

Backyards & Beyond

Winter/Spring 2012

RURAL LIVING IN ARIZONA

Volume 6, Number 1



Featured Plant

Melinda Fawver

Common Name: HoneyLocust
Scientific Name: *Gleditsia triacanthos*



Jeff Schalaus, Extension Agent, Agriculture & Natural Resources, University of Arizona Cooperative Extension, Yavapai County

Selecting the right tree species for your particular needs is not always easy. Aside from appearance, you should also consider space requirements, evergreen vs. deciduous, insect

and disease susceptibility, and irrigation requirements. The honeylocust (*Gleditsia triacanthos*) is an excellent deciduous tree for both commercial and residential plantings across Arizona (suitable for USDA Plant Hardiness Zones 3-9). It has few pests, an interesting branching pattern, tolerates our summer heat, and has moderate irrigation requirements.

Honeylocust is native to the eastern U.S. from eastern Texas north to South Dakota east to Pennsylvania and back south roughly following the Appalachian Mountains then south to Mississippi and Louisiana. Over its native range, it seldom grows in pure stands and tends to prefer the river valleys and floodplains. Even though it's from the humid eastern U.S., it performs well in Arizona.

Honeylocust is a member of the pea/bean (Leguminosae) family. It produces seeds in long, flat, twisted pods. The seeds have impermeable coats and do not readily germinate until the seed coat has been mechanically broken or it has passed through the gut of an animal. This is true for many seeds in this family: mesquite, palo verde, catclaw, lupine, etc. Native grown honeylocust saplings produce woody spines which are undesirable in landscape situations. As these trees mature, they tend

to produce fewer spines. However, when cuttings are grown from thorn-less portions of mature trees they tend to remain thornless. The nursery industry has used this to produce honeylocust cultivars that have no thorns and have desirable growth forms and/or interesting foliage colors. These are grown from vegetative cuttings or are grafted onto seedling rootstock. Every once in a while you may see a mature honeylocust tree with spines. These individuals were probably grown from seed.

Honey locusts are adapted to salty and/or alkaline soils making them a good choice for arid areas. Once mature, they have a lacey canopy which provides good visibility through the canopy and grass can grow right up to the trunk. The sweet smelling flowers are much favored by bees and the juicy pulp between the seeds within the pods is relished by cattle and wildlife. The wood is very hard, very heavy, and resistant to decay. It is used occasionally for furniture, fence posts and railroad ties. Because Arizona is outside of honeylocust's native range, there are relatively few pest management issues.

Featured Bird

Dan L. Fischer

Common Name: White-crowned Sparrow
Scientific Name: *Zonotrichia leucophrys*



Dan L. Fischer – Author of *Early Southwest Ornithologists, 1728-1900*, University of Arizona Press

It is rare to observe the White-crowned Sparrow anywhere or any time in Arizona except during their migration or winter. Some exceptions could be during some years when their summer breeding might be limited to the few higher northern mountains of the state with elevations nearing 11,000 feet. Although common in winter throughout most of southern portions of North America, its breeding range

is well to the north including the extreme northern states from both coasts to the Arctic, the higher western mountains and the northern region along the west coast. Once its seasonal fall and winter movement south begins, this sparrow becomes one of the most abundant during this period in Arizona.

The initial arrival of the White-crowned Sparrow to its southern winter residence in Arizona and south into Mexico is most often first noted by its clear, lovely song which it sings throughout this season. During this period the birds flock and feed and their continued presence is noted as much time is spent singing. Before moving south and still in their nesting area, the first year birds, in their early formative months, learn and perfect vocalization characteristics that ultimately produce a variation or dialect nearly matching their father and other nearby males.

These rather large, pale, adult White-crowned Sparrows arrive in fall after completing a fresh molt revealing a handsome basic plumage, and, as its common name implies, with distinctive

alternating black and white crown strips. The young first year birds on arrival, however, are quite distinct from the adults by displaying brown and buffy crown strips, but by early spring they begin their molt, transforming them into an alternate plumage with aspects of an adult. Two Greek terms, *leucos*, "white" and *ophrys*, "eyebrow" comprise the specific name which describes the white line above the eye.

Although he never visited North America, German naturalist Johann Reinhold Forster (1729-1798), is credited for describing the White-crowned Sparrow. In 1772, while in England, he described this sparrow in a publication which included several other North American birds. The specimens were sent by Hudson's Bay Company employees located near the Severn River area which drains east into the great, shallow Hudson Bay. In the same year, Forster's energies and contributions to science were again noted for he, along with his son Johann Georg Adam, joined Captain Cook's second voyage around the world to study South African, Antarctic, New Zealand and Pacific island birds.

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Sativa Bennett

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Arizona's Rock Art

Kirk Astroth, Ph.D., Director, Arizona 4-H Youth Development,
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As Arizona celebrates its centennial as a state, the reality is that people have been living here for thousands of years. Arizona has a rich cultural history that lies outside our backdoors, beckoning us to discover who these people were, what they valued, and how they lived. Despite some people's efforts to disparage rock art as "Indian graffiti," rock art is a record of our ancestors' daily lives and deserves to be protected. Many rock art sites have sacred meaning and were located in special

places that held unknown significance to ancient peoples. Some rock art is representational of daily activities while others are more abstract and their meaning is still hidden to us. All of it represents an art gallery that can be enjoyed at a stroll.

We are fortunate that there are numerous historic sites around the state that people can visit within just minutes or a few hours from their homes. Here are some of my favorites.



Photo 1



Photo 2



Photo 3

V-V Heritage Site—Camp Verde

One of the largest petroglyph panels in the state is near the University of Arizona's V Bar V Ranch north of Camp Verde. Take Exit 298 off Interstate 17 and instead of heading west to Sedona, turn east and follow the gravel road for 2.5 miles. Just past Wet Beaver Creek, you will see the sign for the V-V Heritage Site. Park in the lot and be sure to stop at the Visitor Center first to check in and get oriented. If it is a hot day, you will appreciate the fans and coolers inside. And they sell cold water. You will need a National Parks pass or pay a fee to enter.

Then take the short 0.3 mile trail south to the petroglyph panel. Usually, a volunteer is there who is more than happy to share his/her knowledge about the petroglyphs. Petroglyphs are pecked into the rock. Pictographs are painted onto rock surfaces.

This particular panel (see photo 1) is unique because it is believed that it was used like a giant calendar to track the movement of the sun and be able to predict when the equinox and solstice would occur. Large stones were intentionally placed in a crack above the panel and the shadows from these rocks fall across key petroglyphs during specific times of the year.

The panel also includes Sandhill Cranes (Photo 2) and one of the few images of a female with hair whorls still worn by some Hopi women today (Photo 3). About a half mile away, on Sacred Mountain, researchers have discovered a 60-room pueblo and may have been the largest agricultural production area for the time. Numerous cobble-outlined plots for growing plants have also been discovered at this site.



Photo 4



Photo 5

Palatki and Honanki Ruins—Sedona

These two sites provide a glimpse into the lives of prehistoric peoples who lived in present-day Arizona. These are the largest settlements of Sinagua culture in central Arizona. Palatki had over 60 rooms, and unlike any other cliff dwellings I have seen, the pictographs and petroglyphs are right with the dwellings. Theories are that this settlement was inhabited since the end of the last Ice Age up to the near present. Tree ring data shows habitation from 900-1300 A.D. The two sites are close to one another and about 10 miles southwest of Sedona. There is a rock art trail at Palatki Ruins, and at Honanki Ruins the pictographs are right inside the dwellings etched on cliff walls. Look for the figure above the room with a filled-in doorway. Notice the human and animal figure in red below the shield (Photo 4). There is also a pictograph of people in a line with their hands in the air—an interesting image (Photo 5).



