Water Conservation Ideas

Did you know that using a rain barrel to catch the water flowing from eaves and troughs is one of the simplest, cheapest ways to conserve water and divert it from the storm sewer system?

How Do We Use Water?

Water is a resource that has many uses, including recreation, transportation, hydroelectric power, agricultural, domestic, industrial, and commercial uses. Water also supports all forms of life and affects our health, lifestyle, and economic well being. As individuals, we use water for sanitation, drinking, and many other human needs, and we pay for the public water utilities that provide water. The average American uses 140 to 160 gallons of water per day. Examples of the amount of water used by an individual during everyday activities are:

To flush a toilet	5 to 7 gallons	To take a shower	25 to 50 gallons
To run a dishwasher	15 to 25 gallons	To take a bath	50 gallons
To wash dishes by hand	20 gallons	Wash small load of clothes	35 gallons
To water a small lawn	35 gallons	To brush teeth	2 to 5 gallons

Although more than three quarters of the earth's surface is made up of water, only 2.8 percent of the earth's water is available for human consumption. The other 97.2 percent is in the oceans; however, this water is too salty to use for most purposes, and the salt is very costly to remove. Most of the earth's fresh water is frozen in polar ice caps, icebergs, and glaciers.

Why is Water Pollution Prevention and Conservation Important?

Although water flows from our faucets throughout the day, we often take the amount of fresh water available on earth for granted. As the world's population increases, water consumption increases. Preventing water pollution and conserving water are important to assure a continuing abundance of water that is safe to use for ourselves and future generations.

Water Pollution

Water pollution is any human-caused contamination of water that reduces its usefulness to humans and other organisms in nature. Pollutants such as herbicides, pesticides, fertilizers, and hazardous chemicals can make their way into our water supply. When our water supply is contaminated, it is a threat to human, animal, and plant health unless it goes through a costly purification procedure.

Examples of pollution

* Large areas such as agricultural fields that have been covered with fertilizer or pesticides. Fertilizer and pesticide residues can runoff or wash into streams and rivers or seep into soil, contaminating underlying groundwater.
* Pollutants can come from a specific source such as a pipe that discharges used water or other material from a factory into a water body. Such discharge can harm the aquatic ecosystem.
* Parking lots, gardens, driveways, sidewalks, lawns, and roads. Rain water or melted snow can transfer materials such as oil, litter, fertilizers, and salt down storm sewer inlets found on the streets. In some areas, the storm sewer transports this polluted water to a nearby river, lake, stream, or wetland.
* Pollutants can contaminate our drinking water sources, reduce oxygen levels which can kill fish and other wild life, accumulate in the tissue of fish we catch and eat from the lakes, and reduce the beauty of the water.

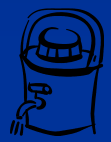
How Can Pollution Prevention Help You?

It is hard to imagine that one person can make a difference in protecting and conserving fresh water supplies on this planet, but each individual can really help the environment. The following related concepts can help you protect water from pollution, conserve water by reducing the amount of water you use, and save money.

Pollution Prevention

Changing What You Use

- Replace shower heads and faucet aerators with water efficient models.



- Use a water-filled milk jug or plastic bottle in your toilet tank to displace water; this allows your toilet to operate using less water.

- Choose non phosphate or low phosphate detergents. High phosphate levels in lakes and streams can kill fish and other wildlife.

- Use a broom instead of water to clean your driveway or garage. Do not sweep debris into the street or storm sewer.

- Put a spray nozzle on the end of your hose for car washing and plant watering to prevent the hose from continually releasing water and to control the amount of water used.

- Use native plants in your garden that require less water.

- Use cat litter or sand instead of salt on icy walks. Salt pollutes water and kill plants.

Pollution Prevention

Changing What You Do

- Do not let the water run while brushing your teeth or washing your face (you can save up to 5 gallons).
- Do not leave the water running if you wash dishes by hand. Rinse all of your dishes at once by using a dish rack placed in the sink.
- Only run your dishwasher and washing machine when they are full.

- Do not throw in the trash, pour down the drain, or dump on the ground; paint, antifreeze, and other household hazardous wastes, because they can migrate to your water source.

- Dispose of tissues, dead insects, and other waste in the trash can rather than a toilet.
- Plant native plants instead of traditional lawn grass to avoid the use of herbicides, pesticides, and fertilizers.
- Do not dump used motor oil on the ground or into sewers; throwing motor oil in the trash is illegal. Recycling centers and many service stations accept used motor oil for recycling.

Pollution Prevention

Improving Your Housekeeping

- Fix leaks by replacing faucet washers and toilet flappers as needed. A slow drip or leak can easily waste more than 100 gallons of water a week.
- Put all litter in trash cans so it does not get washed into the storm sewers.
- Clean up waste products while walking your pet.

Pollution Prevention

Educating Yourself and Others

- Educate your community about effects of dumping waste (pesticides), down drains and into waterways.

- Encourage your neighbors, family, and friends to install low flow water fixtures and to practice water conservation.

Water IQ

Why?

- We must use our precious water resources more efficiently. In the summer months, outdoor water use can account for 50 to 80 percent of home water use. Much of this water is wasted through inefficient landscape watering practices. Using water more efficiently will save money and protect the quality of life of future generations. We must be responsible and save water now.

Water IQ

Water-Wise Landscape Watering

- **When Should I Water?** Pay attention to signs of stressed grasses, such as a dull green color, footprints that remain visible after walking on the lawn, or curled leaf blades. Water only after the top 2 inches of the soil has dried out. Check moisture by feel with a soil probe or a screwdriver.

- **What Time of Day Should I Water?** Evaporation loss can be 60 percent higher during the day, so water during the early morning or in the evening. Do not water on windy days. Proper watering at night does not contribute to brown patch fungus, which is caused by overwatering and excessive fertilizer use.

- **How Often Should I Water ?** Proper watering, 1 inch of watering once every five days or more, will help grass and shrubs develop deep roots. Over-watered turf will have a short root system and will not be drought tolerant.

- **What Should I Water?** Only your plants. Don't water sidewalks and driveways. Use a broom to sweep debris away. This can save 30 gallons per 5 minutes of work.

- **How Can I Use Rainwater?** Harvest it. Funnel the water from your gutters into a barrel or cistern and save it for a sunny day. Rainwater is free, and its better for your plants because it doesn't contain hard minerals. Also the pH of rainwater may be better for plants.

Water IQ

Water-Wise Landscape Watering

- How Long Should My Grass Be? Don't scalp your lawn. Taller grass holds moisture better, encourages deeper root growth, and makes it less susceptible to browning. Keep grass 3 inches tall during the summer (more than 3 inches stresses the grass).

- When Should I Mow? Cut grass only when it is dry, keep mowing blades sharp, and don't cut more than one-third of its length at one time.

- How Can I Conserve Soil Moisture? Use lots of mulch, it will make your shrubs and young trees more tolerant to heat. One to 3 inches of mulch retains moisture, reduces runoff, helps moderate soil temperatures, aids in root development, reduces erosion, slows weed growth, prevents soil compaction, and makes your landscape beautiful. Rock and gravel in large, hot sunny areas radiate heat from the sun, and may increase temperatures and water losses from plants and soil. Place mulch directly on the soil or on weed barrier fabric that can "breathe." Avoid using sheet plastic in planting areas. Top dressing (applying a thin layer of compost to the surface of the lawn) functions like mulch for your lawn. It increases organic content and it protects grass roots.

- What Should I Know About Fertilizing? Contact your County Extension Service for a soil kit and recommendations for the ratio of nitrogen, phosphorus, and potassium that should be in your fertilizer. The correct ratio of nutrients helps grass withstand stress, use less water, and reduces excessive nutrient runoff. Too much fertilizing causes excessive growth, creating more demand for water, more thatch, and the need for increased mowing frequency. Many people apply too much fertlizer, which simply runs off and pollutes local waterways. Leaving grass clippings on the lawn reduces the need for chemical fertilizer.

Rain Garden

Building a rain garden (or a couple of rain gardens) in your own yard is probably the easiest and most economical thing you can do to reduce your contribution to storm water pollution. By capturing rainwater from your roof, driveway, and sidewalks and diverting it into a rain garden, it can slowly soak into the ground, filter contaminants and keep quantities of clean water from going down the sewer system. You'll have a great looking garden that puts water in its place.

What Is a Rain Garden?

