

Rain Barrels

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WSU COWLITZ COUNTY MASTER GARDENERS

PPT Don Enstrom & Art Fuller



Please mute your microphones!

If you have a question during the slide presentation press and hold the space bar while you speak!

This will minimize feedback!



Topics Covered:

- ▶ Why capture rainwater?
- ▶ Longview area rainfall.
- ▶ Legality.
- ▶ Safety.
- ▶ Constructing.
- ▶ Installing.
- ▶ Decorating.
- ▶ Commercial types.
- ▶ Larger systems.
- ▶ Calculating need.
- ▶ Maintenance.
- ▶ What to do with excessive water.

Why capture rain water?

- ▶ Store clean, chlorine free water for your plants.
- ▶ It's readily available, convenient and easy to do.
- ▶ You can save money on city water and conserve potable water – a scarce resource!
- ▶ You can reduce well demand, pump wear & tear, potable water usage, and energy.
- ▶ You can protect landscaping during drought conditions.
- ▶ You can improve the environment by reducing storm water runoff and its resultant erosion and pollution.

Free & Pure Rainwater!

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Unfortunately, all at the Wrong Times!

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December, 2007 in Chehalis

Photo by Jennifer Woodford, courtesy of King5.com

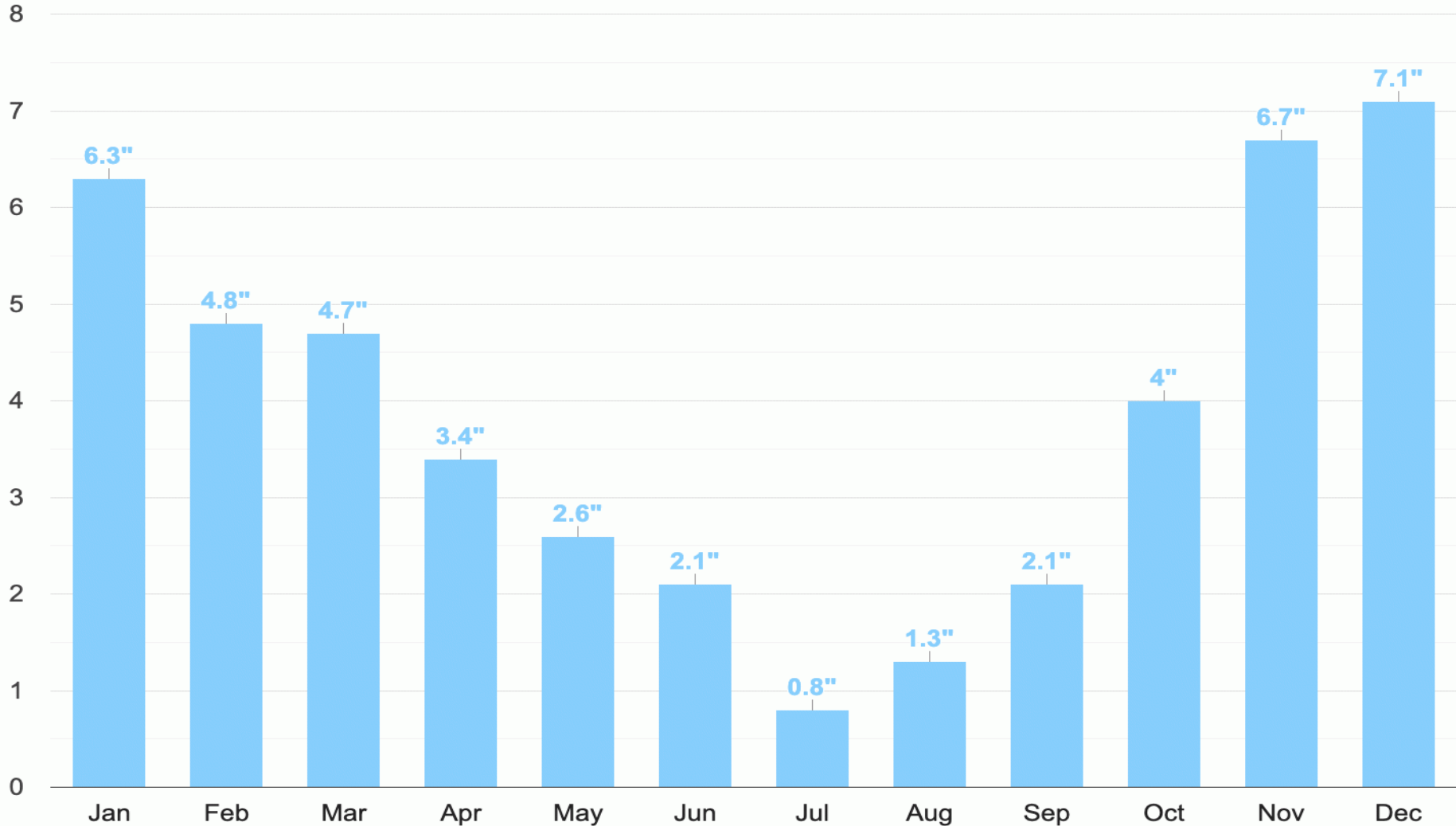


Longview Rainfall Graph for the Year:

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Rainfall - Longview, WA

Rainfall (")



Is it Legal to Collect Rain Water?