Photo 6

Picture Rocks Pass—Tucson

Aptly named, Picture Rocks Pass on the way to Saguaro National Park West is a great place to see some interesting petroglyphs. Park at the pullout just past the Redemption center east of the pass and walk in the wash south to the large cliff of rocks where you will see a scattering of petroglyphs. Images of deer and sheep cover the rocks along with images of people. Thoughtless individuals have defaced some of these images, so please, teach your children respect and do not touch the images or climb the rocks (Photo 6).



Photo 7

Honey Bee Canyon—Tucson

This special pocket park is located in Oro Valley off Rancho Vistoso Boulevard. Look for the parking area on the south side of the divided road. This is a great hike for the family and easily done. Park and head north in the dry creek bed under the bridge. There are plenty of trees here to provide shade but seldom is there water. After about a mile and before the head of the canyon opens up to the desert, look for the rock face on the west side of the creekbed. There are a number of images pecked into the rock here. For a sample, see Photo 7. Notice the owl like figure on the right of the panel.

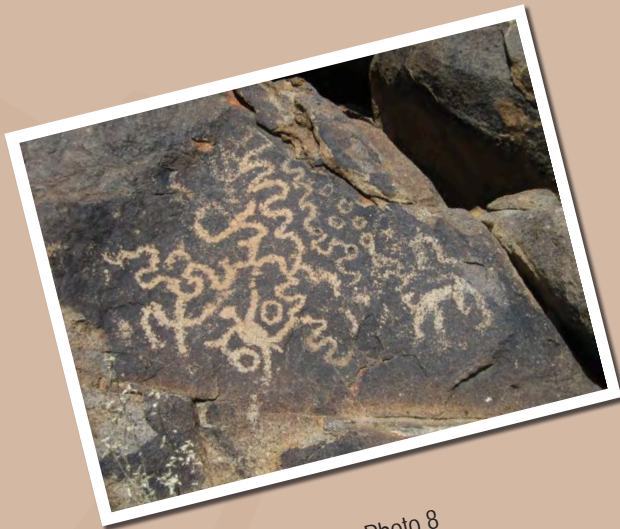


Photo 8

Picacho Mountains Petroglyphs—Eloy, AZ

East of Eloy, the Picacho Mountains are an isolated range in dry desert country. The Central Arizona Project runs along the base of the mountains, and in the northern part of the range are two prominent hills with hundreds of petroglyphs. Archaeologists have documented over 4,000 petroglyphs at 19 different sites in this area. Unfortunately, this area is also a sad example of how many of the rocks and art have been vandalized and destroyed by careless people. Still, the area is interesting to explore and you can see many examples of interesting rock art. Look for the animals that are upside down next to people with their arms raised in the air (Photo 8). Be sure to take plenty of water when investigating this site as it is hot and dry during much of the year.

From Exit 211A head north on AZ 87 for about 4 miles. Turn east on Houser Road, and go another 5 miles until you come to a T-intersection. This road is called Brady Pump Road but is usually not signed. Take a left and head north on this road for about 2.8 miles until the pavement ends. There you will see a brown water tower for the CAP on your right. Rather than taking the right fork at the water tower, head north on the dirt road, crossing a cattle guard and gate. Go north for 1.2 miles, then turn east (right) on the well-travelled gravel road (high clearance is not needed although the road can be sandy at times) and continue another 1.5 miles. The petroglyphs are on the west side of two prominent hills with black rocks. The petroglyphs are located on Arizona State Trust Land. You should have a permit to recreate at this area and you can get a permit by calling 602-524-4631. Both locations have parking areas.



Photo 9

Kings Canyon Petroglyphs—Tucson

Within Saguaro National Park, Kings Canyon trailhead is opposite the Desert Museum and is quite easy to find. The parking area is small, and hikes up the trail are usually best in early morning or in the cool winter months. About 1 ½ miles up the trail, you can find a profusion of rock art near the picnic area. Look at the rocks on the north side of the wash and keep your eyes peeled for images. Soon, you will be seeing many including spirals and sun images (Photo 9).



Photo 10

Signal Peak—Tucson

Another location for some outstanding petroglyphs in Saguaro National Park is the picnic area at Signal Peak. Located off the Golden Gate dirt road in the north part of the park, these petroglyphs are found on a small rock outcropping about ½ mile from the picnic area. Spirals, deer, desert bighorns and other images are immediately recognizable before your climb out of the wash below the knob. Additional images are on top. This is a great hike for small children.



Photo 11

Key Hole Sinks Petroglyphs—Williams

Just to the east of Williams about 5 miles is a popular snow play area called the Key Hole Sinks. Get off of Interstate 40 at exit 171 and drive east on the frontage road (actually old Route 66 before the freeway was built) for about 3 miles. There is a pull off on the south side of the road where the sledding hill is located.

This sink resulted from collapsing limestone after many years of underground erosion. The trail starts on the north side of old Route 66 and you must enter through a small gate. The hike is only about ½ of a mile and is relatively flat. There are blue triangles on the trees indicating the cross-country ski route when there is ample snow on the ground and the route is difficult to find.

Like other petroglyph sites, this one was seriously vandalized in 2005. Fortunately, it has been restored by concerned local people. The images here are faint and can be difficult to spot, but keep looking, especially along the north side and you will see images starting to appear. The best image is of a deer hunt where hunters drove deer into this natural box canyon. It is a great image and is clearly a representation of the actual site that was used for hunting.

Other images are closer to the small pond that forms when water pours into the sink after a rain or snow storm (Photo 11). Enjoy the forest and please keep the gate closed to keep grazing animals from entering the site. And report any vandalism!



Photo 12

Petrified Forest National Park—Holbrook

Petrified Forest National Park east of Holbrook is fascinating just for the petrified trees that litter the ground throughout the park. But the park also has some excellent examples of rock art that should not be missed. This stunning picture of a bird holding a frog in its beak (Photo 12) can be found on a panel near the Puerco Village Ruins in the park. Puerco Village ruins are about in the middle of the park and right along the main park road. There were about 100 rooms in this village that was inhabited about 1250 A.D. and may have housed as many as 1,200 people. The image included here might just pique your interest in visiting this unique Arizona landmark.

Sears Point Petroglyphs—Gila Bend

As long as you are out and about on I-8, you may as well continue on to Sears Point—another site with hundreds of petroglyphs etched onto volcanic rocks. This site is about 75 miles east of Yuma. Exit the interstate at Spot Road, and on the north frontage road head east for about 1 mile to Avenue 76½ -E. Go north on this dirt road for about 7 miles to a parking area. The petroglyphs are in front of you by the low ridge of rocks.

These are just a few of many sites around Arizona. Once you get interested in viewing petroglyphs or pictographs, you will start looking for them everywhere. They represent a key element of our past and deserve our respect and protection.



Photo 13



Photo 14

Painted Rocks Road—Gila Bend

Although inaccurately named, this rock art site is made up of petroglyphs, not pictographs. There are also more modern-day inscriptions left by travelers from the past. Boulders here are covered with petroglyphs. There are at least 800 images at this site. The best time to visit this site is between October and April. See Photo 13.