- A rain garden uses native landscaping to soak up rain water from your downspout. The middle part of the garden holds several inches of water, allowing it to slowly infiltrate into the ground instead of being delivered to the storm drain all at once.

Why Install a Rain Garden?

- A rain garden allows 30% more water to infiltrate into the ground than a conventional lawn. This helps replenish the groundwater supply (important during a drought), and reduces the amount of pollution that reaches our streams through storm water runoff. Since studies show that the first inch of rainfall is responsible for the bulk of the pollutants in storm water, a rain garden is designed to temporarily hold water from a one-inch rainstorm, and slowly filter out many common pollutants like sediment, oil, grease, and nutrients. Rain gardens require less watering and fertilizer than conventional lawns and provide habitat for birds and butterflies.

Choose The Right Place for Your Rain Garden

Your property has an existing drainage pattern (even though it may not be very noticeable), and it will usually be easiest to take advantage of that. Note the direction of runoff and low spots where water collects. If you are not sure where these are, and it's not raining, find them by placing a water hose on the ground and watch to see where the water collects. If these spots are away and downhill from your building foundation, they will be good places for your rain garden. If there is a spot on your property where standing water collects, this area has poor infiltration. You may think it is thus the wrong spot for your rain garden. However, if you could collect water anywhere on your property, these areas would likely have poor infiltration also. This is because soil is compacted during construction in order to prevent sinkholes and to support building foundations and other structures. This general compaction of building site soils makes the need for your rain garden even more critical. If you have many low spots, you can choose those that are closest to the downspouts from your roof or nearest to a paved driveway.

A Few Hints for Choosing a Spot

Avoid creating a rain garden too close to building foundations; this may lead to a leaky basement. *If you can locate it at least 10 feet and downslope from the building, that should be good. Also, you must stay away from the drain field if you have a septic system.*

Digging / Planting Your Rain Garden

Dig The Garden

To enable the rain garden to hold several inches of water during a storm, you'll have to dig a hole 3– 4 inches deep across the entire surface of the garden. If the soil lacks organic material, you can improve it by digging the hole 5-6 inches deep, and adding 2-3 inches of humus or other organic material. Make sure the bottom is level. Next, test how the garden will hold water during a storm by letting water flow into the rain garden from a hose placed at the downspout. Based on this test, make any necessary adjustment (i.e., create a berm on the lower side of the garden using the diggings, or use a downspout extension or shallow ditch to direct the water into the garden).

Add The Plants

Choose drought-tolerant plants that won't require much watering, but make sure they can withstand wet soils for up to 24 hours. A list of native plants that meet these criteria is provided below. Also take into account how much sun your garden receives. It is often helpful to draw out a planting plan before you start, and mark planting areas within the garden with string. After planting, weeding may be required until the plants become more established. You may also need to periodically prune some of the plants to let others grow. In the winter, leave dead or dormant plants standing and cut back in the spring. Your garden may need a bit more maintenance than a lawn in the beginning, but in the long run it will be easier to care for and provide many added benefits.

Native Plants for Rain Gardens

Sun/part sun

Shrubs

- Mountain laurel
- High bush blueberry
- Spice bush
- Inkberry
- Sweet pepperbush

Part sun/part shade

Grasses

- Blue wood sedge
- Virginia wild rye

- Perennials
- Butterfly weed
- New England aster
- Wild snakeroot
- Wild bergamot
- Blue-eyed grass
- Solomon's seal
- Black-eyed Susan
- Wild pink
- Yellow flag iris
- St. johns wort
- Day lily
- Hosta

- Grass-leaf blazing star

shade

Ferns

- Rattle snake fern

Rain Barrels

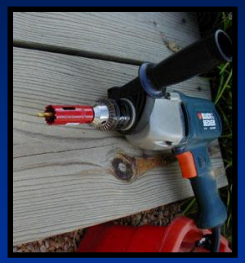
What Is a Rain Barrel?

A Rain Barrel collects and stores rainwater from rooftops to use later for lawn and garden watering. Water collected in a rain barrel would normally pour off your roof directly or flow through roof gutter downspouts and become stormwater runoff.

Why Use Rain Barrels?

- Rain Barrels conserve water and help lower costs (a rain barrel can save approximately 1,300 gallons of water during peak summer months).
- Rain Barrels reduce water pollution by preventing stormwater runoff which can contain pollutants like sediment, oil, grease, bacteria, and nutrients.
- Rain Barrels are inexpensive, easy to build and install.

Rain Barrels



Tools

- Power drill with hole bit (1/6 inch smaller than faucet insert) and pilot drill bit. (A 3/4" faucet measures 1" on outside, so you need 1" hole bit)
- Pliers to tighten lock nuts
- Paper towels (for excess caulk)
- Utility knife or small saber saw to cut lid
- Scissors to cut screening
- Hacksaw to shorten
- Downspout
- Screwdriver for hose clap

Supplies

•Barrel– best are the 45 to 55 gallon barrels that are used to ship olives / peppers and other food items to this country. Some farm-supply stores sell them for about $20 each.
•A 3/4" faucet (measures 1" on outside)
•Washers and lock nut for the faucet
•Caulk (clear plumbers)
•Screening (buy a roll that is used to repair screen windows. Nylon fabric– like netting is better than the metal type)
•Hose adapter for your overflow (many options here, depending on where you want you overflow to go)
•Washer and lock nut needed for the adapter
•Hosing (short piece) to connect one barrel to another.
•Hose clamp will be needed
•Bricks or cinderblocks to raise your barrel above the ground (this will improve water pressure)

Steps

•Drill hole near bottom of barrel.
•Caulk around outside of hole.
•Screw faucet in (use washer).
•Caulk inside then put on lock nut with washer (use pliers)
•Drill a hole near top for overflow.
•Put in a hose adapter for overflow, use washers, use pliers to tighten.
•Cut center of lid.
•Cut screen larger than the lid.
•Level the dirt under the rain barrel, then add some sand.
•Rain barrels need to be higher than ground level – use bricks or cinder blocks.
•Measure and cut off part of downspout.
•Put the barrel in place.
•Connect the overflow from one barrel to the next, or have overflow hose divert excess rain to a garden or distant area of your choice, away from your home's foundation.

More Helpful Tips to Construct your Rain Barrel

- First, a faucet goes near the bottom of the barrel. Use clear caulk and washers on the inside and outside of the faucet. A lock nut is used inside the barrel to hold the faucet in tightly. You will need to reach into the barrel to attach the lock nut. (Fig. 1)


Figure 1

Some barrels have solid tops, while others have screw– on rings that are open in the center. If your barrel top is solid, cut the center of the top out using a saw or utility knife. Later, you will put a piece of screen over the barrel to keep mosquitoes and leaves out of the water. The top will hold the screen in place. (Fig. 3)


Figure 2

You will need to provide for the overflow from the barrel. This allows you to connect a hose so the overflow goes to a garden or you can connect one barrel to another. (Fig. 2)


Figure 3

•Build a base for your barrel. Bricks and cinderblocks work well.
•Remember— a gallon of water weighs over 8 pounds, so a full rain barrel will be heavy.
•Measure and cut off a portion of your downspout.
•Keep the downspout piece that you are removing— you can use it in the winter when your rain barrel is in storage.
•The higher the barrels, the morewater pressure you will have. (Fig. 4)


Figure 4

Fill your watering cans, or hook a hose to the faucet. Look for "low pressure" sprinklers if you want to water a garden. Use the water within a week or so— this is not meant to be long-term water storage. Replace the netting every year or two to keep mosquitoes out. (Fig. 5)


Figure 5

Butterfly Gardens

Planting gardens with flowers that attract butterflies is a natural way to attract butterflies to your yard, garden, patio, or even window sill. Brightly colored butterflies provide interest to your surroundings and are also effective crop and flower pollinators. Your butterfly garden will also attract birds and other wildlife.

- **Butterfly Behavior and Characteristics:** Butterflies appear in spring when the temperature is above 60° F, you can observe them through late fall. Butterflies are interesting to watch. You may wish to view them in your butterfly garden and keep a record of which butterflies visit specific plants. Some of their interesting behaviors include the following:

- **Nectaring** Adult butterflies take nectar from many plants. Some plants produce nectar to attract insects, birds, and other wildlife so the plants will be pollinated. The nectar is sipped through a long, straw-like proboscis that is usually kept coiled. The insects' feet have special taste receptors that can detect sweet liquids, causing the proboscis to uncoil when it comes in contact with the nectar.

