

Backyards & Beyond

Spring 2007

RURAL LIVING IN ARIZONA

Volume 1, Issue 1



Welcome to the first issue of Backyards & Beyond – Rural Living in Arizona. This informative, concise, and timely quarterly magazine is made for YOU: the small acreage landowner, new landowner or backyard enthusiast.

The concept for this magazine came from Wyoming and their collaborative publication called “Barnyards and Backyards – Rural Living in Wyoming.” As more people make Arizona their home, our traditional farm and ranch lands are being divided into small acreage home lots. Through this publication we aim to provide the education and guidance owners need to successfully manage their resources and care for their property. We will promote sustainable practices that enhance the ecological, economic and social aspects of the land and its people. The publication will include information by UA faculty and staff, NRCS personnel, experts from other universities and agencies, and non-government organizations interested in small acreage stewardship.

The University of Arizona Cooperative Extension and the USDA Natural Resources Conservation Service joined together to produce this first issue. Funding has been provided by the Renewable Resources Extension Act.

Arizona Cooperative Extension



Cooperative Extension, the outreach arm of The University of Arizona, is “taking the university to the people.” Since our beginnings in 1914, Extension serves as a statewide network of knowledgeable faculty and staff that provides lifelong educational programs for all Arizonans. We are unique because our teaching efforts are made possible by a cooperative effort between the Federal Government, the University of Arizona’s College of Agriculture and Life Sciences and each of the counties we serve. We are part of a nationwide educational network of scientists and educators who help people solve problems and put knowledge to use. Arizona Cooperative Extension, with offices in all 15 counties and on reservations, provides a link between the university and the citizens of this state. You can visit the web site at <http://cals.arizona.edu/extension>

Arizona Natural Resources Conservation Service



Since 1935, the Natural Resources Conservation Service (originally called the Soil Conservation Service) has provided leadership in a partnership effort to help America’s private land owners and managers conserve their soil, water, and other natural resources. We provide services to all private landowners who are interested in restoring and enhancing our wondrous landscape through a unique partnership with landowners, conservation districts, state and local governments, American Indian Nations, and rural and urban citizens. Arizona NRCS is an agency of the United States Department of Agriculture (USDA). We have offices located in USDA Service Centers and other sites throughout Arizona. The heart of our conservation delivery system is found in Arizona’s 41 conservation districts. A conservation district is a legal subdivision of state or American Indian Nation government and operates on the premise that local people know most about local needs. Please take some time to visit the web site at <http://www.az.nrcs.usda.gov>



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Mitchel McClaran



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Arizona Native Plant Law: What You Need to Know

Kim McReynolds, Area Extension Agent, Natural Resources, University of Arizona Cooperative Extension, Cochise, Graham and Greenlee Counties



(A) Desert willow (*Chilopsis linearis*) is a salvage assessed protected plant. (B) San Francisco Peaks groundsel (*Senecio franciscanus*) is a highly safeguarded protected plant. (C) Honey mesquite (*Prosopis glandulosa*) is in both salvage assessed and harvest restricted. (D) Soaptree yucca (*Yucca elata*) is one of the many salvage restricted protected plants.

Arizona is home to a wide diversity of native plants. There are around 3,350 species of flowering plants and ferns known to be growing without cultivation in the state. Some species are scattered widely throughout the state, while others occur only locally and are adapted to particular conditions within a certain habitat zone.

What a lot of people don't realize is that many of Arizona's native plants are protected by law. These protected plants may not be removed from any lands, whether private or public, without the permission of the land owner and a permit from the Arizona Department of Agriculture. While land owners do have the right to remove native plants on their land, there is a process that must be followed. Protected species notification must be given to the Arizona Department of Agriculture and a permit must be issued prior to removal.

The Arizona native plant law was enacted to protect rare plant species and to protect some species from being over harvested. There are four Protected Native Plant Categories:

1. Highly Safeguarded – This group of plants is threatened for survival or are in danger of extinction. Protection includes not only the plants themselves, but their plant parts such as fruits, seeds and cuttings. A few

of the species that are in this category are saguaro, Arizona willow, and some of the agaves and cacti.

2. Salvage Restricted – This large group of plants are subject to damage and vandalism. This is a large list of species with 44 plant families represented, the largest being numerous species of cacti.
3. Salvage Assessed – This much smaller group of plants have enough value if salvaged to support the cost of salvaging. This list includes the desert willow, palo verde, ironwood, smoke tree and several mesquite species.
4. Harvest Restricted – Also a smaller group, these plants are protected due to the fact that they are subject to excessive harvesting because of the intrinsic value of products made with their wood or fiber. Included in this group are bear grass, yucca, ironwood and mesquite.

To learn more about the Arizona native plant law, procedures for obtaining a permit for plant removal, transporting native plants, and to view the specific species listed under the above protections, visit the Arizona Department of Agriculture's website at <http://www.azda.gov/ESD/nativeplants.htm>.

Help Protect Arizona

from Non-Native Invasive Plants

*Larry D. Howery, Ph.D., Rangeland Management Extension Specialist,
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In the western United States the invasive plant problem has been described as, “a biological forest fire racing out of control because no one wants to be fire boss.” When small invasive weed infestations are left unchecked, they may grow exponentially and spread across the land much like a slow-moving biological wildfire. However, land consumed by fire usually recovers and is often more productive than before the fire occurred. On the other hand, land consumed by invasive weeds may be irreversibly changed and never again regain its potential to provide the economic and ecological benefits that society currently enjoys.

Some of our most problematic invasive weeds in the United States were introduced from Europe or Asia (Eurasia), Africa, and the Mediterranean region either purposely or by accident. Some invasive weeds were introduced into Arizona with the intention of solving an environmental problem such as excessive soil erosion during the 1930's, while others likely inadvertently hitched rides in ship ballasts, hay bales, or in agricultural seed. In Arizona, some infestations that were at one time just a few plants have increased to several thousand acres. If this trend continues, invasive weeds in Arizona have the potential to cause similar kinds of ecologic and economic damage as has occurred in neighboring states (e.g., Utah, Colorado, California).

It is very important to be concerned about the damage that non-native, invasive plants can cause, but it is also important to recognize that while most invasive plants are not native to Arizona, not all non-native plants are invasive or harmful. Of the thousands of plants that have been purposely introduced into North America, less than 10% have become problematic invaders. Although there are plenty of “horror stories” involving introduced plants, many non-native, domesticated plants have proven to be beneficial to society as crops (e.g., corn and wheat), for landscaping, and for revegetation efforts on degraded or weed-infested lands.