To find this site, travel on Interstate 8 and exit at the Painted Rock Dam Road (#102) which is about 12 miles west of Gila Bend. Head north on Painted Rocks Dam Road for about 11 miles. The road is paved and easily traveled by passenger car. There are picnic tables but no water, so bring plenty. Please don't climb on the boulders or deface the petroglyphs. The numerous broken rocks are a result of previous visitors who did not heed this advice and have destroyed many petroglyphs. You may be lucky enough to see some of the local wildlife as well—like this collared lizard (Photo 14).

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PHOTOS

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Living with Coyotes

Jeff Schalau, Extension Agent, Agriculture & Natural Resources, University of Arizona Cooperative Extension, Yavapai County



The coyote is a southwestern icon. How often do we see t-shirts, coasters, and other items displaying the profile of a seated coyote with her nose in the air, mouth open, howling at the moon (bandana optional)? Arizona may lead the nation in coyote tourist items, but real coyotes can be found in 49 of the 50 United States as well as Canada and Mexico (there are no coyotes in Hawaii...yet). Understanding the habits of coyotes will help minimize damage to crops, livestock, pets, and property while helping us appreciate their benefits.

The adult coyote (*Canis latrans*) weighs 20 to 40 pounds with males usually being larger than females. With large erect ears, slender muzzle, and bushy tail, they resemble a small collie dog. The voice of the coyote is quite distinctive, consisting of various howls, high-pitched yaps, and occasional dog like barks. Coyotes are most active at night and during the early morning and late evening hours. In areas where they are not disturbed by human activities, and during the cooler times of the year, they may be active throughout the day.

The primary diet of the coyote consists of mice, rats, ground squirrels, gophers, rabbits, and carrion. They are proficient predators, possessing the speed, strength, and endurance necessary to tackle prey as large as adult deer. Coyotes also eat insects, reptiles, amphibians, fruits, juniper berries, birds and their eggs, and deer or pronghorn fawns. In some cases, coyotes prey heavily on sheep, calves, and poultry. In urban and suburban areas, garbage, domestic cats and dogs, other pets, hobby animals, and pet food can be important food sources.

Coyotes breed mainly during January, February, and March. The gestation period is about 60-63 days. The young are born March through May, with litter sizes averaging 5-6 pups. Coyotes produce one litter per year. They are weaned at 5 to 6 weeks and leave the parents at 6 to 9 months. Usually, less than half of the litter survives the first year. Most adults first breed in their second year. Non-breeding,

yearling, coyotes often stay with the adult parents and help care for the pups. Coyote dens are found in steep banks, rock crevices, sinkholes, and underbrush. Coyote dens are often holes that have been used by badger, skunks, foxes, or other animals, with entrances enlarged to about one foot in diameter.

We can minimize conflicts with coyotes by limiting their access to food, water, and shelter. Garbage can lids should be secured at all times or garbage stored indoors. Pets should be fed and watered indoors. Ripe fruits and vegetables should be covered at night or the garden/fruit trees enclosed by a coyote proof fence to prevent access by hungry coyotes. All windfall fruit/vegetables should be picked up daily. In areas where predation on pets has been documented, cats and small dogs should not be left out after dark unless enclosed in a coyote proof enclosure. Food should never intentionally be left out for wild animals (except some birds). This alters their preference for native foods, changes their natural behavior, and habituates them to human activity.

To exclude coyotes, fences should be at least 5½ feet tall. These can be made of solid wood, cement blocks, brick, or wire. If net wire fencing is used, the bottom portion should be at least 3½ feet tall with squares smaller than 6 inches. All fences should have some sort of galvanized wire apron buried at least 4 to 6 inches in the ground which extends out from the fence at least 15 to 20 inches. The apron should be securely attached to the bottom of the fence. Coyotes are very adept diggers and prefer to dig under fences rather than jump them. Brush and vegetation should be cleared from backyards and adjacent areas to eliminate habitat for prey which could attract coyotes.

There have been rare instances of coyotes attacking humans and most of these have been on children under the age of 5. While there are several confirmed records of such attacks, the risk is much greater of being attacked by domestic dogs. It is also legal to hunt coyotes provided the hunter is licensed and following current hunting regulations set out by the Arizona Game and Fish Department.

Weights, Measures and More When Feeding Horses

William A. Schurg, Ph.D., Professor and Cooperative Extension Equine Specialist, Animal Science Department, University of Arizona

Horse Specialists for years have continued to recommend that horse owners feed their horses by weight and not by volume. This is because feeds have different densities and one can easily over feed digestible energy by using volume measures alone. Feedstuffs also have differences in digestibility so if we use the example of corn vs. oats at the same volume, corn will provide nearly twice the digestible energy and significantly less fiber than oats. So if you are a horse owner who uses the “universal measuring” device known as the coffee can to measure out your feed, please weigh the can. The use of coffee cans and scoops to measure the volume fed at a feeding is very commonplace because it is extremely convenient for the horse owner when they feed the same products all the time. The danger may arise when one changes feeds or when an estimate of nutrient intake is needed.

I get calls all the time from horse owners wanting to know if they are feeding their horses right. They usually give me some background about their horse(s) and then provide me with coffee can and flake measures of the feedstuffs they are using. When I ask for the kinds of feeds being fed, the actual weight amounts delivered daily to their horse is when I get definite arched eyebrows. A nutritionist must have specific information in order to use their knowledge in calculating daily nutrient intakes and adequacy.

So what should our horse owners do? Horse owners should invest in some type of scale to allow weighing of feed. One should check the coffee can device and determine that this 1 pound can really contains 1 pound. One of my colleagues wrote an article and showed that depending on the type of Maxwell House Coffee (all in the same

size can) had ranges of weights from 11-16 ounces. So therefore, not all 1 pound, 2 pound or 3 pound coffee cans are equal. Further in this article by Dr. Hintz; results demonstrated the following using a 1 pound can: whole barley - 1.4 lb/can; beet pulp - 0.5 lb/can; cracked corn - 1.45 lb/can; whole corn - 1.5 lb/can; ground corn - 1.35 lb/can; whole oats - 1.0-1.2 lb/can; pelleted grain mixture - 1.4-1.6 lb/can; sweet feed - 1.0-1.3 lb/can and so forth. So as you can see there is tremendous variability. I have found that when using the “3 pound” can that the variability many times is even more dramatic. So this is the real rationale for feeding by weight and not by volume.

Furthermore, understanding the differences in flake size as a function of weight is also very important. Is the flake a 2" flake; 4" flake; or more? What does each flake really weigh? Are we dealing with Bermuda grass hay, mixed hay or alfalfa hay? These are all important and vital questions to ask when determining levels to feed. Horse owners would be surprised to see how much savings in both amounts and costs of hay that can be garnered if they really feed their horses by weight to provide the appropriate amounts of nutrients daily. Remember the average horse needs to consume about 1.5-2.0% of its body weight each day of total dietary ingredients to meet maintenance needs. For many maintenance horses hay alone diets may be sufficient provided free-choice water and salt is available.

So the bottom line is whenever possible horse owners should feed their horses by weight and not by volume. Take time to investigate the different weights that are available in all the feeds you use and in the long run it will allow you to feed your horses more economically and maintain a more healthy individual.





Recognizing and Describing Plant Communities

George Ruyle, Ph.D., Marley Endowed Chair for Sustainable Rangeland Resources, University of Arizona Cooperative Extension and School of Natural Resources and the Environment

PLANT COMMUNITIES

Plants grow in communities. All plants have neighbors, other plants, with whom they interact with in many ways. These plant communities occur in complex patterns that don't appear to be chance affairs because we see the same general patterns repeating themselves over the landscape. Plant communities are often dominated by a few species while other species are scarcer. Noting which plants are dominant, which are common and which are rare can describe plant communities. For practical purposes, plant communities may be considered subdivisions of a vegetation cover. Wherever the plant covering the soil shows more or less obvious spatial changes, one may distinguish a different plant community.