- **Puddling** Sometimes a dozen or more butterflies will gather round a puddle or wet place. This behavior is called "puddling" during which butterflies sip nutrients with their probocsics. Animals such as butterflies that eat only plant nectar need extra minerals and salts to supplement their diets. Butterflies most often seen puddling include swallowtails, fritillaries, and skippers.

- **Basking** Butterflies fly best when their body temperature is between 85-100°F, if colder, they need to warm up. They do this by basking in the sun with their wings outstretched to absorb heat. If the temperature goes below 80°F, butterflies can be seen basking before they can begin flying.

Butterfly Gardens

Butterfly Behavior and Characteristics:

- **Roosting** Butterflies need a place to roost during the night, and often pick the underside of a leaf. If you want to see where they roost, wait until late afternoon and follow them to their roosting spot. Butterflies also roost during rainy, cloudy, and cold weather. Usually they spend about 14 hours each day roosting, usually from sunset until midmorning.

- **Hibernation and Migration** According to species, butterflies spend the winter in different ways and places. Most, however, winter in the same areas where they spend the summer. The monarch is the only truly migratory butterfly. They migrate as far south as Mexico, returning to West Virginia in the spring. It takes several generations of monarchs to make the trip from North America to their over wintering grounds in México and California. Monarchs that migrate in the fall have just emerged from the pupae; monarchs that migrate to our area this spring are the second or third generation of those that over wintered in the south. It's still a mystery how these insects know their migratory route.

- **Hibernation Boxes** You can buy or make hibernation boxes to offer butterflies protection from predators through the winter, but they are not essential if you provide sufficient food, water, and clover. West Virginia has only a few kinds of butterflies that hibernate and these are not generally colonial, so they probably will not use the hibernation boxes. If you wish to use hibernation boxes, attach them to a tree or post in a shady place near host plants.

- **Shelter** Butterflies require shelter from the elements and a place to roost. Shrub foliage is useful as a windbreak as are patches of tall grass. You also can provide a place for butterflies to roost, perch, or even hibernate by building a log pile and placing the logs crosswise to create as many open spaces as possible. The ideal log pile size is 5 feet high and 6 feet long. Log piles, suitable for large yards or farms, should be in the shade near host plants.

Butterfly Gardens

- **Other Food Sources for Your Butterflies** Some butterflies feed primarily on rotting fruit, tree sap, and even manure. You can make a homemade feeder filled with a solution of sugar water: 4 parts water to 1 part granulated white sugar. Extra solution can be kept in the refrigerator. You can make a feeder by filling a dish or flat container with an absorbent material such as tissue paper and saturating it with sugar solution. This arrangement allows butterflies to perch while feeding.

- **Transplanting Larvae or Plants** It is best to refrain from transplanting larvae to your garden from other areas because of the risk of introducing harmful exotic species. A classic example of this is the gypsy moth, a non-native introduced pest that causes millions of dollars of damage to trees annually. It is best to work with native species of animals and plants adapted to your area.

- **Butterfly Gardens** Many butterflies tend to live their lives within a relatively small area. A few species stay in proximity and turn into regular visitors. Lawns that are excessively trimmed, mowed, and covered with pesticides provide poor environments for butterflies. Therefore, if you want to have a flourishing butterfly garden, you need to provide wildflowers, tall grass, and perhaps some weeds, in a pesticide-free setting.

- The butterfly garden should include a shallow pool or wet area, although butterflies can get moisture from dew.

- Butterflies like to perch on trees and shrubs, so dogwoods, wild cherry, and redbud are good garden choices. Large rocks strategically placed may serve as resting and basking spots for butterflies.

- Scent and color are important to attract butterflies. They have sensors for smell and taste in various places on their bodies, but most smell with their antennae or forelegs. Butterflies perceive shapes only at close range but can see more colors than humans, and they can see ultraviolet light.

- Therefore, planting a variety of flowers is better than planting only one specie. The best color combination is yellow, mauve, or lavender flowers with a strong scent. Purples and reds are also colors to select.

Common West Virginia butterfly species, the larval host plant, and the nectar source for adult butterflies

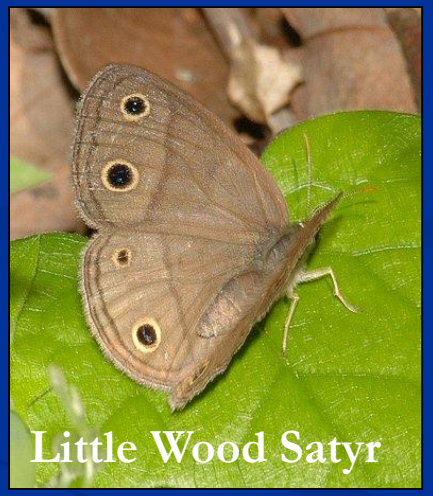

Pipevine Swallowtail


Monarch


Zebra Swallowtail

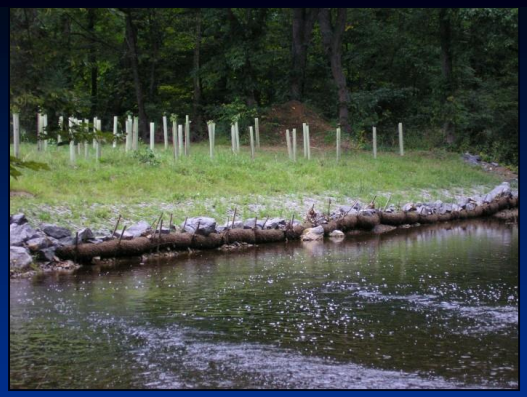
Common butterfly species	Larval host plant	Native nectar sources
Pipevine Swallowtail	Dutchman's pipe	Milkweed, joe-pye-weed
Zebra Swallowtail	pawpaw	Dogbane, redbud, milkweed
Spicebush Swallowtail	Spicebush, sassafras	Joe-pye-weed, dog-bane
Monarch	milkweed	Milkweed, dogbane, goldenrod
Little Wood Satyr	grasses	Sap, carrion, dung
West Virginia White	Toothworts, mustard	Spring beauty, toothwort
Clouded Sulphur	clovers	Clovers, aster, goldenrod
Orange Sulphur	Legumes, clover	Clover, tickseed, dogwood
Eastern Tailed-blue	Red clover, leguems	Cinquefoil, dog-bane, asters
Spring Azure	Dogwood, black-cherry	Holly, willow, spicebush
Common Wood Nymph	grasses	Sap, dung, milkweed
Pearl Crescent	asters	Aster, ironweed, dogbane
Red-spotted Purple	Black cherry, poplar, oaks	Sap, dung, carrion, cherry
Mourning Cloak	Willows, elms, aspens	Sap, dung, minerals from soil
Comma	Nettle, elm	Sap, dung, carrion
Question Mark	Nettle, elm, hackberry	Sap, dung, carrion, aster
Red Admiral	nettle	Sap, dung, carrion
Hobomok Skipper	Panic grass	Blackberry, milkweed
Silver-spotted Skipper	Black locust, stick tights	Joe-pye-weed, iron-weed
Dreamy Duskywing	willow	Redbud, blueberry, strawberry
Tawny-edged skipper	grasses	Coneflower, dog-bane, milkweed
Long Dash	grasses	Milkweed, tick-trefoil
Little Glassywing	grasses	Ironweed, dogbane, milkweed
European Skipper	Timothy and orchard grasses	Fleabane, daisy, milkweed
Cross Line Skipper	grasses	Dogbane, ironweed, vetch


Spicebush Swallowtail


Little Wood Satyr


West Virginia White

Tree Planting



Adding trees to landscaping is easy, attractive, and has many storm water benefits. A single mature tree with a 30 foot crown can intercept over 700 gallons of rainfall annually. Evergreen trees will capture more rainwater in winter months that deciduous trees.

Benefits

Trees capture and hold rainfall in leaves and branches. They slow runoff flow and can decrease storm water volume by 35% or more for small storms. Trees improve water quality by filtering rainwater and holding soils in place, which is especially important along stream banks. Their shade reduces pavement heat, which in turn, lowers runoff temperature.

Costs

Costs vary with the type and size of the tree, but the general range is $20 to $100 each, not including the planting. Local non-profit groups often supply free or low-cost trees that are appropriate for our climate.