- ▶ Water right permit is not required and there is no limit on the volume of water collected & stored, provided:
 - ▶ Water collected cannot be sold and must be used on the same property where it is collected.
 - ▶ Rain Water may only collect from existing structures who's primary purpose is other than rain collection.
 - ▶ You cannot construct structures specifically to collect rain water.
 - ▶ Cannot adversely impact stream flows or other's water rights.

Is the water safe to drink or use on vegetables?

- ▶ Roof collected rainwater may contain contaminants leached from roofing materials and bacteria from bird droppings.
- ▶ Roof collected rainwater is not potable - do not drink it, do not give it to your pets.
- ▶ In irrigating vegetables, water at the ground level only.
- ▶ Be extra careful with plants that have edible greens - lettuce, spinach, beets, herbs, etc. Do not spray/splash onto foliage.
- ▶ If in doubt, you may want to have your stored water tested before using it on vegetables.

<http://www.sightline.org/2015/01/07/a-green-light-for-using-rain-barrel-water-on-garden-edibles/>

Is Rain Water from your Roof Safe?

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- Roofing Material Assessment: Investigation of Toxic Chemicals in Roof Runoff
 - Washington Department of Ecology, September 2014, Lacey WA
 - <https://fortress.wa.gov/ecy/publications/SummaryPages/1403033.html>


DEPARTMENT OF
ECOLOGY
State of Washington

Publications Home

Publication Summary

TITLE	Roofing Materials Assessment: Investigation of Toxic Chemicals in Roof Runoff from Constructed Panels in 2013 and 2014	
Publication number	Date Published	
14-03-033	September 2014	

 [Acrobat PDF format](#) (Number of pages: 118) (Publication Size: 1312KB)

 [Win Zip format](#) (Publication Size: 18MB)
Note: Zip files for App A, D, F

[List of Appendices and Appendix E](#)
(14 pages) (204KB)

VIEW NOW: [Appendix B](#)
(47 pages) (1MB)



Some Thoughts to Think about Prior to Collecting Rain Water:

- What materials are in your Roofing, Flashing, Gutters, Downspouts?
- What treatments have you applied to your roof?
- How old is your roof?
- What materials collect on your roof?
- What do you want to use the water for?

Types of Roofing Materials:

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Steep-Slope Panels

ID Code	Asphalt shingle – composite of 6 types of shingles with algae resistant (AR) copper-containing granules	ARR
	Asphalt shingle – composite of 6 types of shingles without algal resistant (AR) granules*	AS-1, AS-2, AS-3
	Copper	CPR
	Concrete tile	CTI
	Manufacturer-painted galvanized steel, painted with silicone-modified polyester paint	PAZ
	Manufacturer-treated wood shake, treated with chromated copper arsenate (CCA)	TWO
	Wood shingle	WOS
	Frosted glass (control) at steep slope	GST

Low-Slope Panels

	Modified built-up roof with atactic polypropylene (APP) granulated cap sheet	BUA
	Built-up roof with oxidized asphalt granulated cap sheet	BUR
	Modified built-up roof with styrene butadiene styrene (SBS) granulated cap sheet	BUS
	Ethylene propylene diene terpolymer (EPDM)	EPD
	Polyvinyl chloride (PVC)	PVC
	Thermoplastic polyolefin (TPO)	TPO
	Zincalume® (a trade name for Galvalume)	ZIN
	Frosted glass (control) at low slope	GLO




* Results of these replicates were systematically averaged in this study and denoted as ASA

And the Survey Says:

Roofing Material (Identification Code)	Estimated percent of roof area in Puget Sound basin*	Median concentrations across all 20 rain events				
		Arsenic	Cadmium	Copper	Lead	Zinc
Asphalt shingle with AR (AAR)	71	0.21	0.005	30	0.05^a	6.4
Asphalt shingle without AR (AS ^A)		0.08	0.005	2.1	0.06	2.7
Copper (CPR)	0.3	0.05	0.015	1,905	0.22	4.0
Concrete tile (CTI)	2.9	0.35	0.005	0.63	0.32	4.3
Painted galvanized steel (PAZ)	5.3	0.07	0.005	0.56	0.18	52
Zincalume® (ZIN)		0.08	0.005	0.50	0.18	114
Treated wood shake (TWO)	6.5	1,385	0.105	825	0.03^a	8.8
Wood shingle (WOS)		0.12	0.005	0.74	0.04^a	5.6
Modified built-up roof with atactic polypropylene (APP) granulated cap sheet (BUA)	13	0.06	0.005	0.51	0.03^a	2.9
Built-up roof with oxidized asphalt granulated cap sheet (BUR)		0.08	0.005	0.46	a	2.5
Modified built-up roof with styrene butadiene styrene (SBS) granulated cap sheet (BUS)		0.10	0.005	0.37	0.04^a	2.5
Ethylene propylene diene terpolymer (EPD)	unknown	0.07	0.005	0.38	0.13	57
Polyvinyl chloride (PVC)		21	0.005	0.43	0.17	5.1
Thermoplastic polyolefin (TPO)		0.06	0.005	0.48	0.12	3.5
Steep-slope glass control		0.07	0.005	0.40	0.14	3.7
Low-slope glass control		0.08	0.005	0.46	0.17	4.1

General Guidelines - If there is any doubt, Have your Roof Runoff Tested!

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	Aged Asphalt Shingles – without algae resistant (AR) copper-containing granules Manufacturer-painted galvanized steel, painted with silicone-modified polyester paint Aged Wood Shakes/Shingles - never treated
	New Asphalt shingles – without algae resistant (AR) copper-containing granules New Wood Shakes/Shingles Aged Treated Wood Shingles Concrete tile Any New Roof (1st year)
	Asphalt Shingles – with algae resistant (AR) copper-containing granules Manufacturer-treated wood shake, treated with chromated copper arsenate (CCA) Recently Treated Wood Shakes/Shingles Copper Roofing, Flashing, Gutters, Downspouts Lead Flashing Zinc Flashing No Moss Strips

Caution: Your Roof Runoff is no longer just Rain Water!

Warning! ¡Peligro!

Remember, the water in your rain barrel is NOT POTABLE.



Do not use it for drinking, washing or cooking. The water in your rain barrel likely will contain fecal coliform bacteria from bird droppings, and other potentially harmful microbes.

¡Agua no es potable! No se use para tomar, lavar, ni cocinar.

Graphic from Seattle Rain Barrel User Guide

https://www.seattle.gov/util/cs/groups/public/@spu/@conservation/documents/webcontent/cos_004351.pdf

Ready to Build a Rain Barrel?

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Here are the parts you'll need:

- ▶ Barrel.
- ▶ Hose bib.
- ▶ Screen and grate.
- ▶ Overflow hose.
- ▶ Fittings for downspout.
- ▶ Concrete blocks or other platform.



Ideas on Supplies:

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55 gal Barrel \$84



Diverter \$14.99



Screen \$15.99



Bib & Bulkhead fitting \$12.99



$\frac{3}{4}$ inch PVC elbow for overflow \$4.99

Constructing your Barrel:

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- ▶ Lay the barrel on it's side and be careful of any contents. Drill a 1" hole 2 - 4 inches from bottom of barrel to fit a $\frac{3}{4}$ " fitting.
- ▶ Teflon tape the hose bib, thread bib into hole and seal with silicon prior to tightening completely.



Or use a Bulkhead Fitting:

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- ▶ Drill a close tolerance hole for the sealing washer.
- ▶ Install the bulkhead fitting with hose fitting or valve.



Install the Inlet:

- ▶ Cut hole.
- ▶ Install screen.



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Add Overflow at Top:

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- ▶ Drill hole to fit your overflow elbow.
- ▶ Install fitting - sealant not necessary.



Installation:

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- ▶ Measure and cut downspout.
- ▶ Place on blocks or platform.
- ▶ Install overflow and direct away from house.
- ▶ Place screen over barrel (under lid).
- ▶ Think about safety - strap down barrel.



And You're Done!

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- ▶ Congratulations - you've built your rain collection and storage system using a recycled barrel and inexpensive materials.



Decorate your Barrel

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Or Purchase a System:

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- ▶ Prefer not to build a system?
- ▶ Pre-fabricated barrels are available with a screen, cover, valve and overflow built in.