These changes may be caused by spatial changes in the plant species that make up the soil cover, changes in spacing and height of plants, or changes in growth form or life form of plants. Actually, within a particular climatic area, these plant communities reflect physical changes of the landscape. Dry hillslopes, rocky outcrops, wetlands, valley bottoms with deep soils, are all examples of these physical changes. Each particular kind of soil and site is generally suited to a selection of locally available plants and these plants are found growing together wherever those physical conditions occur.

PLANT LIFE FORMS (groups of species)

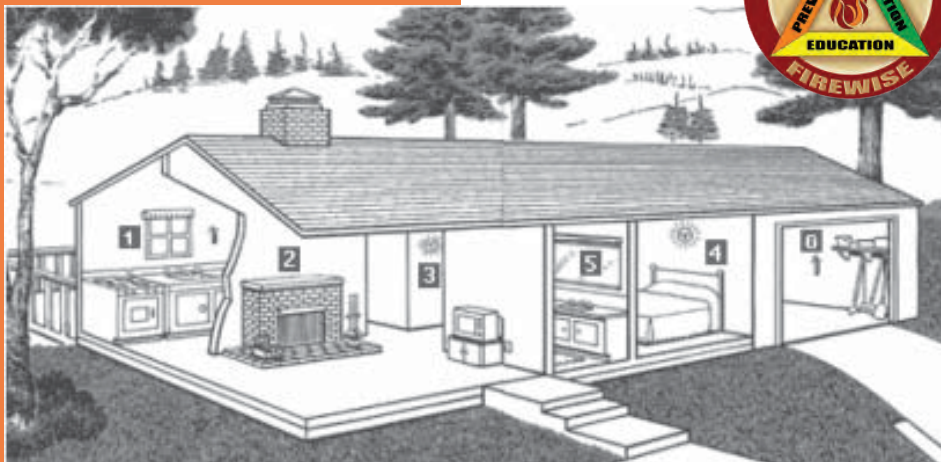
Plants on the natural landscape are commonly grouped into the categories of grasses, forbs (herbaceous broad-leaved plants) and shrubs and trees. Grasses are monocots, meaning they just have one seed leaf. Monocotyledonous plants or monocots can be recognized by the parallel veination of their leaves. Dicotyledonous plants, or dicots, are broad-leaved plants with net or branched veins in their leaves. Forbs are herbaceous or non-woody dicots, often called weeds. Shrubs are usually broad-leaved plants with woody bases and or stems. Trees are woody plants over some predetermined height, usually 10-20 feet.

Even within the grass family there is much life form diversity. There are annual grasses, which grow from seed and complete their life cycle in one growing season. There are perennial grasses that live for many years. There are cool season grasses that begin growth early in the spring when soil temperatures reach 45 degrees or so, and complete their reproductive cycle (form seeds) before the hot summer weather sets in. And there are warm season grasses that begin their surge of growth later in the summer after the soil warms to about 65 degrees. Grasses can be further classified according to their growth stature and forms. There are tall, mid and short grasses in addition to bunch grasses and sod-forming grasses.

DESCRIBING PLANT COMMUNITIES

Plant communities can be described by the various physical characteristics of their respective plant species. Physical characteristics are traits that can be measured or quantified in some way. For example, plant biomass is one of the most commonly measured attributes of plant communities, and refers to the weight or yield of the plant material within a given area. Other physical characteristics of plant communities that may be measured include soil cover, plant density, and species composition. Soil cover is a vertical projection of the plant canopy onto the ground when viewed from above. Plant density describes the number of individual plants in a given area and plant frequency describes the probability of finding a species or plant within a particular area. Each of these characteristics may be described for a particular species, groups of species or entire plant community. Species composition then, refers to the contribution of each plant species to the vegetation as a whole.

So the next time you look out over the landscape, try to recognize the repeating plant communities that can be seen. And if you are really ambitious you can try to describe some of these to determine what makes these plant communities recognizable from one another.



INTERIOR “HOMEOWNERS’ ” “INSIDE AND OUT” WILDFIRE CHECKLIST

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1. KITCHEN

- ☐ A fully charged fire extinguisher is kept in the kitchen.
- ☐ Electric and gas stoves are in good operating condition.
- ☐ Baking soda is kept handy to extinguish stove-top grease fires.
- ☐ Handles of pots and pans containing hot liquids are kept away from the front of the stove.
- ☐ Flammable curtains and towels are kept away from burners on the stove.
- ☐ Matches and lighters are stored out of the reach of children.
- ☐ Flammable liquids are properly stored in approved containers and away from ignition sources such as pilot lights.

2. LIVING ROOM

- ☐ A screen is installed on the fireplace.
- ☐ Fireplace and barbeque ashes are stored in a non-combustible container and disposed of only when cold.
- ☐ Fireplace chimneys and flues are cleaned at least once a year.

3. HALLWAY

- ☐ Smoke detectors are installed between living and sleeping areas.
- ☐ Smoke detectors are tested monthly and batteries replaced twice a year.
- ☐ All electrical outlets are designed to handle appliance loads.
- ☐ Child safety plugs (caps) are inserted on electrical outlets.
- ☐ Electrical cords that do not work properly, have loose connections or are frayed, have been repaired or replaced.

4. BEDROOM

- ☐ Smoke detectors are installed in the bedrooms.
- ☐ Electric blankets and other electric appliances are turned off or unplugged when not in use.
- ☐ Residents do not smoke in bed.

5. BATHROOM

- ☐ Hot appliances such as curling irons and electric irons are disconnected when not in use and stored in a safe location until cool.
- ☐ Flammable items such as towels are kept away from wall and floor heaters.

6. GARAGE

- ☐ A fully charged fire extinguisher is mounted in the garage.
- ☐ Shovel, hoe, rake, and buckets are readily available for use in a wildfire emergency.
- ☐ A solid door with self-closing hinges is installed between living areas and the garage.
- ☐ A metal container is available for disposing of oily rags.
- ☐ All combustibles are stored away from ignition sources such as water heaters.
- ☐ All electrical tools and appliances are disconnected when not in use.
- ☐ Hot tools such as glue guns and soldering irons are allowed to cool before storing.

7. DISASTER PREPAREDNESS

- ☐ A three-day supply of food is available that does not require refrigeration and generally does not need cooking.
- ☐ A three-day supply of drinking water is available.
- ☐ A portable radio, flashlight, emergency cooking equipment, portable lanterns and batteries are kept handy.
- ☐ A First Aid kit is readily available and fully stocked.
- ☐ A list of valuables has been made and valuables are stored together for easy access and removal.
- ☐ A portable generator is kept on hand to supply power to lights and cooking appliances.
- ☐ A contingency plan has been made to enable family members to contact each other.
- ☐ All family members are trained and ready to protect themselves with STOP, DROP AND ROLL in the event their clothing catches on fire.

