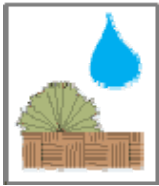




## Save Water in Five Steps

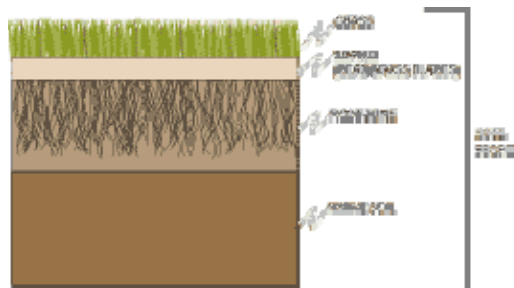
1. Proper clock / controller management.
2. Improve system performance.
3. Spray to drip irrigation conversions.
4. Redesign your landscape and install drought tolerant plants.



### Step 1 - Understanding plant / water / soil relationships.

Understanding the way water moves through, and is stored in soils is essential to understanding how a plants can access and pull that moisture up into the leaves for hydration and growth. Soil is just like a sponge. The larger the sponge, the more water is stored.

*For soils in your yard this example is best described as; “the deeper the soil profile the larger the sponge, the more moister is available for the plant roots to pull up into the leaves”.*

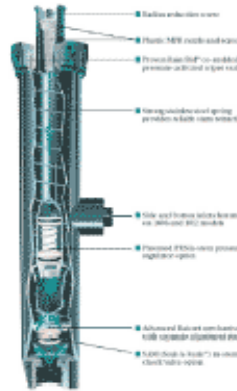


**SOIL PROFILE** - *The different layers of various soils from the surface down. For this discussion we will concentrating on the layers that concern plant growth. Those are the*

*thatch layer (this is technically not a soil layer but it is important for our discussion), the surface of the soil, and the root zone.*

## **An irrigation system is an imitation of natural rain.**

We all know that rain is a uniform application of water. It's the same amount in the front yard as it is in the back yard. A spray irrigation system, or one that uses pop-up spray heads to apply water is the most accurate way to imitate rain. We know this

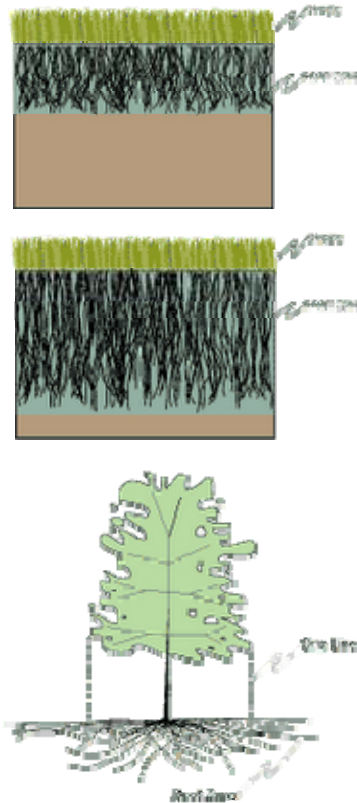


because when we were kids it was fun to play in the sprinklers because we could get wet with the sun shining to keep us warm. Playing in the rain was sometimes too cold because the sun was gone behind the clouds. This point is important due to the fact that the sun can act against us when we water by evaporating the moisture before it has a chance to enter the soil profile. We'll get into this more in step two. A spray irrigation system is the best type of system to have for plant growth because we know it imitates rain most accurately. However, it can be the most inefficient system due to the fact that the water is launched into the air as tiny droplets that can evaporate due to wind, heat, and soil conditions.

*IRRIGATION EFFICIENCY - The application of water to your landscape with minimal losses to evaporation.*

## **Plant roots are opportunistic.**

They will grow wherever they find good conditions. The basic needs of plant roots are moisture and oxygen. Plant need oxygen to grow. Oxygen from the atmosphere can penetrate soils at the upper layers of the soil profile. How deep depends on the



types of soils, textures, and other factors that are not as important as just knowing that the roots need that oxygen to grow and survive. So if your lawn is muddy or makes a squishy sound when you walk on it, it may have so much moisture that there is reduced oxygen and poor root health. Avoid over saturated soils at all times.

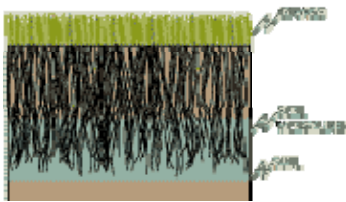
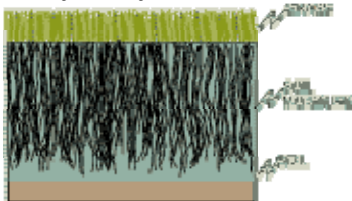
Most of the time we will be talking about lawns. Trees and shrubs are a little different because they usually have larger, deeper roots due to the fact that they are larger plants. Plant root size is in direct relation to the size of the plant. Duh! An oak tree or spruce have huge roots that go much deeper than your lawn. The point that I'm trying to make is that we don't need to give extra water to trees due to their deep tap roots that can access ground water. However, new trees need some help because their roots are still inside the container or root ball, and will not be able to provide enough water to make up for the water losses of the leaves or needles. An extra drip system is a good addition to the new trees for a few years until they can get established in the landscape. Extra irrigation for larger trees that have been in the ground for years is not needed and wasteful. Most mature trees have roots that extend twice the width of the branches of the tree. Your mature trees are probably getting moisture from the irrigation you provide to the lawn anyway. Yet, trees can benefit from a mulched area at their base. This gives them a place for moisture and nutrient up-take without having to compete with lawn grasses. This may not be the look that is pleasing to you but it's a great way to help trees to thrive. We will look at different drip systems later and how to use them for different applications and plant types later in step four.

