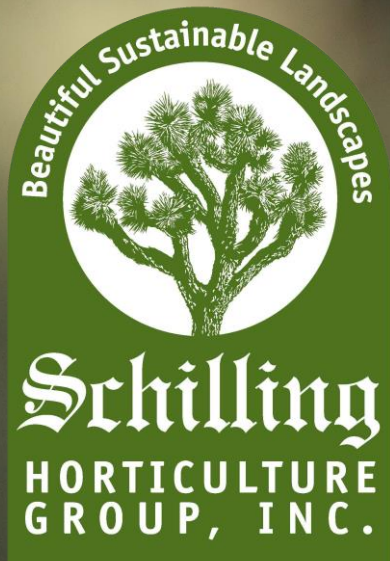


# Irrigation 101: Principles and Components for Residential Irrigation

With Norm Schilling





# Types of Residential Irrigation

1. Drip Irrigation



2. Spray Irrigation

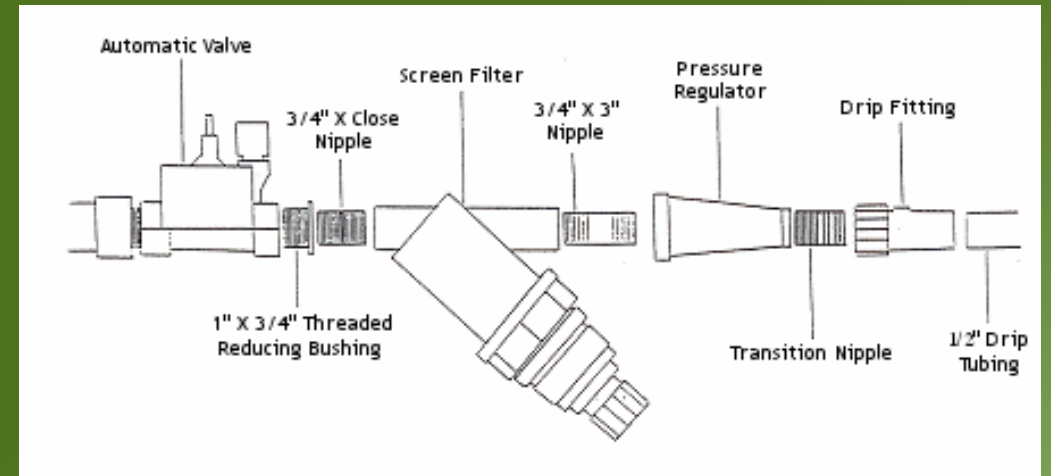


3. Inline Irrigation



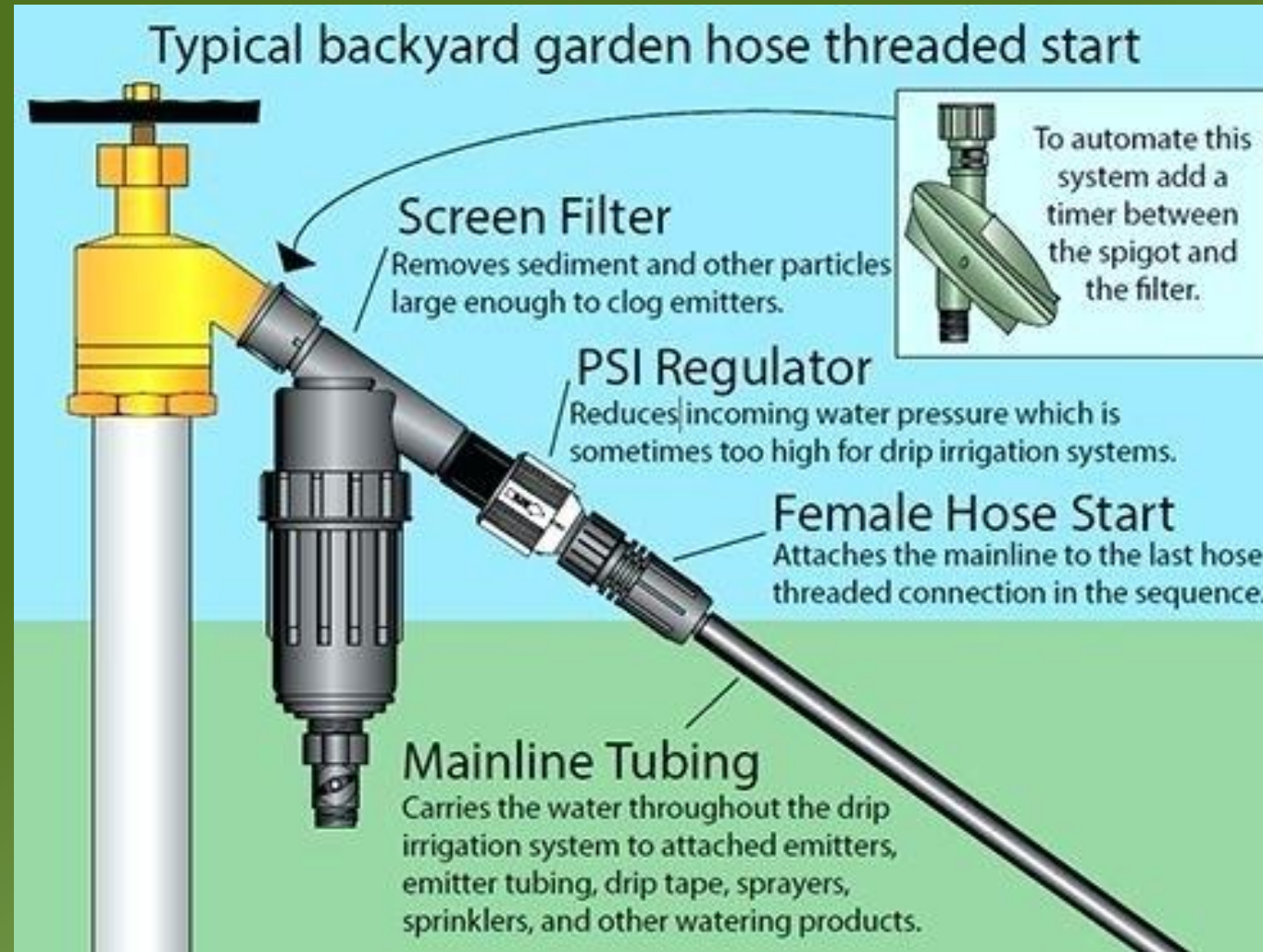
# Drip Irrigation Systems

- Low-pressure, low-volume
- Most efficient way to deliver water to plants
- Easy to work with