50 gallon - \$99.74
Amazon – Oct 2020

Store Bought Systems:

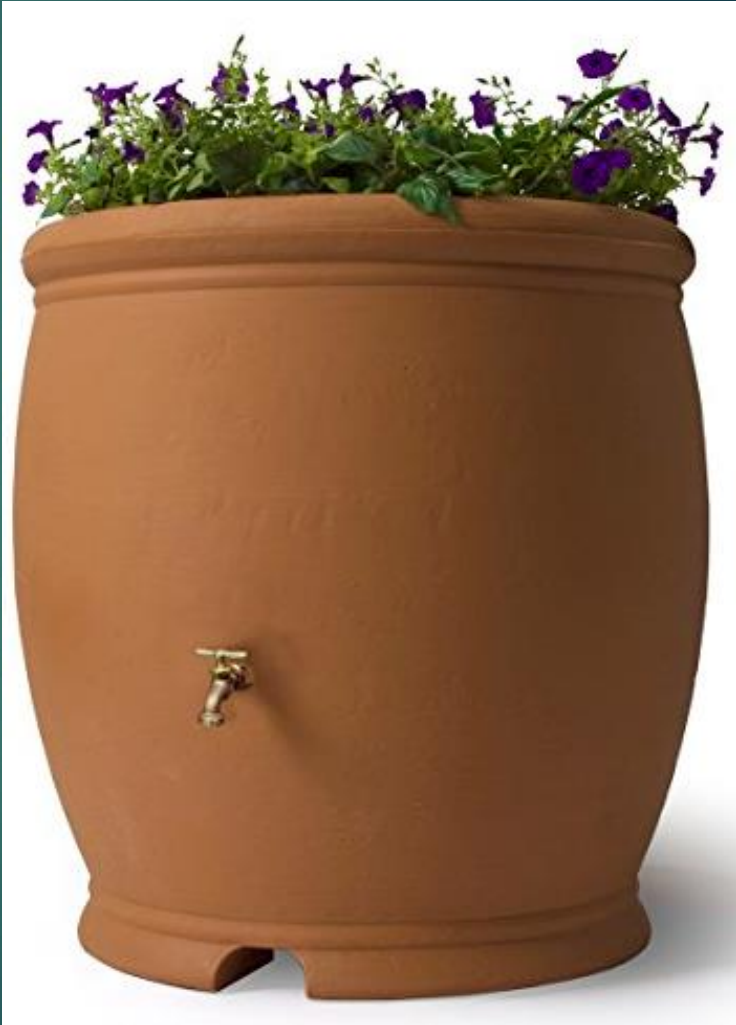
50 gallon - \$138



80 gallon - \$226



100 gallon - \$579



Store Bought Systems:

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90 gallon - \$217

Do You Want More Storage?

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- ▶ Its simple to add another barrel.



Connector Hose:

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- ▶ Drill holes in both barrels.
- ▶ Add connectors.
- ▶ Attach hose once barrels are placed.



Ex: Serial Filling & Storage:

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- ▶ 100 gallons.
- ▶ Simple filter.
- ▶ Separate draws for each barrel.
- ▶ Manual water draw.
- ▶ Good overflow design.



Ex: Ganged Barrels:

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- ▶ 200 gallons.
- ▶ Ganged barrels.
- ▶ Manual water draw.
- ▶ No filter.
- ▶ Is overflow adequate?



Ex: Parallel Storage:

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- ▶ 300 gallons.
- ▶ Distribution piping.
- ▶ No apparent filter.
- ▶ Overflow poorly designed.



Bucket Filter for Easy Cleaning:

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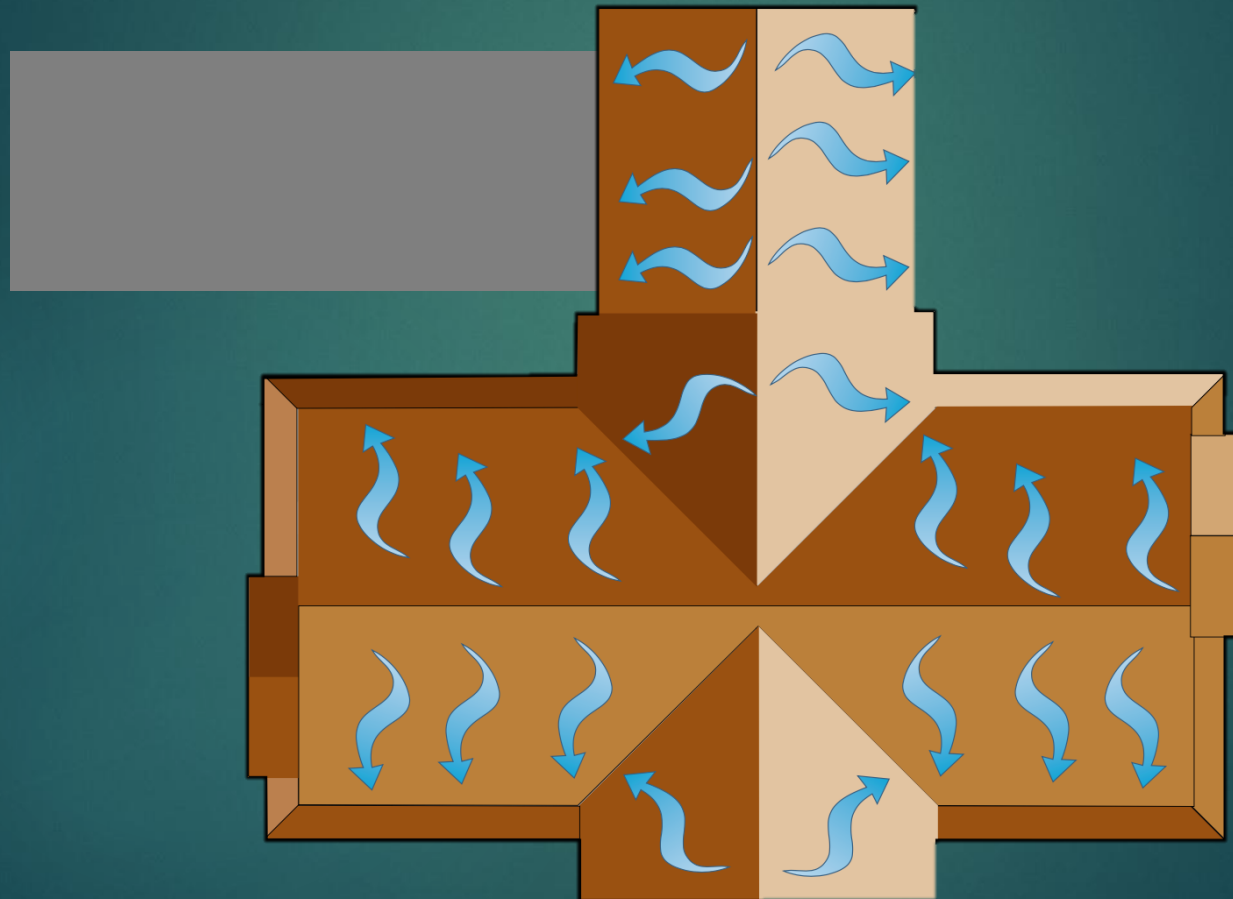


Designing Large Systems:

- ▶ How much can you collect?
- ▶ How much do you need?
- ▶ How much should you store?
- ▶ How do you transport the water?

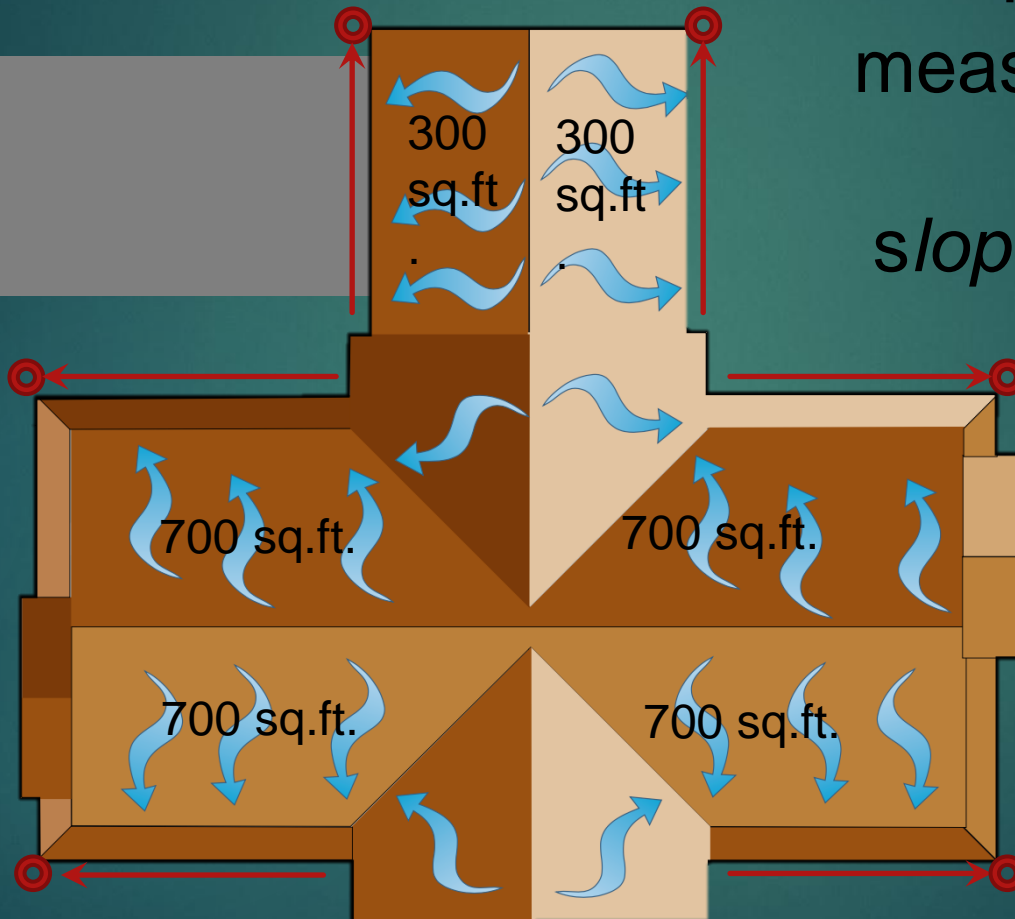
How Large is your Roof?