1. ROOF	
<input type="checkbox"/>	Tree branches touching or overhanging the roof have been removed.
<input type="checkbox"/>	Tree branches within 10 feet of the chimney have been removed.
<input type="checkbox"/>	All dead leaves and needles have been cleaned from the roof and gutters.
<input type="checkbox"/>	Roof meets the Uniform Building Code fire resistance classification of "Class B" or better.
<input type="checkbox"/>	Chimney outlet and stovepipe covered with a nonflammable screen of 1/2 inch or smaller mesh.
2. CONSTRUCTION	
<input type="checkbox"/>	Home placement is away from ridge tops, canyons and areas between high points on a ridge.
<input type="checkbox"/>	Home placement is at least 30 feet from the property line.
<input type="checkbox"/>	House is constructed with fire resistive building materials.
<input type="checkbox"/>	Underside of balconies and above ground decks are enclosed with fire resistive materials.
<input type="checkbox"/>	Size and number of windows that face large areas of vegetation are limited.
<input type="checkbox"/>	Windows are dual-paned or triple-paned glass construction.
3. LANDSCAPE	
<input type="checkbox"/>	A "defensible space" has been created by modifying flammable vegetation to a distance of 75 to 125 feet around all structures.
<input type="checkbox"/>	On steep slopes, flammable vegetation has been modified out to a distance of 100 feet or more.
<input type="checkbox"/>	Trees and shrubs are at least 10 feet apart.
<input type="checkbox"/>	Branches of remaining trees are pruned 8-10 feet above ground fuel.
<input type="checkbox"/>	Landscape plants are resistive to fire and burning.
<input type="checkbox"/>	The number of trees in heavily wooded areas is reduced by thinning.
<input type="checkbox"/>	All plants are maintained regularly by removing dead branches, leaves and needles.
4. YARD	
<input type="checkbox"/>	Woodpiles are stacked at least 30 feet from all structures and flammable vegetation is cleared away within 10 feet of woodpiles.
<input type="checkbox"/>	LPG tanks (butane and propane) are located at least 30 feet from any structure, on the same elevation as the home, and surrounded with 10 feet of clearance.



<input type="checkbox"/>	All construction materials and debris are removed from the yard.
<input type="checkbox"/>	You have checked to see if open burning is allowed in your area; if so, you have obtained a burning permit.
5. EMERGENCY WATER SUPPLY	
<input type="checkbox"/>	An emergency water supply is established and maintained that meets fire department standards. All emergency water sources are clearly marked and visible.
<input type="checkbox"/>	Firefighter access is readily available to your closest emergency water source.
<input type="checkbox"/>	If you have a water well, an emergency generator is available to operate the pump in the event of a power failure.
6. ACCESS	
<input type="checkbox"/>	At least two exit routes from your neighborhood are identified.
<input type="checkbox"/>	Roads allow two-way traffic.
<input type="checkbox"/>	Road width, grade and curves are designed to allow access for large emergency vehicles.
<input type="checkbox"/>	Driveways are constructed to allow large emergency equipment to reach your house.
<input type="checkbox"/>	Bridges are designed to carry heavy emergency vehicles, including bulldozers carried on large trucks.
<input type="checkbox"/>	Road signs are clearly posted to show traffic restrictions such as dead-end roads, and weight and height limitations.
<input type="checkbox"/>	Dead-end roads and long driveways have turnaround areas wide enough for emergency vehicles.
<input type="checkbox"/>	Turnouts are constructed along one-way roads.

EXTERIOR

<input type="checkbox"/>	Flammable vegetation is cleared at least 10 feet from roads and five feet from driveways.
<input type="checkbox"/>	Overhanging tree branches above roads and driveways are removed.
<input type="checkbox"/>	Fire barriers, such as greenbelts, parks, golf courses and athletic fields are in place.
<input type="checkbox"/>	Streets are named or numbered, and signs are visibly posted at each street intersection.
<input type="checkbox"/>	House address is readily visible and readable at the beginning of the driveway, or on the house if easily visible from the road.
7. OUTSIDE	
<input type="checkbox"/>	An emergency outside meeting place has been designated.
<input type="checkbox"/>	Emergency exit drills are practiced regularly.
<input type="checkbox"/>	Electric service lines, fuse boxes and circuit breaker panels are installed and maintained as prescribed by code.

This checklist is based on and draws heavily from a publication produced by the Colorado State Forest Service. FIREWISE is a multi-agency program that encourages the development of defensible space and the prevention of catastrophic wildfire.

WHEN IT RAINS IT RUNS OFF!

RUNOFF AND URBANIZED AREAS IN ARIZONA

Summer Waters, Extension Agent, Water Resources, Maricopa County; Kitt Farrell-Poe, Ph.D., Water Quality Extension Specialist, Agricultural & Biosystems Engineering Department; Kristen Wagner, Program Coordinator, Sr., Urban Horticulture, Maricopa County; all with the University of Arizona Cooperative Extension.

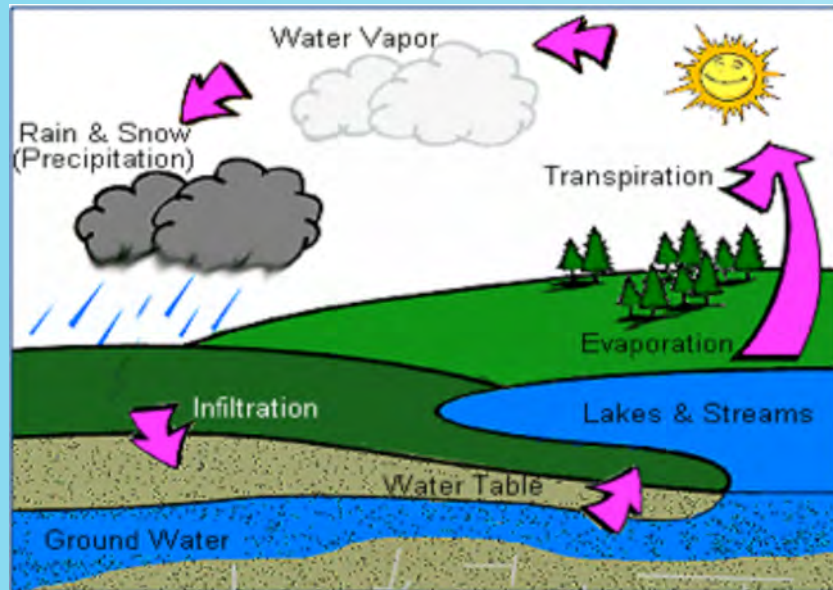


Figure 1. The Multiple Paths of Water in the Environment

Introduction

This document is designed to introduce the concepts of urban runoff and nonpoint source pollution to the general public. It provides an overview of some of the stormwater issues in Arizona, background on regulations, and useful tips that you, as an individual, can implement. References and additional resources are provided at the end of the document to direct you to additional sources of local information.

Understanding Stormwater and Runoff

When precipitation falls from the sky, it has multiple paths that it may take through the environment (figure 1). These paths include infiltration, evaporation, transpiration, and runoff. *Infiltration* occurs when water is absorbed into the soil profile. *Evaporation* occurs when the water in the ground becomes vapor and returns to the air. *Transpiration* is water that escapes from plants in the form of vapor. *Stormwater runoff* occurs when rain falls onto the ground and/or snow melts but is unable to infiltrate and therefore flows across the land. Runoff typically flows to a nearby water body or low-lying area.

What is Urban Runoff?

In urban areas, water is often unable to infiltrate into the soil because buildings and paved surfaces (impermeable surfaces) are very common. As a result, urban runoff flows across rooftops, roadways, sidewalks, urban landscapes, and driveways. It eventually reaches a stormwater collection system. Stormwater collection systems can utilize existing natural features such as streambeds, or they can utilize human-made systems such as stormwater infiltration basins, collection channels, and underground pipes (figure 2).