Different soil types will absorb and hold water differently. As a rule course soils will hold less water than fine soils. We have many different soils type here in our area. You could have fine silt washed down from the mountains or pure cobble rock. Maybe you have both! New homes can have all kinds of soils types usually with a thin cap of screened topsoil applied by the landscaper during installation. I don't want to imply that you need to spend a lot of time worrying about your soil type. You just need to keep this in mind as your irrigation system runs during the season.

The courser your soil (the larger the soil particles) is, the shorter the duration between watering times. If you have very fine, deep, silty soils you may be able to go days between watering. But only if your lawn has deep roots. If you have one of those situations with poor cobble soils with a thin cap of topsoil then you will have to work a little harder to train the lawn to grow those deep roots. The trick is to run your irrigation system for a long time (maybe 30-40 mins. per zone) and then stop watering for as long as possible so the soil can dry out. That's right. I said 30-40 min per zone. Most people run a zone for about 10-15 min. and loose much of that water to evaporation. Plus they only end up watering the top few inches of soil. Where do you think the plant roots will grow if only the top few inches of soils are moist? You got it, at the surface. And that's the opposite of what we want to happen!

## Plant roots need dry cycles.

They harden off and get more durable when subjected to dry periods. Does it rain every day a dawn for 10-15 minets? If your a farmer that would be



great. The reality is that it rains for hours and then no rain for days or even weeks. Plants have evolved over time to cope with this by growing when soil moisture is high and hardening off during dry periods to wait for the next rain cycle. Remember we want to imitate mature.

There is another benefit to dry cycles. Remember that roots are opportunistic. As the soil dries it dries at the surface first and then dries down deep. The roots at the surface stop growing as that soil dries. The roots that are deeper continue to grow because the moisture in the deeper soil layers allows that growth. Roots will also

continue to grow deeper over multiple dry cycles. The result is a deeper root system. Plants don't have minds. They don't think about these things. They react to their environment in predetermined ways. It's our job to manipulate that environment to encourage those plant habits. As you can see we can encourage bad habits as well if we don't take the right steps.

In step 2 we will look at your irrigation system and how to use it to perform these procedures and best imitate natural rain with minimal losses to evaporation. The trick is to realize that we under irrigate most of the time and that you can have the confidence to apply water for over a half an hour rather than 10 minutes. For years I worked in the interior plantscape industry installing and maintaining large indoor gardens in malls, hospitals, and restaurants. When people would ask me to look at their plants and tell them what was wrong it would usually be a simple fix of watering with more water, less often. This fear of over watering is well founded. Yet, we need to overcome that fear and let plants grow the way nature intended.

*CONCLUSION - Your soils should be totally saturated without being muddy and then allowed to dry out as much as possible without wilting the plants to encourage deep root growth.*



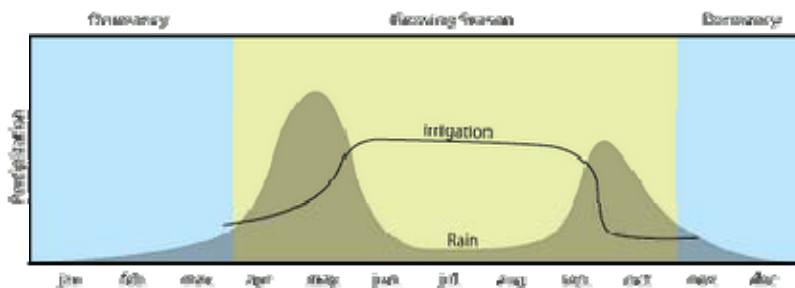
## **STEP 2 - Proper Clock / Controller Management.**

Now that we know what the roots require to grow, we need to find out how to run our irrigation systems to provide the proper moisture levels. The most important piece of your irrigation system is the clock or controller. If you have an old system it is very important to think about replacing your controller. If your system is very old then you may want to replace the heads and valve too. Or you may want to simply replace the whole thing. Ask a few different landscape or irrigation contractors for an assessment of your system to see if you need upgrades or replacement. Most systems have a life of about fifteen years.