The reasons why some introduced plants become invasive while others do not are extremely complex but depend on the characteristics of the introduced species as well as the unique abiotic and biotic



Scotch thistle (*Onopordum acanthium*)



Leafy spurge (*Euphorbia esula*)

characteristics of the ecosystem into which the plant is introduced. Invasive plants often behave in unpredictable ways, sometimes lying “dormant” for decades, and then exploding exponentially. One striking example of this phenomenon is yellow starthistle in California (<http://wric.ucdavis.edu/yst/>). This Eurasian plant is believed to have been inadvertently introduced into California in the mid-1800’s and then subsequently expanded its range to 1 million acres by 1958. It increased by another 7 million acres in less than 30 years by 1985, and in the next 20 years it more than doubled its acreage to greater than 15 million acres.

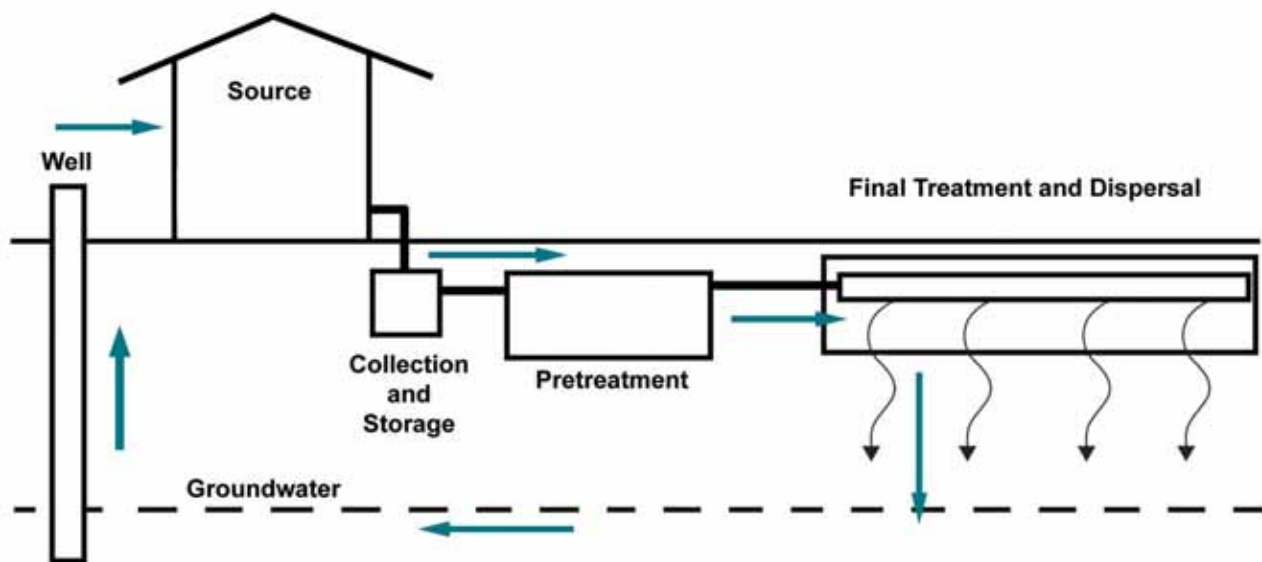
Complex interactions determine whether or not a plant will ultimately become invasive. Characteristics of an introduced plant that increase its probability of becoming invasive include, but are not limited to 1) fast growth, 2) rapid reproduction, 3) high seed production and dispersal ability, 4) tolerance of a wide range of environmental conditions, 5) aggressive and prolific vegetative reproduction, and, commonly, 6) association with humans or human activities (land management practices).

You can help control invasive plants in Arizona in several ways. First, learn how to identify the invasive plants in your area and report occurrences to private and public land managers or owners. In Arizona, keeping weeds from becoming established should continue to be a very high priority. The proverbial axioms, “an ounce of prevention is worth a pound of cure” and “the easiest weed to control is the one you don’t have yet” certainly hold true here. It is critical to detect and, if possible, eradicate incipient infestations before they have a chance to spread onto uninfested land. Once a plant sets seed, takes root, and becomes

well established, the amount of effort to manage the plant greatly increases.

Second, you can control problem weeds on your own property so that your weeds do not become your neighbor’s problem. There is no “cookbook” or “silver bullet” approach to controlling invasive weed infestations. Management options will vary with each weed species, the scale of the problem, and the ecological conditions unique to the area (soil type, depth of water table, timing and amount of precipitation, topography, etc.). Annual and biennial weeds can sometimes be effectively managed during the early stages of infestation with pulling or cultivation, whereas well-established perennial weeds may require timely application of herbicides that are registered for the targeted weed. When weed infestations become well entrenched, integrated management will be necessary to combine the appropriate set of management tools for the targeted plant and ecological site. Possible tools for weed management include mechanical (e.g., hand pulling, grubbing), chemical (e.g., herbicides), and biological (e.g., insects, targeted grazing) methods. Keep in mind that many invasive plants have spines and/or toxic or irritating substances. When controlling weeds manually by hand-pulling, or by applying herbicides, be sure to take safety precautions by wearing the appropriate protective clothing (gloves, boots, safety glasses, etc.). Before using herbicides, always read the label and follow instructions.

Lastly, you can volunteer to help with inventories, mapping, and eradication of invasive plant species in your area. Contact your local county extension office for more information on how to control specific invasive weeds or to get more involved in weed management efforts.



Managing Your Household Septic System

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

Your septic system is your responsibility!

By law in Arizona, homeowners are responsible for maintaining their septic systems. Maintaining a septic system protects an investment in a home. If properly designed, constructed, and maintained, a septic system can provide long-term effective treatment of household wastewater. A malfunctioning system can contaminate surface water and groundwater resources.

Both the septic tank and the drainfield (also known as a leach field or absorption field) must be properly maintained to protect human health and the environment. Managing a household septic system requires that you control the volume and quality of wastewater and maintain the septic tank and drainfield.

How does a septic system work?

A residential onsite wastewater treatment system is a system at or near the residence that collects, treats and disperses wastewater generated at the home. Specifically, the treatment train will include a wastewater source, collection and storage, a pretreatment component (typically a septic tank), and final treatment and dispersal (usually the soil). Microbes in the soil digest or remove most contaminants from wastewater before it eventually reaches groundwater.

