ACSP Water Conservation

Making water conservation an everyday practice

BY TOM BENEFIELD, CGCS

Every living organism, plant and animal is wholly-dependent on water. No other aspect of daily survival of life is as important as the need for this precious resource.

One needs only to look at the bleak conditions of drought-ravaged parts of the globe to understand the unique interwoven relationship between water, life and death.

It is through this knowledge that we gain an appreciation for the concept of water conservation. Our country has become the advanced civilization we call home because of our abundant fresh water supply and our ability to use it. If our country is to continue prospering, it will be because we have learned to develop and wisely use this resource many take for granted.

Water conservation means using water wisely.

Even in places like South Florida, home to one of the world's greatest wetlands, we find a pressing need to utilize and develop an attitude of conservation. With the recent deluges of Tropical Storm Gordon and the closing of golf courses being for prolonged periods of time due to inundation of rain, it is difficult to maintain focus on the conservation message.

However, one only needs to look back a few short years to the droughts of 1989, 1990 and 1991 to see that from a historical perspective, what we are now experiencing will be viewed as a brief moment in time. With the addition of a thousand people a day to this state, using 400 gallons per day, we will need an additional one and a half billion gallons of water per day just for the newcomers.

One day soon, we will again be living on the edge of available water resources. Couple this with a direct correlation of less available water recharge and collection basins acreage and you can understand the need for starting now to prepare for tomorrow.

With society's increased need for top-grade drinking water comes the realization that some water usage of our culture will be forced to adjust. Along with this

ACSP: Part IV

In Part 4 of this series on the Audubon Cooperative Sanctuary Program for Golf Curses, ideas for fulfilling the *Water Conservation* category are presented.

- ✓ Environmental Planning
- ✓ Member/Public Involvement
- ✓ Wildlife & Habitat Management
- ✓ **Water Conservation**
- ❑ Water Quality Management
- ❑ Integrated Pest Management

adjustment will also be large-scale acceptance and usage of reclaimed waste water. The goal is to save high-quality ground water resources for usage by the masses.

What this leads to is a shrinking of the water resource pie we currently use for irrigation. When the pie shrinks, we must turn inward to cope and deal with the problems encountered by managing turf under different attitudes.

Most of us practice some aspect of conservation on a daily basis. The use of computerized irrigation systems, utilizing weather stations, installing moisture sensors or automatic pump shutdown switches in the event of significant rainfall are all excellent examples of water conservation.

Each and every day that we make an analysis of the golf course to determine the irrigation needs, we are not only practicing sound turf management principals, but subconsciously we are also applying conservation measures.

We know conservation will be a major part of golf course life in the coming years. Our goal at this point should be to work diligently with the water agencies to position our industry at a sustainable degree of certainty for tomorrow.

Irrigation Practices

Irrigation weather station monitors conditions and adjusts run times.

Water Conservation and healthy turf are compatible

BY MATT TAYLOR

Assistant Golf Course Superintendent
Collier's Reserve Country Club

At Collier's Reserve, water conservation is a top priority. Beginning with the irrigation system design, selecting the best equipment available, and controlling water frequency, we are intent on maximum efficiency and minimum energy use and maintenance, as well as optimum water conservation.

Incorporating sound Integrated Plant Management (IPM) and agronomic practices, we keep a healthy turf, which translates into water conservation.

Irrigation System Design Golf Course and Common Grounds

The irrigation system at Collier's Reserve is a state-of-the-art, computerized prescription irrigation program and is controlled through a weather station.

Run times are calculated daily by theweather station which monitors and compares evapotranspiration (ET) rates and automatically sets each head's run time for that day. The computer program allows each head on the golf course to be manuallyfine tuned for irrigation cycles if adjustments are needed for wetor dry areas on the course, and delivers only the amount of waterneeded, where it's

needed. This keeps the turf healthier and results in water and energy conservation.

The system is a low-volume water delivery system. Its reduced water pressure cuts down on wind drift, misting and possible irrigation line breaks. Sprinkler heads throughout the course were individually staked to insure maximum coverage while avoiding throwing water into native plant areas, pine tree beds, preserves and lakes. Part- and half-circle heads throw irrigation water from the outside of the roughs to the inside of the fairways.

