Harvest the Sky
with Rain Gardens

Katie Teague

County Extension Agent – Agriculture/Water Quality

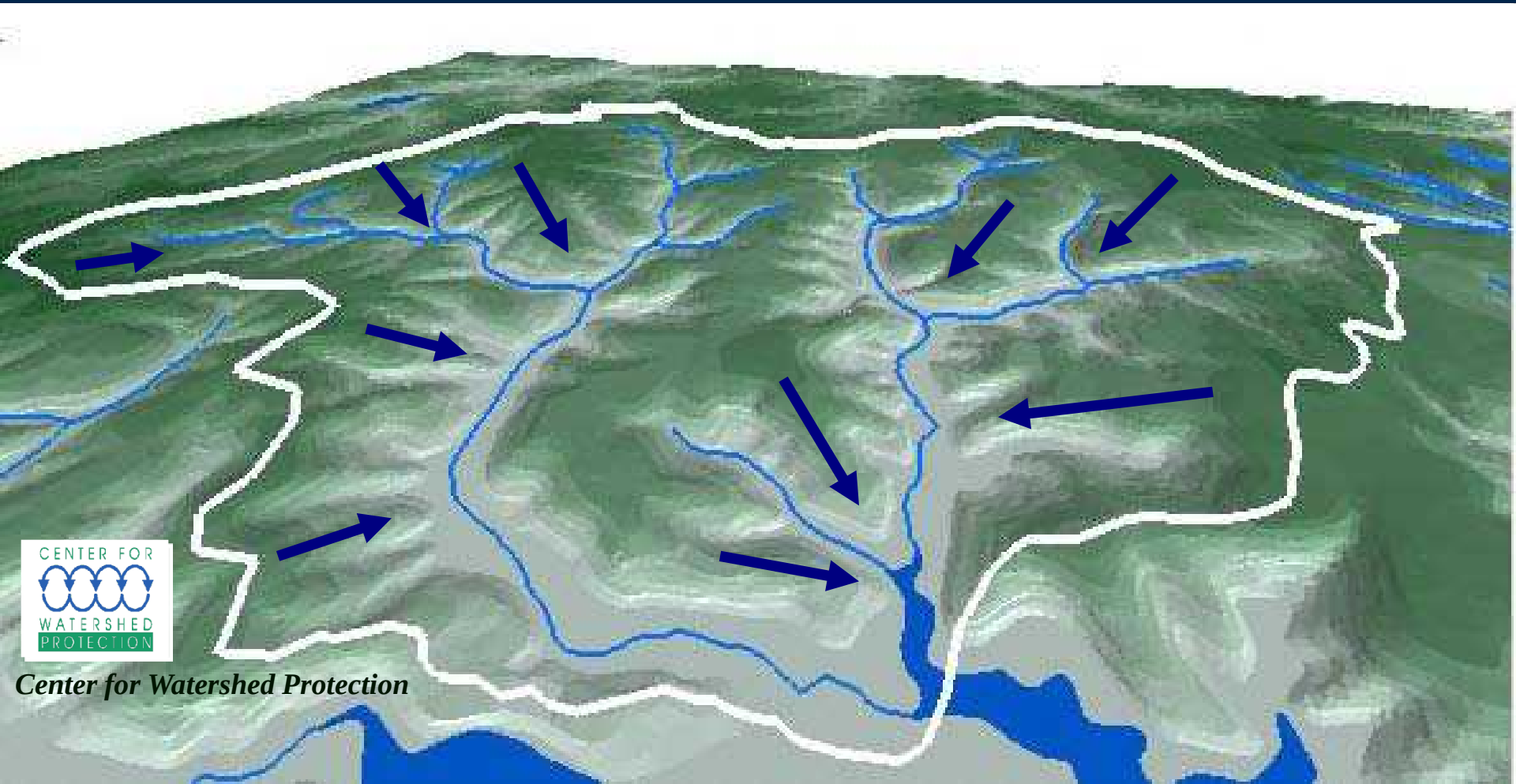
DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System

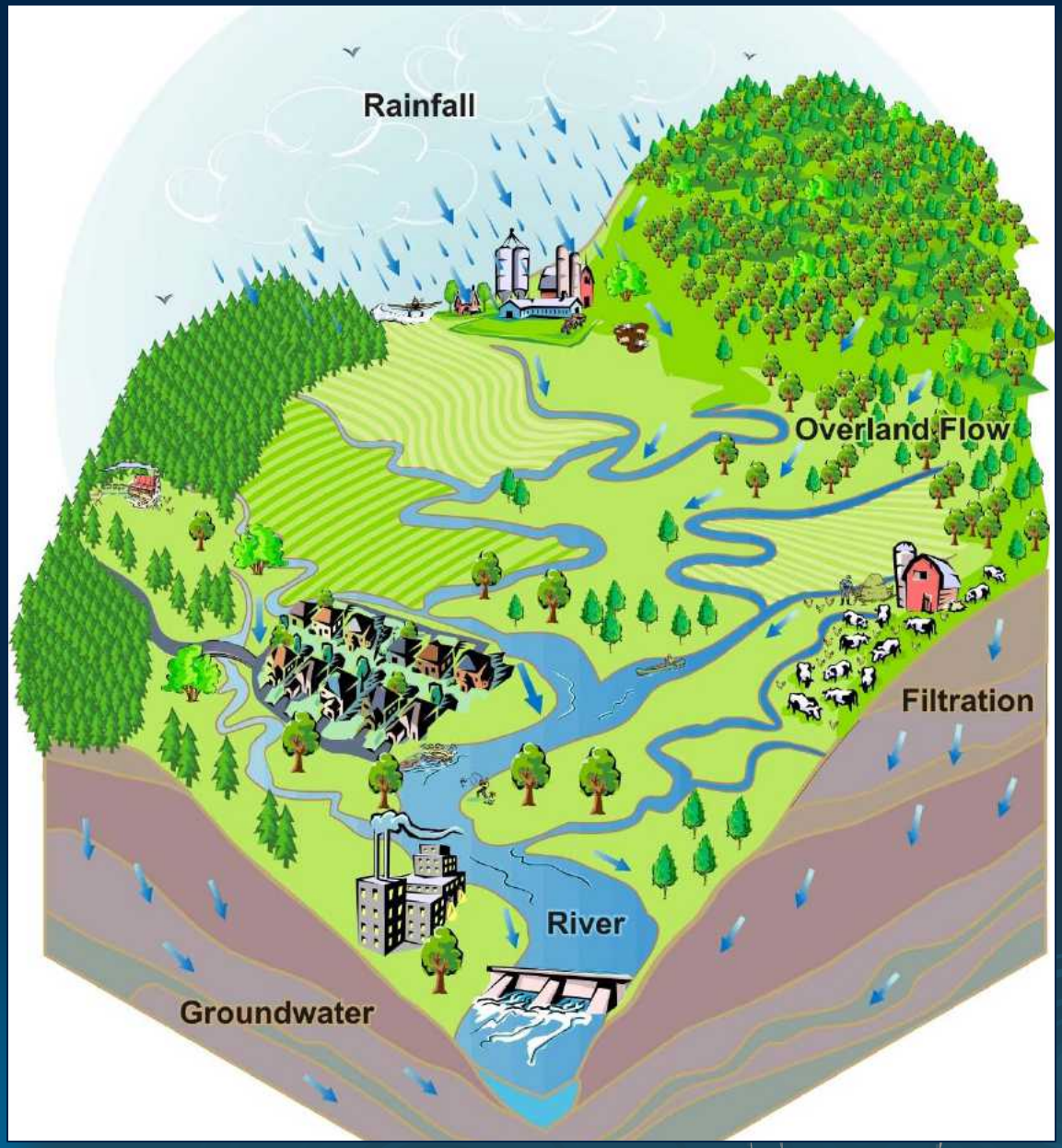
First, allow me to build a case for rain gardens

Watershed… “water shed”?!

