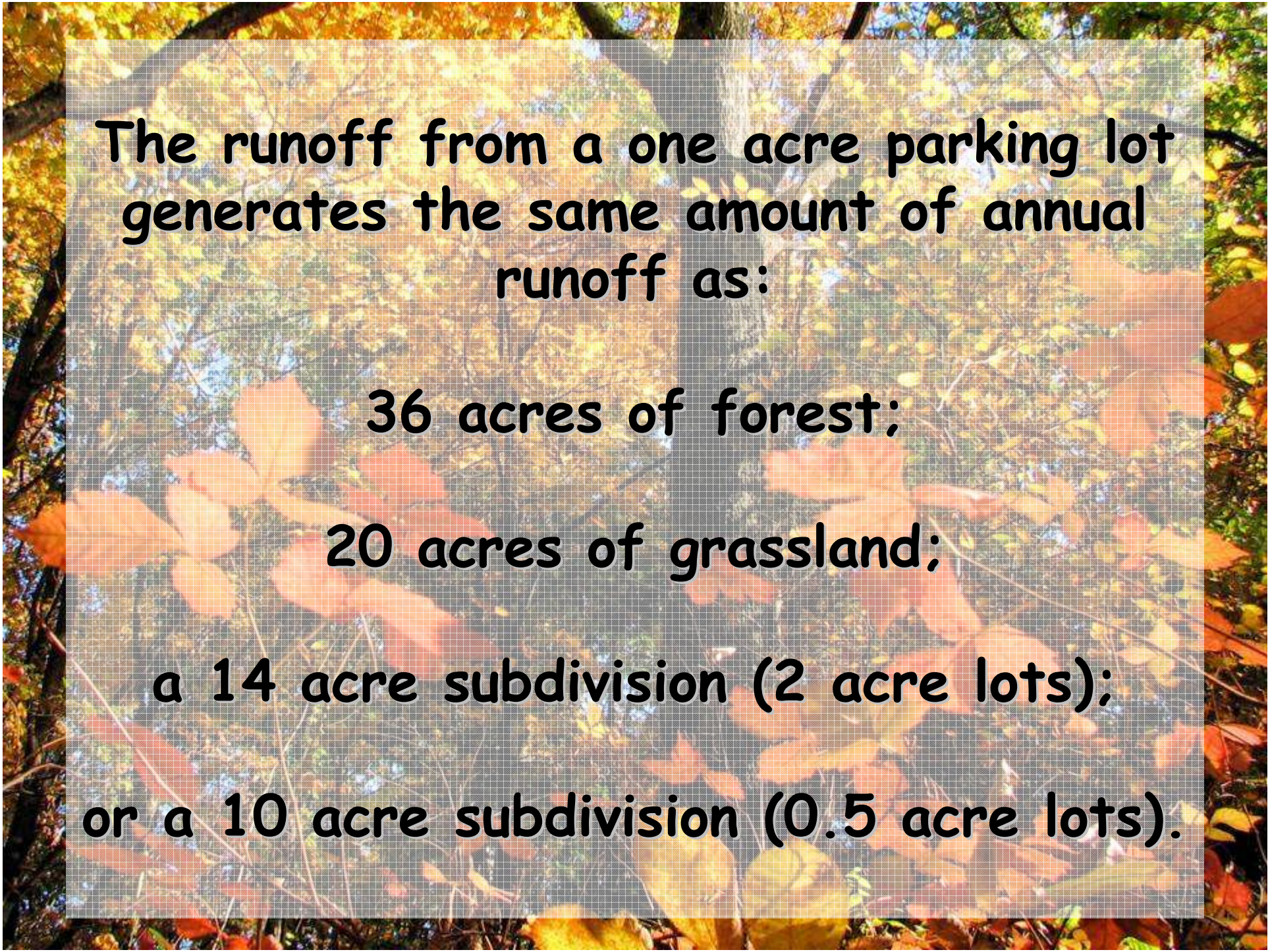

trees &
stormwater

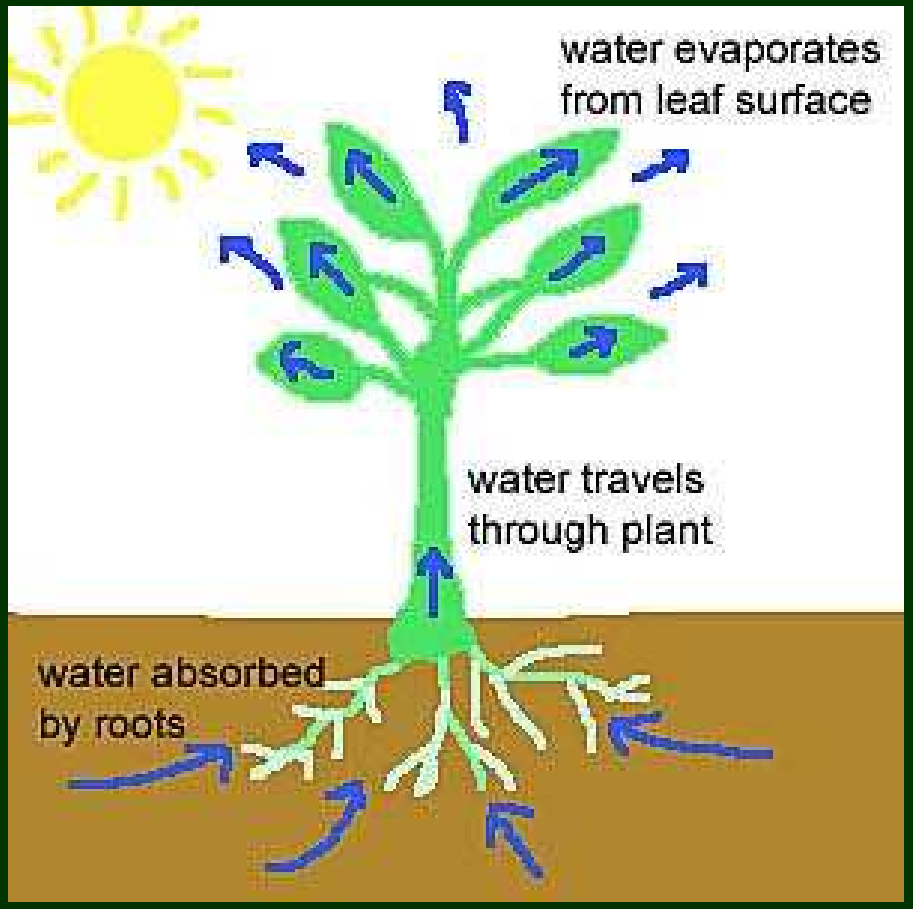
part I: why stormwater managers should

trees

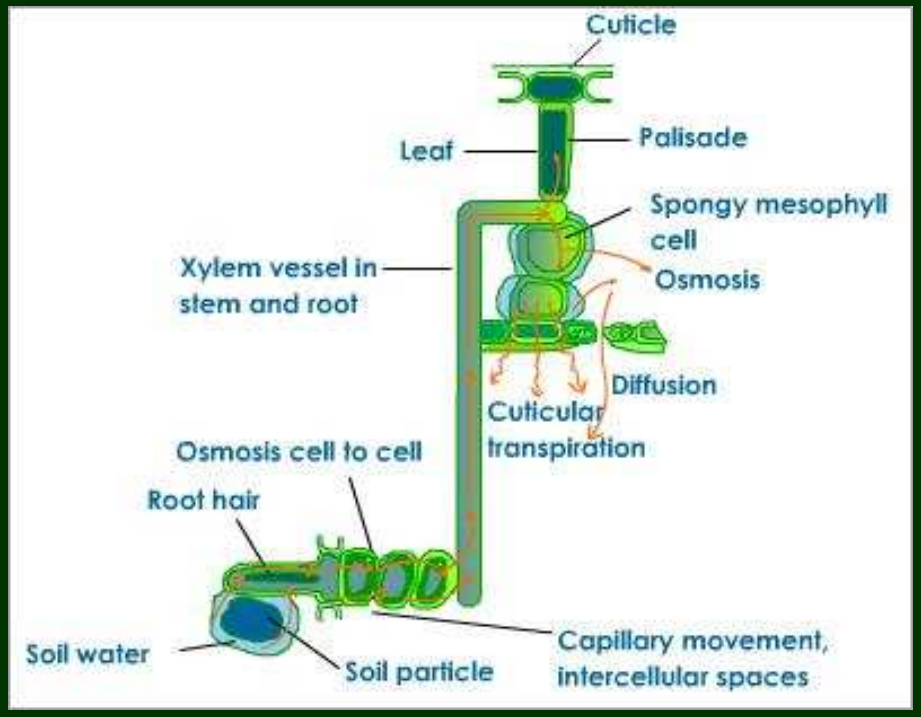

The runoff from a one acre parking lot generates the same amount of annual runoff as:
36 acres of forest;
20 acres of grassland;
a 14 acre subdivision (2 acre lots);
or a 10 acre subdivision (0.5 acre lots).


how?