Historically, fairway irrigation designs would place heads in the middle of the fairways with water patterns throwing to the outside. The initial cost of a system like Collier's Reserve's is greater in design and construction, but the finished product produces exact coverage on the target turf areas.

At Collier's, we added 250 irrigation heads to the original design, at an approximate additional cost of $120,000. However, we will realize a 20% reduction in water and energy costs which will reap tangible and intangible benefits.

Projected pumping costs for both pumpstations combined, in 1995, is approximately $16,000. Off-peak pumping contributes to this low figure.

Greens and tees

Greens heads are individually set and controlled which allows heads to irrigate in varying amounts, depending on slopes or low areas onthe greens. All heads are half-circles, or adjustable, and irrigate only the greens. This is a benefit because you do not irrigate greens' slopes or approaches when watering-in a product or during the normal irrigation cycle.

The tee complexes are designed to support native grasses on three sides of the tee slopes and turfgrass on the fourth side. Cost savings are realized in maintenance and water because the native grasses do not require irrigation or hand labor — except to pull the few weeds which emerge through the tight canopy of native grasses.

Irrigation heads on the tee tops are more site specific and smaller because they do not irrigate large areas, such as tee slopes, which require larger heads. Again, we realize water and energy savings.

Equipment – Pumps

The highest quality premium efficiency pump motor with variable frequency drive (VFD) was selected to run the irrigation system. The pumps are 2% more efficient than any other pump available at that time. Because the property is separated by the Cocohatchee River, two pump houses were built; one on each side of the river.

Twin, premium-efficiency motors, driven by VFD's were installed in each pump house.

The VFD's expend only the energy required to meet the demands of the pumps. For example; if only 40 GPM (gallons per minute) is demanded, the VFD supplies only the energy needed to provide 40 GPM. We have already seen reduced costs due to energysavings from efficient irrigation pumps.

Irrigation Frequency

During most of the year, we water every other day, except greens. If weather conditions are favorable (i.e. rain, cool weather) we may skip several irrigation cycles. There is no set schedule for watering greens. Greens are checked daily by the Integrated Plant Management (IPM) Specialist, the Cup Cutter, and myself. We check moisture, root structure, etc. When watering is done on the greens, we water deeply enough to wet the entire root zone. We also monitor and hand water any "hot spots" on the greens on a daily basis. Our goal is to have 100 non-irrigation days per year at Collier's Reserve.

Other Irrigation

Newly-planted trees and native vegetation on the golf course and common grounds have low volume drip irrigation which will be removed when the new plantings are fully established.

IPM and cultural practices

At Collier's Reserve, we follow specific Integrated Plant Management (IPM) guidelines. Coupled with sound agronomic practices, we strive to produce the healthiest turf possible. A strong healthy turf will by itself greatly conserve water.

By controlling weeds, pests, disease, and using the proper fertility levels, you increase the turf's vigor.

We control the cart traffic which helps eliminate turf compaction on the fairways and roughs. When compaction does occur, aerification of the turf helps restore it. We have a testing program schedule for soil, grass tissue and our irrigation pond water quality.

Acid injection helps control high water pH and bicarbonate levels and can increase the efficiency of our irrigation water.

Water conservation must start with the pump stations and be carried through by checking every sprinkler head to ensure a properly working system.

Past routines of watering every other night or sometimes every night to keep the golf course green "wall to wall" have been reevaluated. We may let the turf go unwatered one more night if it appears to be on the border of needing water; thus begins true water conservation.

You not only conserve water, energy and wear and tear on your irrigation system, but will strengthen the root systems on the turfgrass plants.

Caution: Ifyou let the soil become hydrophobic, you will need excessive water to restore proper or desired soil moisture levels.

Summary

Not only is it wise to have a state-of-the-art irrigation system with the hardware and software to support it, it must be a well-managed and maintained system. Understanding the philosophy of IPM and water conservation principals are essential for a successfulwater conservation program.