Planting Instructions for Tree Seedlings

The planting season in West Virginia for bare root seedlings occurs in the early spring and in late fall. Shipping and planting of bare root trees should only occur when seedlings are dormant. Planting seedlings after bud break, caused by exposure to warm temperatures, will result in decreased survival rates.

Tree Planting

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Steps for Successful Planting

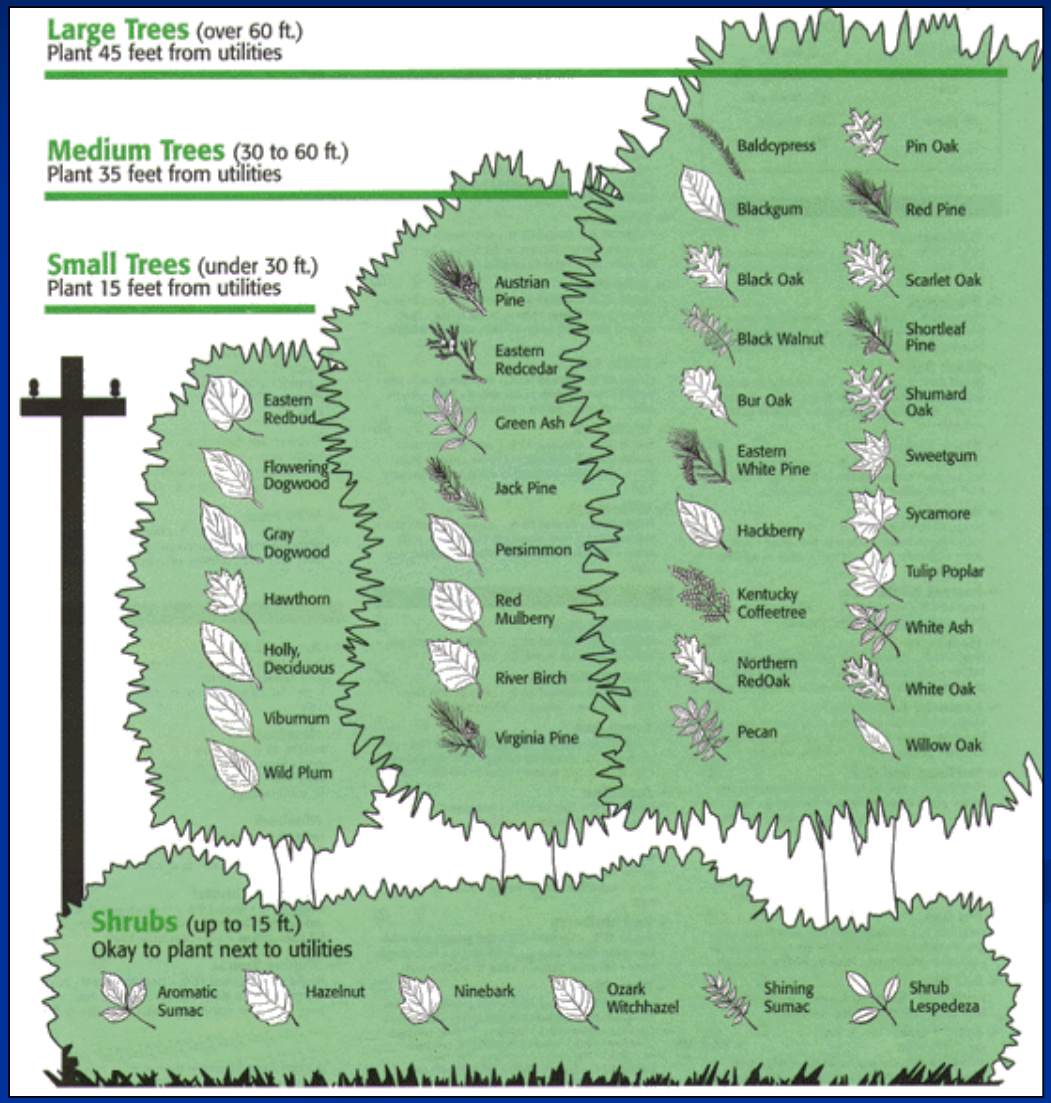
- If possible, unpack and plant seedlings immediately. If you cannot plant seedlings immediately, store the bundles in a cool, dark place and water the bundles periodically to ensure the roots are well moistened.
- Dig a hole at least twice as wide and only as deep as the root system.
- You may need to prune off dead or extremly long root tips.
- Spread the roots out so they are evenly distributed in the planting hole. A cone shaped mound of soil can be formed in the hole to help support the roots.
- **Do not** bend the roots to force them into a planting hole that is too small.
- It is very important to plant the seedling at the correct depth. The upper roots should be just under the surface of the soil. Do not plant too deep.
- Place the soil back in the hole and gently tamp to remove any air spaces. Roots should not be exposed above ground.
- You will need to provide a deep soaking watering for each seedling at the time of planting and once a week for the first two growing seasons. Lack of water is the number one killer of newly planted trees.
- Mulch seedlings to a depth of 2" to 3" in an 18" diameter circle around each trunk. Maintaining adequate mulch increases growth and vigor while reducing damage from mowers and string trimmers.
- **Do not** make mulch deeper than 3 inches. Excessive mulch leads to root problems.
- **Do not** allow mulch to be in direct contact with the trunk. This can promote the growth of decay causing agents.
- Seedlings will need very little pruning, if any, at the time of planting. Only dead, damaged or diseased branches shoud be removed.
- **Do not** "shape" or attempt to balance the branches to the root system. Reducing the leaf area will only further stress the trees and reduce the capacity for growth.
- Balled and burlapped (B&B) trees, although best planted as soon as possible, can be stored for some time after purchase as long as the ball is kept moist and the tree stored in a shady area. B&B trees should always be lifted by the ball, never by the trunk. The burlap surrounding the ball of earth and roots should either be cut away completely or at least pulled back from the top third of the ball. Any string or twine should be removed. Backfill soil is placed in the hole surrounding the tree just to the height of the ball or slightly lower to allow for some settling. Do not compress the back fill soil as this may prevent water from reaching the roots from expanding beyond the ball.

Tree Planting

- Container trees can also be stored for a brief period of time after purchase as long as the soil in the container is kept miost and the tree stored in a shady spot. Once carefully removed from the container check the roots. If they are tightly compressed or "potbound", use your fingers or a blunt instrument to carefully tease the fine roots away from the tight mass and then spread the roots prior to planting. In case of woody compacted roots, it may be necessry to use a spade to open up the bottom half of the root system. Loosening the root structure in this way is extremly important in the case of container plants. Failure to do so may result in the roots girdling and killing the tree. Once the tree is seated in the hole, backfill the hole to the soil level of the container.
- **Do not** add fertilizer or use other soil admendments. Fertilizer is not tree food. Fertilizer can often do more harm than good.
- Your seedling will probably not need to be staked. If support is needed, place wooden stakes on opposite sides of the tree and support with wide, flexible material, do not use wire or other rigid material. The seedlings must be able to flex to promote strong trunk development.
- To help your tree establish itself when transplanted, treat the planting area with mycorrhizal fungi, a specially formulated fertilizer and biostimulant.

Select the Right Tree for the Right Place

Find out the mature height and width of your trees and make sure the planting site is large enough to accommodate future growth. Do not plant large maturing trees (>30' high) under or near overhead utility lines, near buildings or roadways, or in areas of restricted soil space. A healthy root system will spread farther than the branches. Large tree species need large areas to grow.



Tree Diversity

One of the best ways to avoid serious pest / disease problems with plants is to mix different species together. Choosing a tree should involve more than picking one that you like the looks of. Your choices should also consider what else has been planted in the area. In any forest ecosystem, diversity plays a major role in long-term stability. Overuse of a single type of tree greatly increases the vulnerability of the tree itself to insects and diseases that can wipe out the entire species. American Chestnut Blight and Dutch Elm disease are perfect examples historically and presently.

Eco-Friendly Fertilizers

As "*eco-friendly*" yard-care practices fast become the new norm, more and more homeowners are looking for options that keep their lawns looking good while minimizing the impact on the environment.Two ways to do that are by switching to lawn fertilizers that are high in "slow release" nitrogen and by switching to new low- and no-phosphorus fertilizers. Both are aimed at giving lawns only the nutrients they need as they need them, thereby reducing excesses that can run off the property and harm waterways.