A septic tank is a watertight container typically made of concrete, fiberglass, or polyethylene, and it is buried underground. It holds wastewater long enough to allow solids to settle out, forming a sludge layer, while oil and grease float to the surface forming a scum layer.

It also allows partial decomposition of the solid materials. Compartments and a tee-shaped outlet in the septic tank help prevent the sludge and scum from leaving the tank and traveling into the drainfield. Screens placed in the outlet tee also keep solids from entering the soil.

Maintenance

Inspect and pump regularly. Annual or biannual inspection of the septic tank is advisable to determine the thickness of the sludge and scum layers. A probe may be put into the tank from one of its access ports to make this determination. Always use caution when inspecting a system without professional assistance; septic tank gases can be lethal.

Slow accumulations of sludge and scum are normal. You should remove these materials through periodic pumping (at least once every three to five years) and appropriate disposal. This will protect the soil treatment area from materials that will damage its effectiveness.

A private contractor who specializes in septic system cleaning and pumping can be found in your telephone directory. This service will cost you some money, but it is less expensive than digging up a fouled drainfield.

Avoid overloading the system. Conserve water and repair leaky fixtures. Garbage disposals will cause rapid accumulation of sludge in a septic tank, and their use should be minimized or eliminated to keep the septic system functioning properly. Remember, except toilet paper, nothing should go into the septic tank that hasn't gone through your body first.

Additives that are marketed as septic tank cleaners, rejuvenators, or primers are not needed. Most of these additives won't harm your system, but they don't help them either. Some of these additives are strong chemicals that can harm a septic system.

Avoid damage to the drainfield. Keep a healthy grass cover over the system to prevent exposure of the soil and possible erosion around the drainfield. Do not drive over the system because it can compact the soil and possibly break drain lines. Try to position trees so that their roots will not enter the septic tank or drainfield and plug them.

Properly sited, designed, constructed, and maintained septic systems can provide an efficient and economical wastewater treatment alternative to public sewer systems. While septic systems are designed and installed by licensed professionals to meet the needs of individual sites, homeowners are responsible for the system's operation and maintenance. There is more information on household septic systems at the Arizona Cooperative Extension Onsite Wastewater Education Program website (<http://cals.arizona.edu/waterquality/onsite>) and at the Extension publications web page (<http://cals.arizona.edu/pubs>).

Critter Corner

Cottontail Rabbits

*Jeff Schalaus, Extension Agent, Agriculture and Natural Resources,
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Cottontail rabbits can be viewed in one of two ways: as friendly, observable backyard wildlife or as destructive garden and landscape pests. Rabbits will often eat succulent plants or gnaw on the bark of young trees. If rabbit damage reaches an intolerable level, population control may become necessary. There are several strategies that can be employed to minimize damage caused by cottontail rabbits. There is one rule to remember when evaluating any wildlife damage management strategy: damage prevention is long-term – population control is short-term.

Three species of cottontail occur in Arizona: the mountain cottontail, eastern cottontail, and desert cottontail. The smallest of these (22-30 ounces) is the relatively short-eared mountain cottontail, which is largely restricted to elevations above 7,500 feet from the Mogollon Rim



Jim Peaco, NPS

northward. The generally larger eastern cottontail (28-52 ounces) is found in the mountains of southeastern and central Arizona where it occupies many of the same habitats as the Coues white-tailed deer. The most abundant and important rabbit by far, however, is the desert cottontail (26.5-44 ounces), which is found in every county in the state up to elevations exceeding 7,000 feet.

Typically, cottontails live only 12 to 15 months in the wild and it is rare for them to live longer than two full years. They often raise two to three litters per year and can have as many as five or six rabbits in each litter. A female cottontail can be bred within hours of giving birth to her litter. In the drier areas of Arizona, litters often consist of only two or three young. The young leave the nest in two to three weeks. An average cottontail doe can produce up to 18 young per year. However, this reproductive potential is rarely reached due to predation and environmental factors. In rural and remote areas, rabbits are an important food source for coyotes, bobcats, foxes, badgers, mountain lions, eagles, and hawks.

Cottontail rabbits generally spend their entire lives in an area of 10 acres or less, so if there is suitable habitat within this distance, you are likely to encounter rabbits. During cold weather, they use natural cavities and burrows of other animals for their dens. Otherwise, rabbits seek cover and protection in brush piles, brushy hedgerows, debris filled gullies, and landscaped backyards with suitable cover. While moist areas act as an attractant due to succulent vegetation, cottontails do not seem to require free water for drinking. The removal or modification of any of these features will change the area's suitability for rabbit habitat.

With any garden "pest," damage must be correctly identified before control efforts can be effective. Cottontails are often observed feeding and frolicking which makes damage identification simpler. In general, rabbits eat vegetables and flowers in spring and summer and cause damage to the lower portions of woody plants in fall and winter. Cottontails seem to prefer plants in the rose family: apples, raspberries, blackberries, etc. Vegetables and annual flowers are favorites. Conversely, corn, squash, tomatoes, potatoes and some peppers are rarely bothered.

Rabbit damage always appears near ground level. Plants will have cleanly clipped stems on tender shoots and small, chiseled, gnaw marks on woody plants. Gnaw marks may be confused with woodrat damage, but woodrats are entirely nocturnal and often cause plant damage well above ground. If the damage is 20 inches or higher above ground, then it was probably not caused by a cottontail. Look for tracks and/or droppings as further evidence that it is truly rabbit damage.

The best way to prevent rabbit damage is to simply exclude them. This can be most effectively done with a two foot-tall chicken wire fence with the bottom tight to the ground or buried one or two inches deep. Chicken wire should have holes one inch or smaller. To protect young trees, use cylinders of ¼" wire hardware cloth (heavy duty galvanized wire screen) wrapped around the tree trunk. It should be spaced one or two inches away from the trunk, buried two inches deep, and be tall enough to extend beyond a cottontail's reach (20+ inches).

Repellents are also available. These substances either render the plant parts distasteful or create a bad smell to rabbits. Commercially available products may not be locally available, but can be mail ordered and restrictions may apply. Hot pepper products can be used as taste repellents, but new growth will not be protected. Repellents will not always protect plants from damage. It really depends on what alternative foods are available. If food is limited, even the least desirable plants may be damaged.

Some plants are less palatable to rabbits than other plants. For a list of rabbit resistant plants, visit or call your local University of Arizona Cooperative Extension Office and request the publication: Deer and Rabbit Resistant Plants or download it online from <http://cals.arizona.edu/pubs>.