Many people set the time on their controller in the spring and then walk away for the rest of the season. I call this the RONCO effect. 'Set It and Forget It!' This is



wrong for irrigation. Nature changes during the seasons. So should we! I tell people to change their irrigation cycles a minimum of three times a season. Here and in most parts of the country there is a spring wet period followed by a hot summer period that may have thunderstorms or may be very dry as with our region. Then there is a fall period that is cooler and in some areas wetter too. Can you see a trend? In our area the spring can be very wet. In fact you may be able to start your system and then not run it for weeks. Most of the time you will want to maintain moisture levels to allow the grass and larger plants to come out of dormancy before the hot dry summer cycle begins. A system should also be checked once a month to ensure it is working properly. We will look at this more in step three.



Irrigation controllers have reached a level of computer sophistication that allows user to design many different management programs for maintaining soil moisture. For our discussion we will focus on only a few.

Cycle and Soak method of watering - This is when you run a zone for two or more short periods instead of a long continuous cycle.

Seasonal Adjust feature on you controller - This is a feature on most computer irrigation controllers that allows you to keep the same schedule and reduce the overall amount of water being applied by a percentage. The Rainbird company has developed a wonderful set of on-line tutorials to help you learn how to use your Rainbird controller. <http://www.rainbird.com>

*IRRIGATION ZONE - Any section or portion of a irrigation system that runs at any one time.*

## **Irrigation times equal water penetration.**

Why cycle and soak? The decision to use a cycle and soak method is determined by the type soil you have in your yard and how dry the soil is at the start of a watering cycle. Runoff of water from the surface of the soil should be avoided. If your soil can only absorb a certain amount of water at a time then you may have water running off onto sidewalks or down the drain if your system is applying water faster than the soil can absorb it. Then switch to cycle and soak. Run your zone for ten minutes. then run it again for fifteen more in the same evening. This allows the soil to get charged with a little water so it will be able to absorb more later. This method is crucial for those zones where 30 or even 45 minutes of watering time are needed.

Seasonal adjust is a good feature because it allows you to change the amount of water without having to change all the times and possibly make a mistake with the controller. Use this feature sparingly. It would be better to keep the amount of water per cycle the same and lengthen the time between watering cycles.

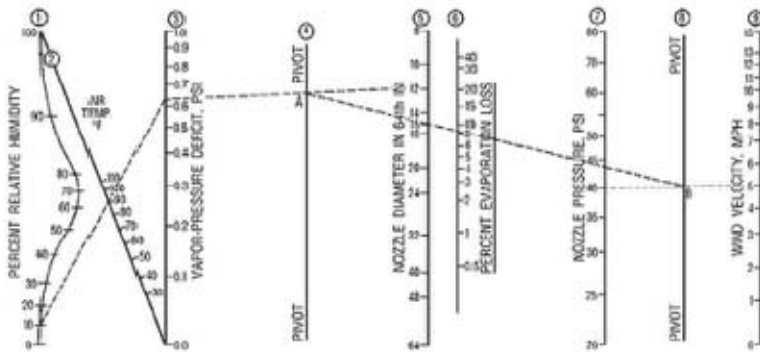
## **The soil will not change so the amount of water applied should not change. Change the duration between watering to react to the climate.**

Remember, your soils profile and its texture (whether it's coarse or fine) will not change so the amount of water that can be applied at any one time will also not change. How will you know how much water your soil can handle? That question can only be answered by setting watering times, running the system, and then physically checking the moisture levels at different soil depths. This can be done by digging a hole and feeling the soil, or using a soil probe. Using a shovel at first will help determine how deep your root zone is. There is no use in watering down a foot and a half if your root zone is only eight inches deep.

The point is that regular investigation is required to know how your soils and roots are reacting to the watering times and schedules. Don't 'Set It and Forget It!'

University research shows that up to seventy five percent of irrigation water can be lost to evaporation when running the system during hot, windy, daytime cycles. That's right 75%! **ALWAYS WATER AT NIGHT.** If your system is too large to run all the zones in one evening then split it into different nights and keep trying to get those roots to grow deeper.

Researchers use complex charts like the Irrigation Monograph below to determine evaporation rates for irrigation systems. We will avoid long academic discussions of how to use these graphs. We will look at how they show the water losses by watering in the day time as apposed to the night time. Using the Nomograph below we can determine that with our low humidity levels, and high winds that are common in the summer the amount of water losses during the day are close to 20%. However, running the irrigation at night with a reduction of wind speeds and temperatures, those losses are reduced to **UNDER 5%.**



That becomes more significant when we look at the amount of water in gallons that are used when running a system for one day or cycle.

## Lets look at an average irrigation system.

**IRRIGATION SYSTEM** - 50 spray heads using 2 ‘gallons per minute’ (GPM).  $50 \times 2 \text{ GPM} = 100 \text{ GPM}$  total system usage (in gallons). The system runs once a day for 20 minutes per zone  $100 \text{ GPM} \times 20 \text{ minutes per day} = 2000 \text{ gallons per day}$ . The system runs a total of 5 months during the Summer season.  $2000 \text{ gallons per day} \times 150 \text{ days per season} = 300,000 \text{ gallons per season}$ .

