Rainwater Harvesting for Landscape Use

Lincoln County Master Gardener Association

orcoastmga.org

What are we talking about?

- Rainwater harvesting — the collection and storage of rain to use as a primary water supply — it is one of the simplest and oldest methods of managing water supply
- We will also discuss some methods for distributing the water to garden locations
- For landscaping purposes

Source

EM 9101
Harvesting Rainwater for Use in the Garden

https://catalog.extension.oregonstate.edu/em9101

EM 9101 • December 2014

Harvesting RAINWATER for use in the garden

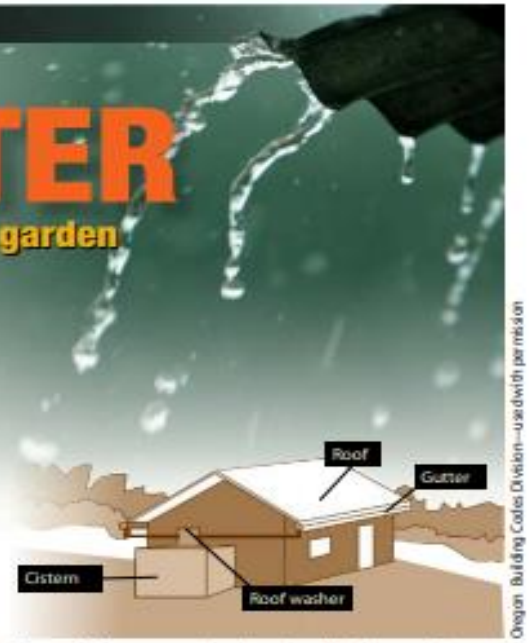
Sam Angima

Rainwater harvesting is the capture, diversion, and storage of rainwater for a number of different purposes. Although water is publicly owned in Oregon, state law allows residents to collect runoff from rooftops and store it in reservoirs, rain barrels, water tanks, or other containers. For those with small acreage property (ideally, less than 1 acre), harvested and stored rainwater can cut city and well-water consumption by providing an alternative source for irrigating landscapes, vegetables, or small fruit gardens.

Other than the initial cost of installing a catchment and pumping-and-delivery system, rainwater is free. Rainwater also tends to be pure, soft (fewer salts than city or well water), and near neutral pH (not acidic or basic). Capturing, storing, and using rainwater also helps reduce the intensity and flow of storm waters. If used to irrigate, rainwater helps flush salts off lawn and garden soils while reducing overall water bills.

Water Collection

The easiest and most common way for homeowners to harvest rainwater is through a rainwater collection system that includes a roof, gutters or roof drains, and a piping system to convey the water to and from a storage system. Designs range from a simple rain barrel at the bottom of a downspout for watering a garden to extensive cistern systems that can provide substantial amounts of water for large-scale and long-term uses. New filtration and treatment technologies make rainwater relatively safe to use. Rainwater harvesting systems can be installed in existing buildings or incorporated into new construction. Storage tanks can be inside or outside, above or below ground, or partially above and partially below ground (Figures 1 and 2).



Oregon Building Codes Division—used with permission

Figure 1. Above-ground rainwater collection and storage system.

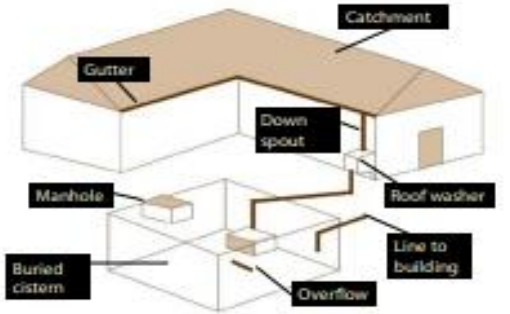


Figure 2. Underground rainwater collection and storage system.