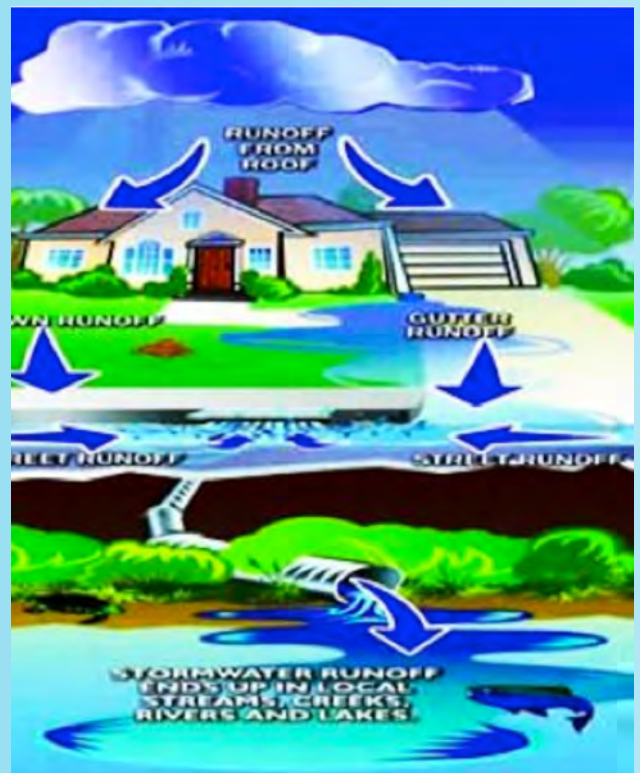


Figure 2. Stormwater Runoff Pathways

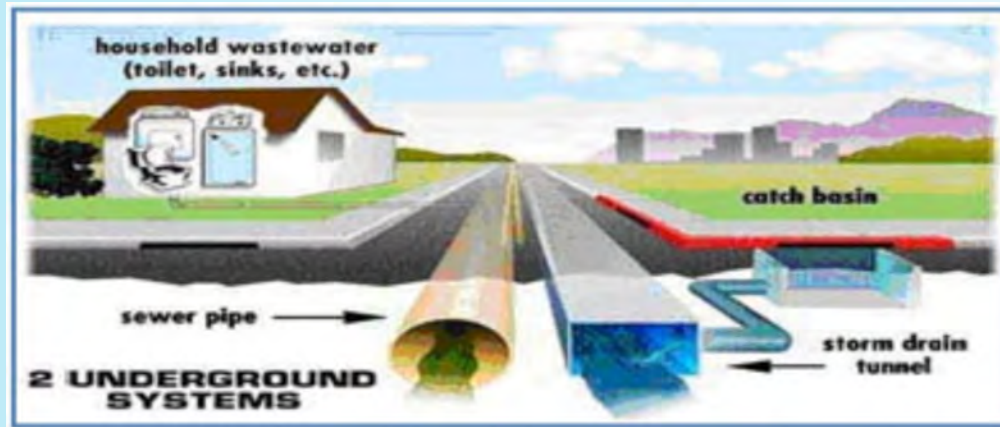


Figure 3. Arizona's Two Systems for Removing Stormwater and Wastewater



Figure 4. Stormwater Infiltration Basin in Yuma

In urban areas, stormwater collection systems convey water from natural storm events as well as the excess water that results from inappropriate or wasteful practices such as over-irrigating landscapes, overlooking irrigation system maintenance, or improperly disposing of pool filter backwash. It is important to remember that stormwater collection systems benefit us by quickly moving water from streets into waterways or drainage areas, which can prevent flooding.

Many people are not aware that in Arizona separate systems are utilized to collect stormwater and sewage. A stormwater system collects urban runoff and directs it, untreated, into rivers, infiltration basins, and parks. A sanitary sewer system is a separate system that collects household, industrial, and commercial wastewater from sinks, toilets, etc. and sends it to a wastewater treatment plant to be treated before being discharged into a river or other water body (figure 3).

Water enters a stormwater collection system through collector channels or storm drain inlets that can be seen on streets, parking lots, and curbs. This water flows directly from the streets into our washes, rivers, parks, and infiltration basins. Figure 4 shows a stormwater infiltration basin for a housing development in Yuma.

How Does Urban Runoff Cause Water Pollution?

Urban runoff pollution is caused when the runoff, while traveling across the urban environment, acquires contaminants that affect water quality. The pollutants from urban runoff include plant material, fertilizers, pesticides, automotive and household chemicals, litter, and pet waste. These can be naturally occurring or human-caused. Urban runoff pollution is also called nonpoint source (NPS) pollution because it comes from many different sources and the original pollution source is not easily identified. NPS

pollution usually comes from a broad area. This contrasts with point source pollution, which can be attributed to a single, identifiable source (for example a factory discharge pipe).

While individual homes might contribute only small amounts of NPS pollution, the combined effects of neighborhoods and communities are serious and greatly impact our natural resources. NPS pollution accumulates as runoff and flows through neighborhoods, down roads, across parking lots, and into the stormwater system.

What are the Sources & Effects of Urban Runoff Pollution?

Remember, urban runoff comes in contact with debris and pollutants as the water flows through the urban environment and into channels and storm drains. These may include fertilizers and pesticides from the lawn and garden, litter left in the street, oil from a leaky car, or pet waste in the park. Even washing a car can create nonpoint source pollution in the form of sediment and detergents. Urban runoff pollution can have negative effects on fish, people, and plants. Some pollutants can concentrate in fish and cause health concerns in people who eat them. The Arizona Game and Fish Department posts fish consumption advisories for rivers in Arizona. This is important information because fishing is a popular recreation in Arizona's urban areas as well as the more pristine streams.

Nationally, the Environmental Protection Agency lists sediment as the most common pollutant in rivers, streams, lakes, and reservoirs. In Arizona, the Arizona Department of Environmental Quality (ADEQ) has identified sediment as one of top three pollutants affecting Arizona's rivers and streams. It can come from natural sources, but is often exacerbated by human activity. Water polluted with sediment becomes murky or cloudy, which prevents animals from seeing food, prevents the growth of natural vegetation, clogs fish gills, and disrupts the food chain. Nutrients are often bound to sediment and are released when it is disturbed. Excessive nutrients used for lawns and landscaping can also become pollution when they wash down into the storm drains and cause increased plant growth, including algae. As plants die and decay, oxygen is removed from the water. Lowered oxygen levels can lead to the death of aquatic organisms and fish. Household cleaning products such as detergents and car wash soaps that leave the home and enter the urban environment can also negatively impact water bodies when they are concentrated in urban runoff.

Another household pollutant is pet waste. Pet waste left on the ground can harbor *E. coli* bacteria, as well as roundworm, tapeworm, and *toxoplasma gondii*. Not only are these parasites transmittable to humans, toxoplasmosis can cause serious health concerns in immune-compromised individuals and pregnant women. Many of these organisms persist in pet waste left on the ground, even in Arizona's desert environment.



Figure 5. Storm Drain Marker in Maricopa County



Figure 6. Storm Drain Marker in Tucson

Litter also contributes to NPS pollution. An estimated 75% or more of Arizona's wildlife relies on riparian areas (areas close to and along waterways), the same areas into which most storm drains empty. Litter from urban runoff can harm wildlife. For example, wildlife that ingests plastic can suffer internal injuries and death. Discarded fishing line and plastic six-pack holders can entrap birds, fish, and mammals. Lizards that crawl inside bottles or cans often become trapped and eventually die of overheating. Trash and litter can be harmful to humans when it clogs storm drains to the extent that it impacts surrounding properties. Storm drains clogged with trash cannot function properly and often result in local flooding. Trash such as food leftovers and diapers can carry bacteria. Improper disposal of trash or garbage and littering are the cause of this type of stormwater pollution.