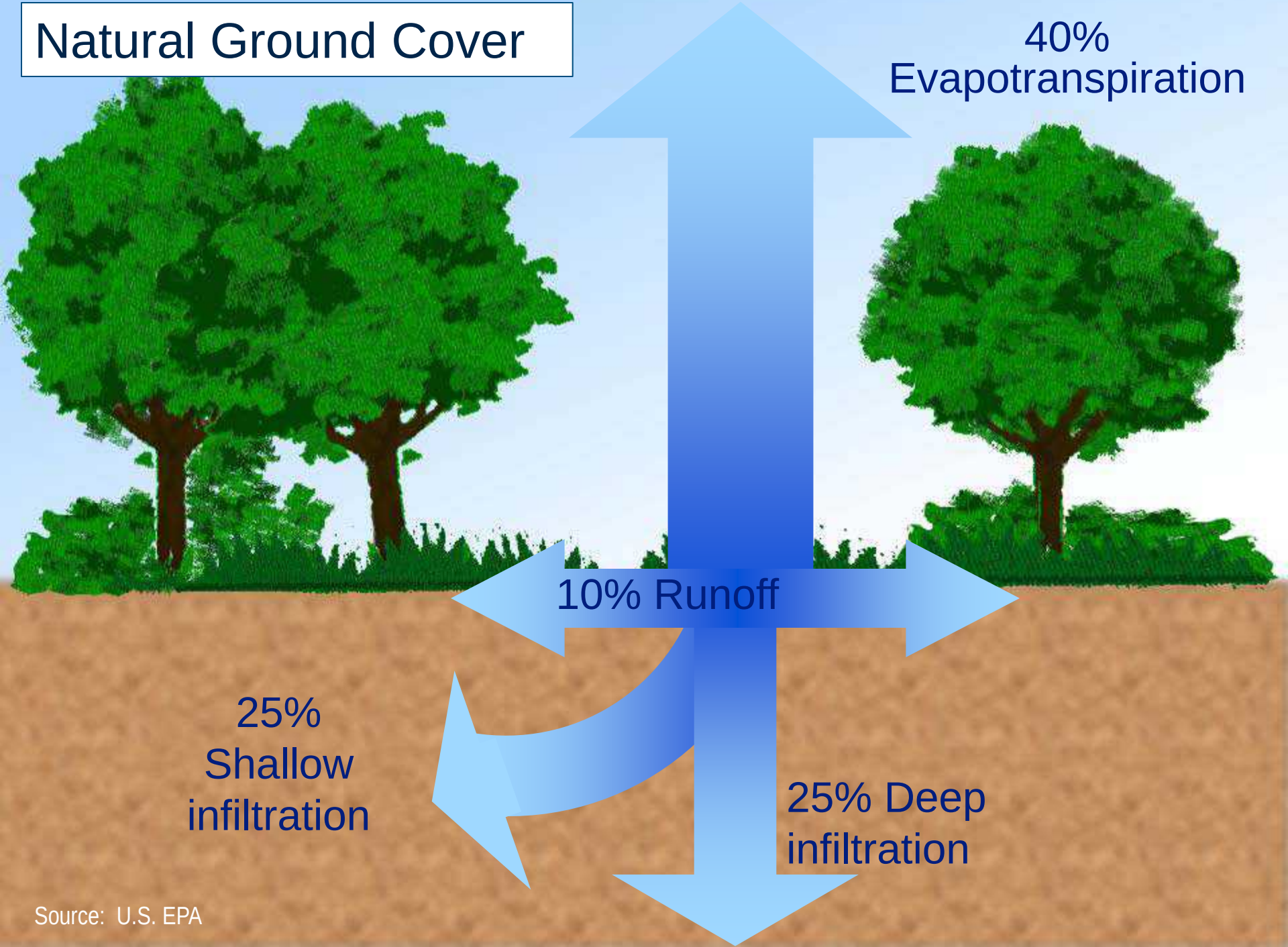
Watershed

A watershed is the area of land that drains to a particular point along a stream




Rainfall
Overland Flow
Filtration
River
Groundwater

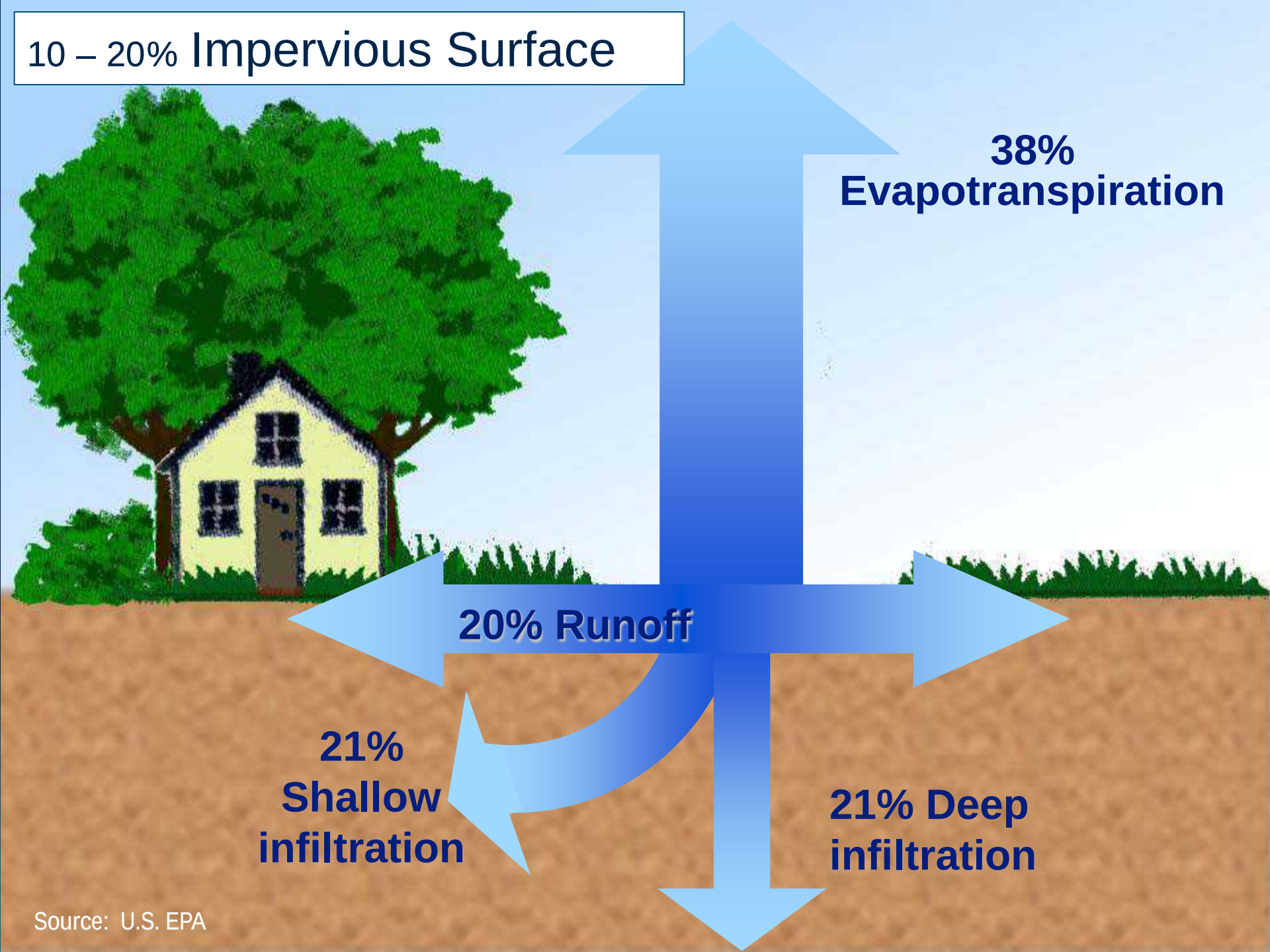
Natural Ground Cover



Source: U.S. EPA

Source: USDA/NRCS

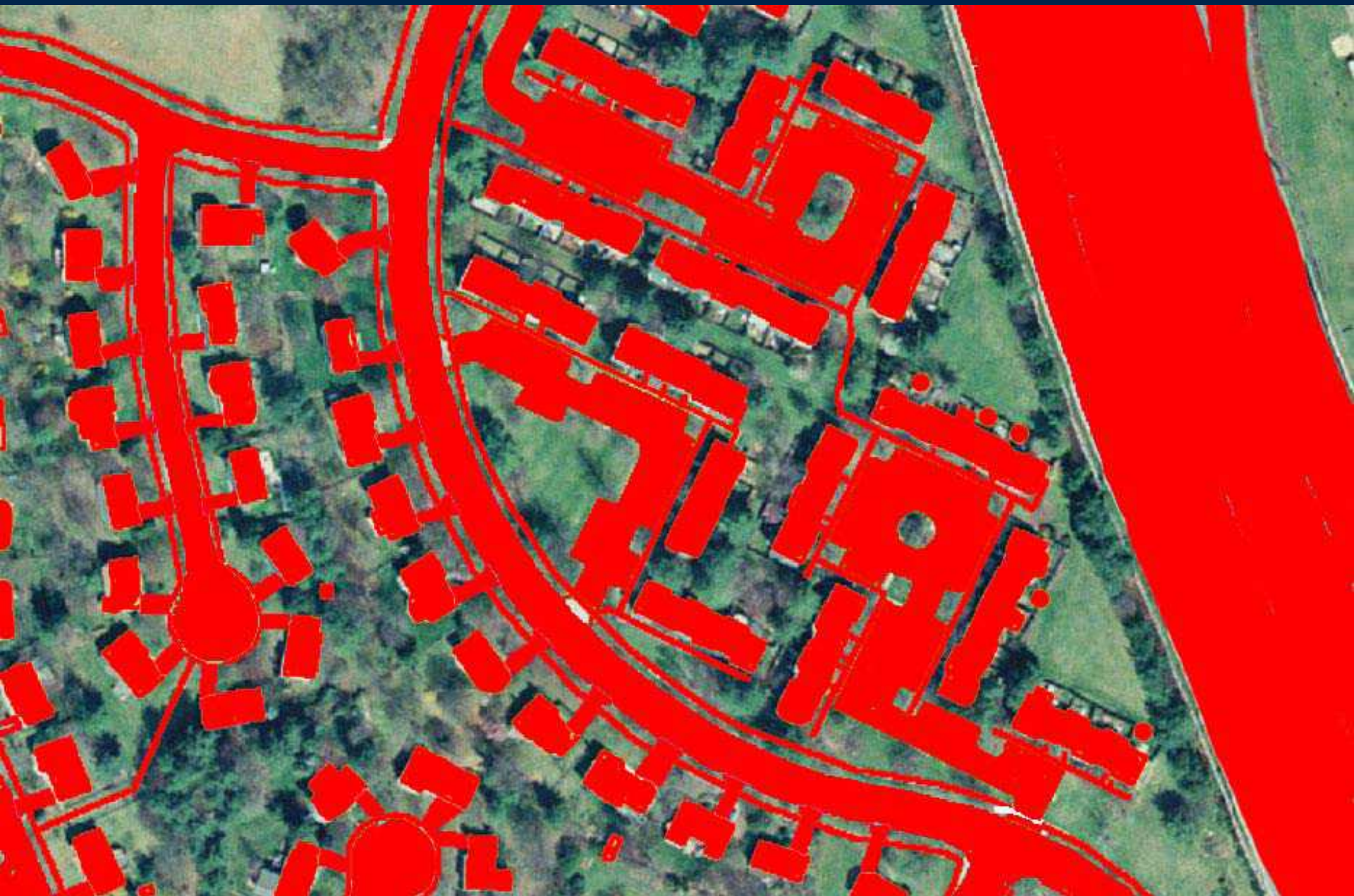
10 – 20% Impervious Surface

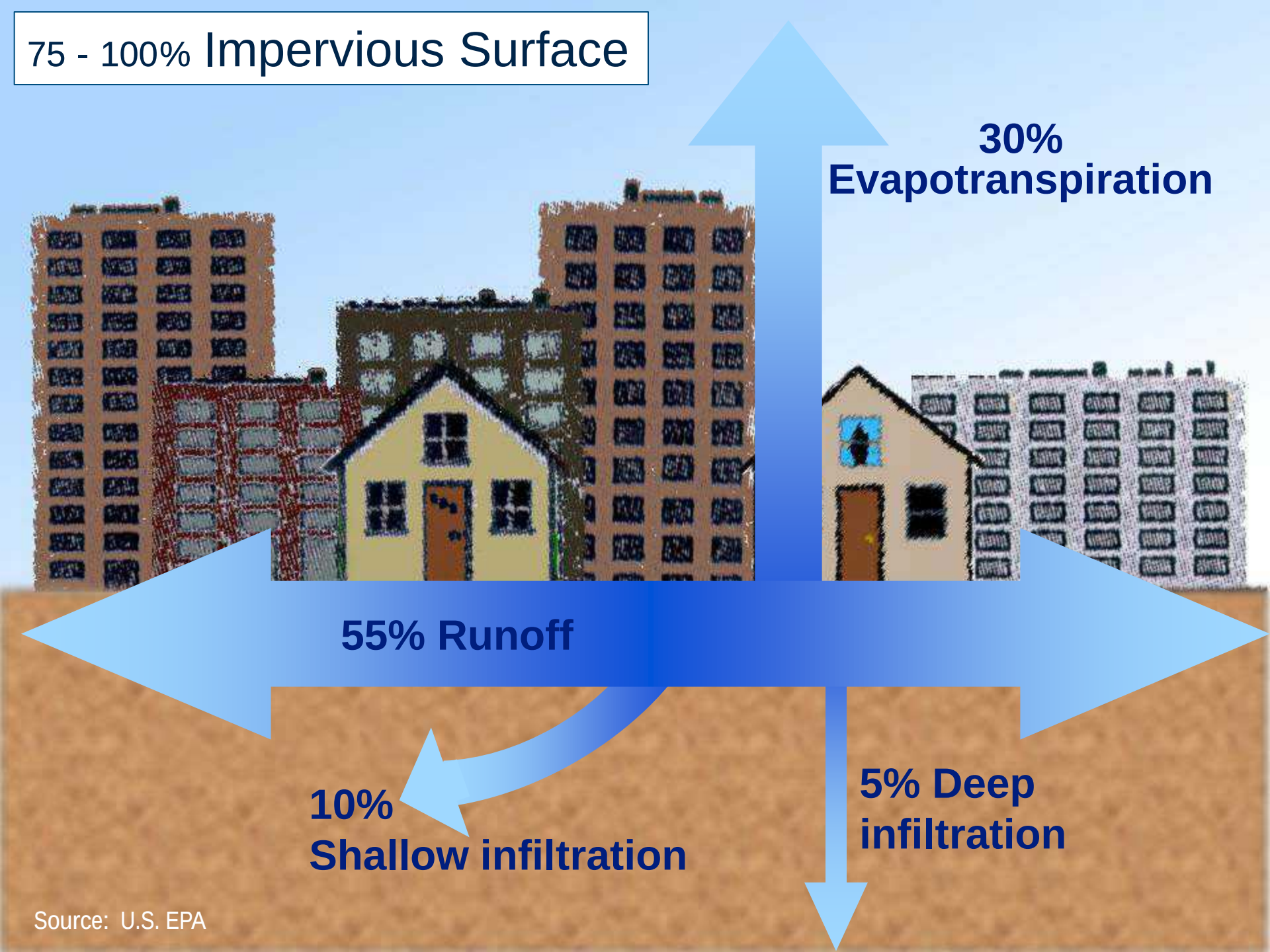


Source: U.S. EPA

Source: U.S. EPA

Impervious Surfaces




75 - 100% Impervious Surface
30%
Evapotranspiration
55% Runoff
10%
Shallow infiltration
5% Deep
infiltration
Source: U.S. EPA

Impervious Cover Influences Wet Weather Stream Flow

When it rains, a large amount of water . . .

Runs off of impervious surfaces → **Enters the stormdrain system** → **Is directed straight to the stream**