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How Large are your Collection Areas?

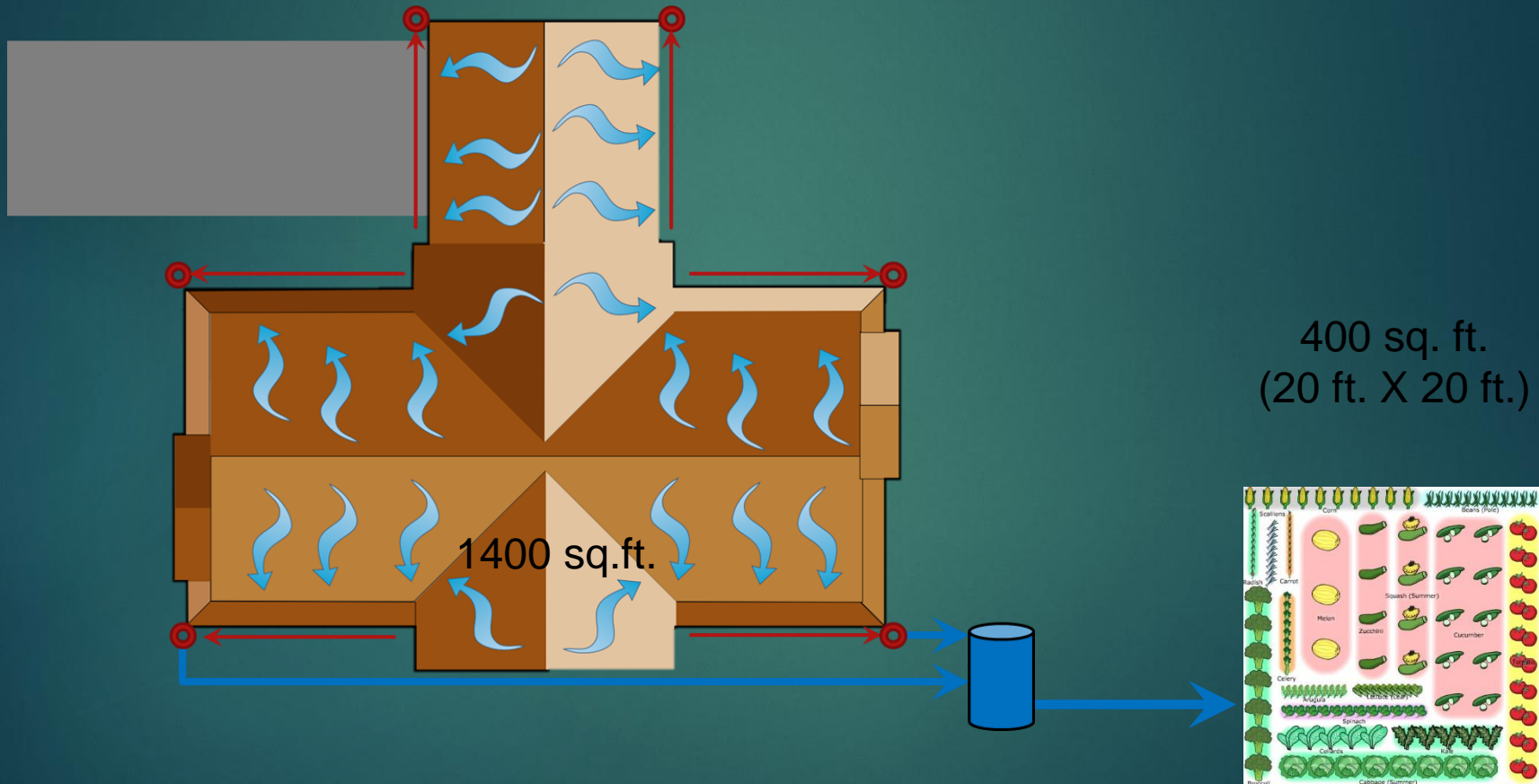
36



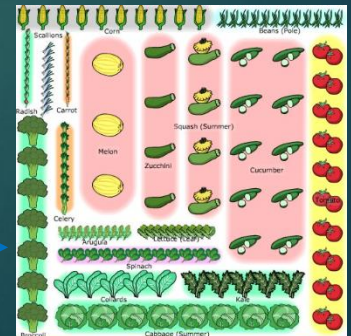
This foot print
measures 3400 sq. ft.
--
*slope & height do not
matter!*

How big an area do you want to water?