**WITH 20% OF IRRIGATION LOSSED TO EVAPORATION WHEN WATERING IN THE DAY THAT EQUALS 60,000 GALLONS OF WATER LOSSED FROM OUR AQUIFER PER SYSTEM PER YEAR!**



### **WRAP YOUR MIND AROUND THIS!**

**A swimming pool that measures 30 ft. wide by 50 ft. long with an average depth of 5 feet holds about 56,000 gallons of water. A small landscape can loose enough water to fill a swimming pool. Its important to relate loses of water to items in every day life so we can be more aware of how careful we need to be with irrigation management. The first five to ten minutes of an irrigation cycle can be stolen from the soil as the water covers and saturates the leaf blades and thatch layer. So if your watering for ten minutes your roots are getting little or no water. It's important to mention that these figures are not meant to make anyone feel bad or to expose them as part of the problem. Everyone wants to do the right thing. Yet many of us do not know where to start. The first way to start being more responsible is to be more aware. It's important to equate these facts and figures to items that the average person can understand**

*CONCLUSION - The irrigation controller is a tool to manipulate soil moisture levels in soil to grow deep roots.*



## **Step 3 - Improving System Performance**

**Improving system performance is a process of ensuring that your irrigation water is distributed evenly throughout your landscape. The technical term is Distribution Uniformity. The factors that can lead to poor performance are:**

**MAINTENANCE ISSUES - Clogged nozzles - Old, or damaged nozzles - Different types of heads on the same zone**

**DESIGN ISSUES - Underpowered system - Leaking pipes and valves. - Incorrect spacing of heads.**



How do we usually fix those nasty dry spots that occur in our lawns every summer? Add more time to the zone! That's like trying to improve gas millage by installing a larger engine in your car. As we learned earlier the depth of the roots have a lot to do with keeping our lawns healthy. The uniform application of water is another big issue. Remember, were imitating natural rain. Before the roots have a chance to grow deeper we need to be sure that all the roots are getting

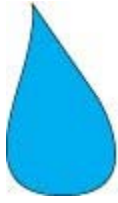


the same amount of moisture per irrigation cycle. This is one aspect of this discussion that I recommend paying for good help. Researching the kind of heads you have, selecting and buying nozzles, and installing them can be tedious and time consuming. There are many technical issues and special tools that will be needed to do the job.

## **The distinction between maintenance and design issues reflects how involved and possibly expensive the process can be.**

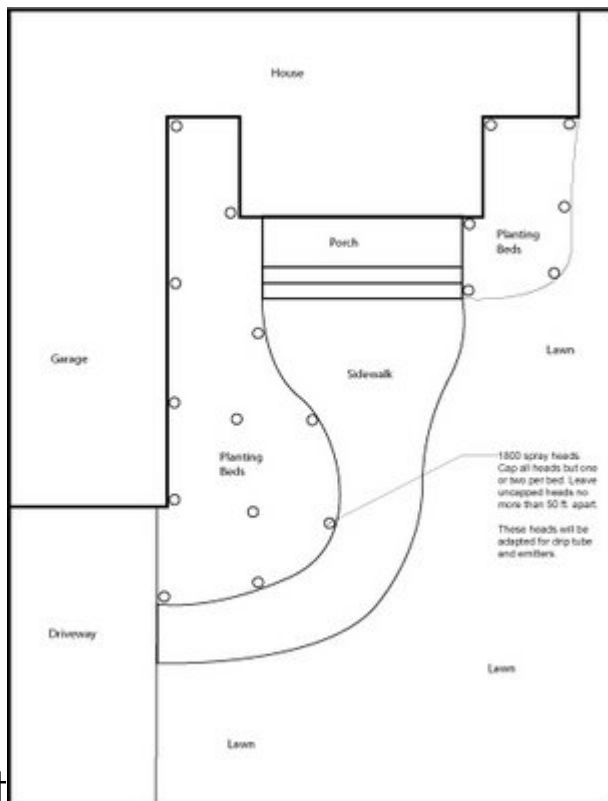
Changing nozzles can be done by the home owner with a little homework and a half day spent in the yard. The design issues may need more extensive work. Many contractors will inspect your system for free and suggest a solution. I do recommend getting at least three different companies to look at the system and compare each solution to be sure you are getting only what you need.

*CONCLUSION - Most irrigation repairs can be done easily. But don't be afraid to invest in good professional help.*