Center for Watershed Protection

Impervious Cover Influences Wet Weather Stream Flow

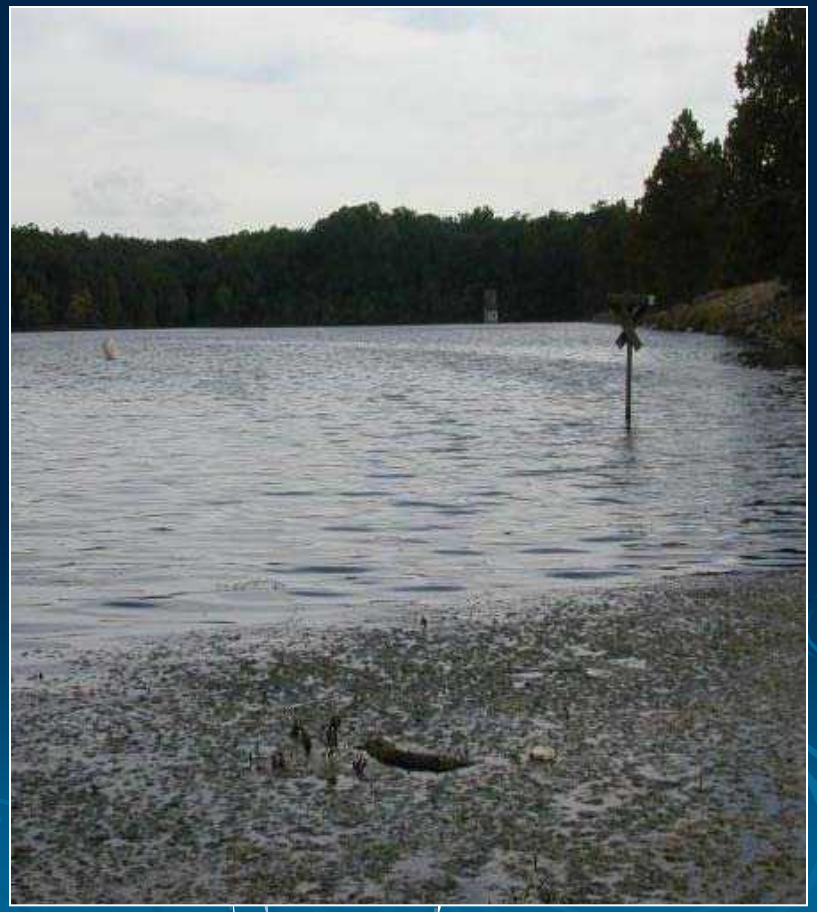
The large amount of stormwater runoff in the stream system can cause:

More Frequent Flooding

Higher Flood Levels

Stormwater runoff carries pollutants including nutrients, sediment, bacteria, pesticides and automotive fluids to surface water resources

Understand Consequences of Excessive Runoff



- *Pollutant transport*
  - Aquatic habitat
  - Recreation opportunities
  - Increased treatment costs
  - Aesthetic beauty
- *Erosive power*
- *Increased regulations*

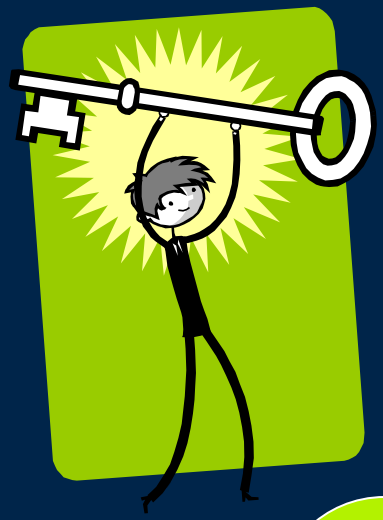
Shift in thinking…

Rain = Liability:

- Water falls on roof
- How can it be channeled?
- How can we divert it from landscaping?
- How can we get it off our property FAST!?