Quick Guide to N-P-K

The three-number N-P-K formulas listed on fertilizer bags indicate the breakdown of the three main nutrients.

The first number refers to the percentage of nitrogen, which turf grass needs for blade growth and green color. The ingredient labels also give a breakdown of how much of the nitrogen is water-soluble vs. water-insoluble or "*slow-release*."

The second number refers to the percentage of phosphorus, which turf grass needs for root and cell development and for producing seeds.

The third number refers to the percentage of potassium, which turf grass needs for disease-resistance, winter hardiness and drought-tolerance. A label that lists, for example, a formula of 29-2-10 has 29 percent nitrogen, 2 percent phosphorus and 10 percent potassium.

Slow-Release Nitrogen

Nitrogen is a nutrient that turf grass needs on a regular basis. It's primarily responsible for blade growth and that rich, green color that most people want.

Traditional lawn fertilizer nitrogen sources such as urea, ammonium nitrate and ammonium sulfate are water soluble, which makes them readily available to lawn roots. The good news is that they green up lawns quickly and are cheap to produce, but they also can burn lawns when over-applied, are more likely to run off in heavy rains, and cause growth surges that lead to excess mowing and thatch buildup. They also need to be applied four or more times a year to keep a steady supply of nitrogen available. These water soluble fertilizers make up the steps in most 4 step programs and are used extensively by lawn service companies.

Newer lawn fertilizers use slow- or controlled-release forms of nitrogen. Their breakdown is slowed by pelletizing or encapsulating the nitrogen in membranes or by reformulating the nitrogen so it breaks down at a lower and slower rate. One of the most effective types is IBDU (isobutylidene diurea). Environmentally, IBDU and other slow-release types reduce runoff because less material is applied less often – only two or three times a year instead four, five or more times. These also are slower to run off because they're not as water-soluble as fast-release nitrogen.

Cutting the Phosphorus

A newer environmental concern involves phosphorus, a second main nutrient that turf grass needs for root and cell development and for producing seeds. Up until recently, phosphorus was thought to be needed by lawns in regular amounts, and so lawn fertilizers typically included some in every bag.

Environmental Scientists recently found that excess phosphorus was a key cause of algae outbreaks that were clogging water ways. Besides farms and factories, home yards were identified as a source of phosphorus runoff. In yards, some phosphorus occurs naturally from the breakdown of leaves and plants, but some also comes from the phosphorus applied to lawns in bagged fertilizer.

This issue caused the lawn-care industry to take a new look at phosphorus. Soil tests found that most home lawns have adequate amounts of phosphorus and that a lawn's need for phosphorus is lower than initially thought– due in part to the fact that phosphorus leaches so slowly through the soil.

When and How Much?

No matter what you apply, one of the most eco-friendly things you can do is apply no more fertilizer than is needed, apply it correctly and apply it at the right time. The best place to start is with a soil test. Your local Extension Service offers a free kit to mail in soil samples for analysis. The reports give you an accurate reading of what your soil needs and how much of it should be applied. Soil testing doesn't have to be done every year, but they are a good idea every three or four years. Remember, more is not better. Not only does excess fertilizer increase the chance of nutrient runoff, it can encourage thatch and make lawns more prone to some diseases, such as leaf spot and brown patch. On the other hand, under-doing it can lead to a thin lawn. When lawns thin, runoff and soil erosion increase, and that in turn actually increases the amount of nutrients leaving the property – even though you're applying less. The goal is to get it just right – enough to encourage optimal growth and a thick stand of grass but not more than the lawn needs. Without periodic soil tests, you're left to guess. Soil tests also will tell you if you need to adjust the soil's acidity level (its pH). That's important not only for good grass growth, but pH affects how fast nutrients break down. IBDU, for example, breaks down faster in acidy soil. A pH reading between 6.5 and 7 is ideal. The best time to apply fertilizer is when the soil is dry or lightly damp. Right before a light to moderate rain is fine. Otherwise, the fertilizer should be watered in soon after being applied. The idea is to drive the granules into the soil and to begin to dissolve them but without so much water that runoff occurs.

Some of the worst times to fertilize are:

- When a lawn is dormant in summer heat (cool season grasses go dormant with summer heat, while warm season grasses thrive in heat and require fertilizer in summer).
- During a drought.
- When the ground is frozen.
- When the ground is saturated or soggy.
- Right before heavy rain is expected.
- The best time of year to fertilize cool-season grasses is fall, when growth is slowing and grass blades are transferring sugars to the roots. Homeowners using fertilizers that are highest in slow-release nitrogen (30 percent or more), can grow a decent lawn with as few as two fertilizations per year (late spring and early fall). Those using fertilizers with 15 to 29 percent slow-release nitrogen should fertilize in three sessions (late spring, early fall and late fall), while those using mostly fast-release nitrogen (less than 15 percent slow-release) should fertilize four times (mid-spring, early summer, late summer and late fall).

Pervious Concrete

Runoff occurs when rain falls. This runoff causes increased pollution in rivers and streams, flashfloods, and loss of rain water that could otherwise replenish water tables and aquifers. Pervious concrete has a 15-25% void structure that allows 3-8 gallons of water per minute to pass through each square foot– accounting for far more than is generated during most rain events. Pervious concrete puts rain water back in the ground where it belongs.

What is Pervious Concrete

Pervious concrete is a mix of coarse aggregate, cement, water, and little to no sand. Also known as "no fines" or porous concrete, this mixture creates an open-cell structure, allowing rainwater to filter through to underlying soil. By modeling natural ground cover, pervious concrete is an excellent choice for storm water management.

Pollution

According to the United States EPA storm water runoff can send as much as 90% of the pollutants– such as oil and other hydrocarbon liquids found on the surface of traditional parking lots and driveways– directly into our rivers and streams. The EPA now requires state and local governments to implement measures to reduce and improve the overall quality of storm water runoff in an effort to address this important pollution the problem. Pervious concrete has been recognized by the EPA as a best management practice (BMP) to address this most vital environmental concern. The open-cell structure of pervious concrete provides a medium for aerobic bacteria that break down many of the pollutants that seep from parked cars. Pervious concrete also contributes to enhanced air quality by lowering atmospheric heating through lighter color and lower density, decreasing the impact of heat island effects. The heat island effect occurs when tree-covered areas are replaced with dark pavement surfaces, and is characterized by up to a 12-degree average temperature increase between an urban area and its surrounding countryside. This heat island effect increases ground level ozone production by as much as 30%.

Pervious Concrete

Maintenance

Maintenance of pervious concrete pavements is a subject of longstanding debate. Proper maintenance generally consists simply of vacuum sweeping or power washing. Ongoing research shows that systems that are not maintained still perform very well over time but not at their original astronomical infiltration rates. However, a good cleaning generally will improve the infiltration rate of the system. Some permitting agencies require maintenance agreements prior to putting a pervious concrete pavement into service. Similar to nearly all other storm water treatment tools, proper maintenance will keep the system running at higher performance levels.

Benefits of Pervious Concrete

- Reduces storm water runoff
- Eliminates the need for ponds and other costly storm water management practices
- Replenishes water tanks and aquifers
- Allows for more efficient land development
- Minimizes flash flooding and standing water
- Prevents warm and polluted water from entering our streams
- Mitigates surface pollutants

Xeriscape

Xeriscaping refers to the conservation of water through creative landscaping.

Originally developed for drought-afflicted areas, the principles of Xeriscape today have an ever broadening appeal. With water now considered an expensive and limited resource, all landscaping projects, residential or commercial, can benefit from this alternative. Xeriscapes do not have a single look—almost any landscaping style can be achieved. The principles can be applied to all or part of a yard, in any geographic region of North America.

Benefits:

Saves Water

For most of North America, over 50%, of residential water used is applied to landscape and lawns. Xeriscape can reduce landscape water use by 50-75%.

Less Maintenance

Aside from occasional pruning and weeding, maintenance is minimal. Watering requirements are low, and can be met with simple irrigation systems.

No Fertilizers or Pesticides

Using plants native to your area will eliminate the need for chemical supplements. Sufficient nutrients are provided by healthy organic soil.

Pollution Free

Fossil fuel consumption from gas mowers is minimized or eliminated with minimal turf areas. Small turf areas can be maintained with a reel mower.

Provides Wildlife Habitat

Use of native plants, shrubs and trees offer a familiar and varied habitat for local wildlife.