Habitat modification and exclusion are the most effective strategies against rabbit damage. Repellents are a useful tool where other strategies are not practical. Live trapping and relocation are not recommended. If a release area is suitable habitat for cottontails, then a resident population will already be present. Remember that cottontail rabbits are a small game species in Arizona and using lethal means to control them is illegal without a permit. Consult the Arizona Game and Fish Department in your area for more information. In addition, local firearms regulations may also preclude their use. Remember: damage prevention is long-term – population control is short-term.



Desert cottontail rabbit.

Gary M. Stolz, USFWS

For more information:

Arizona Game and Fish Web Site: Cottontail Rabbit
http://www.azgfd.gov/h_f/game_cottontail_rabbit.shtml

Pests in Gardens and Landscapes: Rabbits. UC IPM Web Site:
<http://axp.ipm.ucdavis.edu/PMG/PESTNOTES/pn7447.html>

Prevention and Control of Rabbit Damage. University of Nebraska – Lincoln Extension.
<http://www.ianrpubs.unl.edu/epublic/pages/publicationD.jsp?publicationId=79>



Welcome to Arizona!

Warm, Dry, and Sometimes Even Wet!

Mike Crimmins, Ph.D., Climate Science Extension Specialist, Soil, Water and Environmental Science Department, University of Arizona

The “Five C’s” represent what have historically been important to the economy and the people of Arizona, many of which are still important today: Copper, Cattle, Cotton, Citrus, and Climate. The last “C”, representing climate, is one of Arizona’s most famous features. Arizona boasts a warm and sunny climate that is unrivaled in the continental United States for tourism and recreation opportunities and as a comfortable refuge from the cold winters in northern states. Arizona’s climate is more complicated than simply warm and sunny, though. Winter precipitation can bring snow to the highest elevations, that is important for water resources and rainfall to low desert areas that supports unique desert wildlife and vegetation. Summer thunderstorms bring much-needed rainfall to the warm season grasses of Arizona’s rangelands. The intervening warm and dry periods provide ample sunshine to drive diverse agricultural production across the state, including crops ranging from winter lettuce to cotton.

The key to adapting to Arizona’s climate is accepting and expecting variability. Arizona’s climate is anything but constant and varies dramatically through time and across the state’s mountains and valleys. Getting used to two distinctly different wet seasons (one in summer and one in winter) is the first step toward becoming acclimated to Arizona. The second step is getting used to sometimes not seeing precipitation at all during those seasons. Remember that Arizona is a dry place and that lack of precipitation over periods of seasons to years is not uncommon.

Arizona’s two “wet” seasons are illustrated in Figure 1. This is a distinctive feature of Arizona climate. Figure 1 shows the monthly average precipitation and monthly average temperature for the state (these data

represent a broad statewide average and not just one station). Note the peaks in monthly precipitation during the summer months of July, August and September and again in December, January, February, and March. Precipitation during the summer months is the result of a circulation pattern called the North American Monsoon System, more commonly referred to as simply “the monsoon.” Moist air from the Gulf of Mexico and the Gulf of California flows into Arizona, creating an ideal environment for thunderstorm development.

Winter precipitation comes in the form of broad frontal storms associated with low pressure systems that originate over the Pacific Ocean. Winter storms typically bring light precipitation to the region and accumulating snows to the highest mountain areas. Winter precipitation is especially important for maintaining Arizona’s water resources. Soaking winter rains and upper elevation snowfall are critical for maintaining stream flow and groundwater levels.

Arizona precipitation is highly variable over space and time, which is characteristic of a dry climate. Extended periods of below-average precipitation are not uncommon given this variability. Expecting average conditions from month to month or year to year is unrealistic with the inherent climatic variability of the region. This variability makes Arizona an interesting and exciting place to experience.

Tracking Arizona Climate Online

Here are some web resources that provide up to date information on Arizona’s weather and climate:

- NOAA National Weather Service (<http://www.weather.gov>): Click on your county to access local forecasts, weather observations, and climate information.
- Arizona Department of Water Resources Statewide Drought Program (<http://www.azwater.gov/dwr/drought/DroughtHome.html>): Find information on current drought conditions across Arizona and tips on preparing for drought.
- University of Arizona Climate Science Applications Program (<http://cals.arizona.edu/climate>): Access climate-related extension bulletins and climate summaries for Arizona.
- University of Arizona Climate Assessment for the Southwest (<http://www.ispe.arizona.edu/climas>): Access climate-related reports, links, and the Southwest Climate Outlook, a monthly assessment of current and forecasted conditions.
- Rainlog (<http://www.rainlog.org>): Volunteer to help track precipitation patterns across Arizona and view other volunteer's historic observations.

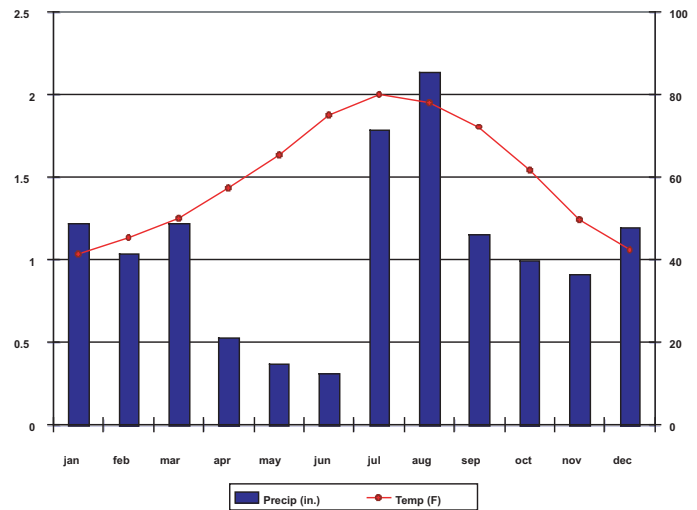


Figure 1: Monthly average precipitation and temperature for Arizona.

Composting “Black Gold” for the Soil

*Rob Call, Extension Agent, Horticulture, University of Arizona
Cooperative Extension, Cochise County*



Keeping the compost pile moist, but not wet is a key to success in the southwest.