Rain = Resource:

- Water falls on roof
- How can it be captured?
- How can it be stored?
- How can it be used?



keys to managing

Runoff

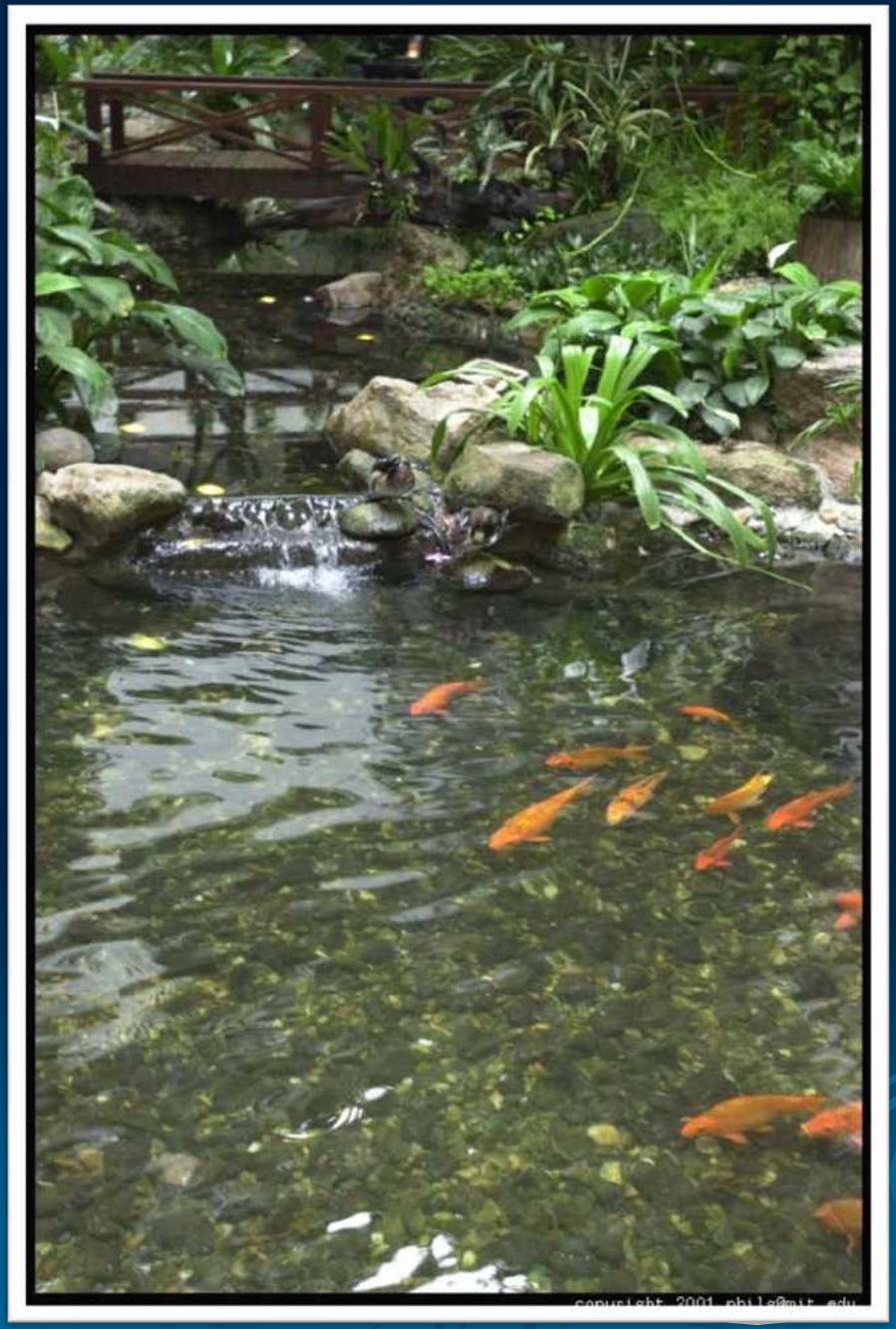
1. ***Slow it down***
2. ***Spread it out***
3. ***Soak it in***

What is a rain garden?

Rain Garden

A landscaped depression planted with native vegetation to soak up rain water draining off roofs, lawns, or streets.

It’s not…



When it rains, the garden fills with a few inches of water that filters into the ground within 48 hours instead of running off into a storm drain.

Invert your thinking

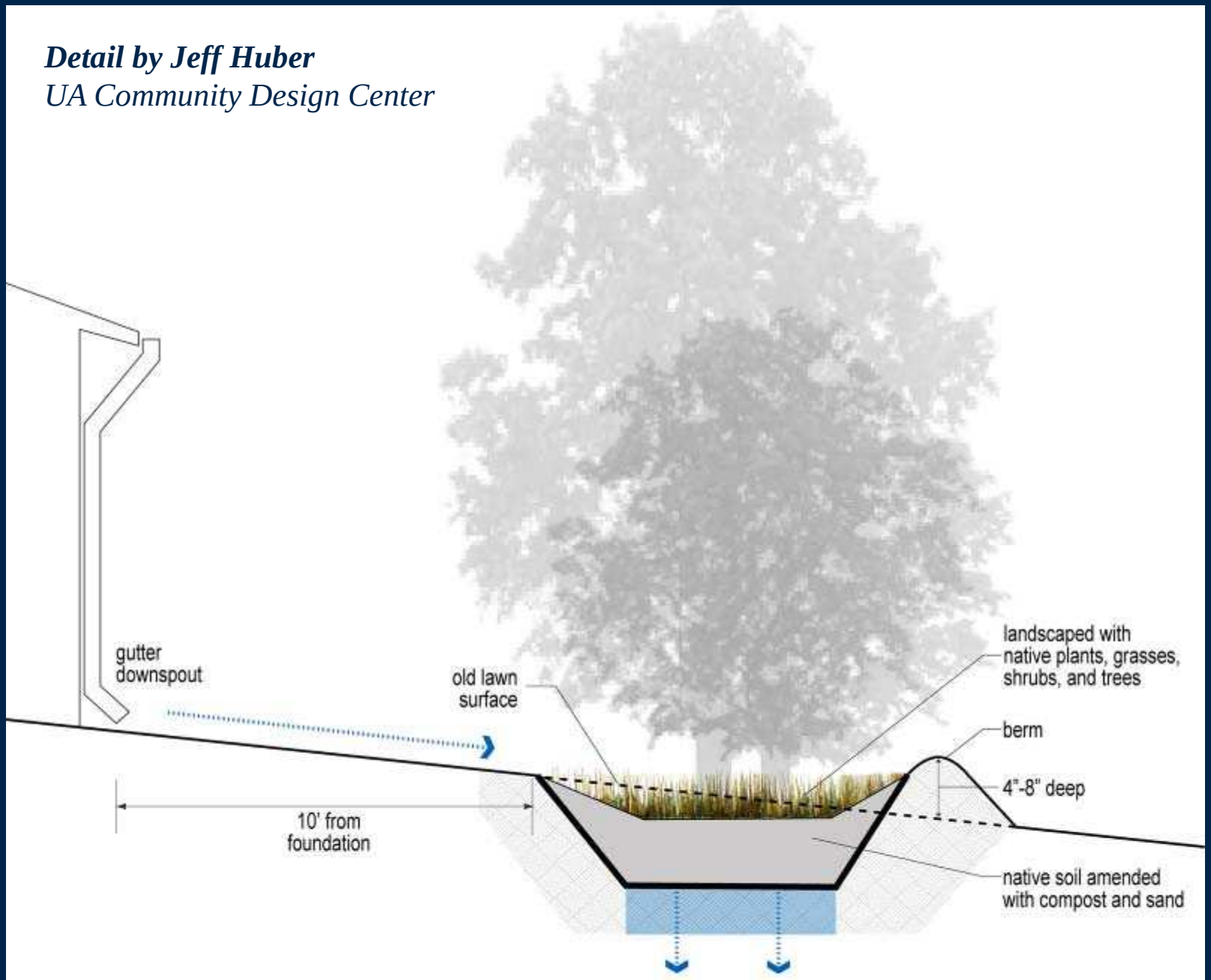
Stormwater runoff also carries pollutants including nutrients, sediment, bacteria, pesticides and automotive fluids to surface water resources

Rain gardens work for us…

- **Increasing water infiltration**, recharging groundwater
- **Protecting streams and lakes** from urban stormwater pollutants including sediment, fertilizers, pesticides, auto fluids, and metals
- **Enhancing the beauty** of yards and neighborhoods
- **Providing food and habitat** for birds, butterflies and insects
- **Reducing flooding and drainage problems** in communities

Detail by Jeff Huber

UA Community Design Center




RAIN

4-Year study on 17 rain gardens in Minnesota:

How do you build a rain garden?

Take an “Umbrella Survey”

Consider Runoff

- Flow paths
- Volume

Get a Handle on Runoff Volume

Calculate roof size and estimate the volume of water generated from a 1” rain

Example:

A home with a 1,200-sq.ft. roof will generate **744 gallons of runoff!**

With Arkansas’ 45” of average annual rainfall, the home will generate 33,480 gallons of runoff a year!

Capture that FREE rainwater!

Example:

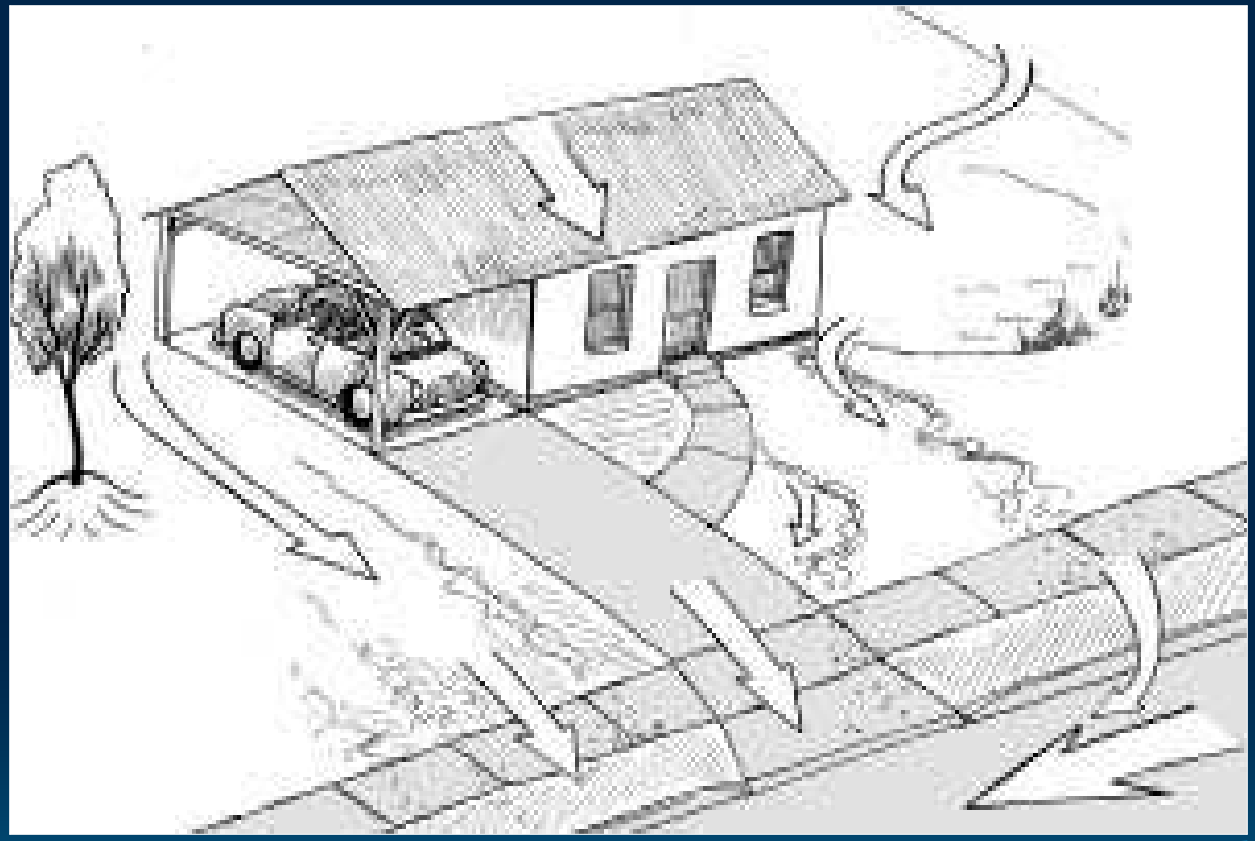
Back to our 1,200-sq.ft. home…

For a 1” rain on a hipped roof with 4 downspouts:

~300 sq. ft for each downspout = **186 gallons**

Rule of thumb: Garden = 10 – 30% of drainage

Identify Runoff Flow Paths



As the rain falls, where does it go?

Where does it go from there??

- ***Find a <u>good</u> site***
- ***Call before you dig!***

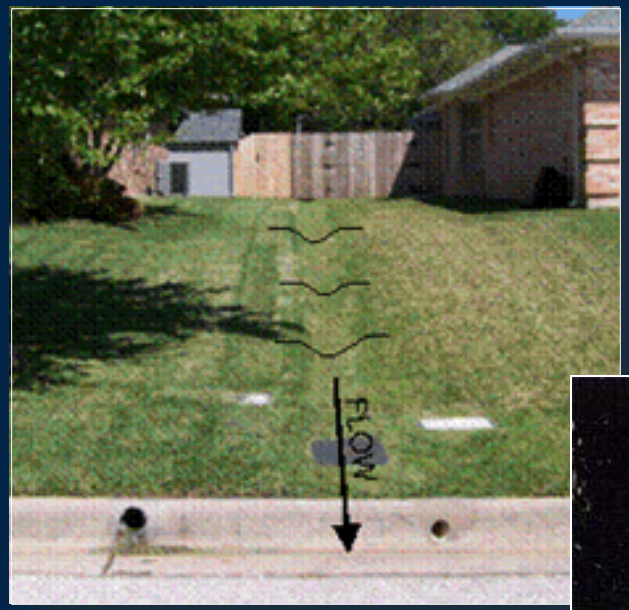
ARKANSAS ONE CALL

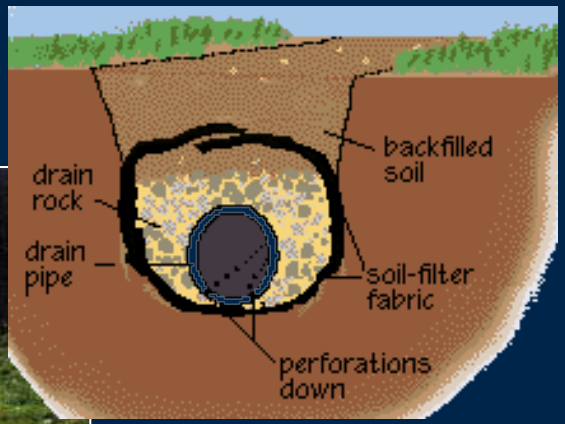
1-800-482-8998

(have it marked/flagged first!)

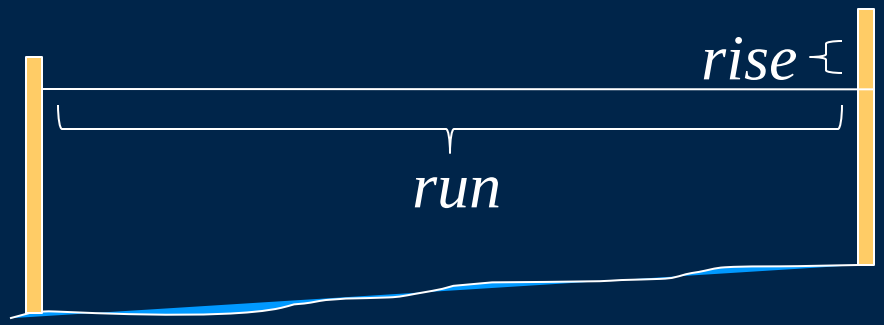
- Find a good site
- Call before you dig!
- ***Check infiltration***

Redirect water





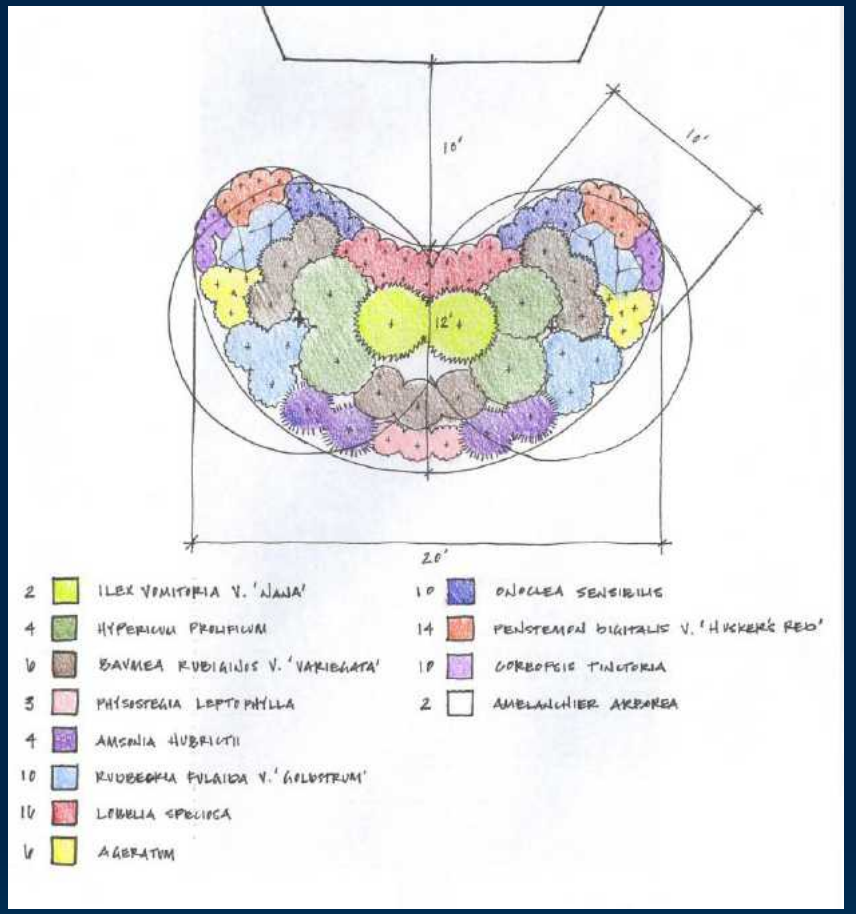
- Find a good site
- Call before you dig!
- Check infiltration
- ***Determine slope***