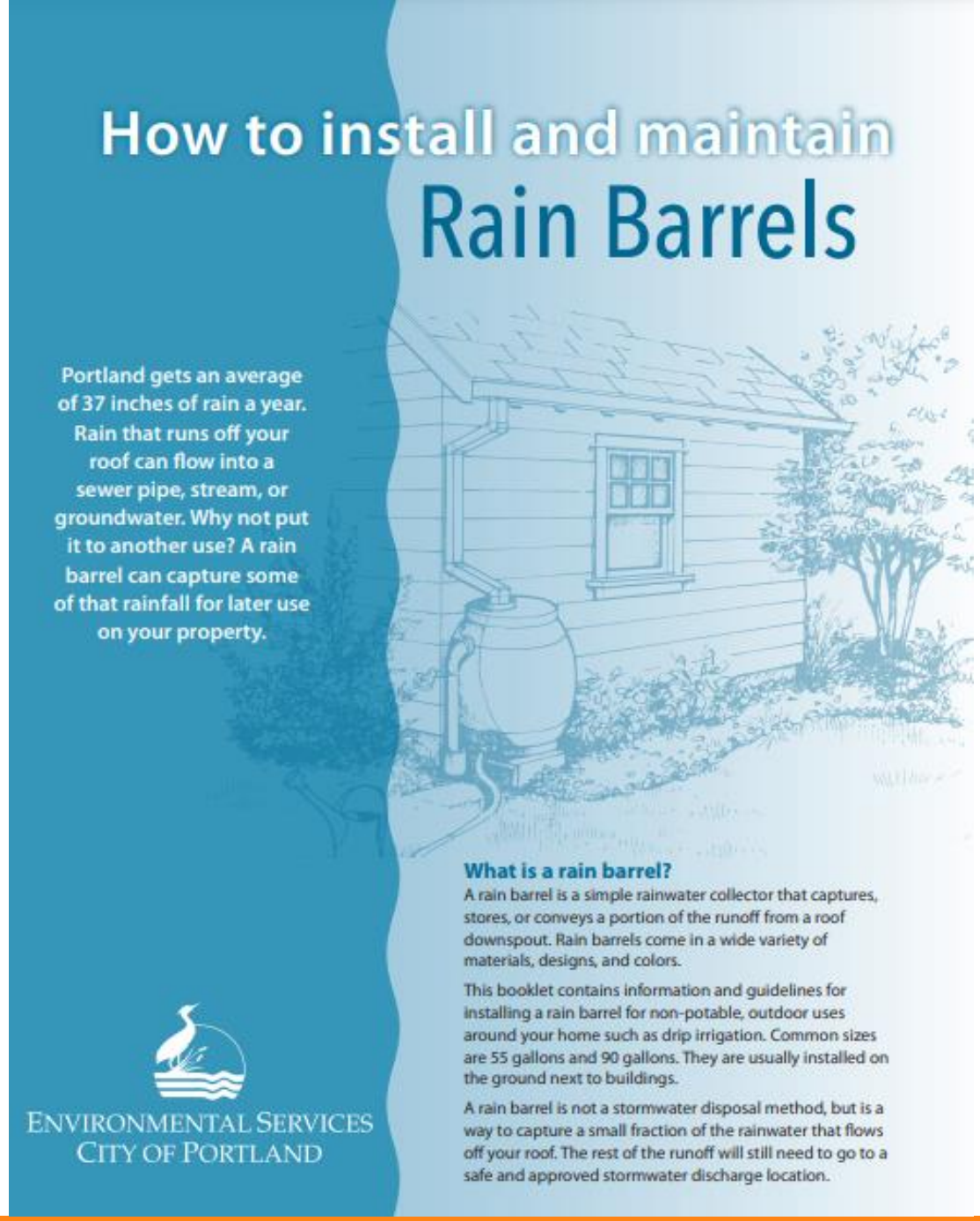
Sam Angima is the Extension Regional Administrator for the North Coast region.