If you want to grow a great vegetable garden or some beautiful annual flowers, you would do well to get some “black gold” soil. Compost, the secret behind the most successful gardens, increases soil organic matter that act like little sponges in the soil by holding water and nutrients. Natural composting, or biological decomposition, began with the first plants on earth and has been going on ever since. As vegetation falls to the ground, it slowly decays and provides the minerals and nutrients needed for plants, animals, and microorganism growth. Composting is a way to produce organic matter. Compost contains humus, the loose, crumbly matter that results from the decay of organic matter. It is dark brown or black and has a soil-like, earthy smell. It is created by combining nitrogen containing “green” organic wastes (e.g., grass and plant trimmings, kitchen scraps, manure) in proper ratios with carbon containing “brown” materials (e.g., dry leaves, straw, sawdust, dried manure) into piles, rows, or vessels. Both are essential to create compost. Mature compost has experienced high temperatures, above



Rob Call

Some examples of compost containers. Drum composters aid in aeration. Plastic containers may sun-rot.

140°F., that eliminate most pathogens and weed seeds that natural decomposition does not destroy. Avoid using animal-based materials and oils when composting. These will attract pests (skunks, cats, dogs and other scavengers) and cause bad smells.

Advantages of composting

- Composting reduces the dependency on commercial fertilizers and improves soil structure, while adding nutrients needed for healthy plants. It is also inexpensive because you can easily make it with material that would otherwise be thrown away.
- Soil pH may be altered by compost addition. Ideal pH for most edible plants and flowers is between 6.0 - 7.0. If the soil is alkaline (over pH 7.5), as much of the arid Southwest is, compost may help lower it over time.
- Recycling organic waste materials also reduces landfill use.

How to get started

- **Cost** – Composting does not take a lot of time or require much equipment.
- **Location** – The compost pile should be placed in a warm area with adequate sunshine, but out of the wind so it will not dry out too quickly.
- **Size** – An ideal size is one cubic yard (3 feet x 3 feet x 3 feet). If the pile is too small it will decompose slowly. Also, it will not generate and hold enough heat to kill weed seeds and other pests. If the pile is too tall, aeration may not be adequate.
- **Water** – Consistent moisture is important. The pile should contain enough water to feel like a well-wrung out sponge. If the pile is too wet, it may produce unpleasant odors. If it is too dry, decomposition will not occur. Drying out is a major problem for successful composting in the Southwest.

- **Microorganisms** – Periodically add a little native soil to the compost pile. This will inoculate the compost with beneficial microorganisms. These include bacteria, fungi, worms and insects. (Purchase of special composting microbes is not necessary.) Aerobic (air-loving) microbes do the actual decomposing. Creating an environment in which they thrive is the goal.
- **Oxygen** – Air is essential for the organic matter to decompose. Turn the pile frequently, poke deep holes in it, or position the pile a foot or so off the ground to allow for air circulation.

The process

The first point to remember is that smaller pieces of waste material decompose faster. “Green” and “brown” materials are alternatively layered no more than a foot or two deep. The best material ratio of carbon (brown) to nitrogen (green) is about 25 to 30 parts to 1, respectively. If there is too much brown material in the pile, decomposition will be slow. This can be corrected by adding more green material or some nitrogen fertilizer. If too much green material is present nitrogen may be lost and the pile may smell like ammonia. While layering the two types of material, remember to add some native soil to inoculate the pile with microbes. After the pile is started, wet it thoroughly with water. Monitor moisture over time. Placing a water sprinkler on the pile may aid in keeping the pile moist, but not wet. Turning the pile will aerate it. This will accelerate the decomposition process.

Using compost

Screen the compost using $\frac{1}{4}$ - $\frac{1}{2}$ ” mesh hardware cloth tacked or stapled to the bottom of a box frame made of 1” or 2” x 4” lumber. Place the box on top of a wheel barrow and allow the compost to fall through to produce finished black gold! Return unscreened materials to the compost pile. Add 2 - 4” of finished compost to garden or flower planting areas. Till or turn the soil over with a shovel to incorporate into the soil. Adding too much compost may tie up plant nutrients and stunt plant growth. “Black gold” will increase plant health and growth.

Living with Wildland Fire

David Peters, Fire Mitigation Specialist, Gila District, Bureau of Land Management



Much of the Southwest is considered a high hazard fire environment. Based on recent history and experience, these areas possess all of the ingredients necessary to support large, intense and uncontrollable wildland fires.

Within this hazardous environment are individual houses, subdivisions and entire communities. Many homeowners, however, are ill prepared to survive an intense wildland fire. It is not a question of "if" a wildland fire will occur, but when. As such, the odds of losing human life and property are growing.

Our ability to live more safely in this fire environment depends on pre-fire activities. These are actions taken before a wildland fire occurs that improve the survivability of people and homes. The national Firewise

Communities/USA program is administered by the State Forester, so communities can pursue a comprehensive approach to having a Firewise community.

The look of our Southwest landscape has changed dramatically during the twentieth century. In many instances trees are smaller in our forests, but they are far more numerous. Invasive grasses are overtaking our deserts, which threatens the desert's health and long term viability. The buildup of fuels coupled with recent insect and disease outbreaks has greatly increased potential for severe wildland fires. Climate factors such as drought and warmer temperatures also play a role.

Protect your home from wildland fires in your home ignition zone by following the suggestions in the picture.

<http://cals.arizona.edu/firewise>
<http://www.azsf.az.gov>

Where to Find Information Regarding Your Soil

Cathy McGuire, MLRA Soil Survey Leader, USDA Natural Resources Conservation Service, Tucson

(Adapted from article originally written by Mike Collins, Wyoming NRCS)

What you grow, what you build and how you manage your land all depend on the soil. Soil is the main livelihood of plants and animals. It's also important to air quality, water quality, and the ability to support buildings and treat waste effluent in septic systems

What is a Soil Survey?