rise/run x 100 = % slope

e.g.: 5”/120” x 100 = 4.2 % slope

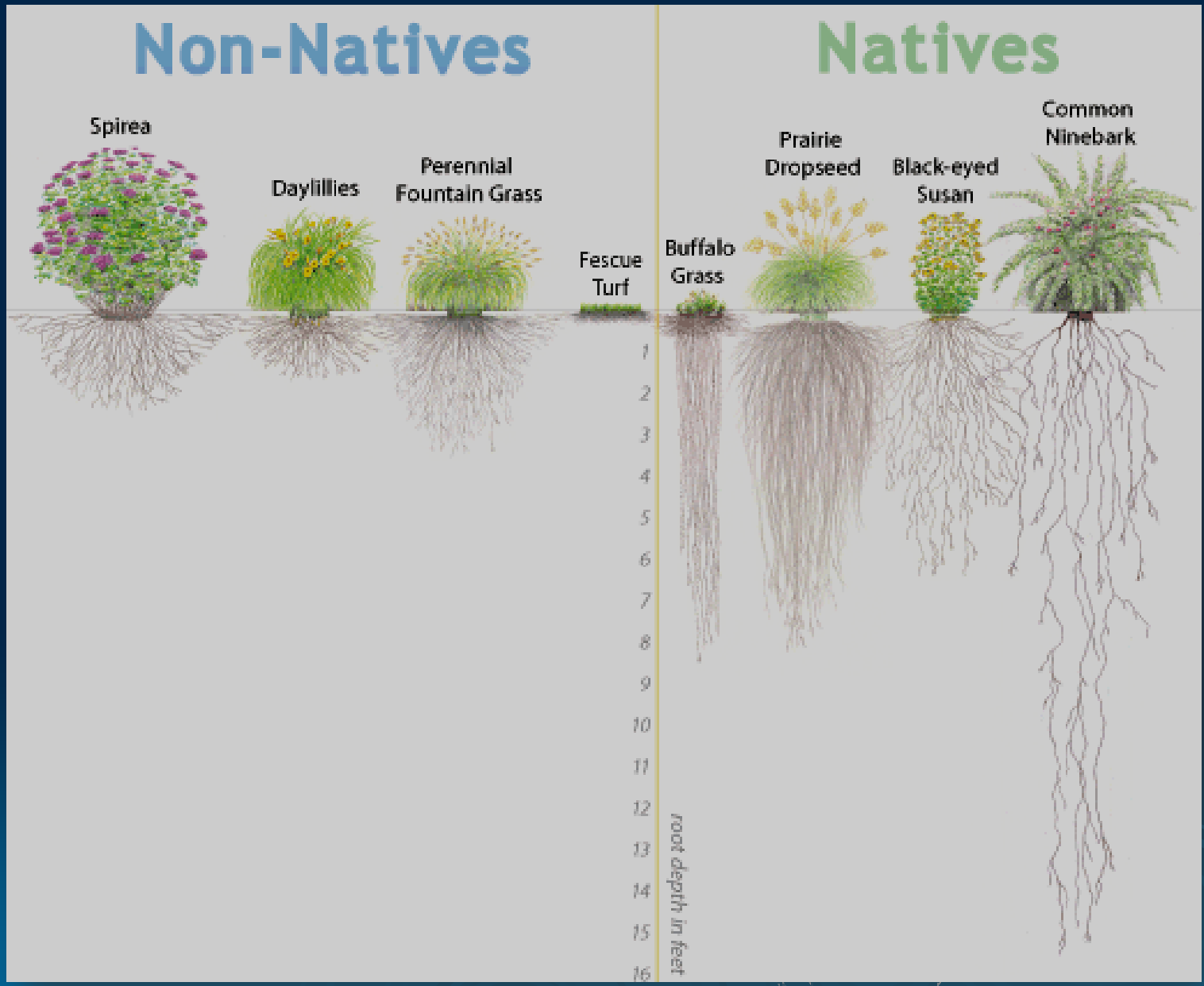
- Find a good site
- Call before you dig!
- Check infiltration
- Determine slope
- ***Size* and design with natives***
  (fun part!)



**** 100 - 300 sq. ft.***

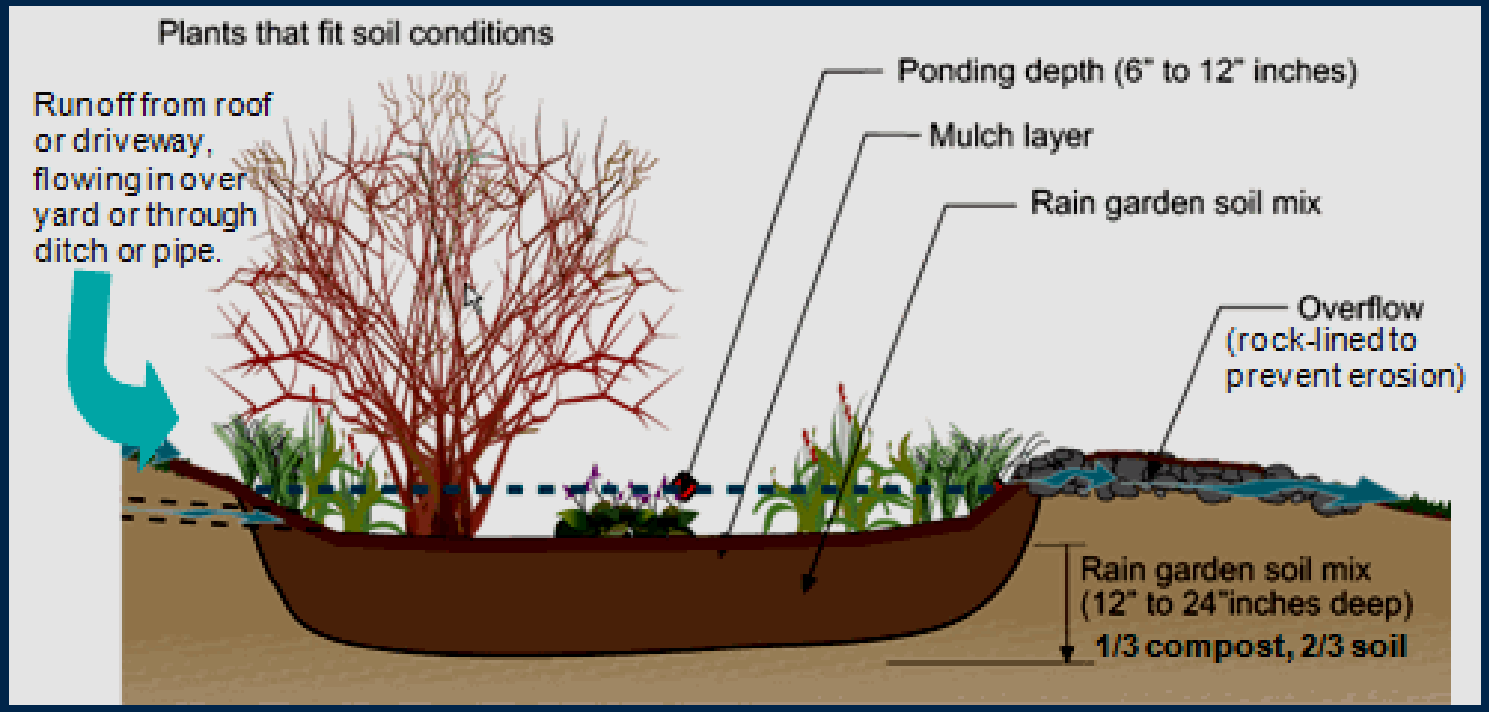
Wet feet, drought tolerant, *NATIVE!*

Using native plants that thrive in our local climate minimizes the need for additional irrigation, fertilizers, or pesticides

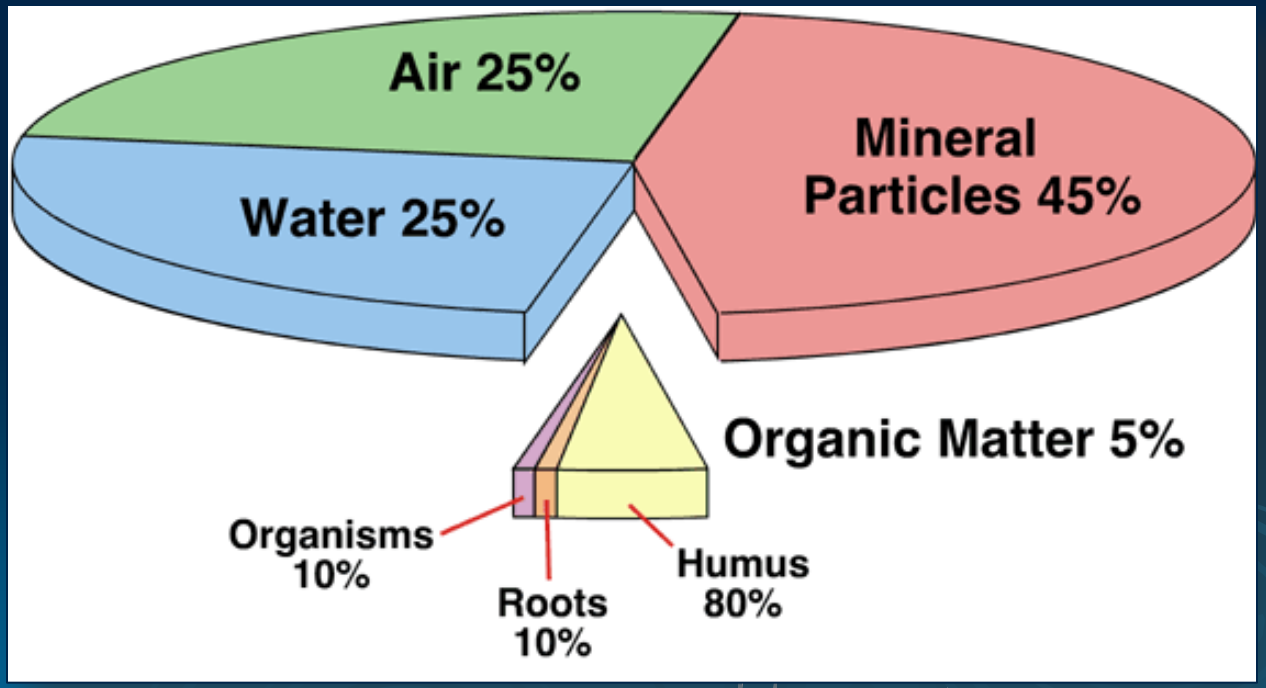

Non-Natives
Natives
Spirea
Daylillies
Perennial Fountain Grass
Fescue Turf
Buffalo Grass
Prairie Dropseed
Black-eyed Susan
Common Ninebark
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
root depth in feet

- Find a good site
- Call before you dig!
- Check infiltration
- Determine slope
- Size and design
- ***Site prep*** *(important part)*

