

What we try to sell people on is viewing their roof and landscape as a micro-ecosystem. A properly planned and planted yard would require no more water than the roof yields and the storage of the home would be of a size as to accommodate that.

For example. Say you have a typical 1,200 square foot home and we have a typical rain year where we get twelve inches of rain (and by the way we don't measure based on anomalies like drought; we measure yearly rainfall on decade averages), the yield is in excess of 8k gallons per year so, if a landscape is designed around that yearly allotment of water then the exterior use of water for the home can be eliminated. The roof water the home yields becomes the primary source of irrigation,.

Rain Barrels the Myth

Many organizations and municipalities are promoting rain barrels. While rain barrels are a form of rainwater harvesting, they only hold a small amount of water. It seems to me they are promoted as the inexpensive or **cheap** solution to outdoor watering and they are. Water is one of the most important resources needed to sustain life and solutions for its use are usually sought out as the **cheap solution**.



Syrup Barrel

Why do we want to store something so special **cheaply**. Properly designed rain barrels offer a great storage vessel for patios and small gardens. However, rain barrels when not designed properly, usually becomes a source of algae blooms and messy cleanings. Many of the workshops now encourage painting to limit the light that encourages algae growth, but few if any incorporate the first flush which diverts the organic materials that feed the algae. Algae blooms involving toxin-producing species can pose serious threats to animals and humans. Why store dirty water that can be used for cleaning and watering? Why use bleach to kill the algae and water plants? Rain water can produce 20-30% more plant growth than chlorine or bleached water. Water can be stored for weeks untreated.

The small volume of storage in these little barrels cannot hold enough water to last through long unexpected droughts for yards or large gardens. The small volume does little to help reduce stormwater surges in urban areas. Even though the workshops promote the stormwater benefits, only a few hundred gallons of water can be captured from one downspout during a normal rain event. Few people I have seen try to capture all the water.

Even Coke promotes [rainwater harvesting](#) by giving away thousands of clear plastic barrels across the country. Will it really help? Sounds good on paper. There is also a new website [Rain Barrel Registry](#), where rain barrels through out the country can be registered for all to see and Coca Cola can have bragging rights to how much water can be saved. Good intentions, but not a lot of information about the practice of rainwater harvesting.



I am not opposed to rain barrels I just want them to have their place in the practice of rainwater harvesting. Many of the people I have approached in my business use hundreds to thousand of gallons per month for irrigation and outdoor water use. Most think a few rain barrels are the answer and want something **cheap**. Most rain barrels only hold about 50 gallons of usable water per container and to store 500 gallons it would take 10 to 12 barrels. What happens when there is no rain for weeks? Home owners spend of thousands and thousands of dollars over time on landscaping and water features for their yard. They need to learn to pay for the infrastructure to support and insure their investment. I believe rain barrel workshop attendees should be required to bring a few water bills. Water bills that track the use for a year are great or bring a January, July and August bill to track out door use and compare in door to out door or summer to winter use.

The stormwater benefits need to match the significant amount of water to match the total amount of

impervious surface on the property. The water needs to be held until after the storm has passed and the water on the land has had a chance to soak into the ground. A house with a foot print of 1800 sq ft should collect about 1000 gallons of water to mimic pre-development of 10% run off in its natural state,



Clean Rain

Rain barrels are sometimes called a gateway drug to rainwater harvesting. The term Gateway Drug was started as a myth by anti drug propaganda for marijuana in the 60's and 70's. Now marijuana is legal in several states. Rain barrels are marketed as a **cheap** solution to our water problem, another myth. Is it propaganda by utilities to not lose revenue from another source of water? Real education is needed on water use and proper education for collecting our rain.

Adding a filter and first flush to the system, clean water can be stored in barrels.



Decorative Barrel

By designing systems properly in both size and components an adequate clean supply of water can be captured for use. Rainwater harvesting systems stores and supplies water for when it is needed during dry weather and droughts. If stored in potable tanks rainwater can be a source of emergency water. Why store smelly, oxygen deprived, toxin filled water to water plants, wash cars and clean things outside or add chlorine that inhibits plant growth. Rain barrels can be used for small gardens and house hold needs. Many come designed to blend into the surroundings.

By investing the proper time and money in rainwater harvesting, true appreciation of water and what it takes to provide a clean source can be obtained. A properly designed system will last for decades and is

easy to maintain.