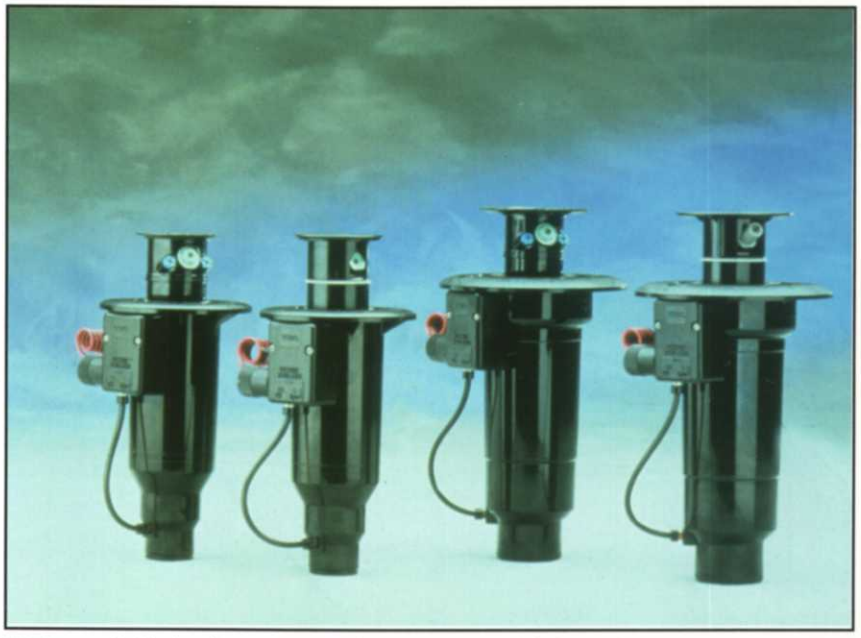
Although a state-of-the-art irrigation system may initially cost more, with the proper management, these extra costs will eventually be recovered. Combining a modern, well-designed irrigation system, and using sound IPM and agronomic practices, you can be assured of a successful water conservation program for your golf course.

Irrigation equipment and sound water management practices

BY SCOTT MORGAN
Marketing Manager, Golf, TORO

The golf course superintendent's responsibility is to use the least amount of water necessary to fulfill customer's minimum playability and aesthetic expectations, staying within budget and regulatory guidelines.

Golf course irrigation equipment manufacturers are tasked with supplying tools to help the superintendent satisfy this challenging responsibility. Irrigation equipment manufacturers strive to fulfill this commitment every day. Their focus may not be aimed directly at water conservation. Instead, manufacturers promote responsible water application indirectly through product development that is sensitive to the golf course superintendent's role.



Modern sprinkler heads can conserve from 25 to 50% of their previous usage.

Manufacturers perceive that golf course superintendents employ sound water management practices and superintendents have always wanted irrigation equipment manufacturers to support these intentions with appropriate products and services.

Simply stated, sound irrigation management is the application of the correct amount of water when and where it is needed.

What is the correct amount of water? The current standard in the industry is evapotranspiration (ET). ET is an agronomic measure of a plant's need for water due to evaporation and the plant's own transpiration. Irrigation equipment manufacturers have developed central control systems based entirely on ET.

These systems calculate the projected water need of plant materials on a golf course based on ET, rainfall, plant type, soil types, soil compaction, terrain slope, geographic location and pH factor.

When do you apply the correct amount of water? We all know golf courses have very specific times when water can be applied. Generally, manual watering and syringing are the only daytime irrigation activities on a golf course.

The summer irrigation window for a typical golf course is eight to ten hours, which seems ample. However, if there are 1,200 sprinkler heads on a golf course with average sprinkler precipitation rates of approximately .7 inches per hour, average water demands of 40 gallons per minute per sprinkler, an ET replacement target of .21 inches per day, and a targeted water usage from the pump station of 1500 gallons per minute, the absolute best you can do is a 10-hour watering window.

Because of these limitations, irrigation equipment manufacturers have loaded features into their control systems to support complex irrigation schedules.