## ***Step 4 - Spray to Drip Conversions***

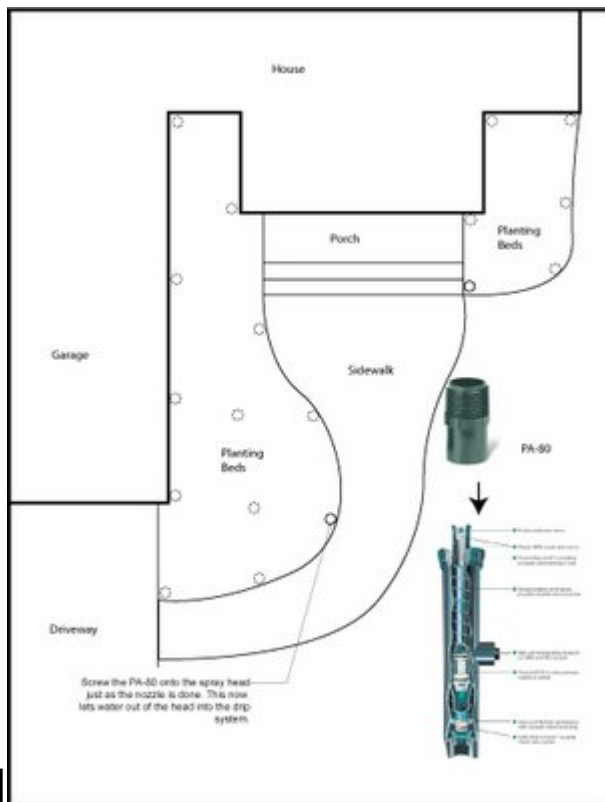
Most of this discussion has focused on lawns. Lawns grow best from overhead spray irrigation which can be the most inefficient. Trees and shrubs will grow very well with drip tube or single emitter devices. Most systems use spray heads around the foundation of the home to apply water to shrubs and flowers. Those spray zones can be converted to drip and save thousands of gallons of water. A product offered by the Rainbird company will allow you to use the existing spray heads to provide water to a drip system. We will discuss how to convert a spray zone to drips for a planting bed that has 20-30 trees and shrubs planted throughout.



**First**

Locate all the spray heads in the zone to be converted. Simply turn on the zone and mark with an irrigation flag provided at the store you buy the drip parts from. They are usually free. A small portion of the heads per zone will be converted to supply

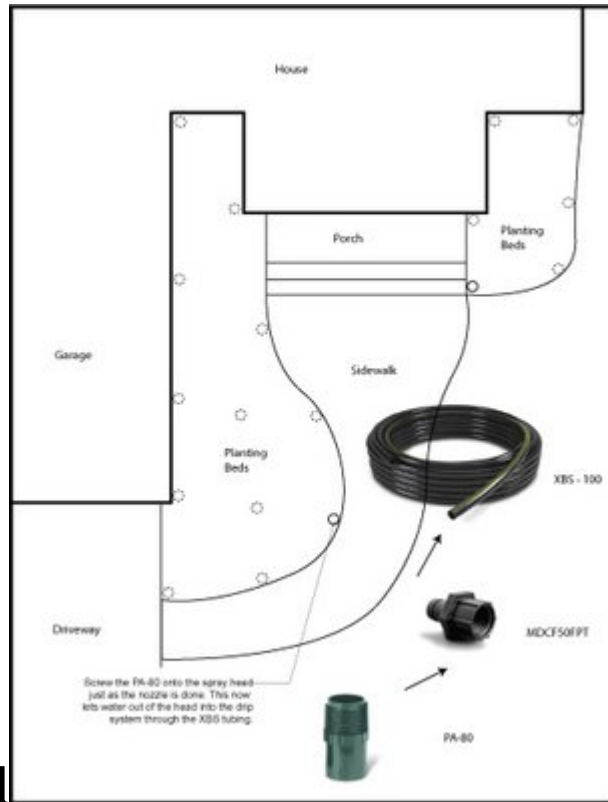
the new drip heads with water. try to keep the heads to be converted about 50 feet apart. this approach will use the existing pipes under ground in place and keep the conversion costs down.



## Second

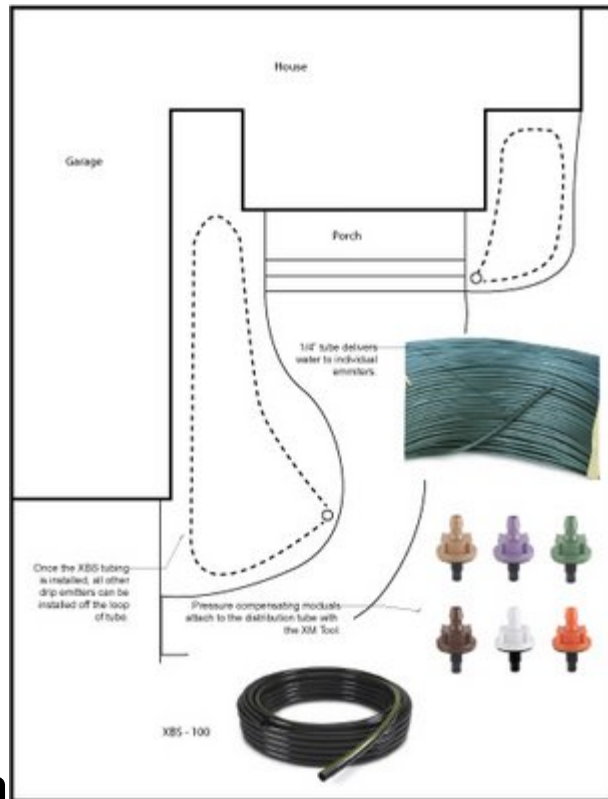
Purchase and install special nozzle caps that cap a spray head so no water can come out. this will divert the water to the heads selected in step one. Then we will install another device that will join the new drip parts with the old spray heads (pa-80). at this point the capped spray heads become no more than a part of the piping. Be sure to flush the system before you insert the new adapter to remove any dirt in the system. Obstructions can cause many problems since the holes in drip systems are so small. The pa-80 is a rainbird product that will allow a direct attachment of the 1/2 inch drip tube to the old head. in the next step we will attach the new distribution tube (xbs - 100) to the old head. in effect we are replacing the underground piping system with a smaller piping system on top of the ground. this will make the process

much easier than digging new trenches. at the end of the conversion we can lay a new layer of mulch and cover the new piping.