- Valve → Pressure regulator → Filter → ½" Poly line → ¼" Poly line (spaghetti tubing) → emitter



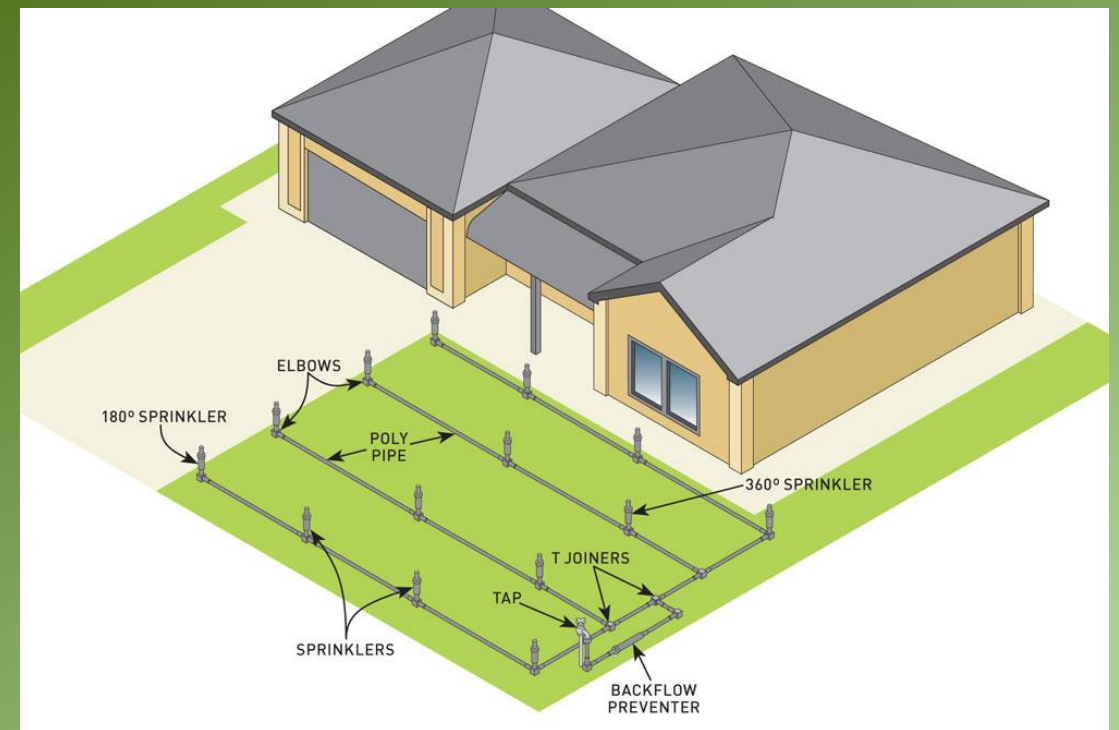


# Another way to install drip irrigation at home...



# Spray Irrigation Systems

- High-pressure, high-volume
- Less efficient way to deliver water to individual plants
- Overspray, run-off, evaporation
- Best for turf
- More difficult to work with
- Valve → PVC tubing → riser → sprinkler head and nozzle