Where do you apply the correct amount of water? Thirty years ago, certain manufacturers perceived that their customers wished to individually control each sprinkler head on their golf course. The valve-in-head sprinkler was created to allow the superintendent to manage every point of irrigation application.

Combined with control innovations such as solid-state field controllers and personal computer-driven central controllers,

With continued focus on water distribution, dramatic percentage decreases will continue to occur

valve-in-head sprinklers offer the most precise water applicator feasible at this time.

We may conclude that valve-in-head sprinklers, sophisticated scheduling features and ET-based central controllers are adequate tools to support sound water management. However, irrigation manufacturers feel there is ample room for technological innovation and improvement.

First and foremost, irrigation manufacturers understand that their products need to be easy to install. Sound water management cannot be supported by the latest technologies if those technologies are problematic to install. Irrigation manufacturers will continue to invest in radio technology, which eases installation problems and hastens system upgrades.

In fact, some manufacturers will search out or intensify strategic alliances with companies that already supply state-of-the-art radio solutions to other industries.

Second, even with a sophisticated central control system, sprinkler heads need to apply water evenly, causing manufacturers to continually improve water distribution. Assuming that a control system supplies adequate tools for sound irrigation practices, the most important component of an irrigation system is the sprinkler head.

For example, some manufacturers can now produce sprinklers with scheduling coefficients (the application rate multiplier used to insure that the area of a sprinkler's pattern that gets the least amount of water is sufficient to replace water consumed by ET) of 1.2. Scheduling coefficients of sprinklers have improved from an industry norm of 2.0 - 2.5 to a current industry norm of 1.3 - 1.5.

That means that golf courses that employ the latest sprinkler technology automatically conserve at least 25% (and up to 50%) of their previous water usage and reduce waste by 50%.

With continued focus on water distribution, dramatic percentage decreases will continue to occur.

Finally, central irrigation system software needs must be intuitive to the system user or the system will not fulfill its potential. Irrigation equipment manufacturers do not have intrinsic expertise in software development.

However, they do understand that superintendents have very specific control needs. The challenge before irrigation manufacturers today is to translate control needs into more understandable central software systems. New developments in central software will continue the progression toward a more consistent and intuitive user interface.

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Recycled Water

Treated Effluent as an Irrigation Source

BY RON ANDREWS
Grand Harbor

Whether you are gearing up an irrigation system for a new golf course, trying to find another water source, or simply up for renewal on your consumptive use permits, it is likely that the subject of effluent irrigation will arise.

Treated sewage effluent, or reuse water as it is commonly known, is becoming available on a much wider scale than it has been in the past. Sewage plant operators are coming under much greater pressure to dispose of effluent water in the most environmentally appropriate manner.

Direct discharge to state bodies of water, long a common practice, is no longer a preferred choice. Plant operators are also finding mounting pressure on deep well injection disposal systems. Both of these methods have had the sling and arrows of pollution watch guards launched at them.

The two modern alternative disposal methods that are receiving the most attention are reuse as an irrigation source and the recharging of systems of artificially created wetlands linked to state water bodies.

Each of these methods has its advantages and both are likely to impact golf courses. For new golf course developments with home sites, this pressure to find better disposal methods will cause plant operators to force these communities to take back the treated effluent that is generated from the sewer tie-ins. This is one of the reasons Grand Harbor uses effluent water.

As more pressure comes on plant operators to dispose of treated effluent through irrigation re-use, they are naturally going to look to all properties with large consumptive uses. To many this means golf courses. Never mind that golf courses don't use the quantity of water that many people think they do.

Also, do not expect plant operators to market their water as something that they need to dispose of. No, more likely it is now a valuable resource for which you should be willing to pay. Perhaps it is, but there are a lot of complicated issues when it comes to irrigating with effluent.

The intent of this article is to discuss these issues from the point of view of a golf course operation that has used effluent for several years.

The first thing you need to consider is what your water sources are now. Your are a much better candidate for effluent irrigation if you are using a non-renewable or a potable water source as part of your irrigation programs. At Grand Harbor, the bulk of our irrigation water comes from a system of storm water treatment lakes and wetlands.