### Third

Before installing the PA-80 to the top of the spray heads to be used for the new drip zone, Be sure to remove the original nozzle first. Once this device is installed all other drip devices can be attached to 1/2 inch distribution tube that is attached to this device. This is the basis for the conversion. Most importantly it can be done above ground with ease. The rainbird mdcf50ft 1/2 inch adapters will allow the attachment of the new distribution tubing. the xbs - 100 is the new piping to deliver water to the individual drip devices.

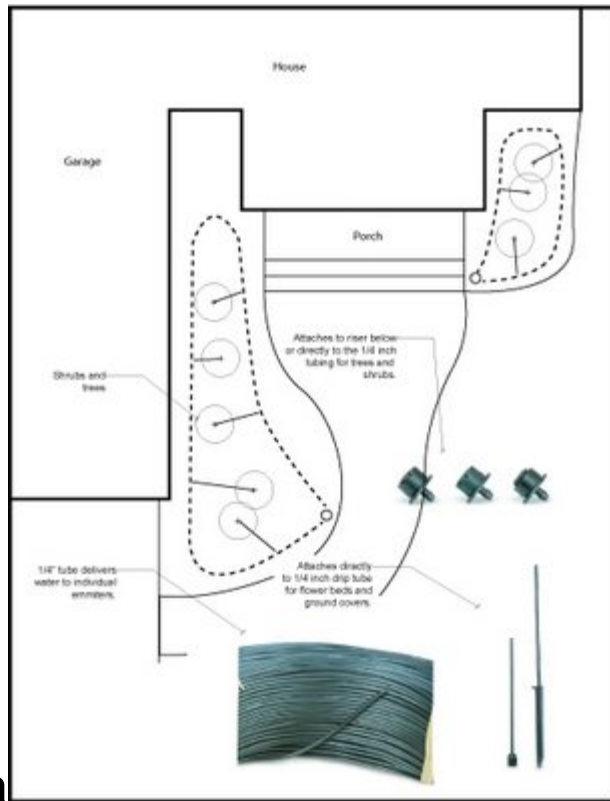


## Fourth

after using the 1/2 inch adapters to install the 1/2 inch XBS-100 distribution tube, build a loop of the tubing to further deliver water to all trees and shrubs in the planting bed.

## Fifth

attach the 'Pressure Compensating Modules' to change from the 1/2 inch XBS tube that delivers the water throughout the bed to the 1/4 inch tube that delivers the water to the specific plant(s). Most spray systems have pressures too high for drip systems requiring large, expensive pressure reducing valves. an 'in-line' pressure reducing valve is also recommended.



## Sixth

From the 1/4 inch tubing you can attach all of the different emitters. with this method the system can be expanded as new plant materials are added. of course their will be a maximum number of emitters that can be added until the zone is under - powered and all the emitters malfunction. Filtration is very important. Because of the small holes used to deliver the water even small amounts of dirt or debris will clog the emitters. When converting a spray zone to drips always install a filter at the valve. your irrigation parts store can recommend a model that works for your system and application. You may also want to bury the spray heads that supply your new drip zone deeper into the ground. Remember these are 'pop-up' spray heads so they will lift the 1/2 inch tubing up out of the ground when the pressure 'pops' them up.

*CONCLUSION - you can save thousands of gallons per month by converting spray zones to drip zones for trees and shrubs.*



## *Step 5 - Re-design Your Landscape to Install Drought Tolerant Plants.*

The fifth step requires more commitment than most but the rewards will be

spectacular. Many people believe the myth that drought tolerant or xeriscape gardens have to be sagebrush and wildflowers. Biome Design Services has pioneered the concept of 'Hybrid landscapes'. This is the combination of native, regional, and exotic plant materials in balance to reduce overall water requirements without sacrificing a traditional look.

*Native plants - Plants and trees that grow naturally in our area such as Southern and central Idaho. Example - lodgepole pine, quaking aspen. Regional plants - plants and trees that grow in the overall region or habitat like the rocky mountains. Example - Colorado Blue spruce. Exotic plants - plants and trees that do not grow in our area or region, or are dependant on man for their cultivation and survival. Example - Kentucky blue grass, annual flowers.*

## **For most people ripping out all of their plants and replanting their yard is not possible.**

But as we have seen our lawns are the largest source of water losses from our aquifer to the atmosphere. So if we change over to drip in our planting beds and convert our lawns to native and regional grasses the savings can be tremendous. For this discussion we will learn how an average homeowner can switch from standard sod lawns to native lawn grasses with minimal cost of disruption to their lives. It's important to look at how a grass seed germinates and what it needs to survive and become established. The three basic needs are listed below.