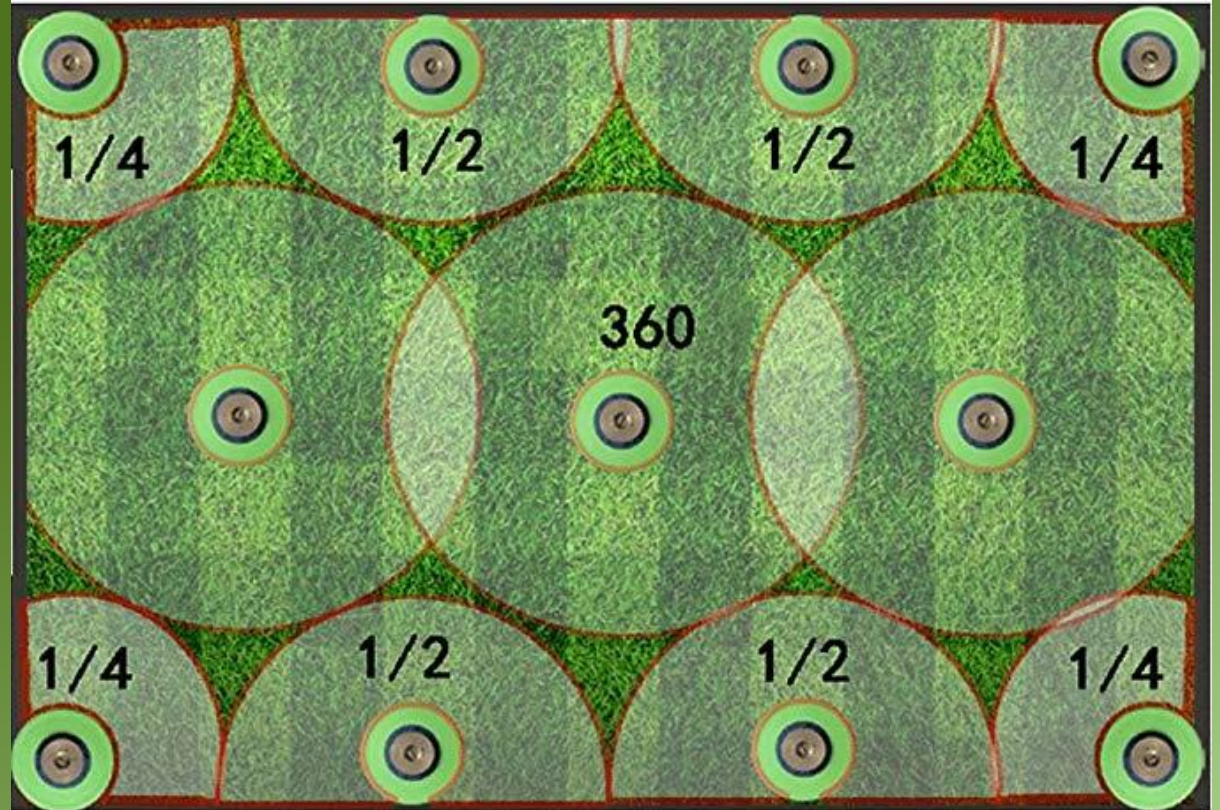






## Product use schematic diagram

Pop-up Lawn Irrigation System Sprinkler Head



360 ° pattern (full open, for middle place)

180 ° pattern (1/2, for side corner)

90 ° pattern (1/4, for turning corner )



# Inline Irrigation Systems

- Output determined by hole spacing
- Efficient way to deliver water to groups of plants
- Best for veggie beds, annuals, and turf
- More labor and expense to install
- Valve → Pressure regulator → Filter → ½" Poly line → Inline tubing



# How Much Should I Water?

## *How Long?*

- “Run time” - how many minutes or hours the water runs
- Will *not* fluctuate throughout the year

## *How Often?*

- Frequency (days per week or month)
- Will fluctuate throughout the year



# How *Long* Should I Water?

Determined by:

1. Rate of flow of your drip emitters
2. Types of plants you are watering
3. Condition of the soil



# How *Long* Should I Water?

## *Rate of Flow*

- The more water your emitter puts out, the shorter your irrigation run time will be.
- To find out how fast your drip emitter produces water, measure how many seconds it takes to fill a tablespoon:
  - 14 seconds equals 1 gallon per hour (gph)
  - 7 seconds equals 2 gph
  - 4 seconds equals 4 gph





# How *Long* Should I Water for 2' Water Penetration?

## *Rate of Flow* for Common Drip Emitters

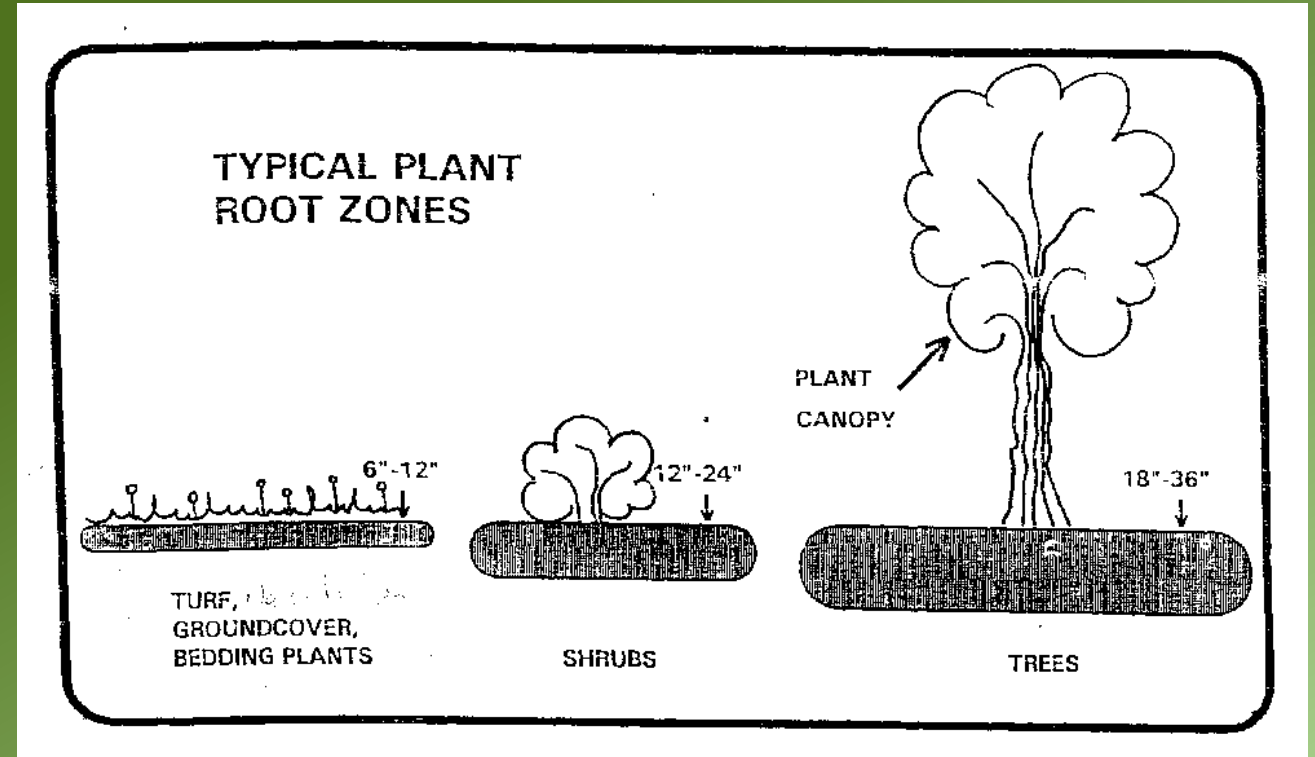
Emitter Type	Length of Each Watering
High-flow emitter (Up to 20 gph)	12 minutes
Low-flow emitter (4 gph)	22-30 minutes
Low-flow emitter (2 gph)	45-60 minutes
Low-flow emitter (1 gph)	90-120 minutes