Transpiration



http://rosegrowing.blogspot.com/2009/01/transpiration-ext.html

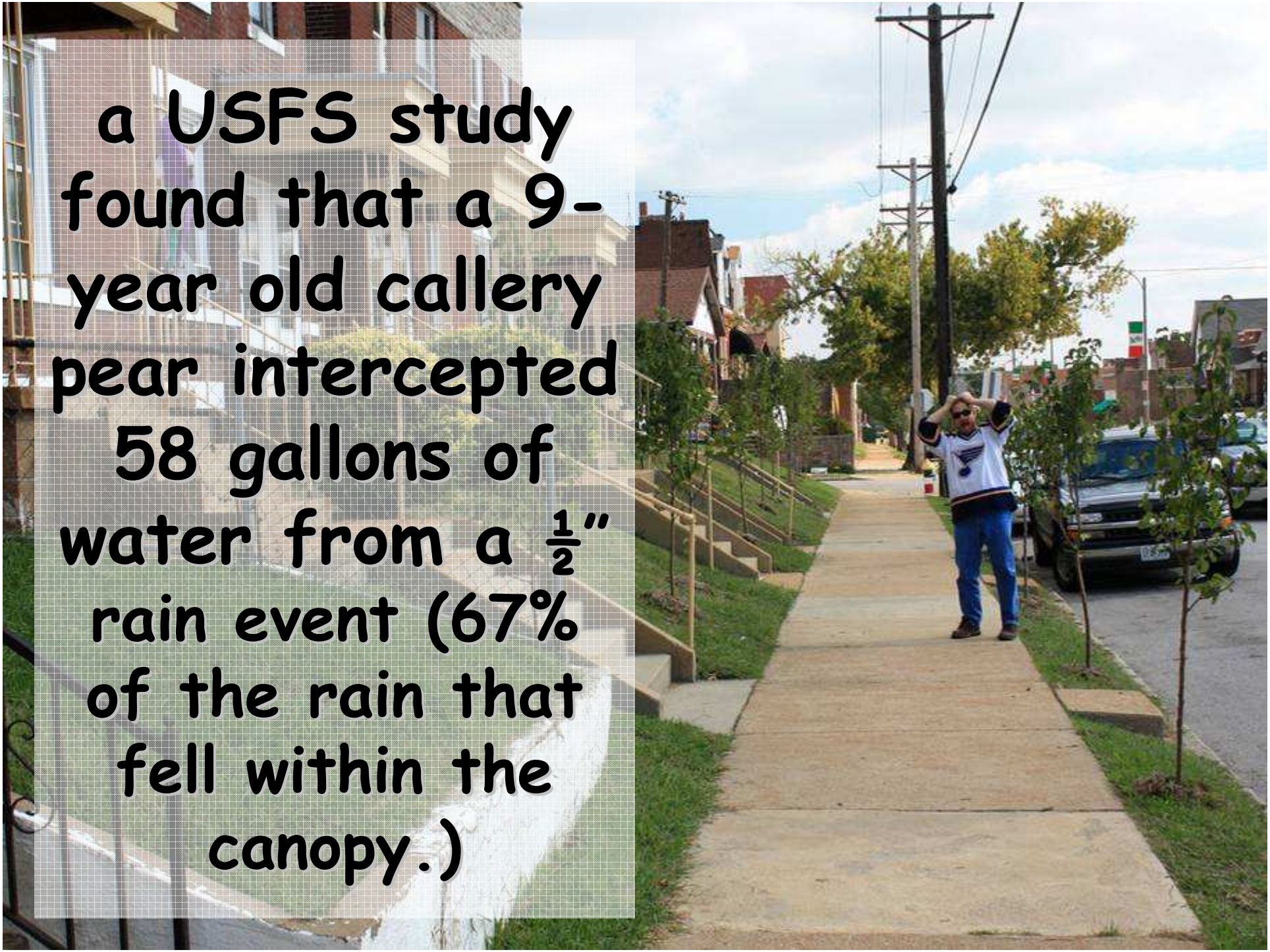


http://www.desktopclass.com/education/9th-10th/transpiration-10th-biology-chapter-lesson-12-4-page-1.html


according to the
USGS, a large
oak tree can
transpire 40,000
gallons per year


interception


how much?
15 – 40%


a USFS study found that a 9-year old callery pear intercepted 58 gallons of water from a ½" rain event (67% of the rain that fell within the canopy.)

i-Tree Design *Beta*

244 Big Sky Dr, St Charles, MO 63304, USA

Home

Get started with these easy steps:

Enter your tree's species:

Oak, Shingle

Note: If you're looking for a Willow Oak, it's listed as "Oak, Willow". If your tree isn't listed, use the general "Other" listings.