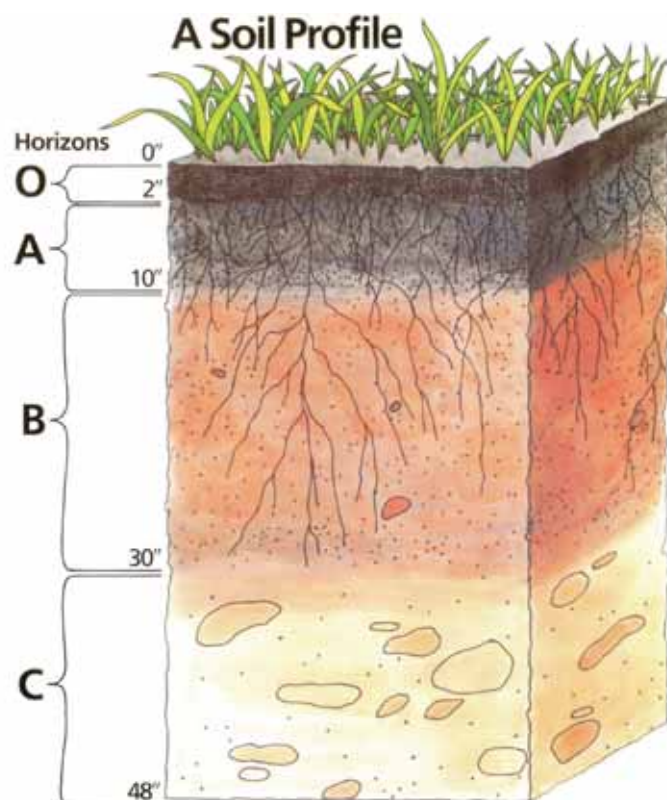
Soil surveys provide an orderly, on-the-ground, scientific inventory of soil resources. Soil surveys include maps showing the locations and extent of dominant soil types and data about the physical and chemical properties of those soils. The soil interpretations derived from that data describe the suitability and limitations associated with each kind of soil. Soil surveys provide basic information needed to manage the soil resource for long-term sustainability. They provide important information needed to manage water quality, wetlands, and wildlife habitat, and they are important to homeowners, city and county planners, engineers, zoning commissions, tax commissioners, developers, and agricultural producers.

Where do I find SOILS information?

Typing "soils" in an Internet search engine will likely give you thousands of links to information. Unless you're a specialist in soils, sorting through this huge amount of information will take some time and effort.

Now, though, there is a new place for soils information — a one stop web site that has information for everyone from kindergarteners to professional soil scientists. The web site <http://soils.usda.gov> contains lesson plans and ideas, posters, links to professional societies, career planning information to become a soil scientist, and all of the references used by soil scientists including the *Field Book for Describing and Sampling Soils*, *Soil Survey Manual*, *Soil Survey Laboratory Methods Manual* and *Soil Taxonomy*.

But the most exciting part of the new web site is Web Soil Survey (<http://soils.usda.gov/survey>). At this site you can delineate an area of interest from anywhere in the United States, pull up a soils map of that area and then examine soil data and interpretations. The site has lots of directions and does not require any GIS specialized skills. This site



contains the latest certified soil information and eventually will replace paper soil surveys.

If the Web Soil Survey does not answer your soil questions or if you need help using the site, contact your local Natural Resources Conservation Service Office. The local office can direct you to soil information or provide a paper copy of published soil surveys. The Arizona NRCS web page (www.az.nrcs.usda.gov/technical/soils) has locations of soil survey offices and field offices that can help you obtain the information that you need.

Hay is Cheap, Land is Valuable

*George Ruyle, Ph.D., Range Management Extension Specialist,
School of Natural Resources, University of Arizona
(Adapted from article originally written by Dallas Mount, Wyoming
Cooperative Extension)*

Why do you live in the country? Clean air? Open space? Scenic vistas? Wildlife viewing? Raising animals? These are all good reasons, and likely you enjoy some, if not all, of these benefits of rural life. Another benefit of rural living can be the appreciating value of your property. With a growing interest in rural living, property values in many areas have seen steady and notable increases the past few years. Many of the values of rural land are bound to the aesthetics of that land and all of the amenities listed above are commonly associated with property value. Landowners need to maintain these aesthetics not only for the benefit of their enjoyment but also to protect the investment in the property.

When it comes to growing forage, grass and other plants eaten by grazing livestock, many Arizona regions that have great beauty and make desirable home sites are not very productive without supplemental irrigation. The photos illustrate land with two different potentials for producing forage. When estimating how many animals can graze on your land, it is always better to error on the side of caution. It is unlikely to damage your land by not grazing it enough, but you can severely damage it by overgrazing heavily and repeatedly grazing plants until they succumb. Your ability to manage grazing animals by rotating them among various pastures, the distance to their water, and the timing of grazing will affect carrying capacity (the maximum amount of grazing animals that your land can support without harming the vegetation and soil resources) and reduce overgrazing. Good grazing management does not mean that every blade of grass that is growing on the property should be grazed. It means managing grazing so that the land is either maintaining or improving in condition. Pastures should look patchy and rough after being grazed, not scalped. If your animals are continually grazing pastures down to short stubble with lots of bare ground showing through you may want to rethink your grazing and consider feeding hay instead.

A common sustainable production level for upland, non-irrigated rangeland sites in Arizona is 5 to 10 acres to produce enough forage to sustain a horse or cow for one month. However, depending on soils, range condition and elevation, carrying capacity can vary widely from around 3 to 50 acres to sustain a horse or cow for one month. Cows and other ruminants eat about 2 percent of their body weight in a day, while horses can eat one and a half times that much. Therefore, a horse that weighs 1100 pounds will eat about 670 pounds of hay in a month. At \$9.50 per each 120 pound bale of hay, the eight acres it would take to produce forage for the month could be replaced by around 53 dollars of hay. Therefore, the gross productive value of many land sites is less than \$7/acre/year. It may be unwise to risk degrading property values



John B. Riggs



John B. Riggs

for such a low return. Additionally, smaller acreage rural homesites are rarely large or productive enough to allow unrestricted year long grazing by even one horse or cow. Is it really worth saving a little bit on hay to overgraze your land? Keeping the animals in a corral and feeding hay is often a much better solution for the health of your land, the watershed and habitat values, not to mention the investment in your property.

If you are still not convinced it is cheaper to buy hay than to overgraze a pasture, there are other factors to consider. Weeds – The number one enemy to weeds is competition. A good, healthy stand of perennial grasses and other vegetation will prevent most weed problems. Getting rid of weeds is expensive and time consuming. Preventing weed problems can be as simple as managing for the health of native grasses and other plants. Soil – Bare ground that is exposed by overgrazing is more susceptible to wind and water erosion than soils that are covered with plants. Animal Health – Horses and other livestock will generally avoid eating poisonous plants if they have a choice. Overgrazing increases the chance your animals will eat something harmful.

Living in rural communities can be enhanced by properly managing the landscapes that attracted development in the first place. Feeding animals hay rather than letting them graze continually on small acreage homesites can maintain native plants and animals and improve the quality of life for all.