The Seven Principals of Xeriscaping

Planning and Design The fundamental element of Xeriscape design is water conservation. Orient the plot by marking down north, south, east and west. Include any limiting features such as trees, fences, walkways or structures. Note areas of sun and shade, which will help you establish zones of differing water needs. You'll want to group plants with similar watering needs for most efficient water use.

Study the natural contours and drainage patterns of the land. These contours can be easily developed into terraces, which add visual interest and help reduce soil loss and erosion due to rain or irrigation. Terraces can be as little as 3" and still offer visual appeal; terraces over 12" will require considerable support. Consider the planned use of each area within the plot. Areas for seating, walkways, visual barriers, dining, or play should be defined andincorporated into your plan.

Areas to be left as turf should be designed to be easily mowed. Curved swaths are usually better than straight runs with sharp turns. Narrow swaths can be difficult to water with conventional sprinklers.

Larger plantings, such as shrubs and trees, can be positioned to provide natural heating and cooling opportunities for adjacent buildings.

Soil Improvement The ideal soil in a water-conserving landscape does two things simultaneously: it drains quickly and stores water at the same time. This is achieved by increasing the amount of organic material in your soil and keeping it well aerated. Compost is the ideal organic additive, unless your Xeriscape contains many succulents and cacti. These species prefer lean soil. It would be beneficial to test your soil prior to planting.

Create Limited Turf Areas Reduce the size of turf areas as much as possible, while retaining some turf for open space, functionality and visual appeal. When planting new turf or reseeding existing lawns, ask at your garden center for water saving species adapted to your area.

Use Appropriate Plants For best results, select plants that are native to your region. Select plants for their ultimate size, this will reduce pruning maintenance. Along north and east-facing slopes and walls, choose plants that like more moisture. Most importantly, don't mix plants with high–and low-watering needs in the same planting area. Trees help to reduce evaporation by blocking wind and shading the soil.

Mulch Cover the soil's surface around plants with a mulch, such as leaves, coarse compost, pine needles, wood chips, bark or gravel. Mulch helps retain soil moisture and temperature, prevent erosion and block out competing weeds. Organic mulch will slowly incorporate with the soil, and will need more applied, or "top-dressed", from time to time. To be effective, mulch needs to be several inches thick. There should be no areas of bare soil.

Irrigate Water conservation is the goal, so avoid over watering. Soaker hoses and drip-irrigation systems offer the easiest and most efficient watering for xeriscapes because they deliver water directly to the base of the plant, this reduces moisture loss from evaporation. They also deliver the water at a slow rate which encourages root absorption and reduces pooling and erosion. In general, its best to water deeply and less frequently.

Maintain Your Landscape Low-maintenance is one of the benefits of Xeriscape. Keeping the weeds from growing up through the mulch may require some attention. Thickening the layer of mulch will help. Turf areas should not be cut too short– taller grass is a natural mulch which shades the roots and helps retain moisture. Avoid over fertilizing.

Here are some popular Xeriscape plantings; this list is by no means complete. Consult with your local garden center for recommended local (native) varieties.

Flowers

Perennials

Asters
Baby's Breath
Butterfly Bush
Blue Beard Tongue
Pansy
Iris
Lamb's Ears
Coreopsis
Gayfeather
Lavender
Statice
Sweet William
Yarrow
Yucca
Yellow Black-Eyed Susan
Sages
Purple Cone Flower

Annuals

Cosmos
Marigold
Red Plume Blanket
Phlox
Portulacca Sundia

Shrubs and Trees

Shrubs

Artemisia
Witch Hazel
Heather
Snowberry
Bayberry
Sassafras
Japanese Black Pine
Washington Hawthorne
Spirea
Mountain Currant
Fragrant Sumac
Mock Orange
Spice Bush

Trees

Dogwood
Fig
White Poplar
Maple
Eucalyptus
Juniper
Chinaberry
Cypress
Osage Orange

Ornamental Grasses

Cool-Season grasses grow best at 59 to 75°F. New growth starts as soon as the temperature rises above freezing in spring, in temperate climate zones. Growth slows and flowers bloom by early summer.

Warm-Season grasses prefer temperatures ranging from 78 to 95°F. New growth begins after the soil warms up to 61°F. Growth slows and flowers start to bloom by mid-summer, and continue through fall.

Tips for Growing Ornamental Grasses

Sunny Spot– Most grasses prefer a sunny area, especially the more brightly colored varieties.

Water New Plantings– Drought resistant grasses still require watering while getting established.

Space Generously– When planting, allow room between clumps for movement.

Trim– Clump grasses can be cut back with shears each spring to allow for fresh new growth. Grasses which turn brown in winter can be cut back to a few inches of the ground.

Divide– Clump grasses may need to be divided if they get too big or have a die-back in the center of the clump. Use a pointed spade to cut larger divisions; pull apart by hand into smaller sections.

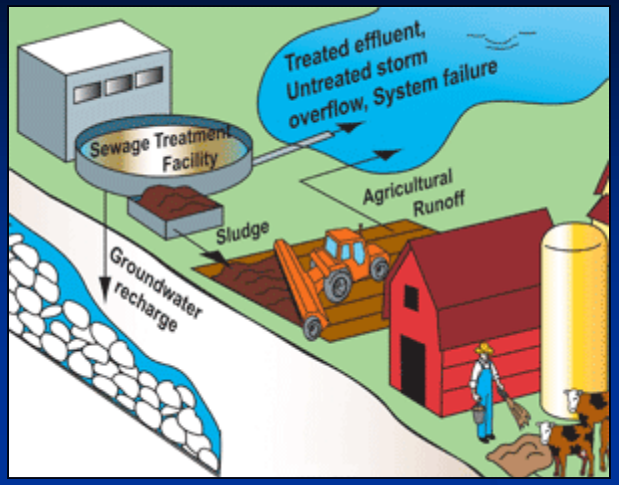
☼ Find out what the annual precipitation is for your area, this will help you select plantings.
☼ Avoid over watering during the hottest, windiest time of day. Early morning is usually best.
☼ Minimize the number of young plants. New plants need watered more often than mature plants which have deeper root systems.
☼ Windbreaks help prevent the plants and soil from becoming dry. Use trees, hedges, shrubs, or tall ornamental grasses as natural windbreaks.
☼ Keep faded flowers picked or clipped off to prolong blooming time.

Pharmaceuticals and Personal Care Products (PPCPs)

Most of us take some kind of medication, whether it's a prescription drug or an over the counter product. Most of us probably have an out of date bottle of something in our medicine cabinets and wander what to do with it. Before you flush that medication or pour it down the drain, learn more about an emerging issue of concern—pharmaceuticals and personal care products (PPCPs) in water supplies. PPCPs are a diverse group of chemicals that include:

- Human and veterinary drugs.
- Dietary supplements.
- Other consumer products, like fragrances, cosmetics and sunscreeens, laundry and cleaning products.
- All inert, or inactive, ingredients that are a part of these products, which can often be just as or more harmful than a product's active ingredients.

How PPCPs Enter the Environment



How PPCPs Enter the Environment

PPCPs enter the environment and become contaminants in several ways:

- **Excretion by Humans and Domestic Animals**– All the components of each pharmaceutical and over-the-counter medication aren't fully metabolized by humans and animals, and the unmetabolized portions of these compounds are excreted from the body as waste.

- **Disposal of Unneeded or Expired PPCPs by Flushing Them Down a Toilet-** Some experts recommend flushing as a safe method of PPCP disposal. Flushing does prevent accidental ingestion, but can cause eventual pollution of ground and surface water.

- **Bathing and Swimming–** Compounds from products such as cosmetics, lotions and sunscreen enter surface water bodies through direct contact.

- **Discharge from municipal sewage systems or private septic systems-** Municipal wastewater treatment plants generally don't treat for the compounds found in PPCPs, so they are present in treated wastewater and discharged into surface water bodies. Septic system owners need to be especially careful about not flushing PPCPs down the toilet or drain - some PPCPs can disrupt the processes in a septic system, posing a risk of groundwater contamination from PPCP compounds and fecal matter.

PPCPs also enter the environment through leaching from landfills; runoff from confined animal feeding operations; discharge of raw sewage from storm overflow events, cruise ships, and some rural homes directly intosurface water; and discharge to groundwater recharge areas.

Did You Know?