Regulating Urban Runoff

The Clean Water Act, passed in 1972, established a national commitment to addressing water pollution. Programs that address polluted runoff under this regulation are implemented at federal, state, and local levels. In Arizona, the Arizona Department of Environmental Quality (ADEQ) oversees the implementation of the Clean Water Act. Municipalities that are required to address nonpoint source pollution report to the ADEQ and receive an Arizona Pollution Discharge Elimination System (AZPDES) permit that outlines the requirements for complying with stormwater regulations. As a result, municipalities throughout the state of Arizona have made efforts to reduce the amount of runoff entering the stormwater conveyance systems, prevent stormwater pollution, and increase the awareness of urban runoff issues through a variety of programs. In the Phoenix metropolitan area, many cities have combined their efforts to reduce NPS pollution through an entity called STormwater Outreach for Regional Municipalities

(STORM). Similarly, the Pima Association of Governments (an organization of municipalities within Pima County) coordinates stormwater outreach efforts for member jurisdictions through its annual *Clean Water Starts With Me* campaign. The City of Flagstaff has implemented a Low Impact Development (LID) Ordinance to proactively address stormwater issues by minimizing runoff from impermeable surfaces. The City of Yuma has implemented its Stormwater Management Program since 2003.

An example of an educational program being implemented across the state is the marking of storm drains with stencils or markers. There are a number of different stencils, all of which are designed to draw attention to storm drains and remind the public not to put trash or other hazardous materials down these drains (figures 5 and 6). However, there remains much that an individual can do to understand and reduce urban runoff.

What Can You Do?

Luckily, easy and often money-saving steps can be taken to improve the water quality of urban runoff. The most effective way to improve the quality of urban runoff is to first minimize the amount of runoff and pollutants being generated. This can be accomplished through pollution prevention and wise use of water outdoors.

Reduce Excess Outdoor Water Use!

Urban areas in Arizona use approximately one-half of their residential water outdoors! Some cities have focused their efforts on water conservation and use just under that amount whereas others still use well over it. Much of the water used outdoors in residential areas irrigates landscapes and lawns. The first step to reducing unnecessary runoff is to eliminate wasteful practices, such as over-irrigating plants and turf, by adjusting irrigation controllers seasonally and repairing leaky irrigation systems.

Next, rethink the path of water through the landscape and thoroughly assess the landscape's needs. Small changes in the physical characteristics of the landscape can allow stormwater to stay on the property and percolate into the soil. Utilizing berms and basins to collect water before it flows into the street and storm drain can help it infiltrate into the landscape and be used by the vegetation. This is often referred to as passive water harvesting. Passive rainwater harvesting includes practices that replace impermeable surfaces, such as sidewalks and driveways, with permeable surfaces that allow water to infiltrate into the soil. Alternatively, you can direct the flow of rainwater from an impervious area toward vegetation. These methods reduce runoff by allowing rainwater to be absorbed in the landscape and used for plants. In addition to reducing the volume of water leaving the landscape, another option to help improve the quality of urban runoff is to reduce the amount of water and chemicals applied to the landscape. Remember, excess irrigation water flows across landscapes and lawns into streets and sidewalks eventually becoming urban runoff.

Landscapes that employ the principles of Xeriscape utilize plant species that are native or well-adapted to the regional climate and limit the amount of turf. With proper design, installation, and maintenance, Xeriscape landscapes can help decrease a homeowner's outdoor water use. By selecting locally-adapted plants and watering properly, the use of water, fertilizers, and pesticides are reduced and therefore are not washed into the storm drains. Xeriscaping is required by some newer communities in Maricopa County and many of the homeowner associations in Pima County. Through local water providers, many cities offer rebates for homeowners that convert their high-water use landscapes to Xeriscape.

Manage Pet Waste!

Multiple studies have found that 40% of Americans do not pick up their pet's feces. To get an idea of the impact of improperly managed dog waste, Maricopa County alone has almost 300,000 licensed dogs. Simply disposing of pet waste properly could decrease the large amount of pet waste flowing into the storm drains each time it rains. The solution is easy: bring a bag with



Figure 7. Pet Waste Bag Dispenser



Figure 8. Storm Drain Clogged with Litter and Debris

you when walking your pet or make use of the dispensers available at local parks (figure 7). Be sure to properly dispose of the bag once the waste is collected.

Wash Your Car Properly!

Water that runs off your car when it is washed can contain substances that cause water pollution. Washing vehicles at automated or self-serve commercial car washes prevents soaps, oils, sediment, and other chemicals on the vehicle from entering storm drains. Additionally, commercial car washes have water collection systems. Water collected through these systems can be re-used many times before it is sent to the treatment plant. Commercial car washes typically use less water than the average homeowner. If you do wash your car at home, use only water-based or phosphate-free biodegradable cleaners and minimize the amount of water you use.

Don't be trashy!

After years of national advertising campaigns, litter is still a common source of pollution (figure 8). Communities that value their waterways and wildlife can join efforts to adopt highways and organize neighborhood clean-up events. Clean-up events are often organized around local riparian areas. These efforts are usually made possible through the hard work of volunteers. You can make a difference by putting trash in its place. In addition, securing lids on trash cans keep the contents from spilling out accidentally. Organic waste such as grass clippings and yard waste should be bagged when put out for collection in order to prevent it from washing into the storm drains.

Summary

Urban runoff can pollute nearby water bodies with sediment, nutrients, toxic chemicals, and pathogens. There are many actions that communities, and you as an individual, can take to reduce the pollutants going into urban runoff. Many are easy (picking up after your pets), some require volunteers (storm drain stenciling), and some require city/county ordinances (Low Impact Development requirements). Do your part to protect our state's most precious natural resource ...water!

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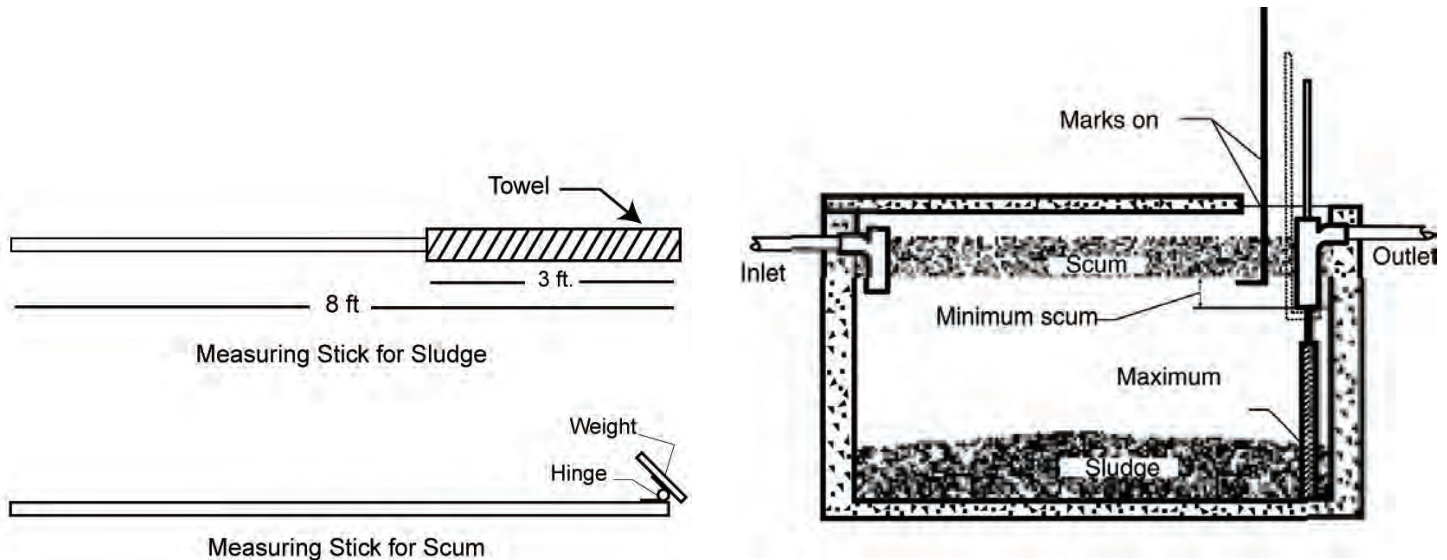
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Additional Resources