*Sunlight - As the seed germinates the first grass blade need to reach the sun to start photosynthesis to give the energy to grow those deep roots we have been speaking about in the previous steps.*

*Moisture - For obvious reasons. In the early stages of growth the seedlings first root is very small so the watering frequency needs to be very short.*

*Loose Soils - The new seedlings need soft soils to penetrate fast and establish quickly.*

Later we'll learn how to provide these parameters to a newly seeded lawn for fast growth and establishment.

What should you plant in place of sod? Our area is a good region to use grasses from the fescue family. There are many types of fescues used in landscaping and golf courses. Because of our high altitude we will focus on three types of fescue. We'll also look at Buffalo Grass too but it has limited use here because of our cold winters.

**Idaho                      Fescue                      -                      Festuca**



## **idahoensis**

A native to western United states up into Canada. It has short fine textured blades and a blue green color. This grass can handle extreme drought. I have planted this grass in native designs that I've done in the past. I watched this species go a month without water in the early summer without losing its color. In fact when the irrigation was turned on it greened up even more in a few days and looked great. It also grows slowly too. So you will need much less mowing. In fact, one of my clients mows his yard once a season. For most people a frequency of once a month would be nice. Many people think that this grass feels lumpy under foot and are hesitant to plant it as a lawn. This seed needs to be planted a double the rate for a bluegrass lawn. As the individual plants grow the bunches are so close together that the lumpiness goes away. In fact the grasses are so tight that few weeds can grow. One drawback is that this variety is not widely grown so large quantities may be hard to find. It would be good to mix this grass with others if sufficient quantities cannot be found.



## **Sheep Fescue - Festuca ovina**

A native of Europe and central Asia. This grass is very similar to Idaho Fescue in growth habit and requirements. It is also extremely drought tolerant with very slow growth. It also needs to be planted at heavier rates than normal. Yet, once it is established it will reseed if the seed heads are left on until the end of the season. I have looked into if this grass has become invasive in any other areas. It is very critical to make sure that this species will do no harm to native plants. So far I have found no evidence of this being the case. This seed is produced in much larger quantities so it would be easier to purchase. Its benefits of water conservation and reduced mowing would make it a great addition to a hybrid landscape.



## **Creeping Red Fescue - Festuca**

**rubra** There are many different varieties of red fescue on the market. It has been used in traditional seed mixes for its ability to grow in shade. It is not quite as drought tolerant as the previous grasses it can be a good choice for shaded areas and its creeping habit will help the other fescues to form a thick sod. This grass is used in many low maintenance seed mixes on berms in our area.



## **Buffalograss - Buchloe**

**dactyloides** As the name suggests this grass was discovered in the plains states and has evolved with the bison here in the United States. It has excellent drought tolerance and a growth habit that creates a thick sod. Its big drawback is that it will go brown in the fall and stay brown until Spring. Most of our area is pretty cold so this grass would be hard to get established. I would recommend using south of Hailey. However, there is a lawn of Buffalograss in the Heatherlands north of Ketchum. It can be done but with some extra effort. Most of the native lawns in my portfolio use mostly Sheep Fescue due to the availability and cost. I have found that it fills in quickly and forms a good sod when established properly. In the next sections we'll go over how you can convert your lawn with a weekend of work, a rental tiller, seed, and fertilizer.

**Converting your lawn is easier than you think.**

## **It doesn't require removal of large trucks of old sod or importing of new soil.**

**This method will give the new seed the three requirements we discussed earlier in the step. Killing the old lawn, tilling the soil, and planting and establishing the new seed are the basic steps to this process. *The goal is to do this without hauling materials to the dump and adding to our waste burden.* In our area hydroseeding is the preferred method of applying seed to lawn and natural grass areas. Lets look at hydroseeding and how it works. We will find that we can recreate those aspects of hydroseed with the existing**