**Think of watering with drip irrigation in hours not minutes;  
1 to 2 hours is not uncommon to get deep water penetration**

# How Long Should I Water?

## General Plant Type

- Water trees to a depth of 24"
- Shrubs to 18"
- Grass to 12"
- When you water your shrubs and perennials you also water the trees

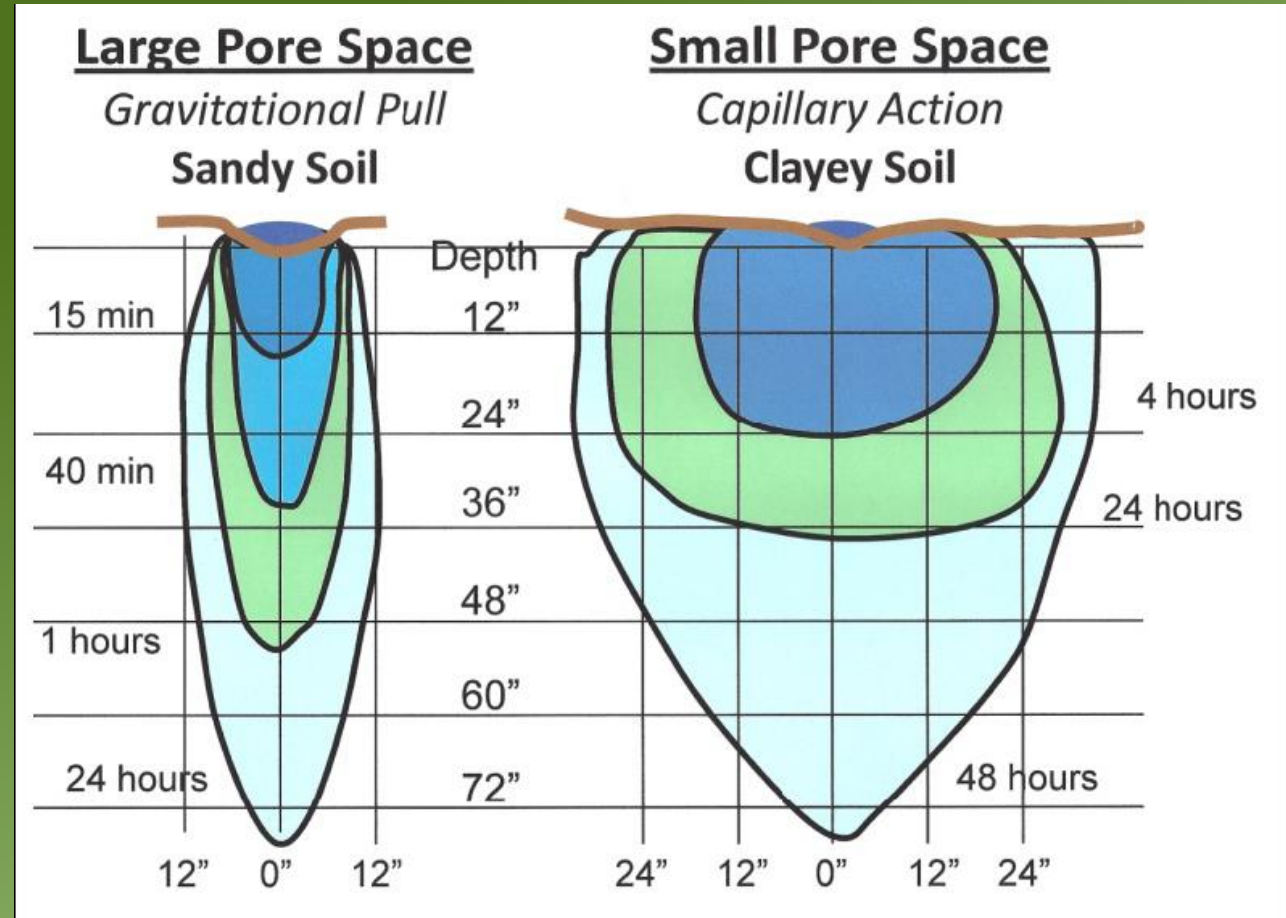




# How *Long* Should I Water?

## *Condition of the Soil*

- Sandy soils should be watered for shorter times, but more often.
- Clayey soils should be watered for longer times, but less often.