Oregon State University

Source

City of Portland
Environmental Services

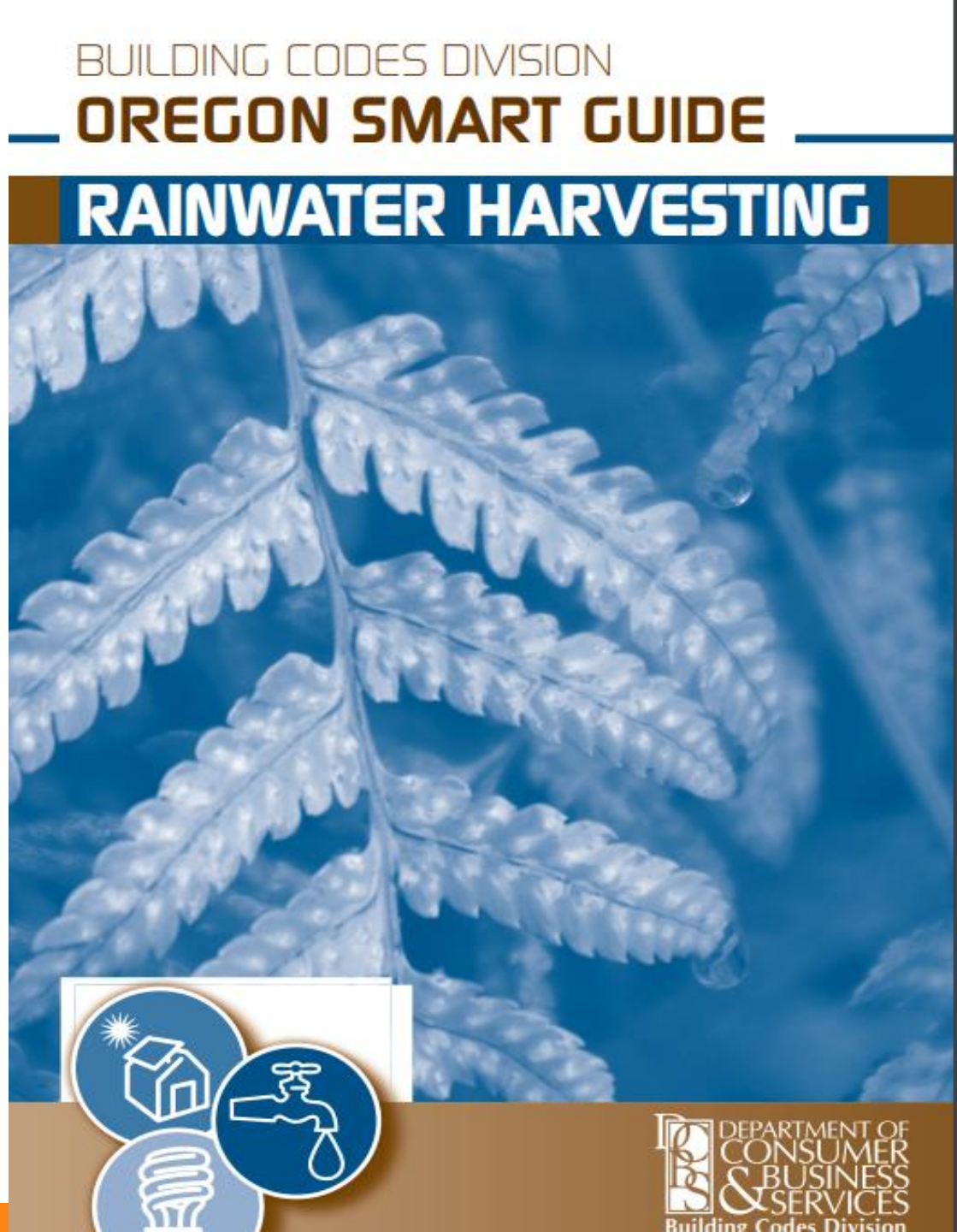
https://www.portland.gov/sites/default/files/2021/howto-rain-barrels-aug2021_0.pdf



Is it legal?

https://www.oregon.gov/bcd/documents/brochures/3660.pdf

- Oregon laws are friendly towards collecting and using rainwater for both potable and non-potable uses.
- Generally roof collection is the preferred method
- Other methods might require a permit



Our starting point

- Roof
- Gutter
- Downspout
- Water distribution

Add water storage

- Roof
- Gutter
- Downspout
- Water distribution

Rain barrel or tank

Let's talk tanks

- Classic rain barrel from city water depts
- 50-55 gallons
- May come with fittings
- Can find used barrels on Craigslist
- Good size for a typical city lot or starter experience

Typical installation

- One barrel

Blue rain barrel

- Horizontal grouping

Blue rain barrel

- Vertical grouping

Painted

Culturally appropriate

50 to 50,000 gallon tanks

Even go modern

What makes a good rain barrel ?

