# Rainwater Harvesting 

## Types of Water Harvesting

- Drinking water
- Irrigation
- Sanitation (toilet flushing, shower, etc.)


## Why Harvest Rainwater?

- Redundancy - Two is One, One is None.
- Soft water
- Soft water makes soap last longer
- Low Cost
- Much easier than using a hand pump


## Project Example

- Every project is going to be a bit different
- This project will have 2 separate systems:
- Drinking water from a metal shed roof
- Sanitation water from an asphalt shingle roof
- We will only be discussing the Drinking Water part.


## The $12 \times 24$ Shed



## About this project

- Metal roof
- More efficient collection than a rougher surface
- Much cleaner
- Little or no leeching of toxins into the water
- Single collection point for the entire roof
- North side of shed to reduce sun exposure


## Storage

- Six 55-gallon drums - 330 gallons total
- HDPE (High Density Polyethylene) material
- BPA free, FDA Compliant Resins
- Black to block sunlight
- Note: "Not recommended for long term of drinking water."
- Open Top - Allows access to install fittings near the bottom.


## Delivery



## Base to support drums



## Drums Installed



## The Key Steps for Rainwater Harvesting

- Limit Sources of Contamination
- Plan for Volume
- Filter Leaves and Debris
- Divert the First Flush
- Secure The System
- Manage Standing Water
- Monitor and Maintain


# - Limit Sources of Contamination 

- Clear away overhanging branches
- Keep the gutters clean


## - Plan for Volume

- Roof Size: $12 \times 24 \mathrm{ft}$.
- 288 sq. ft.
- $144 \times 288$ inches
- 41,472 sq. inches


## - Plan for Volume

- One US Gallon is defined as 231 cubic inches
- Multiply cubic inches for one inch of rain on your roof size $\times 0.004329018$ to get gallons
- 41,472 cubic inches (or 1 inch of rainfall) = 179.533 gallons for this project


## - Plan for Volume

- So, $1^{\prime \prime}$ of rainfall will deliver 179.533 gallons of water from a $12 \times 24$ roof.
- Six 55-gallon drums $=330$ gallons $=1.8$ " of rainfall


## Plan for Volume

|  | Total Prep Sum | Total Prep Sum | Total Prap Sum | Total Prap Sum | Total Prap Sum | 5 year Total | ,5 year 'Average | Gallons Collectable |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| OCT | 2.59 | 5.79 | 7.18 | 2.45 | 1.06 | 23.84 | $1 \quad 4.77$ | 856.01 |
| NOV | 2.02 | 3.25 | 0.13 | 1.31 | 5.83 | 8.88 | 1.78 | 318.85 |
| DEC | 6.6 | 0.96 | 1.21 | 0.88 | 2.17 | 14.28 | 2.86 | 512.75 |
| JAN | 3.77 | 4.82 | 3.91 | 6.72 | 4.63 | 21.69 | - 4.34 | 778.81 |
| FEB | 1.28 | 0.72 | 2.07 | 2.81 | 2.47 | $8.83{ }^{1}$ | 1 1.77 | 317.06 |
| MAR | 0.48 | 2.47 | 1.27 | 1.66 | 1.95 | 9.61 | 1.1 .92 | 344.70 |
| APR | 3.3 | 4.88 | 2.43 | 3.03 | 3.72 | 16.11 ${ }^{\text {\| }}$ | $1 \quad 3.22$ | 578.46 |
| MAY | 4.48 | 13.41 | 1.87 | 3.6 | 2.47 | 27.15 | 15.43 | 974.86 |
| JUN | 8.77 | 6.87 | 10.71 | 6.01 | 3.79 | 42.03 | 18.41 | 1,509.15 |
| JUL | 7.24 | 8.85 | 5.58 | 6.11 | 9.67 | 42.41 | 18.48 | 1,522.80 |
| AUG | 7.95 | 8.22 | 8.81 | 4.63 | 14.63 | 37.17 | $1 \quad 7.43$ | 1,334.65 |
| SEP | 5.3 | 1.14 | 18.27 | 6.63 | 7.56 | 31.34 | - 6.27 | 1,125.31 |
|  | 53.78" | 61.38" | 63.44" | 45.84" | 59.95" |  |  | 10,173.42! |

## Plan for Volume

- The 30-year rainfall average for this location is 54.46 inches.
- Even the lowest average rainfall month (February) still yields 317 gallons.


# - Filter Leaves and Debris 

- Use a "Leaf Eater" directly beneath the gutter outlet.


## - Filter Leaves and Debris



## - Divert the First Flush

First flush of contaminated water is diverted into chamber


Once chamber is full, fresh water flows to tank


## Secure The System

- Make sure all openings to the stored water are screened and mosquito-proof.
- Make sure that squirrels, rats, and other pests can't damage the system.


## - Manage Standing Water

- The only standing water should be the water inside the storage tanks.
- Make sure that angles are steep enough that water flows freely.
- Remember to account for freezing temperatures.
- Monitor and Maintain
- Set up a routine to check the system regularly.


## Resources

- Leaf Eater - Amazon ASIN B004VM9CW0
- First Flush - Amazon ASIN B001OWG6BU
- Plastic Drum - ULINE.COM
- Shipping charge was \$136, including Lift Gate service (required!)
- Misc. fittings \& hardware
- Rain-Harvesting-Handbook-AU-Issue-2-2021web.pdf