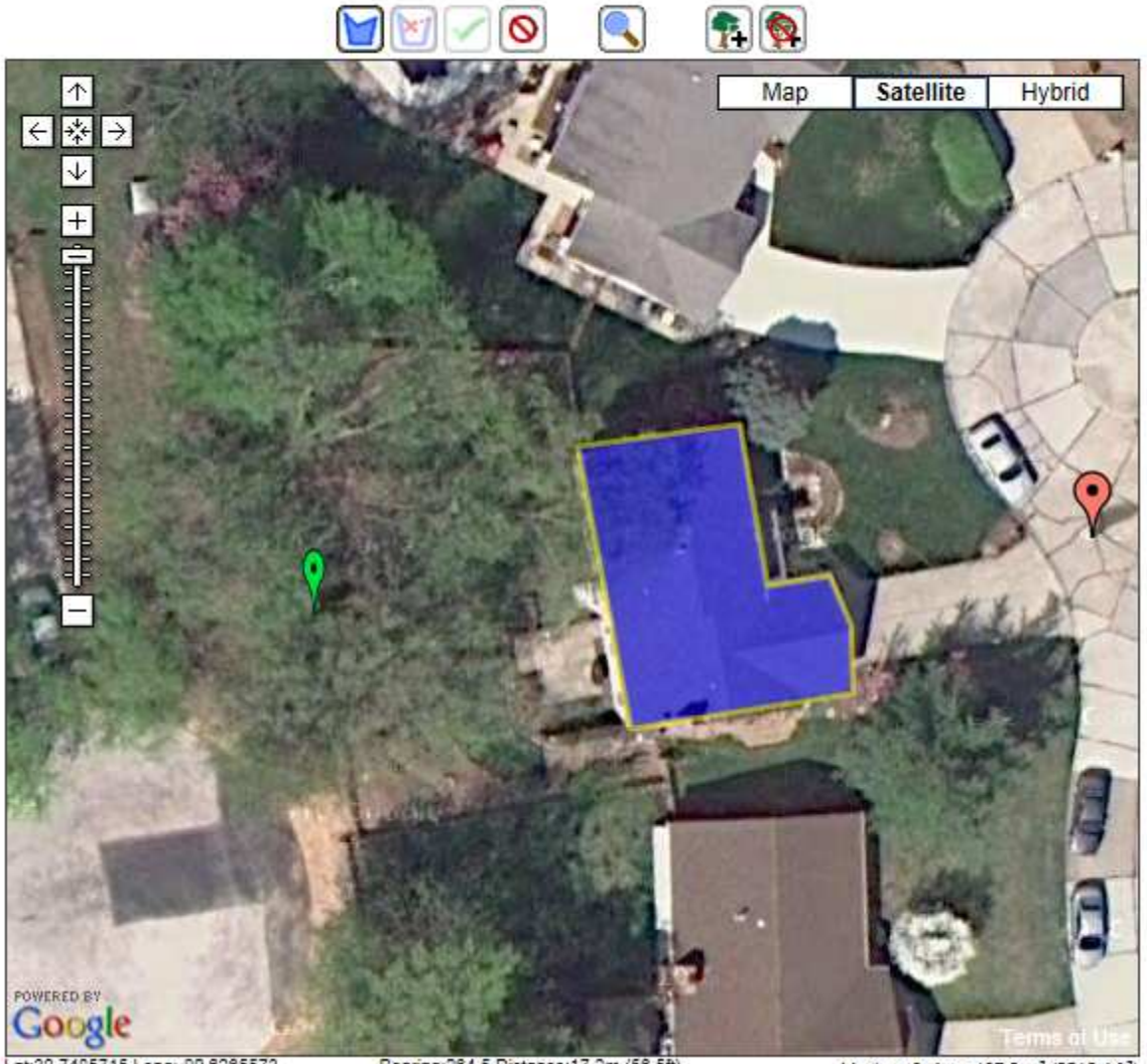
Enter how wide (diameter) your tree is at 4.5 feet above the ground: 22 **inches.**

Note: This measurement is what foresters call "diameter at breast height".

Enter what type of condition best describes your tree: Good

Check here if you would like to evaluate energy effects: ☑

Calculate Benefits



Lat:38.7485715 Long:-90.6265573 Bearing:264.5,Distance:17.2m (56.5ft) Vertices:9; Area:187.2 m² (2015.4 ft²)

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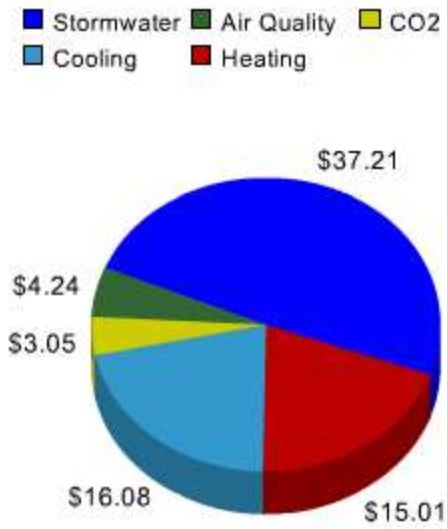

Breakdown of your tree's benefits

Click on one of the tabs above for more detail

This 22 inch Shingle oak provides overall benefits of: $76 every year.

While some functional benefits of trees are well documented, others are difficult to quantify (e.g., human social and communal health). Trees' specific geography, climate, and interactions with humans and infrastructure is highly variable and makes precise calculations that much more difficult. Given these complexities, the results presented here should be considered initial approximations to better understand the environmental and economic value associated with trees and their placement.

Benefits of trees do not account for the costs associated with trees' long-term care and maintenance.

If this tree is cared for and grows to 27 inches, it will provide $88 in annual benefits.