- **Food grade plastic**
- Only ever used for liquid food—syrups, sugar solutions
- Never cooking oils or petroleum products, insecticides or pesticides
- Clean thoroughly
- Flat bottom for proper installation
- Larger rather than smaller
- DIY or Kits
- Enclosed top or screens
- Overflow fitting
- Outflow fitting—garden hose or other piping

$5-$30

$50-$100

Main Components

- Downspout diversion
- Inflow
- Overflow
- Outflow

Roof Materials

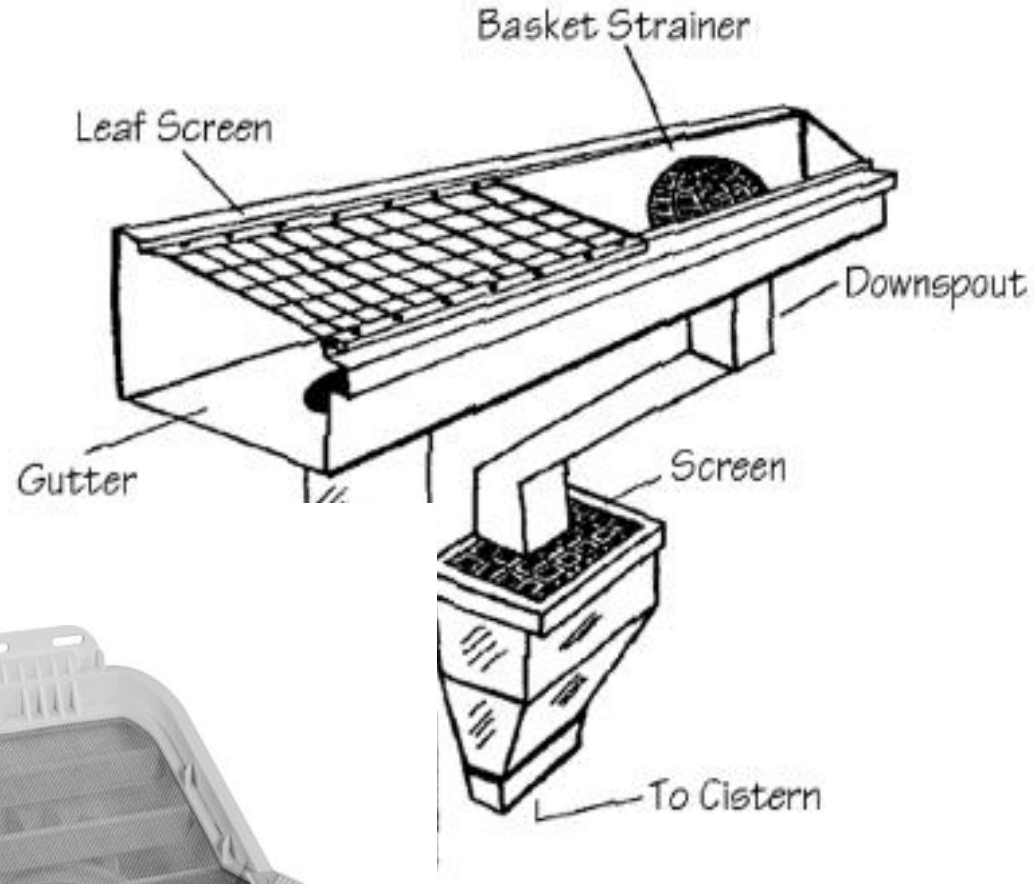
- Good Materials
  - Standing seam metal
  - Corrugated metal

  Workable, but less efficient
  - Asphalt/composition shingles
  - Concrete tile or clay tile
  - Solar panels