# How *Often* Should I Water?

Determined by:

1. The season
2. Specific plant's water needs
3. Condition of the soil





# How *Often* Should I Water?

## *The Season*

- 1 day per week or less during the winter
- 2 to 3 days per week during the spring and fall
- 3 to 5 days during the summer



# How *Often* Should I Water?

## *Specific Plant's Water Needs*

- Moderate water, Low water, Turf grass, Veggie bed
- Supplemental watering for highest water use plant
- Indicator plants (Lantana)
- Visit your plants!
- Plant death often caused by over-watering rather than under-watering

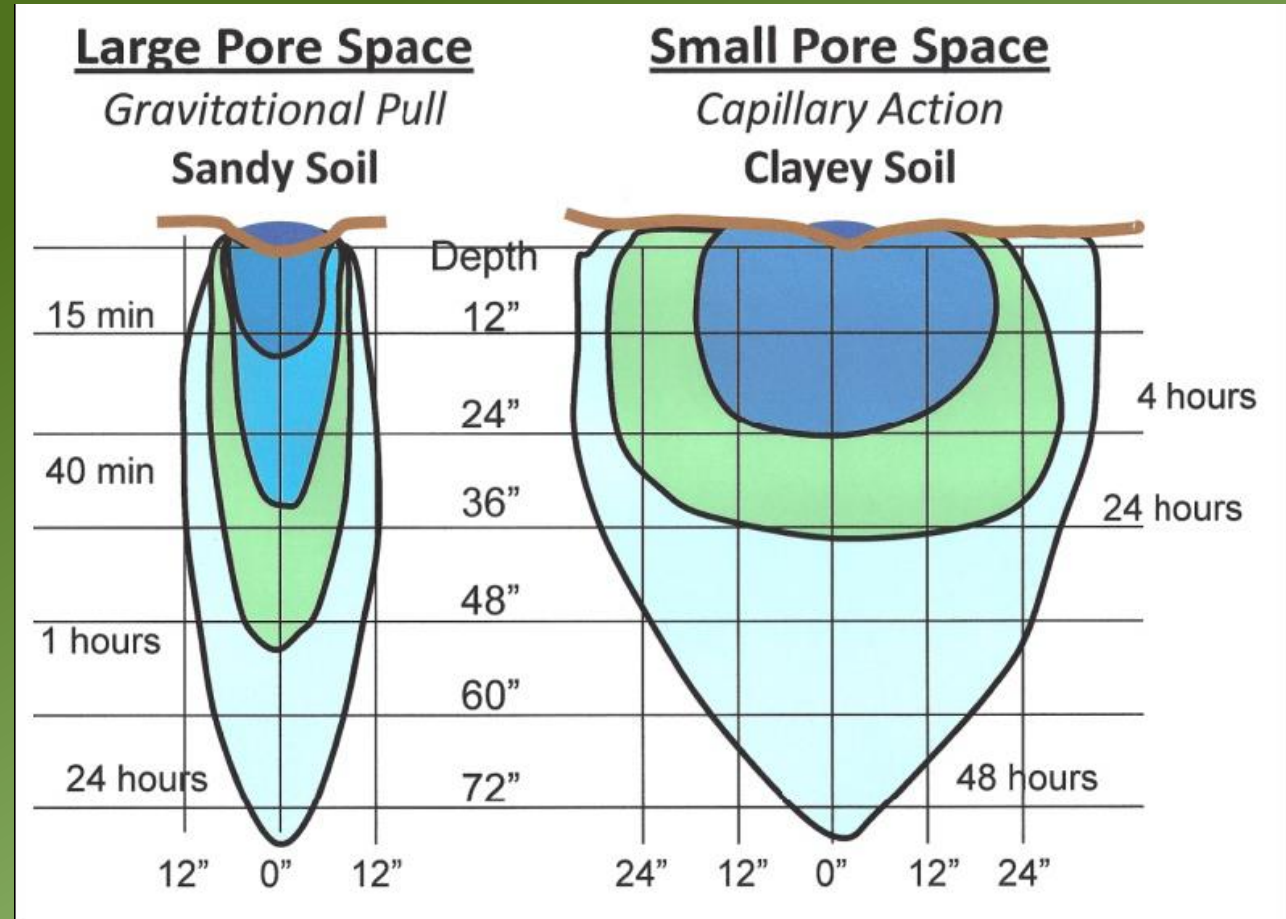




# How Often Should I Water?

## *Condition of the Soil*

- Sandy soils should be watered for shorter times, but more often.
- Clayey soils should be watered for longer times, but less often.