Shingle oak
Quercus imbricaria

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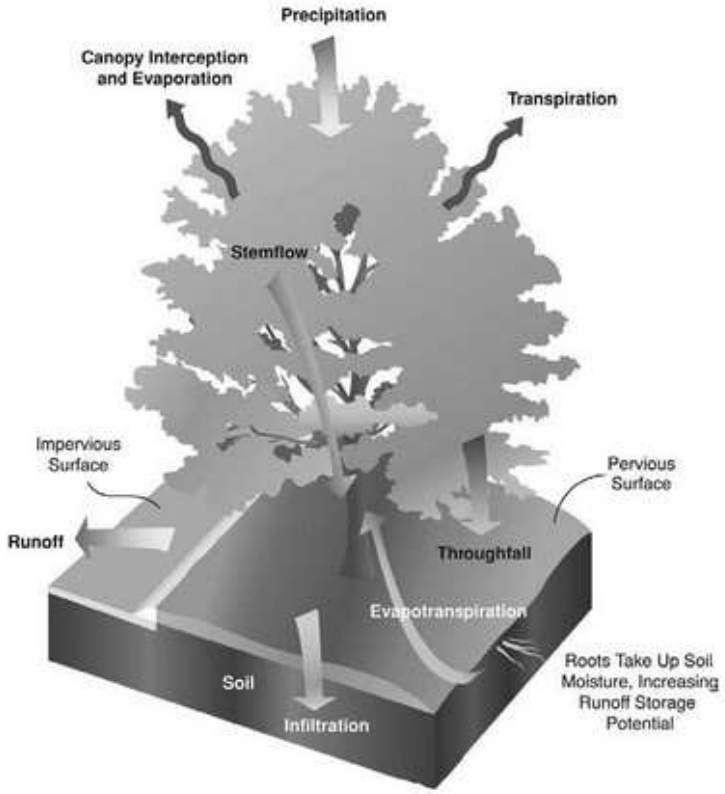


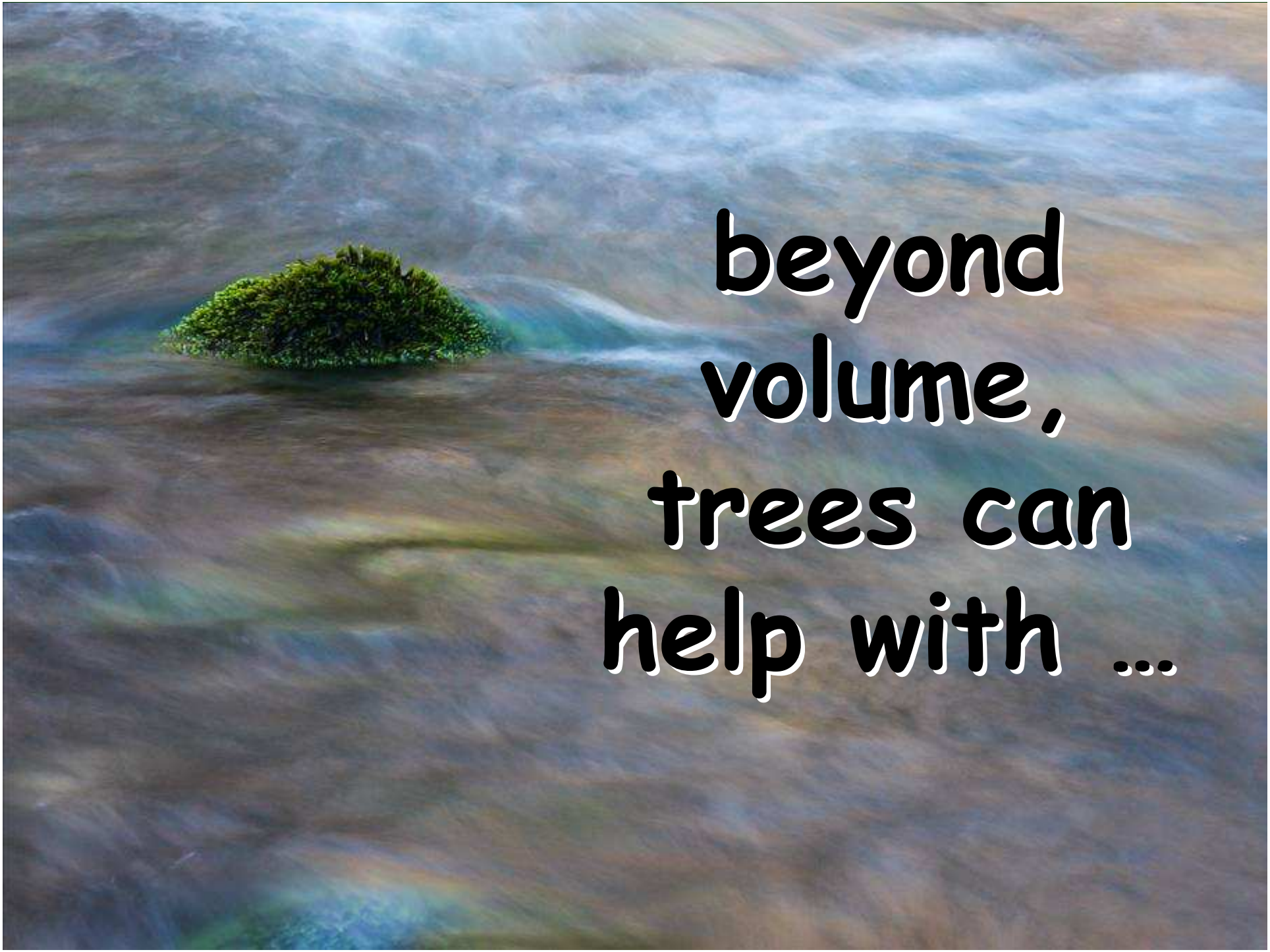
Your 22 inch Shingle oak will intercept 6,001 gallons of stormwater this year.