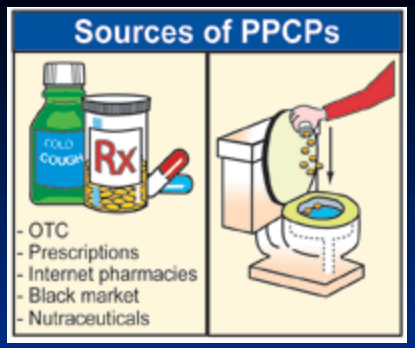
- No drinking water standard for PPCP compounds currently exists and most drinking water treatment plants can't and don't treat for these compounds.

- Scientist have found fewer male fish than anticipated in streams in recent years, and male fish with female reproductive characteristics. Many scientist attribute these findings to endocrine disrupting chemicals such as detergent metabolites (broken down components of the original compound) found in treated wastewater, which is discharged to surface water bodies.

- The technology and funding needed to remove PPCPs from water and wastewater are lagging behind sciences ability to detect chemicals. Current methods can detect these compounds at a part-per-trillion level.

- There are no West Virginia or federal laws regarding flushing or throwing away unneeded or expired pharmaceuticals by consumers.

What Can You Do – Pharmaceuticals



- NEVER flush unneeded or expired medications down the toilet or drain, especially if you use a septic system.

- Find out if any pharmacies in your community will take back unneeded or expired medications, or if atake-back program exists in your community.

- If no other disposal options exist, alter the medications in some way and place them in the trash. Opinions on altering medications vary– some believe the medications should be simply made unpalatable or undesirable to prevent accidental ingestion, while others believe they should be made totally unusable.

- If the medications will be land filled, they should be left in their original containers to reduce seepage,making sure all identifying information has been removed. Add something to the medication to make it unusable (kitty litter to liquid medications, glue to pills, or a small amount of disinfectant to any medication) or unpalatable (a small amount of water to pills or salt, flour or a powdered spice like mustard or turmeric to liquid medications). Package in an obscure container such as an empty margarine tub or non-transparent bag and place it in the trash.

What Can You Do – Personal Care Products

- Use products sparingly, completely, and according to label recommendations.
- Unneeded products are best disposed of by landfilling. Leave products in their original containers.
- When purchasing new products, avoid unnecessary ingredients, such as scents or those labeled antimicrobial.
- Consider using products with ingredients that are more likely to biodegrade harmlessly in the environment, such as those with ingredients like vinegar, lemon juice, or baking soda.

For More Information

- USGS's pharmaceuticals, hormones and other organic wastewater contaminates in groundwater resources:

toxics.usgs.gov/pubs/contaminate_studies_article.pdf

- USGS's pharmaceuticals, hormones and other organic wastewater contaminates in U.S. streams:

toxics.usgs.gov/pubs/FS-027-02/index.html

- US Environmental Protection Agency:

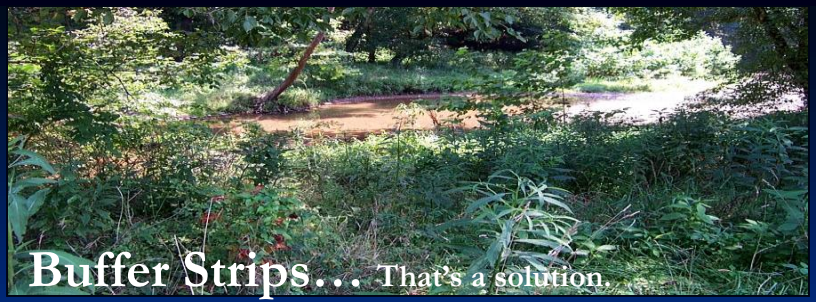
www.epa.gov/nerlesd1/chemistry/pharma/index.htm

Help For Streambanks

Did You Know…
Riparian buffers provide a wide range of benefits:

- Slow surface runoff, decreasing erosion.
- Provide stability to streambanks that prevent erosion and bank failures.
- Regulate water temperatures, important for aquatic life in the stream.
- Filter pollutants such as sediment, chemicals, and nutrients.
- Provide habitat and shelter necessary for wildlife and game species such as turkey, deer, rabbits, and quail.
- Provide food sources for wildlife and fish.

Riparian Buffers



Riparian buffers are areas adjacent to streams that serve as protective barriers between the stream and different land uses. These buffers usually contain vegetation such as trees and shrubs, and play an important role in protecting the quality of the stream. Riparian buffers filter pollutants and sediment from surface runoff, stabilize the streambank and prevent erosion, regulate the stream temperature, provide food and habitat for wildlife, and create shelter for wildlife and game animals traveling to the water source.

By creating or maintaining buffers, landowners increase the quality of the stream. A healthy stream is the foundation necessary to support a diverse ecology that includes wildlife such as fish, game animals, and songbirds. A balanced and stable stream also improves the quality and value of surrounding property. Vegetation prevents erosion that leads to stream bank failure and loss of land. While a riparian buffer is no longer available for livestock grazing or hay production, it is a valuable investment for improving the environment and protecting fields and farms.

If bank erosion is extreme you may contact the **West Virginia Stream Access Permitting Program.** Agency personnel will provide landowners with technical assistance including plans for stream management and restoration. Activities include erosion prevention, the removal of material creating blockages and the creation of riparian or restoration areas. For more information contact the WV Conservation Agency at (304) 558-2204.

Planting Your Buffer

Did You Know…

The easiest way to start a riparian buffer is to let it grow naturally.

If left alone, seeds from plants in the area will begin to grow along your streambank. Some "pioneer" tree species that will probably be the first to grow include willow, sycamore, silver maple, locust, and sumac. Keep in mind that plant communities go through a natural succession when they develop (grasses, taller herbaceous plants, shrubs and finally trees), so your buffer may look "brushy" at first. Be patient! As your buffer grows from season to season, it will change to resemble a mature plant community for your area.

Planting Your Buffer

Planting vegetation along stream banks provides a buffer that prevents erosion, filters pollutants, and slows surface runoff. Consider these tips when planting a riparian buffer.

Consider your options Different types of plants provide different benefits. Grasses can slow runoff and filter some pollutants, but provide the least amount of protection to the streambank. Shrubs and trees provide food sources for the stream, shade which regulates water temperatures, and stability which prevents bank erosion.

Go native Native plants are already well suited to growing in your area. They will be healthier, require less maintenance, and provide food and habitat for wildlife. Native plants can be harvested from other parts of your own property, or purchased from a nursery.

Beware of invasive species Invasive species are plants that grow and spread excessively, displacing the majority of other plants. This reduces the diversity of the ecological community, which is the key to a healthy environment. Invasive species also have shallow root systems, which provide less protection against erosion. You can get more information on invasive plants and alterative plantings from the WVDNR or the WV Native Plant Society.

Plan the best buffer for your property A vegetation buffer as small as 20 feet can make a difference. For larger streams, or in areas of frequent erosion, 100 feet or more will provide the most benefit to the stream. Devote as much area as you can to planting a buffer, considering the benefits of preventing erosion and improving water quality.

Water Saving Tips

There are a number of ways to save water, and they all start with you.

- When washing dishes by hand, don't let the water run while rinsing. Fill one sink with wash water and the other with rinse water.
- Evaporate coolers require a seasonal maintenance checkup. For more efficient cooling, check your evaporative cooler annually.
- Check your sprinkler system frequently and adjust sprinklers so only your lawn is watered and not the house, sidewalk, or street.
- Run your washing machine and dishwasher only when they are full and you could save 1000 gallons a month.
- Avoid planting turf in areas that are hard to water such as steep inclines and isolated strips long sidewalks and driveways.
- Install covers on pools and spas and check for leaks around your pumps.
- Use the garbage disposal sparingly. Compost instead and save gallons every time.
- Plant during the spring or fall when watering requirements are lower.
- Keep a pitcher of water in the refrigerator instead of running the tap for cold drinks, so that every drop goes down you, not the drain.
- Check your water meter and bill to track your water usage.
- Minimize evaporation by watering during the morning hours, when temperatures are cooler and winds are lighter.
- Wash your produce in the sink or a pan that is partially filled with water instead of running water from the tap.
- Set a kitchen timer when watering your lawn or garden with a hose.