# How to Know How Deep Water Penetrates?

- Finger check
- Soil probe/auger
- Moisture meter

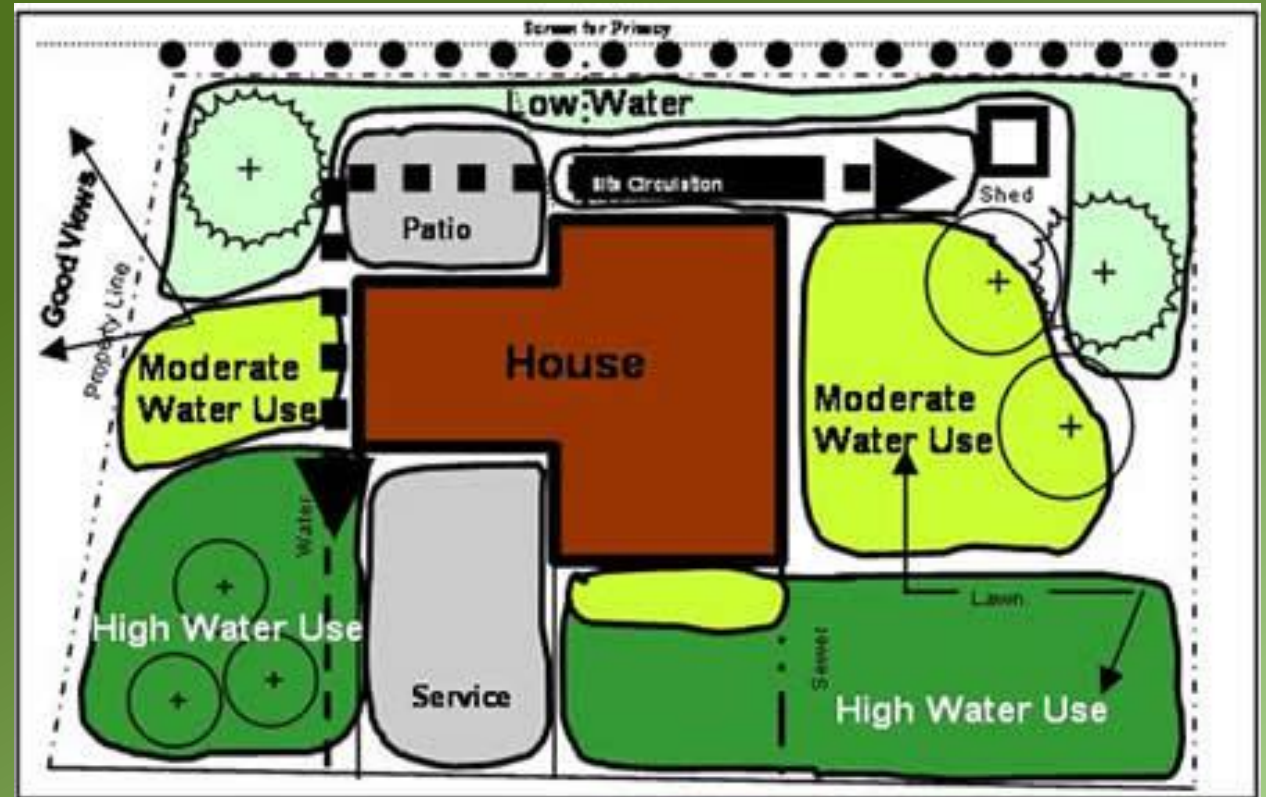




# Hydrozones

- Moderate water users
  - Also known as “traditional” plants
- Low water users
  - Also known as desert plants

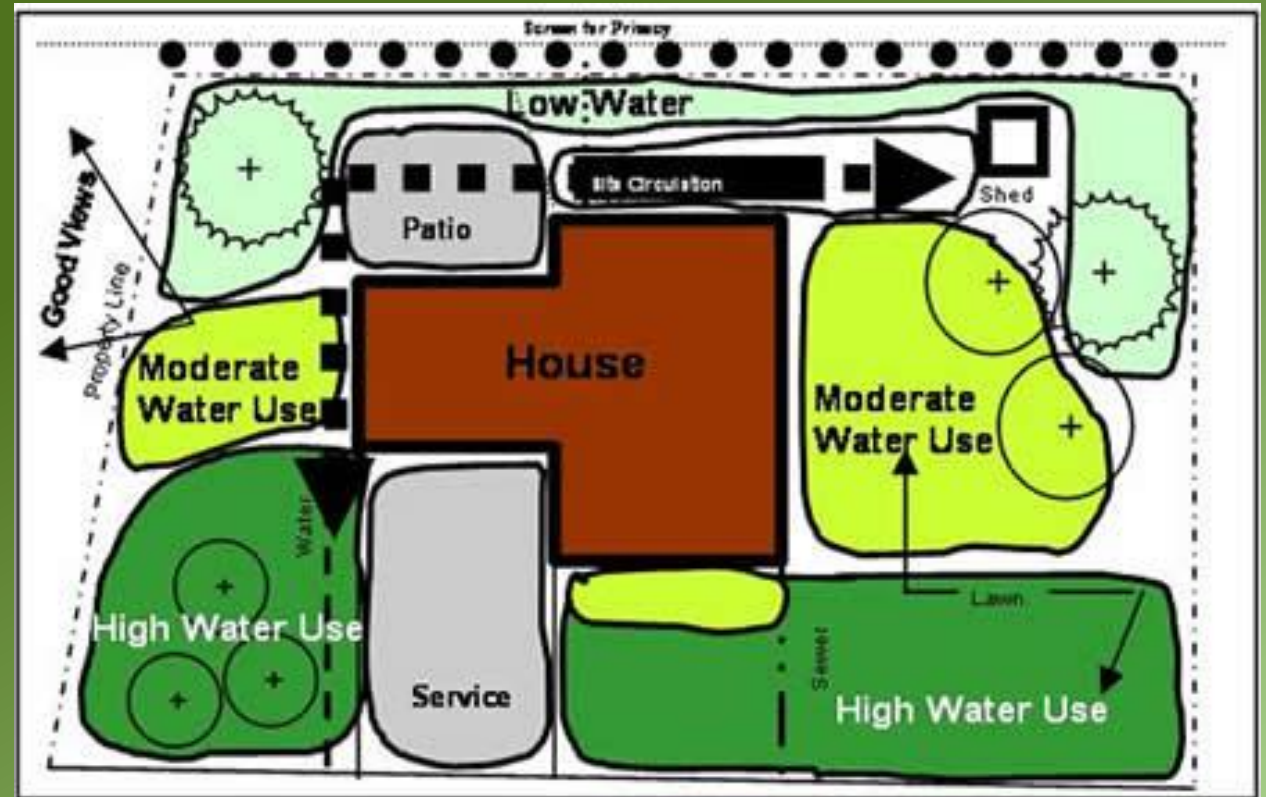
*Note: Desert plants that can take more water may go in either zone*