Urban stormwater runoff (or "non-point source pollution") washes chemicals (oil, gasoline, salts, etc.) and litter from surfaces such as roadways and parking lots into streams, wetlands, rivers and oceans. The more impervious the surface (e.g., concrete, asphalt, rooftops), the more quickly pollutants are washed into our community waterways. Drinking water, aquatic life and the health of our entire ecosystem can be adversely affected by this process.

Trees act as mini-reservoirs, controlling runoff at the source. Trees reduce runoff by:

- Intercepting and holding rain on leaves, branches and bark
- Increasing infiltration and storage of rainwater through the tree's root system
- Reducing soil erosion by slowing rainfall before it strikes the soil

For more information see the USDA Forest Service's Community Tree Guide series.


beyond
volume,
trees can
help with …

H2O quality

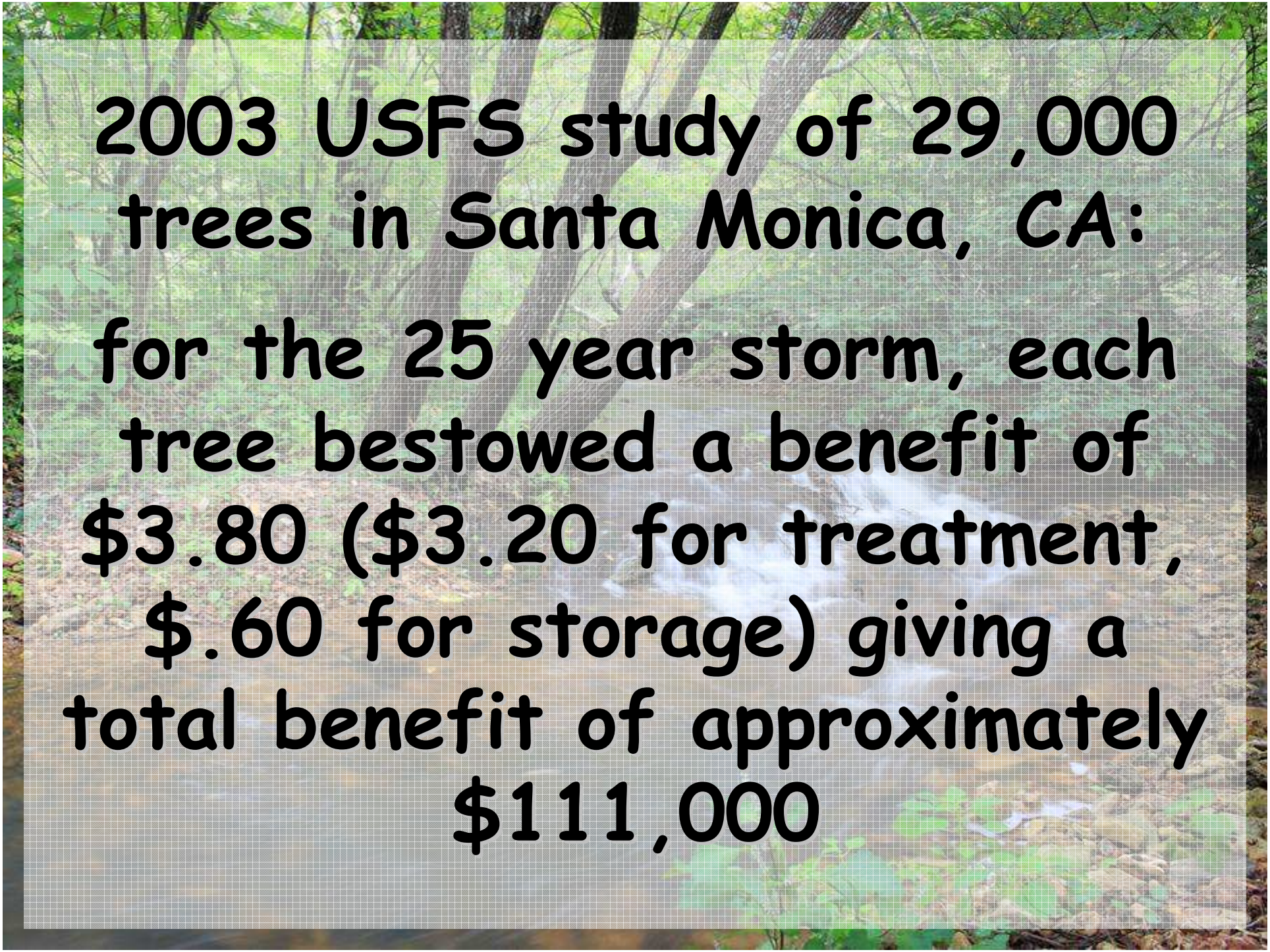
a roadside sugar maple removed

60mg of cadmium,
140mg of chromium,
820mg of nickel,
and
5200mg of lead

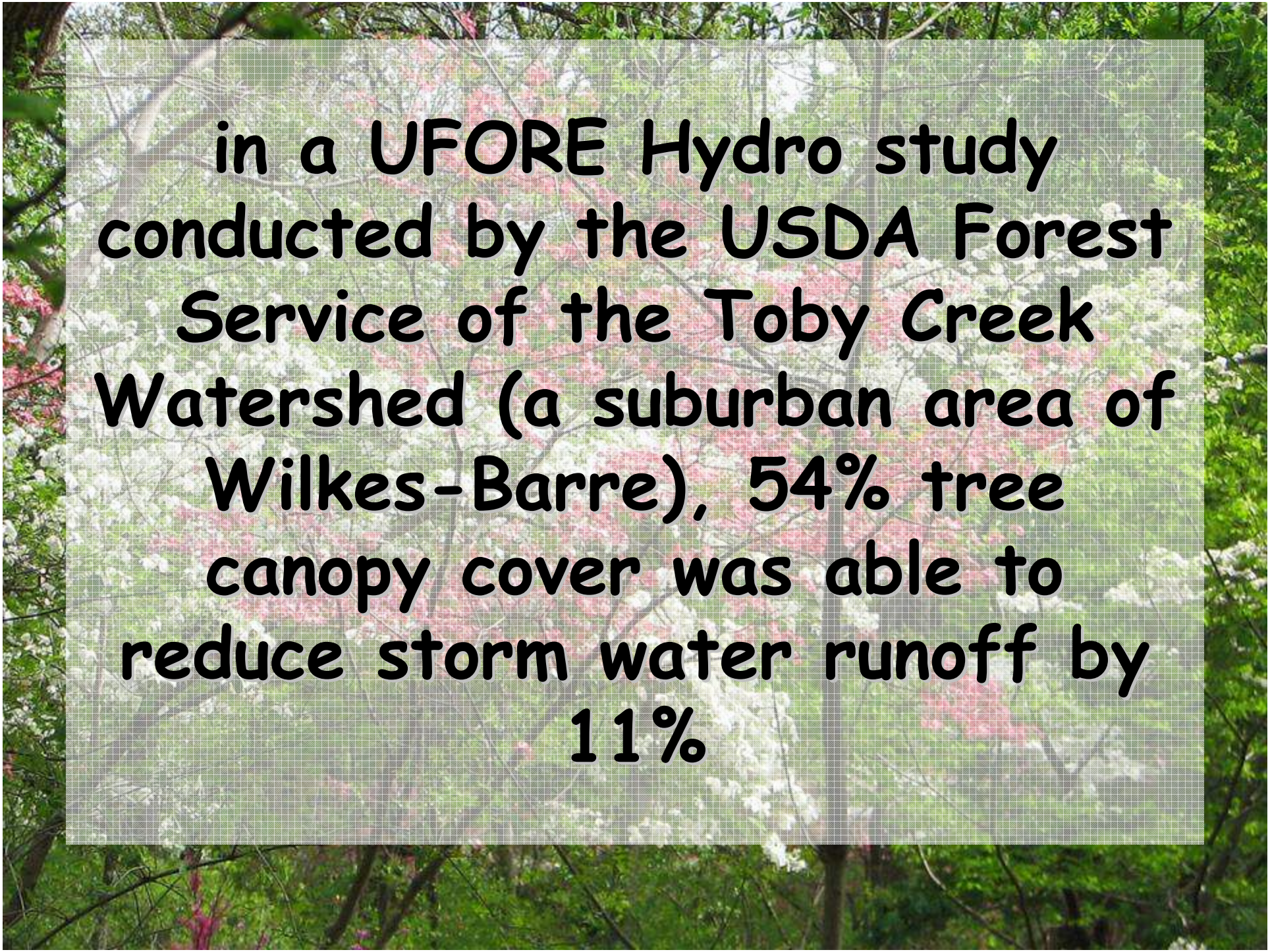
in a single growing season

erosion - armoring

energy
diffusion


2003 USFS study of 29,000 trees in Santa Monica, CA:
for the 25 year storm, each tree bestowed a benefit of $3.80 ($3.20 for treatment, $.60 for storage) giving a total benefit of approximately $111,000