Water Saving Tips

- Use a layer of organic mulch around plants to reduce evaporation and save hundreds of gallons a year.
- Use a broom instead of a hose to clean your driveway or sidewalk and save 80 gallons of water every time.
- If your shower can fill a one-gallon bucket in less than 20 seconds, then replace it with a water-efficient showerhead.
- Collect the water you use for rinsing produce and reuse it to water house plants.
- Divide your watering cycle into shorter periods to reduce runoff and allow for better absorption every time you water.
- We're more likely to notice leaky faucets indoors, but don't forget to check outdoor faucets, pipes, and hoses for leaks.
- Periodically check your pool for leaks if you have an automatic refilling device.
- Only water your lawn when needed. You can tell this by simply walking across your lawn. If you leave footprints, its time to water.
- When you shop for a new appliance, consider one offering cycle and load size adjustments. They are more water and energy–efficient than older appliances.
- Time your shower to keep it under 5 minutes. You'll save 1000 gallons a month.
- Install low-volume toilets.
- Adjust your lawnmower to a higher setting. Longer grass shades root systems and holds soil moisture better than a closely clipped lawn.
- Turn off water while you brush your teeth and save 4 gallons a minute. That's 200 gallons a week for a family of four.

Water Saving Tips

- When you clean your fish tank, use the water you've drained on your plants. The water is rich in nitrogen and phosphorus, providing you with a free and effective fertilizer.
- Use the sprinkler for large areas of grass. Water small patches by hand to avoid waste.
- Put food coloring in your toilet tank. If it seeps onto the toilet bowl, you have a leak. Its easy to fix, and you can save more than 600 gallons a month.
- Plug the bathtub before turning the water on, then adjust the temperature as the tub fills up.
- Use porous materials for your walkways and patios to keep water in your yard and prevent wasteful runoff.
- Direct downspouts and other runoff towards shrubs and trees, or collect and use for your garden.
- Designate one glass for your drinking water each day. This will cut down on the number of times you run your dishwasher.
- Water your summer lawns once every three days.
- Install a rain shut-off device on your automatic sprinklers to eliminate unnecessary watering.
- Don't use running water to thaw food.
- Choose a water-efficient drip irrigation system for trees, shrubs, and flowers. Watering at the roots is very effective, be careful not to over water.
- Grab a wrench and fix that leaky faucet. Its simple, inexpensive, and can save 140 gallons a week.
- Reduce the amount of grass in your yard by planting shrubs and ground cover with rock and granite mulching.

Water Saving Tips

- Teach your children to turn the faucets off tightly after each use.
- Remember to check your sprinkler system valves periodically for leaks and keep the heads in good shape.
- Before you lather up, install a low-flow showerhead. They're inexpensive, easy to install, and can save your family more than 500 gallons a week.
- Soak your pots and pans instead of letting the water run while you scrape them.
- Don't water your lawn on a windy day.
- Water your plants deeply but less frequently to create healthier and stronger landscapes.
- Make sure you know where your master water shut-off valve is located. This could save gallons of water and damage to your home if a pipe were to burst.
- When watering grass on steep slopes, use a soaker hose to prevent wasteful runoff.
- Group plants with the same watering needs together to get the most out of your watering time.
- Remember to weed your lawn and garden regularly. Weeds compete with other plants for nutrients, light, and water.
- While fertilizers promote plant growth, they also increase water consumption. Apply the minimum amount of fertilizer needed.
- Avoid installing ornamental water features and fountains that spray water into the air. Trickling or cascading fountains lose less water to evaporation.
- Use a commercial car wash that recycles water.
- Don't buy recreational water toys that require a constant flow of water.
- Make sure there are aerators on all of your faucets.

Water Saving Tips

- Buy a rain gauge to track how much rain or irrigation your yard receives. Check with your local water agency to see how much rain is needed to skip an irrigation cycle.
- Encourage your school system and local government to help develop and promote a water conservation ethic among children and adults.
- Teach your family how to shut off your automatic watering systems. Turn sprinklers off if the system is malfunctioning or when a storm is approaching.
- Next time you add or replace a flower or shrub, choose low water use plants for year-round landscape color and save 550 gallons each year.
- Install an instant water heater on your kitchen sink so you don't have to let the water run while it heats up.
- Use a grease pencil to mark the water level of your pool at the skimmer. Check the mark 24 hours later. Your pool should lose no more than 1/4 inch of water a day.
- Cut back on rinsing if your dishwasher is new. Newer models clean more thoroughly than the older ones.
- Use a screwdriver as a soil probe to test soil moisture. If it goes in easily, don't water. Proper lawn watering can save thousands of gallons of water annually.
- Avoid over seeding your lawn with winter grass.
- Do one thing each day that will save water.
- When the kids want to cool off, use the sprinkler in an area where your lawn needs it the most.
- Make sure your swimming pools, fountains, and ponds are equipped with recirculation pumps.
- Bathe your young children together.
- Landscape with Xeriscape trees, plants, and groundcovers.
- Winterize outdoor spigots when temps dip into 20 degrees F to prevent pipes from bursting or freezing.

Water Saving Tips

- Insulate hot water pipes so you don't have to run as much water to get hot water to the faucet.
- Drop that tissue in the trash instead of flushing it.
- If you have an evaporative cooler, direct the water drain to a flowerbed, tree, or your lawn.
- Make suggestions to your employer to save water at work.
- Support projects that use reclaimed wastewater for irrigation and other uses.
- Use a hose nozzle and turn off the water while you wash your car and save more than 100 gallons.
- Encourage your friends and neighbors to be part of a water-conscious community.
- If your toilet was installed prior to 1980, place a toilet dam or bottle filled with water in your toilet tank to cut down on the amount of water used for each flush. Be sure these devices do not interfere with operating parts.
- Install water softening systems only when necessary. Save water and salt by running the minimum number of regenerations necessary to maintain water softness.
- Wash clothes only when you have a full load and save up to 600 gallons each month.
- Leave lower branches on trees and shrubs and allow leaf litter to accumulate on top of the soil. This keeps the soil cooler and reduces evaporation.
- Report significant water losses from broken pipes, open hydrants, and errant sprinklers to the property owner or your water management authority.
- Start a compost pile. Using compost when you plant adds water-holding organic matter to the soil.
- Use sprinklers that throw big drops of water close to the ground. Smaller drops of water and mist often evaporate before they hit the ground.
- Listen for dripping faucets and toilets that flush themselves. Fixing a leak can save 500 gallons each month.

Water Saving Tips

- More plants die from over watering than from under watering. Be sure only to water plants when necessary.
- Cook food in as little water as possible. This will retain more of the nutrients.
- Adjust your watering schedule to the season. Water your summer lawn every third day and your winter lawn every fifth day.
- Turn the water off while you shampoo and condition your hair and you can save more than 50 gallons a week.
- Choose new water-saving appliances, like washing machines that save up to 20 gallons per load.
- Water only as rapidly as the soil can absorb the water.
- Aerate your lawn. Punch holes in your lawn about six inches apart so water will reach the roots rather than run off the surface.
- Select the proper size pans for cooking. Large pans require more water than may be necessary.
- Place an empty tuna can on your lawn to catch and measure the water output of your sprinklers.
- Turn off the water while you shave and you can save more than 100 gallons a week.
- When you give your pet fresh water, don't throw the old water down the drain. Use it to water your trees or shrubs.
- If you accidentally drop ice cubes when filling your glass from the freezer, don't throw them in the sink. Drop them in a house plant instead.
- To save water and time, consider washing your face or brushing your teeth while in the shower.
- While staying in a hotel or even at home, consider reusing your towels.
- Wash your car in the grass. This will water your lawn at the same time.

Water Saving Tips

- When backwashing your pool, consider using the water on your landscaping.
- For hanging baskets, planters and pots, place ice cubes under the moss or dirt to give your plants a cool drink of water and help eliminate overflow.
- Throw trimmings and peelings from fruits and vegetables into your yard compost to prevent from using the garbage disposal.
- When you have ice left in your cup from a take-out restaurant, don't throw it in the trash, dump it on a plant.
- Have your plumber re-route your gray water to trees and gardens rather than letting it run into a sewer line. Check with your city codes, and if it isn't allowed in your area, start a movement to get that changed.
- Keep a bucket in the shower to catch water as it warms up or runs. Use this water to flush toilets or water plants.
- When you are washing your hands, don't let the water run while you lather up.
- When doing laundry, match water level to the size of the load.
- Make sure your toilet flapper doesn't stick open after flushing.

For Additional Information Contact:

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