# Hydrozones

## *Same zones on same valve*

- Moderate
- Desert
- Pots
- Orchard
- Veggie beds





# Winter Watering

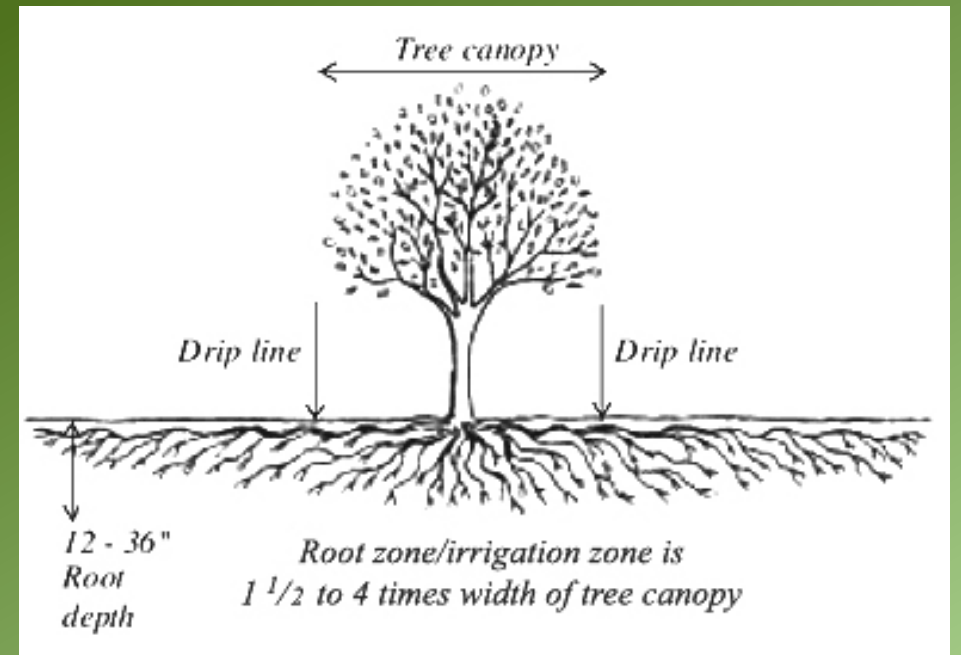
- Don't change how LONG a plant is watered, just how OFTEN (frequency)
- Shut off valves on cacti and succulents



# Wetting Patterns

*Plants should have a wetting area (wetting pattern) that corresponds to their eventual size*

- Small plants (up to 2-3 feet) should have 1 emitter
- Small shrubs (2-4 feet) should have 2 emitters
- Medium shrubs (5-6 feet) should have 3 emitters
- Large shrubs (8-10 feet) should have 7-9 emitters
- Trees (based on size) should have access to the water from many emitters



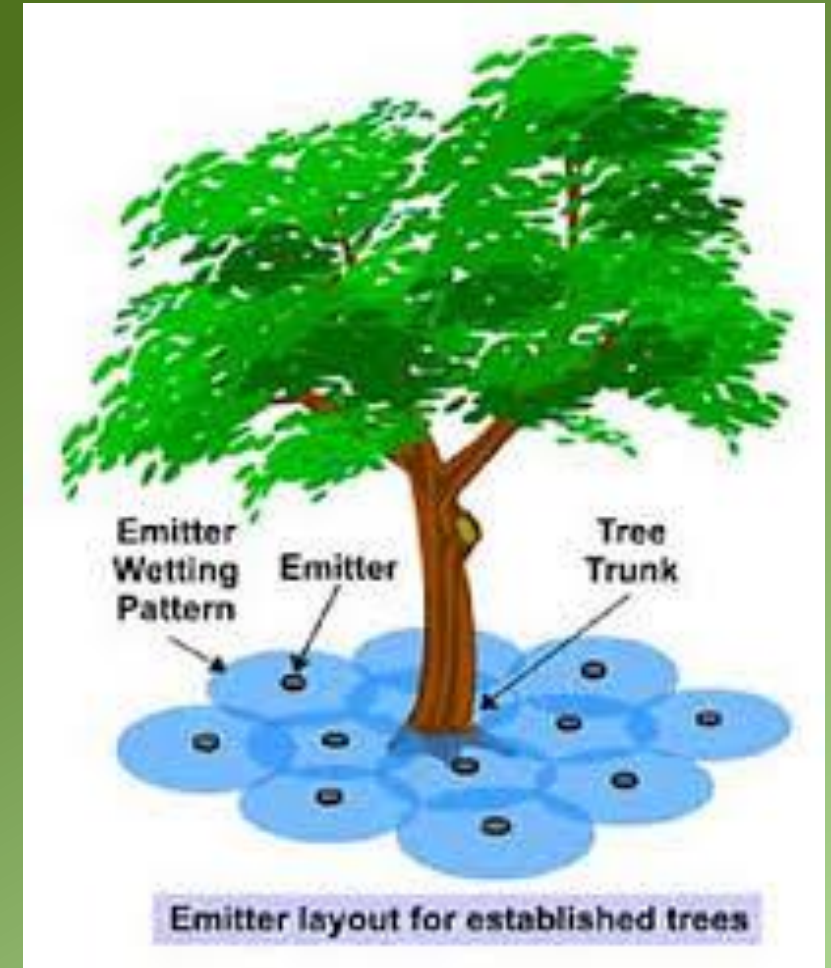
<https://oakcreeknursery-ks.com/watering-instructions-new-plantings/>



# Wetting Patterns: Trees

*To truly give good area coverage in a wetting pattern, emitters around a tree should be spaced around 3 to 6 feet apart*