- Bottom line:
  most materials will work but avoid the ones listed on the right

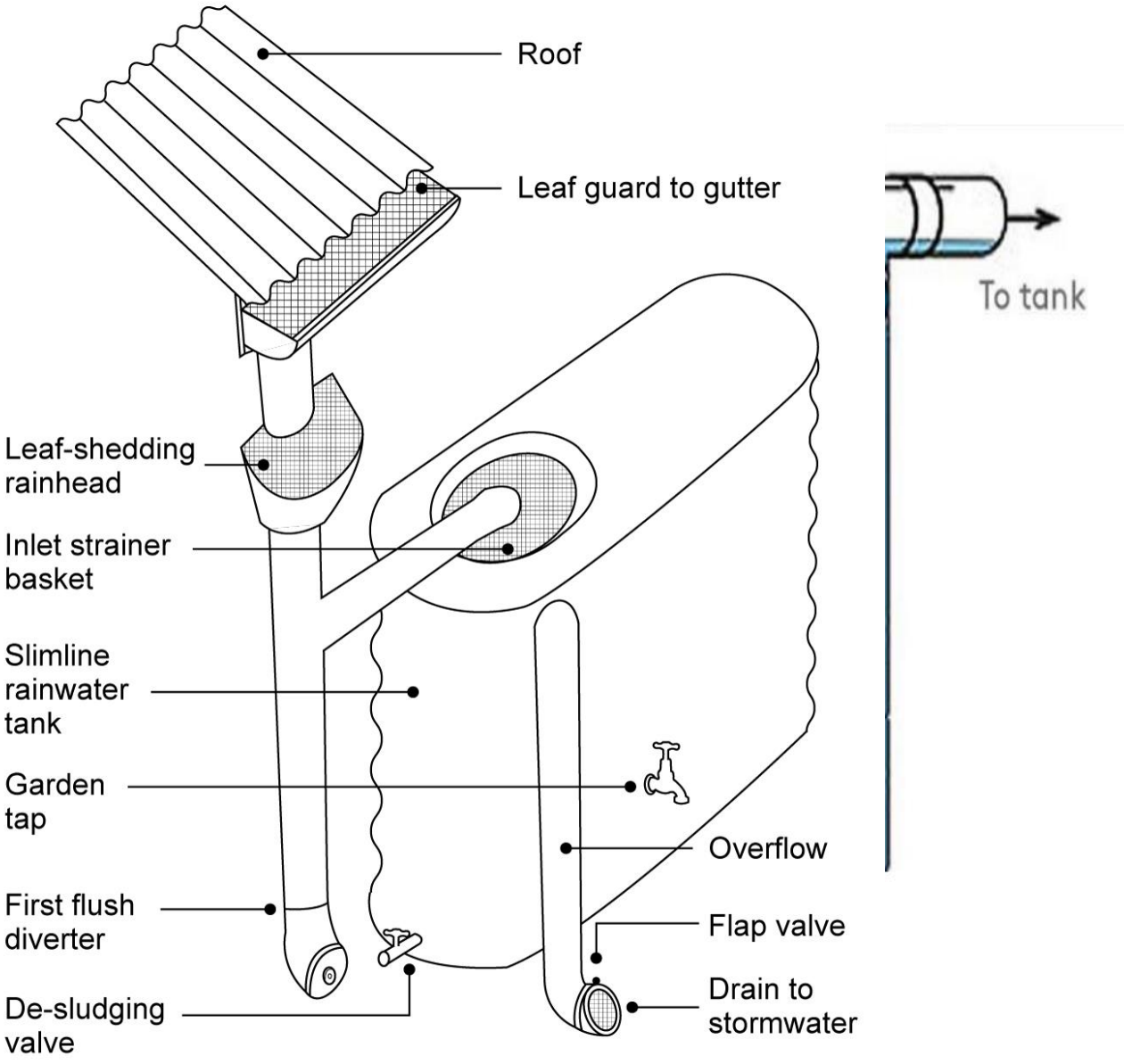
Keeping debris out

- Clean roof
- Basket strainers
- Gutter guards
- Leaf collectors



First Flush

- Diverts the first gush of water in each rainfall
  - Keeps the sediment, leaves, pollen, washed from the roof out of the tank
- Some controversy about their use
  - Sizing issues
  - Requires significant maintenance
  - Proper screening works as well
  - Plants like the organic matter that is diverted
  - Often only the first seasonal rain is dirty enough to warrant diversion



Distributing the stored water

- Gravity
- Pump

Drip irrigation

- Doesn't require any pressure
  - Gravity does the work
  - As long as the drip line stays below the water level in your rain barrel
- Slope and distance matter
  - ½" main line is best-won't restrict the flow; ¼" may work but for shorter distances
- Watering time
  - Most irrigation systems work on 12-20 psi
  - Gravity is about 0-2 psi for flat terrain
  - Can elevate barrel to get more psi
  - 1ft of elevation gives .4 psi
  - Soaker hoses have least psi reqmts
  - Perforated pvc pipes
  - Downspout extensions

Tank pump

- A rainwater tank pump is typically positioned at ground level, next to the tank.
- The water exits the tank from the bottom of the tank and flows straight into the pump
- Install close to tank
- Prime the pump with water, plug the pump into the power and switch it on
- Enclose for protection
- Requires electricity
- Some solar models

Available rainfall -- or how much water could I capture?