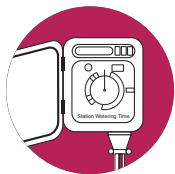
Drip Irrigation 101

Cado Daily, Water Wise Conservation Program Coordinator, University of Arizona Cooperative Extension, Cochise County

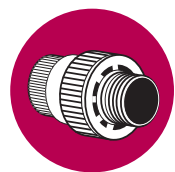
Drip irrigation — also known as low-flow, micro, and trickle irrigation — is the slow, measured application of water through devices called emitters. A properly functioning drip irrigation system saves water because little is lost to runoff or evaporation. This watering method also promotes healthy plant growth, controls weed growth, and reduces pest problems. Drip irrigation systems can be big time and water savers. But if left alone after installation or if incorrectly assembled, the system can be a big water waster instead of a water saver.

Just like the song “Head, Shoulders, Knees and Toes,” that teaches children about anatomy, understanding drip irrigation systems isn’t hard once you learn the basics. The valve is connected to the — filter, and the filter is connected to the — pressure regulator, and the pressure regulator is connected to the — piping, and oh! That’s how an irrigation system goes. There is a wide assortment of equipment to suit most budgets and watering needs. Use the descriptive list below to identify system components and maintenance actions.

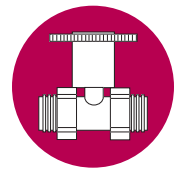
Controller/Timer: This device automatically activates irrigation valves on pre-selected days. It controls when, how long and how often the system waters. Good timers allow maximum watering intervals of 30 days. Established low water use plants do not need water more frequently than every 2-3 weeks. If the controller only allows you to water once a week or less, you are wasting water. Water for no less than 1 hour to allow enough water to penetrate to a root depth of either 1, 2 or 3 feet deep for small plants, shrubs or trees respectively. Change watering frequencies monthly or seasonally. Do not use the budgeting feature on most controllers because it changes the length of watering time, not the frequency.



Backflow Preventer: This device prevents the irrigation system from being siphoned back into drinking water. Your water provider may regulate the installation of backflow preventers. Contact them for more information.



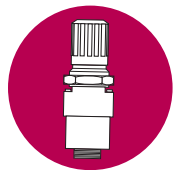
Valves: Manually or automatically operated control valves turn the water on and off. Automatic control valves are wired to a controller. Good drip systems have multiple valves to control watering small plants, shrubs and trees separately.



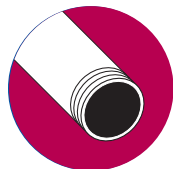
Filter: All drip systems need a filter to keep dirt and debris from clogging the emitters. Replace or clean the filter at least once a year. Clogged filters are often the cause of a poorly performing drip system.



Pressure Regulator: Most drip systems operate at low pressure, usually less than 20 psi. Pressure regulators reduce incoming water pressure to the ideal pressure for the drip system. Water companies are required to deliver water at a minimum of 30 psi, although pressures can exceed 80 psi. Excessive water pressures can pop off emitters and cause water to be emitted at a greater rate than desired.



Pipe: Polyethylene tubing and rigid PVC are the two most commonly used types of irrigation pipes. Pipes distribute water from valves to the irrigated area. Over time, pipes can become bent, cracked or punctured. Excessive plant growth or hissing sounds when the watering system is activated may indicate an underground leak.



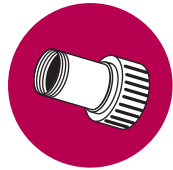
Micro-tubing: Also known as 1/4 inch or spaghetti tubing, micro-tubing delivers water from the piping to or from the emitters. Periodically check for micro-tubing leaks.



Emitters: These connect to the pipes or tubing and deliver water at a slow, consistent rate, usually 1, 2 or 4 gallons per hour. The choice of emitter output depends on how quickly or slowly water penetrates the soil. Compact and clay soils cannot absorb water at a fast rate. That factor makes smaller quantity emitters the best choice to reduce run-off. Inspect pipes and tubing monthly for missing or clogged emitters. As the plant grows, do not keep the emitters near the base of the plant. Move them out to the plants drip line. Close off unused emitters using “goof plugs.”



Flush Valve/Cap: Found at the end of each irrigation line, flush valves cap the line and allow flushing the line of dirt and debris.



Nearly all of your landscape can be watered with drip irrigation. Drip systems are particularly well suited for desert landscapes, places where runoff can be a problem, and small, narrow areas such as entryways. Drip is also a great way to water vegetables, flowers and potted plants. Once you know a little bit about drip irrigation parts, you can be singing your own song!



A Cooperative Rainfall Monitoring Network

*Jeff Schalau, Extension Agent, Agriculture and Natural Resources,
The University of Arizona Cooperative Extension, Yavapai County*

Many people have backyard rain gauges to measure and record precipitation data on a daily basis. Precipitation measurements can provide a rough idea of how long you may go between irrigating your garden and fruit trees, and how your site compares to “normal” or average precipitation for the area. It also makes for great conversation with friends and neighbors! If you are not collecting and recording rainfall data for your location, you really should consider starting. You can also store your precipitation data on the Internet and share it with researchers at the University of Arizona as part of a regional research project.

Precipitation is highly variable across Arizona due to topography, elevation, and seasonal weather patterns. This is especially true during the summer season, when thunderstorms can produce heavy rainfall that is very localized. The National Weather Service, County Flood Control Departments, and other government entities have many weather stations across the state, but there are still relatively large distances between these official weather stations. Scientists are trying to understand if there is an underlying cause to this spatial variability and if they can determine factors driving variability.

Various simple rain gauges are available through catalogs and the Internet. The most common types are the wedge type, cylinder or rectangular, and funnel catch with overflow. All are made of polycarbonate or another plastic and cost between \$10 and \$30. The wedge type has the advantage of accuracy when recording small amounts, but is limited to six inches of precipitation between readings. Cylinder or rectangular types are less accurate, but inexpensive. The funnel catch with overflow has a large collection area, but loses accuracy when measuring rainfall events greater than one inch.

Digital rain gauges are also available and are becoming more affordable. Some models use tipping bucket technology and another uses a calibrated tube that forms uniform drops which are counted

by a sensor. The tipping bucket type trips a switch when the bucket is dumped, usually after accumulating 0.01 inch of rain. The remote base stations receive the signal via wireless technology so you can read the precipitation data from the comfort of your home. Digital rain gauges range in price from \$40 to \$60.