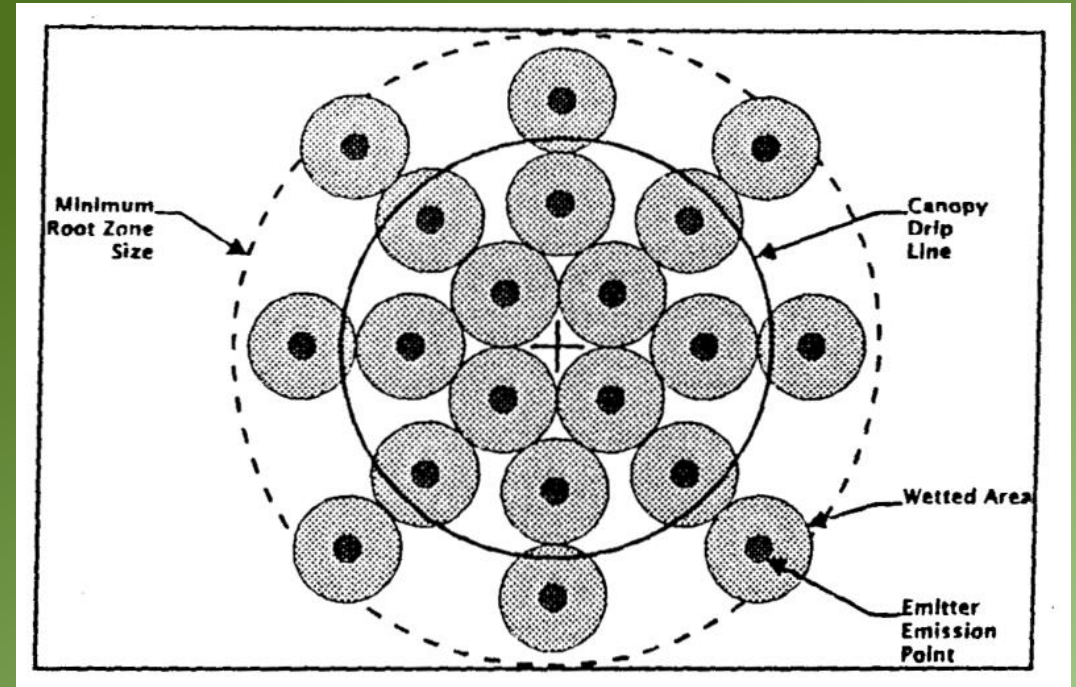
- Encourages roots to spread wide
- Gives trees stability in winds
- Allows for greater nutrient availability
- Small plants beneath or near larger plants can be considered part of the larger plants wetting pattern
- MATURE canopy size (and beyond?)
- Adding emitters when the irrigation system is installed versus as the tree grows



# Wetting Patterns

## *Deep, Wide, Infrequent*

- All plants should be watered deep and wide (in relation to their size)
- The difference between desert plants and non-desert plants is in how often they should be watered

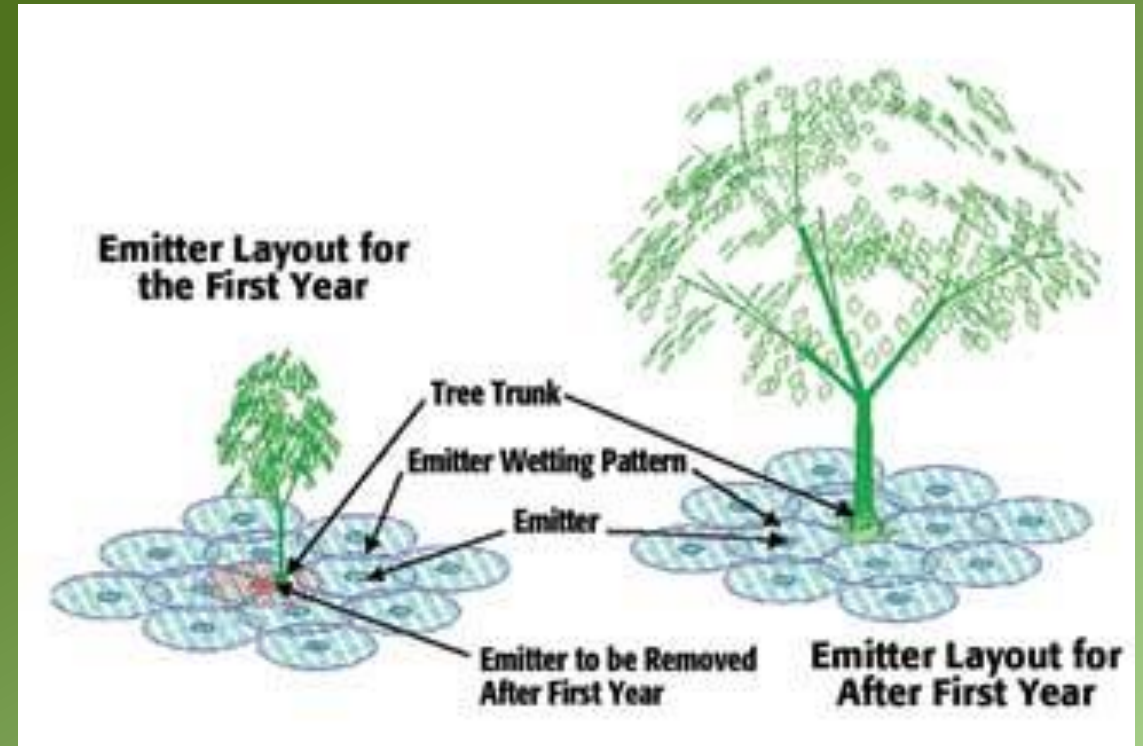




# Wetting Patterns

## *Deep, Wide, Infrequent*

- For instance, a Mesquite (desert tree) and a Pine (non-desert) should both be watered deep and wide, but the Pine should get it much *more frequently* (2-4 times/week in summer) than the Mesquite (3-7 times per year once established)
- Remove emitters from desert trees when no longer needed
  - Mesquites
  - Acacias
  - Palo Verdes
  - Desert Willows



# Components of a Drip Irrigation System

- Mainline (Point-of-connection)
- Pressure Vacuum Breaker (PVB)
- Controller/Timer
- Electric Control Valve
- Filter
- Pressure Reducer
- Pipe: PVC tubing and/or Polyethylene (poly)
- Emitters
- Flush Valve or End Cap
- Adapters, connectors, fittings