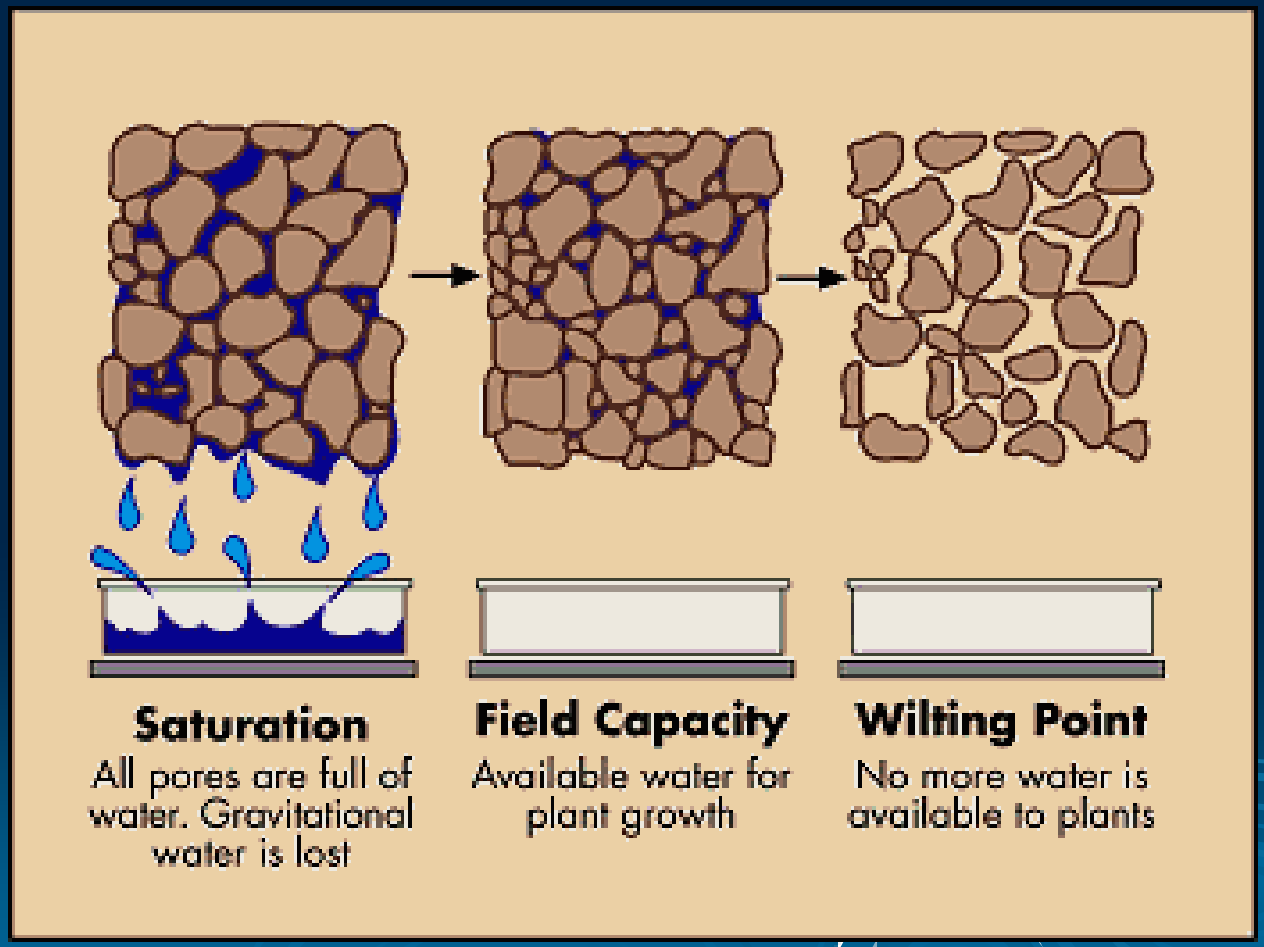
Amending the planting bed with sand and compost enhances infiltration and drainage



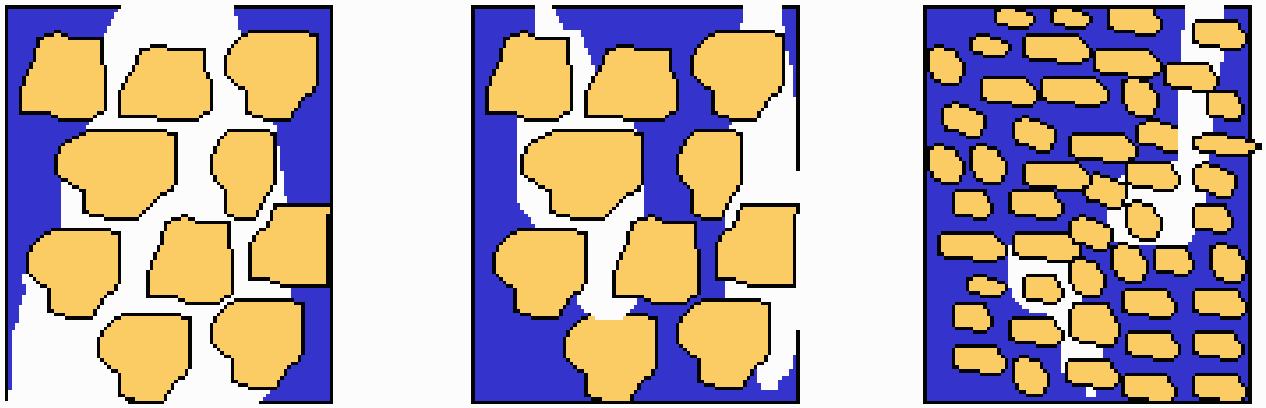
Half of a soil's volume is pore space



Water Holding Capacity

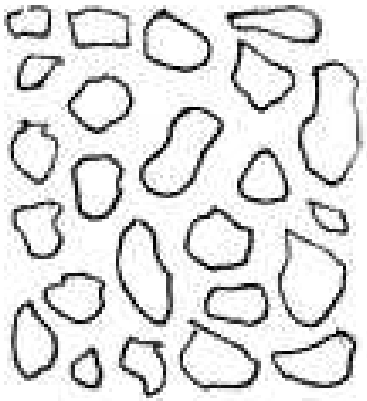


Soil texture:	Sand	Silt	Clay
Size [mm]:	0.05 - 2	0.002 - 0.05	< 0.002

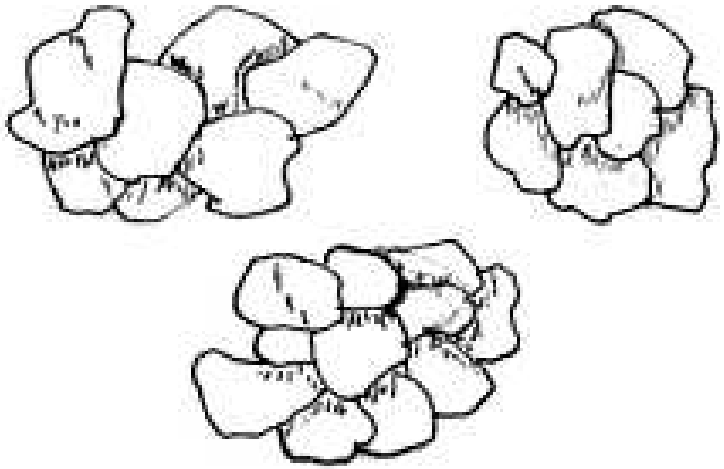


Macropores	+++	++	(+)
Medium-sized p.	++	++	++
Micropores	(+)	++	+++
Percolation:			
Leaching:			