The most critical issue in collecting good rainfall data is the location of your gauge. Place your gauge in an open area away from obstructions such as trees or overhangs, and in an area protected from high winds. Mount your gauge on a post at a height of 3 to 5 feet with the gauge extending several inches beyond the post. Make sure that the top of the gauge is level and the post is not in an area where rainwater can splash from sheds, equipment, carports, etc. If you have a large area, such as a ranch or farm, consider installing several rain gauges.

Are you interested in becoming an official observer? The University of Arizona Cooperative Extension and the SAHRA Water Center (also at U of A) are recruiting citizen volunteers to help monitor rainfall across Arizona. The Rainlog project is an effort to better monitor and characterize rainfall patterns. You can collect and share information on rainfall amounts to help researchers make better decisions in how we use water in our own backyards all the way up to how we manage water resources across Arizona. Rainlog is built around a website (<http://www.rainlog.org>) where observations can be entered on your home computer to create maps that show rainfall amounts across the region.

Participating in Rainlog.org is easy and anyone with a backyard rain gauge can join. Web site registration includes a Google map utility to pinpoint the latitude and longitude of gauge locations, plus guidance on selecting and installing rain gauges and information on how to collect high quality observations. Uploading data after rain events is a simple, straightforward process using a web form. High quality, wedge type rain gauges can also be ordered from Rainlog.org at reasonable prices. I hope some readers will consider this opportunity to share your rainfall data.



Kyle Carpenter

Sustainable Agriculture

*Rick Gibson, Extension Agent, Agriculture, University of Arizona
Cooperative Extension, Pinal County*

Have you ever wondered if your County Extension Agent or Natural Resources Conservation (NRCS) professional really understands your needs? Are you trying to grow produce organically on a small farm and do not know where to turn for sound, local advice? Are you afraid that when you use the word “biodynamic” people will look at you strangely and wonder what you are talking about?

If any of these scenarios seem to fit your situation, then you need to know about SARE, the Sustainable Agriculture Research and Education programs sponsored by the US Department of Agriculture (USDA). Tailored for people and farm or ranch operations that want to do things just a little differently, the SARE programs across the country help producers of all sizes meet the challenges of producing food and fiber in a sustainable manner.

According to a survey of the Four Corners states, by Gary Thompson at the University of Arizona Department of Agriculture and Resource Economics, organic growers in Arizona had gross sales revenues of \$500,000 to \$1 million in 2005. Crops included herbs, citrus, grapes, mixed vegetables and wine. In the region, the majority (53%) sold their crops wholesale, while 30% sold directly to consumers, and 17% sold retail. Thompson asked growers “why use organics?” Their response may surprise you. Thirty-five percent said to receive higher prices; 29% believe in the organic philosophy, 13% for better health, and 8% for better market access

Sustainable Agriculture is:

- Economically viable: If it is not profitable, it is not sustainable.
- Socially supportive: The quality of life of farmers, farm families and farm communities is important.
- Ecologically sound: We must preserve the resource base that sustains us all.

For more information about the Sustainable Agriculture Research and Education program, visit <http://cals.arizona.edu/extension/sustainableag>. Once there, look for the free pamphlet “Sustaining Agriculture in Arizona” that you can download directly to your own printer. You will also find links to the Western Region and national SARE websites. These sources are loaded with information that may just help you feel at home. If you have questions about any SARE-related topics, just ask your County Extension Agent or local NRCS professional. You may also contact the Arizona SARE Coordinator, Rick Gibson, at 520.836.5221 extension 227, or by email at gibsonrd@cals.arizona.edu.

Featured Plant



*Rob Grumbles, Extension Agent, Agriculture, University of Arizona
Cooperative Extension, Mohave County*

Common Name: Blue Grama
Scientific Name: *Bouteloua gracilis*

Description: This warm season native grass is a perennial bunch grass that usually grows 6 to 20 inches tall. Blue grama is found at elevations from 1,000 to 8,000 feet on rocky slopes, plains, forest openings and mountain meadows. Blue grama flowers from July to October and reproduces by both tillering and seed. In Arizona, plants usually grow in the tuft or bunchgrass form and can be fairly large.

Forage Value: Blue grama is one of the best forage species in the southwest. It is highly palatable and holds up well to grazing and drought conditions. It can provide nutritious forage throughout the year.

Management: Blue grama is one of the more grazing-tolerant native grass plants. For the best response, defer grazing for part of the growing season at least every 2 to 3 years. Blue grama is best rested from grazing in the fall prior to dormancy.

ARIZONA WELLS

sahra.arizona.edu/wells

The Arizona Wells database is designed to help homeowners, water professionals and state agencies more easily locate general well information, historic water levels, ownership, and water quality information. The information is available through public databases from the Arizona Department of Water Resources (ADWR) and an easy-to-use web interface developed by the Center for Sustainability of semi-Arid Hydrology and Riparian Areas (SAHRA) at the University of Arizona.

The website allows you to query ADWR's two main well databases, the Wells-55 Registry and the Ground Water Site Inventory (GWSI) in order to retrieve a variety of types of water well information. The GWSI database is ADWR's main repository for statewide groundwater data. GWSI consists of field data that have been collected by personnel from the Hydrology Division's Basic Data Section or the U.S. Geologic Survey. The information in GWSI is constantly being updated by ongoing field investigations and through a statewide network of water level monitoring sites. Some of the more useful information contained in GWSI includes past well ownership, historic water levels, and limited well construction information. Note that a particular well in GWSI may not have the correct owner listed since the well may not have been measured by ADWR Hydrology in several years.

The Wells 55 database contains Notices of Intent to Drill or to Modify or Deepen, Registrations of Existing Wells, Driller Reports, Completion Reports, Change of Well information, Change of Ownership, Notice of Well Capping, Notices of Intent to Abandon and Abandonment Completion Reports. The information contained in the Wells 55 website has not been verified by the State of Arizona and the Arizona Department of Water Resources is unable to guarantee the accuracy of this information. The Wells 55 database on this website is not reproduced in its entirety but is formatted for ease of use.

Every new well is required by law to be registered with the state. This information may be incomplete because well registration, while required, is voluntary. The well owner or the well driller reports all of the well information to ADWR. Wells are registered to assure that they meet minimum construction standards, are not located too close to septic systems and do not adversely impact nearby wells. Since the law went into effect in 1980, ADWR has registered more than 130,000 wells and receives between 400 and 600 applications to drill new wells each month.

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