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400 sq. ft.
(20 ft. X 20 ft.)



Storing rain water on a large scale:

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Caged IBC Tote
275 gallon



Cisterns
1000-5000 gallon



Rules of Thumb for Calculating Storage Requirements

- ▶ An inch of rainfall falling on an area of 1.0 sq. ft. equals 0.623 gallons of water.
- ▶ A typical plastic food grade barrel will hold 50 gallons of rain water.
- ▶ Irrigating a garden requires 1.0" - 1.5" of water per week.
- ▶ Annual rainfall in the Longview area is about 46" per year, but summer drought rainfall (1 Jun through 31 Aug) is a very low 2.4 in. Longview gets precipitation on an average of 183 days per year.

Calculating Storage Required:

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- ▶ 1400 sq. ft. roof x 0.623 gallons x 46" = 40,121 gallons of rain water per year. (803 barrels, 145 totes, several cisterns)
- ▶ 400 sq. ft. garden x 0.623 x 1.25" x 11 weeks = 3,430 gallons of irrigation over the summer.

BUT - Irrigation requirement is offset by rain falling on the garden, and storage requirement is offset by rain falling on the roof during the summer.

400 sq. ft. (20 ft. X 20 ft.) garden x 0.623 x 2.4" = 600 gal.

1,400 sq. ft. roof x 0.623 x 2.4" = 2,100 gal.

3,430 - 600 - 2,100 = 700 gallons (14 barrels, 3 totes)

Pumped Systems (if gravity flow is not an option):

12 vdc
5.5 gpm 80 psi
\$54.99



110 vac
12.33 gpm \$99 can
run sprinklers



120 vac
5.5 gpm \$49.85



Design Summary:

We get plenty of rain water over the year, but we need the water during the summer drought ... so we need storage.

There are many ways to build your system, from the simple to the large & complex.

There is no “right” amount of storage ... design your system to be of a size & complexity that you are comfortable building and maintaining.

My 1st system:

275 gallon tote.

180 feet of 1" PVC pipe run underground which connects to a water faucet within my orchard.

I use this to water for newly planted orchard trees.

In use for 4 years.



My 2nd system: A 275 gallon tote used to water ornamental beds. In use for 4 years.



My 3rd rain barrel system: A 55 gallon drum collecting water from a treehouse. Used to water ornamentals. Just completed 10 Oct 2020.

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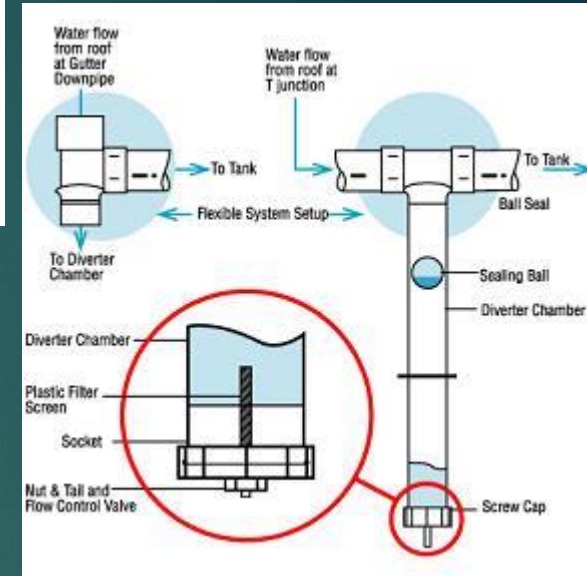
Maintenance & Accessories:

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- ▶ Keep the roof, gutters, and downspouts clear of dirt & debris.
- ▶ Direct overflows away from the structure.
- ▶ Empty above ground systems during freezing weather.
- ▶ Screens, Mosquito Dunk & Mosquito Bits help control mosquito, gnat, and fly breeding.
- ▶ “Leaf Eaters” help keep your rain barrels clean.
- ▶ “First Flush Diverters” help control sediments and bird drop bacteria.
- ▶ Timers & soaker hoses designed for gravity systems are available.