- Basic formula

  Size of roof (sq ft) x Est annual rainfall (in) x .62 x (75-90%)

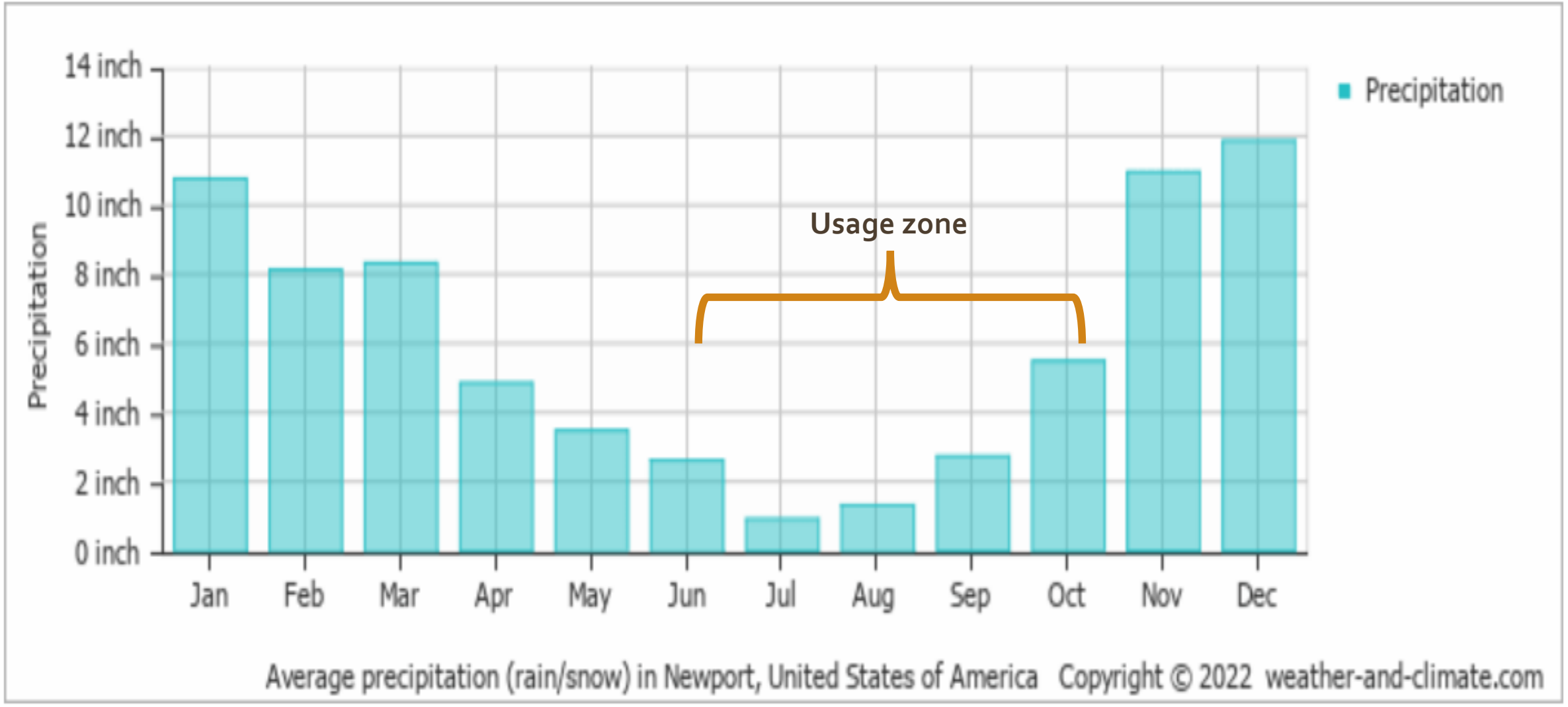
- My House

  Tank 1 (2500) 500 sq ft x 80" x .62 x 80% = 20,000 gal

  Tank 2 (3000) 1000 sq ft x 80" x .62 x 80% = 40,000 gal

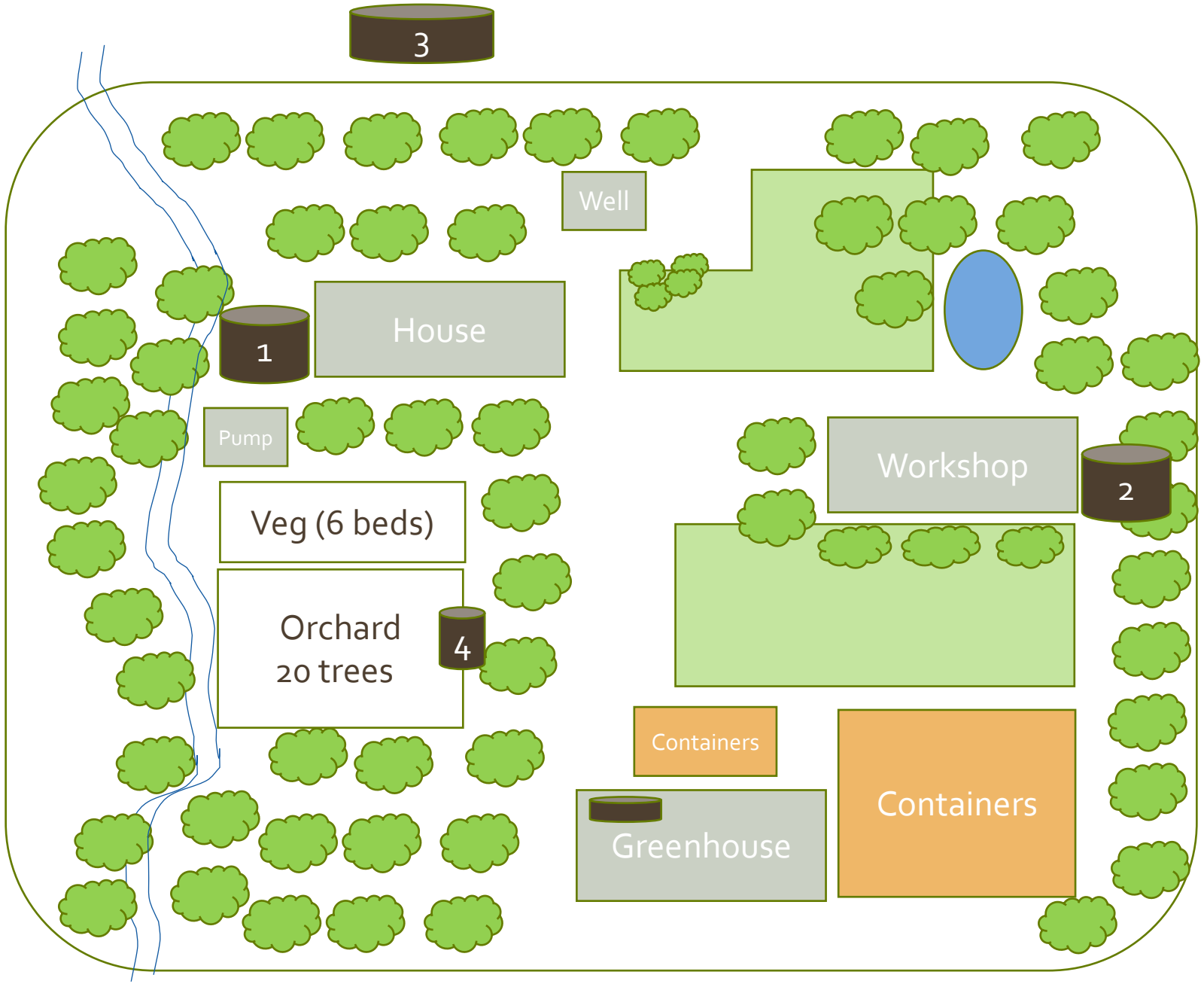
- 80" is the estimated annual rainfall for Lincoln County
- .62 is the amount of water captured in 1" of rain per 1 sq ft
- 75-90% is the roof collection factor

Average Rainfall for Lincoln County = 80”



How much water do I need?

- In general
  - 1”/week over your entire growing surface for the summer (3-5mth)
  - 4’ x 8’ bed requires 20 gallons/week x 16 weeks = 320 gallons
  - 5 beds = 1600 gallons
  - or 32 blue barrels



My garden

~ 1/3 acre
(15,000 sq ft)

- 4 water tanks
  - Tank 1 2500 gal
  - Tank 2 3000 gal
  - Tank 3 3000 gal
  - Tank 4 500 gal

  Total 9000 gal