Organic matter is the “glue” that binds soil particles…

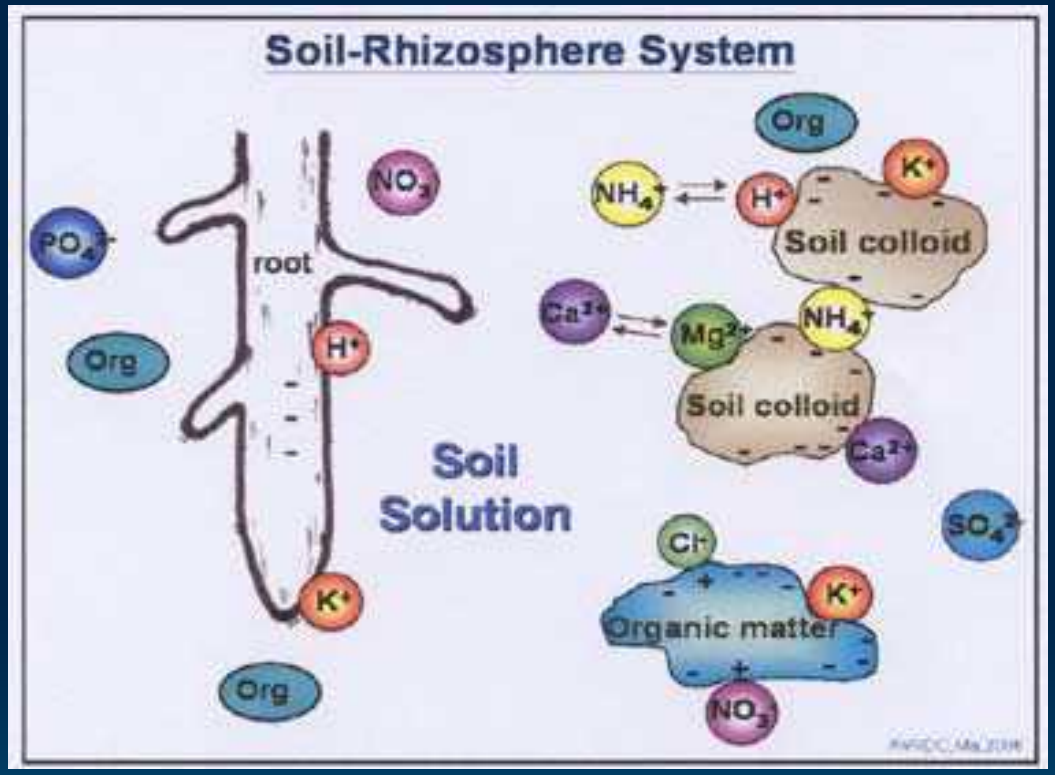


Single grains –
No organized structure



Grains formed into aggregates –
Good organized structure

Nutrient Availability

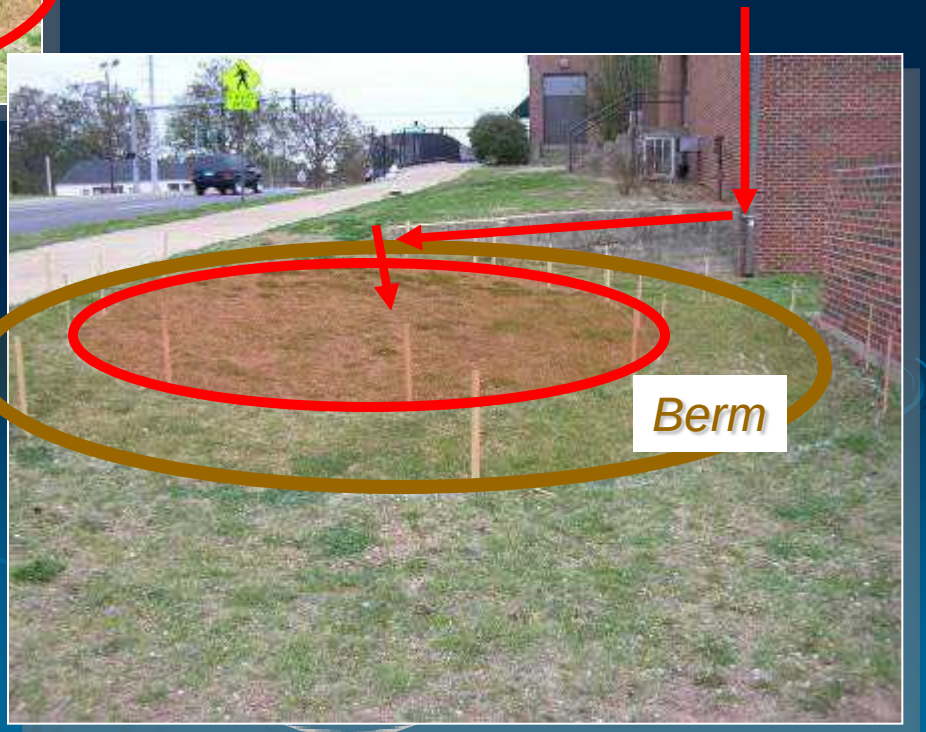


- Find a good site
- Call before you dig!
- Check infiltration
- Determine slope
- Size and design
- Site prep
- ***Plant and mulch***
  (get lots of help!)

“Diggin’ in for Water Quality”

Demonstration rain gardens in Fayetteville

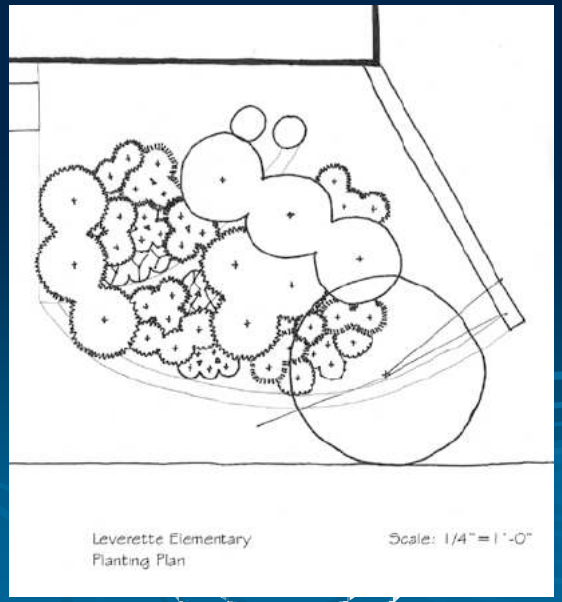
Leverett Elementary School



One Call

Layout

Soils



Design


Site prep


Plant


Guttering


Watch it grow!

Within 1 year…

HOMESTYLE

Arkansas Democrat Gazette

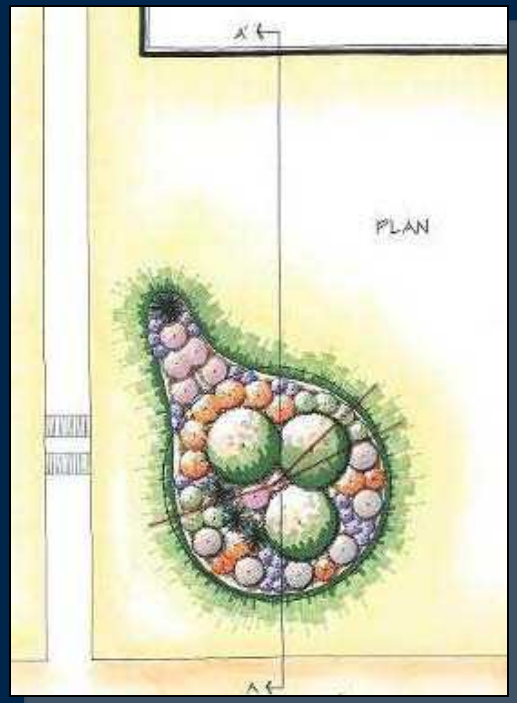
www.arkansasonline.com SATURDAY, SEPTEMI

Arkansas Democrat-Gazette/AMELIA PHILLIPS

Rain gardens, landscaped with native plants like this one at Leverett Elementary School in Fayetteville, collect runoff then let it seep slowly into the soil. This helps reduce pollution, flooding and erosion in creeks.

Puddle power

Happy Hollow Elementary School



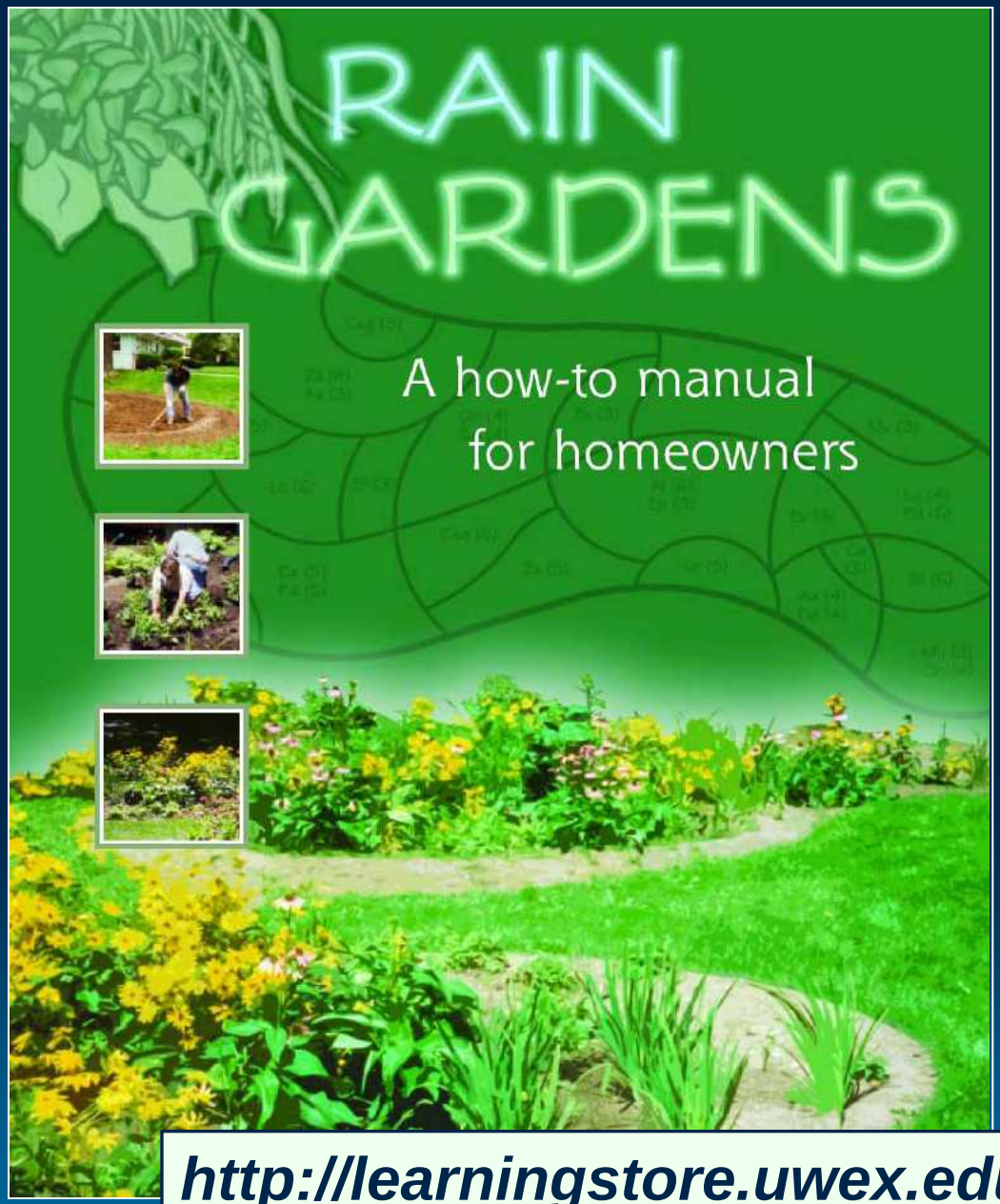
Gulley Park

Walker Park

Seven Hills Supportive Housing Facility

From this…

… to this!



University of Wisconsin Cooperative Extension Service

http://learningstore.uwex.edu/pdf/GWQ037.pdf

Recognize that you are part of a community that *shares* water resources…

Take individual actions to protect and preserve community water resources

We *all* share a responsibility in this effort!

Questions?