- Coconino County Stormwater <http://www.coconino.az.gov/stormwater.aspx?id=1111> Coconino County, Arizona
- Flagstaff Stormwater Management <http://www.flagstaffstormwater.com/> Flagstaff, Arizona
- Clean Water Starts with Me <http://www.pagnet.org/Programs/EnvironmentalPlanning/Water/nbspnbsPAGStormCleanWaterStartswithMe/tabid/766/Default.aspx> Pima Association of Governments
- Stormwater Management Program. <http://www.co.yavapai.az.us/Content.aspx?id=15998> Yavapai County, Arizona
- Prescott Stormwater Management <http://www.cityofprescott.net/services/water/storm.php> Prescott, AZ
- Citizens Stormwater Pollution Prevention. <http://www.co.yuma.az.us/index.aspx?page=561> Yuma County, Arizona
- Stormwater Program: City of Yuma. <http://www.ci.yuma.az.us/13658.htm> Yuma, Arizona.

Maintaining Your Septic Tank

Kitt Farrell-Poe, Ph.D., Water Quality Extension Specialist, Agricultural & Biosystems Engineering Department, University of Arizona Cooperative Extension.



Procedures for measuring the accumulation of sludge and scum layers in a septic tank. Source: Septic Tank Maintenance. OSU Extension Facts No. 1657. Delbert Schwab, J. H. Armstrong, S. Harp. Oklahoma State University Extension.

SAFEGUARDING YOUR SYSTEM

Your septic tank is the first step of an onsite domestic wastewater treatment process and must be properly maintained to work correctly. The best designed and operated septic tank and soil treatment area eventually fails unless sludge is periodically removed from the septic tank. Inadequate maintenance can cause sewage to back up into the house and solids to overflow to the soil treatment area. Often, the soil treatment area must be abandoned and a new one constructed when solids clog the soil. This fact sheet is one in a series developed to help septic system owners maintain their septic systems.

TANK MAINTENANCE

Most tanks need to be pumped every 3 to 5 years, depending on the size of the tank, daily flow of wastewater into the tank, and use of a garbage disposal. A table at the end of this fact sheet gives guidelines for estimating the number of years between pumpings. You can either pump your tank on a regular schedule (every 3 to 5 years) or based on the accumulated sludge and scum layers. Septic tanks need to be pumped out when the sludge layer exceeds 24 inches in depth or when the bottom of the scum layer is less than 3 inches above the lower end of the submerged outlet. If you cannot locate the submerged outlet, clean the tank if the scum layer is more than 12 inches thick.

MEASURING SLUDGE ACCUMULATION

Sludge depth can be measured by securing a towel around the bottom 3 feet of an 8-foot piece of lumber. Lower the pole into the tank until it touches bottom and hold it for several minutes. **BE CAREFUL!**

Never lean into or enter a septic tank. You could be poisoned or **asphyxiated**. **Never use matches or flames when inspecting a septic tank.** The gases generated in a septic tank are explosive and deadly. Slowly raise the pole and observe the towel. The discolored portion indicates the depth of the sludge layer. Have the tank cleaned if it is more than 24 inches deep. A septic plumbing contractor should be hired to pump out and inspect the tank. If your tank has been recently installed, check the sludge and scum levels every year to determine how rapidly solids are accumulating in the tank.

MEASURING SCUM ACCUMULATION

The scum layer can be measured by using a stick to which a weighted flap has been attached with a hinge. When the flap-end of the stick is forced through the scum layer, the weighted flap will fall into the horizontal position. Raise the stick until resistance is felt from contact with the bottom of the scum layer. Place a mark on the stick where it meets the top of the inspection port. Then position the flap so that it is under the bottom of the submerged outlet. Again, mark the stick where it meets the top of the tank. Remove the stick and note the distance between the two marks. Have the tank cleaned if the distance is 3 inches or less.

If you choose to do these, remember that the liquid and solid contents of the septic system are capable of causing infectious diseases. After working on any part of the septic system, always wash hands thoroughly before eating, drinking, or smoking. Change clothes before coming into contact with food or other people.

SEPTIC TANK ADDITIVES

There are many septic tank additives on the market today that claim to improve the performance of your septic system: starters, feeders, and cleaners. To date, there is no conclusive evidence that these products will prevent septic system failure or will improve performance. **Adding compounds to a septic tank will not eliminate the need for regular cleaning.** Enzymes and yeast products will not harm your system, but there are plenty of bacteria already in the tank that will break down waste products. Other additives however, particularly degreasers, may contain cancer-causing agents that can end up in groundwater or surface water supplies.

OTHER ADDITIONS TO THE TANK

Special additives are one thing, but what about the use of every day cleaning products? Most experts agree that the normal use of household cleaning products will not harm the system by stopping the action of bacteria in the tank. Large amounts of certain chemicals, however, may interfere with the breakdown of wastes in the tank or could clog the soil treatment area. You also need to keep in mind that the products you use may eventually find their way into local groundwater systems. Consider using biodegradable alternatives for routine cleaning chores. Oxidized bleaches, borax, vinegar, and baking soda are less hazardous alternatives to common household cleaning products.

The use of a garbage disposal can also affect your septic system by adding to the amount of suspended solids entering the tank. Suspended solids can enter the soil treatment area and clog soil pores, reducing the soil's ability to treat wastes.

ESTIMATED NUMBER OF YEARS BETWEEN SEPTIC TANK PUMPINGS*

Tank Size (gallons)	Number of people in your household					
	1	2	3	4	5	6
1,000	12.4	5.9	3.7	2.6	2.0	1.5
1,500	18.9	9.1	5.9	4.2	3.3	2.6
2,000	25.4	12.4	8.0	5.9	4.5	3.7

*More frequent pumping is needed if a garbage disposal is used. Source: Karen Mancil, Septic Tank Maintenance, Publication AEX-740, Ohio Cooperative Extension Service, 1988

It is also important to not overload your system. The septic tank is designed to hold incoming wastewater for a certain time period so that solids have time to settle and lighter portions can rise to the top. Try to space out wash loads over the course of a week instead of running many loads in one day. Water-conserving devices such as low-flow toilets and faucets can also reduce the amount of wastewater that flows into your system. With some care and consideration for your septic tank, it should serve your household well for many years.

For more information on household septic systems, visit the Arizona Extension publications web page at ag.arizona.edu/pubs.

Adapted in part from: Septic Tank Maintenance. OSU Extension Facts No. 1657. Delbert Schwab, J. H. Armstrong, S. Harp. Oklahoma State University Extension. This material is based upon work supported by the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture, under special project number 99-EWQI-1-0613.

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