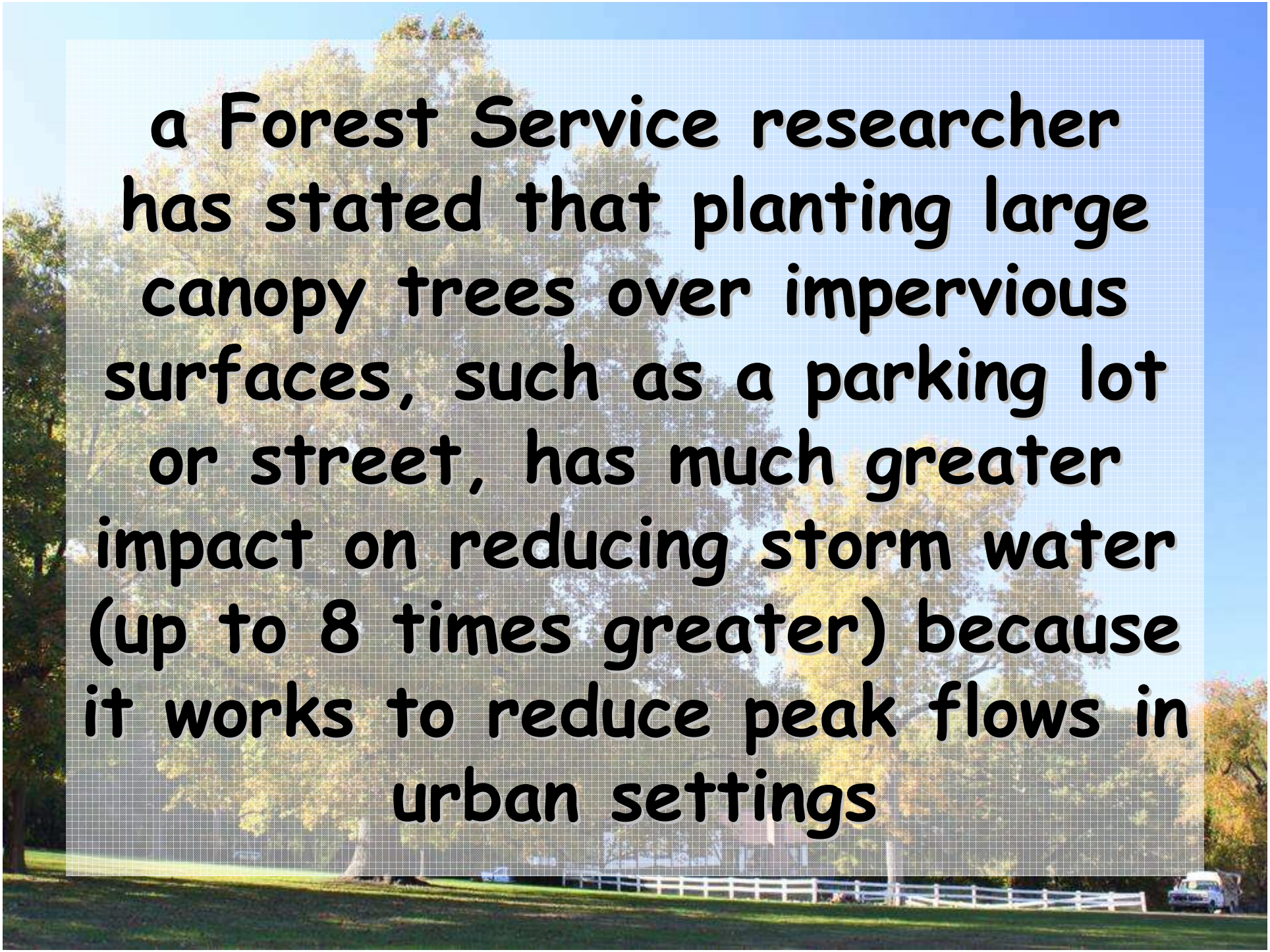
a study of Dayton, Ohio's existing tree canopy found that stormwater runoff was reduced by 7% and could be increased to 12% through planting more trees.


in a UFORE Hydro study conducted by the USDA Forest Service of the Toby Creek Watershed (a suburban area of Wilkes-Barre), 54% tree canopy cover was able to reduce storm water runoff by 11%

aren't
trees
great?!

give your city forestry departments a hand!

part II: how to maximize our tree benefits


a Forest Service researcher has stated that planting large canopy trees over impervious surfaces, such as a parking lot or street, has much greater impact on reducing storm water (up to 8 times greater) because it works to reduce peak flows in urban settings


unfortunately, those sites are tough on trees