Rain Harvesting Pty Ltd
RHUL99 Leaf Eater Ultra
Rain Head- 3 in. Round

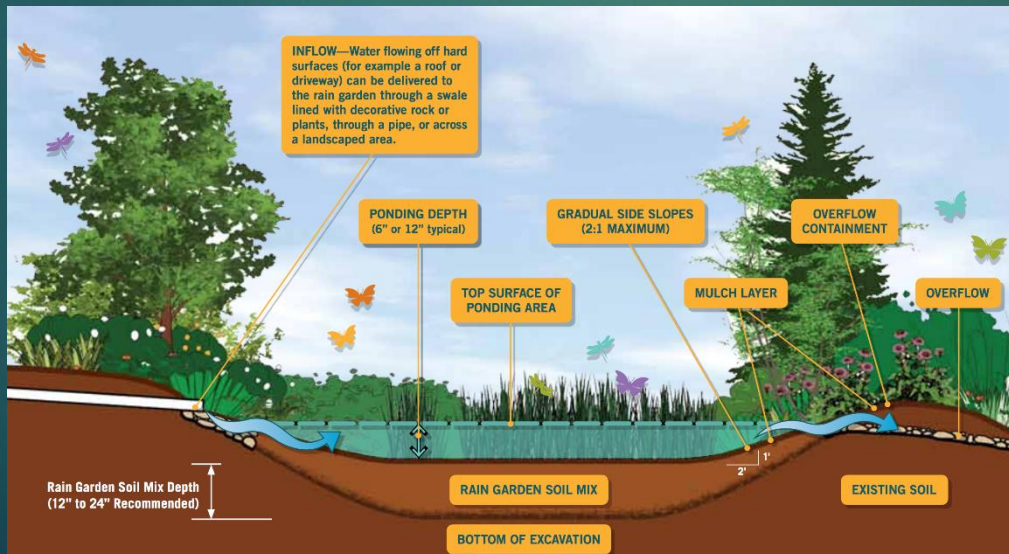


What about all that water you cannot collect and store?

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- ▶ Drain the overflow away from the building and the barrels.
- ▶ Consider Building a Rain Garden.
 - ▶ Prevent erosion, capture suspended solids, filter water.
 - ▶ Reduce your impact on the environment, recharge groundwater.

ext100.wsu.edu/raingarden/



Challenging Storm Water Solutions

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- ▶ Grassy Swales capture 50% of Total Suspended Solids.
- ▶ Your site may require imagination & creativity!



Breakside Brewery
Portland OR

In Summary:

- ▶ Why capture rainwater?
- ▶ Longview area rainfall.
- ▶ Legality.
- ▶ Safety.
- ▶ Constructing.
- ▶ Installing.
- ▶ Decorating.
- ▶ Commercial types.
- ▶ Larger systems.
- ▶ Calculating need.
- ▶ Maintenance.
- ▶ What to do with excessive water.

QUESTIONS?



References:

- ▶ Roofing Material Assessment:
<https://fortress.wa.gov/ecy/publications/SummaryPages/1403033.html>
- ▶ <https://www.sightline.org/2015/01/07/a-green-light-for-using-rain-barrel-water-on-garden-edibles/>
- ▶ Seattle Rain Barrel User Guide:
https://www.seattle.gov/util/cs/groups/public/@spu/@conservation/documents/webcontent/cos_004351.pdf
- ▶ <https://pubs.extension.wsu.edu/potential-contaminants-in-residential-rain-barrel-water-home-garden-series>
- ▶ Vegetable Safety:
<http://www.sightline.org/2015/01/07/a-green-light-for-using-rain-barrel-water-on-gardenedibles/>
- ▶ <https://www.weather-us.com/en/washington-usa/longview-weather>

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Visit:

<https://extension.wsu.edu/cowlitz/mg/projects/>

or

<https://www.cowlitzcomg.com/partners>

or contact

Gary Fredricks at WSU Extension Cowlitz County

Email: garyf@wsu.edu

Phone:(360) 577- 3014 ext 3

Presented by the
WSU Cowlitz County Master Gardeners

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M - F, 9 a.m. - 12:30 p.m.

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Upcoming Workshops:

How-to Mini-Workshops (Tuesdays @ Noon)

10/20	Beginning Bonsai
10/27	Flower Arrangements for Fall
11/3	Fall and Winter House Plant Care
11/10	Winter Container Gardens

MG Evening Workshops (Wednesdays @ 6 P.M.)

10/21	Tips for New PNW Gardeners
10/28	Affordable Landscaping
11/4	Critter Control in the Garden
11/11	Home Invaders; Unwanted Pests

All Workshops are Located at the Following Hyperlink:

<https://www.cowlitzcomg.com/lookingahead#minicourses>