APPLYING HYDROSEED



HYDROMULCH

**lawn in our yards.**

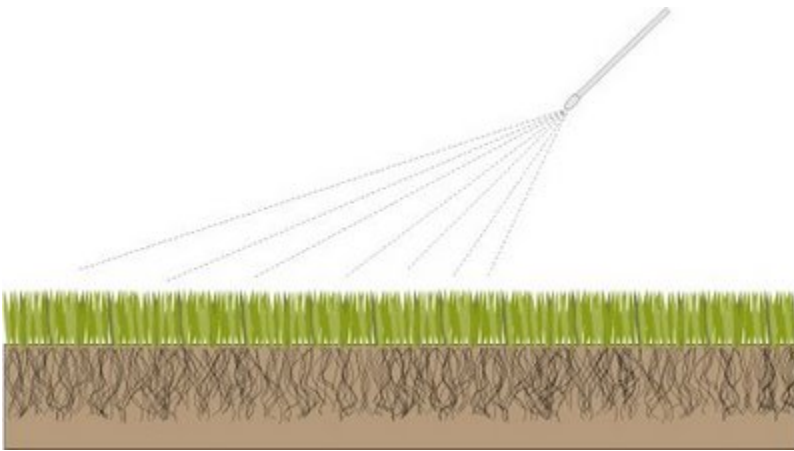
**Hydroseed is the process of spraying a mixture of seed, fertilizer, and a paper product called hydromulch that has been processed to look and feel like a loose fiber. Those ingredients are mixed in a special machine that shoots them out of a hose on to the ground. What this does is give the seedlings when they germinate an environment that has enough moisture to enable the seedlings roots to penetrate the soil. As we learned earlier seedling need three things: sunlight, moisture, and loose soils. Hydroseeding provides these needs with the hydromulch. It holds water for the new roots. It is very loose and will allow the new grass blades and roots to reach the sun and soil under the hydroseed mixture. It is still crucial to loosen the soil under the new hydroseed so the grass can send roots deep into the soil. Remember step two? We can imitate these aspects of hydroseed with the materials on hand if we want to do the whole job ourselves. Yet, if you want to apply hydroseed you can. Just be sure to till the old dead grass into the soil completely. Applying hydroseed on top of old lawn will create an air layer**

that will cause the new seedling to die and will not produce the lawn we want. We'll look more into this later.

## Now let's learn the steps to lawn conversion.

### STEP ONE - Termination

Apply a herbicide to the existing lawn to kill the grass and make way for the new lawn. Killing the old grass is crucial because the old grass blades will shade the ground and keep the new grass blades from reaching the sun. You can do this yourself or hire a professional service to perform this step.



### STEP TWO - Incorporation

After the old grass is dead use a rototiller to till the dead grasses into the top 4" of soil so the new seedlings can reach the soil quickly. *CAUTION! BE SURE NOT TO TILL TOO DEEP. YOU WILL CUT YOUR IRRIGATION LINES. ALL WE NEED IS TO MAKE SURE THE OLD GRASS IS MIXED WITH THE EXISTING SOIL.* In step two you can proceed two directions. If you would like to have your new lawn hydroseeded then the rototiller is



required. If you want to do the entire job yourself then leave the dead grass in place. The dead grass blades will provide similar benefits as the

hydromulch. Spread the new grass seed by hand or with a fertilizer spreader. I recommend using a spreader for a more uniform look. Seed to soil contact is the most important thing to achieve when applying seed. When the seed is laid down there must be some kind of action to get the individual seeds down into the old dead grass and in contact with the soil. This can be done with a leaf rake or by dragging a 4' by 4' section of chain link fence. I recommend the rototiller and the hydroseed but this method will work with good results.

## **Seed to soil contact is the most important thing to achieve when applying seed.**

### **STEP THREE - Seeding**

Seeding rates are important when using these bunch grasses. At lower rates the bunches can create a bumpy feel when walking on the lawn. Traditional seed is applied at a rate of 4 lbs per 1000 square feet. These grasses should be applied at 8 lbs per 1000 square feet. Once the seed is applied the irrigation becomes very important. For most situations it is necessary to run the irrigation lawn zones up to three to five times a day. The reason is that in our climate the top half inch of soil will dry out in a matter of hours. If the seedling's first root is only a quarter of an inch long we need to keep that half inch of soil or hydromulch wet at all times. Below is a typical irrigation schedule for newly applied seed.

*5:00 am 15 minutes - This gets the area moist for the upcoming day.*

*10:00 am 15 minutes - this cycle can be eliminated first as the grass grows.*

*2:00 pm 20 minutes - the longer run time is due to the higher temps and higher wind. This cycle should be kept the longest due to the extreme stress at this time of day.*

*7:00 pm 15 minutes - This is to charge the soils with moisture for the evening. It can be second cycle to be eliminated as the grass becomes established.*

The trick is to closely monitor the grasses as they grow to see how deep the roots are penetrating. Then changes to the irrigation can be made. The deeper the roots the less water we need to apply. This process may take a month or more. We want to slowly wean the lawn off the constant watering to encourage deep root growth that we learned in earlier steps. Fertilization is also important. In the first growing season

a heavy fertilization program will cause the grasses to grow in quickly and reduce weed infestation. It will also help the grasses grow roots faster and enable you to reduce the irrigation faster. When choosing a fertilizer look for one with a balanced ratio of nutrients. You can find the ratio as three numbers located on the bag. Use one application when the seed is applied, and one about two months later. After the first growing season additional fertilizer will be less important. Once the grass is established and had formed a thick sod, it will naturally keep out most



weeds.

*CONCLUSION - It's important to keep in mind that water conservation and reducing green house gasses is a commitment that requires us to think outside the box. It also requires us to look at the big picture. For instance we will use a grass species from another region in order to save water. As our area becomes more developed and we have to share dwindling resources, it is important to change our mindsets and seek out ways to save our resources.*