Such a system is already a highly efficient re-use strategy that

carries the side benefit of providing a diverse habitat for many different species. However occasionally, we will enter a drought that is significant enough to lower our lake levels and impact our ability to irrigate from this source.

This is where effluent irrigation is most important. Without this resource, we would be forced to turn to our Floridan aquifer wells much sooner and more often. This is a second reason why during the permitting of Grand Harbor we were required to accept treated effluent.

However, most of the time, the storm water lake system has plenty of water and meets our needs nicely. Clearly, effluent would be a more valuable resource to a golf course that did not have such a strong first line source.

The quality of the effluent source available to you is also going to be important.

Talk to the plant manager. He or she will have a good idea who is contributing to their input stream and what level of treatment the plant is providing. Most plant managers can provide a good lab report on the irrigation suitability of the effluent leaving their plant. Failing that, obtain a sample and pay for an irrigation suitability analysis.

Test your other water sources while you are at it. For us, this process did a lot to dispel many of the myths of poor quality effluent water. The effluent we receive has a more desirable pH (6.4 - 6.9), lower total salts, lower sodium and bicarbonate than either of our other water sources.

The total nitrogen level is usually very near 10 ppm, which is 2.5 times higher than our storm water lakes. Phosphorus (p not P O) levels are 4 - 6 ppm, or 30 times the level of our storm water lakes. These differences are contributory to a fertilizer program. However, it takes 16 inches of irrigation (0.04 inches/day) to provide 1/2 lb. N/1000 sq. ft. The same quantity of irrigation with effluent would provide 1/3 of a lb. per 1000 sq. ft. more than what irrigation with our storm water would provide.

These are not exactly fertigation levels, but they are significant, especially for the phosphorus. Minor elements are in a suitable range, but zinc (0.5 ppm) and boron (0.3 - 0.4 ppm) levels are somewhat elevated. We have removed zinc and boron as much as possible from our fertilizer sources and have not seen any build-up to date.

People are concerned about where you are putting this water. We do not use it for clubhouse irrigation.

From behind Grand Harbor #7. Lined and walled effluent receiving lake to the right. Percolation pond in use of the left.

In short, we have not found quality to be a problem. It would be remiss of me to not at least mention the perception issues. People are concerned about where you are putting this water. We do not use it for clubhouse irrigation. Minimize over-spray to adjacent properties.

The treatment levels provided by most plants will kill the majority of potentially harmful bacteria or viruses that may be present. However, when this water leaves the plant, it looks potable, so you will need to provide warning signs.

If you are still considering effluent for irrigation purposes on your property, you now have to work out the storage problem. Most of us will not be lucky enough to have effluent delivered to us in a pressurized main that we can tap on demand.

In Florida, it may be possible to obtain a DER permit to store this water in on-site unlined lakes, as long as these lakes are used for irrigation. We elected not to pursue this route for a couple of reasons.

First, our concern was that a certain amount of water would leach away through the lake bottoms, especially during drought periods. Second, we were concerned that the nutrient levels of the effluent, when added to our lakes, would give us greater difficulty with water quality and appearance issues in our freshwater lakes. Instead, we built a 2-acre lined lake that can fluctuate 6 ft. in level.

Adjacent to this lake, we constructed 1.5 acres of cleverly disguised percolation ponds to add to our storage and to increase our ability to dispose of excess effluent during rainy periods.

It was necessary to add aeration equipment to the storage lake to eliminate algae problems in the water. When we do not receive enough treated effluent, we have a high volume transfer pump that moves water from the storm water lakes to the lined lake. This adds about 8% to our cost of pumping this portion of our irrigation.

It the treated effluent is not available in sufficient quantity and the storm water lakes are getting too low, then we can free flow artesian water from the Floridan aquifer into this same lined lake. We have gained the significant advantage that we will not be leaching this well water away through the bottom of an unlined lake.????

This storage strategy has worked well for us and has helped deal with the reality that we have to receive effluent every day, whether we need it or not.

In fact, in Florida at least, I would say

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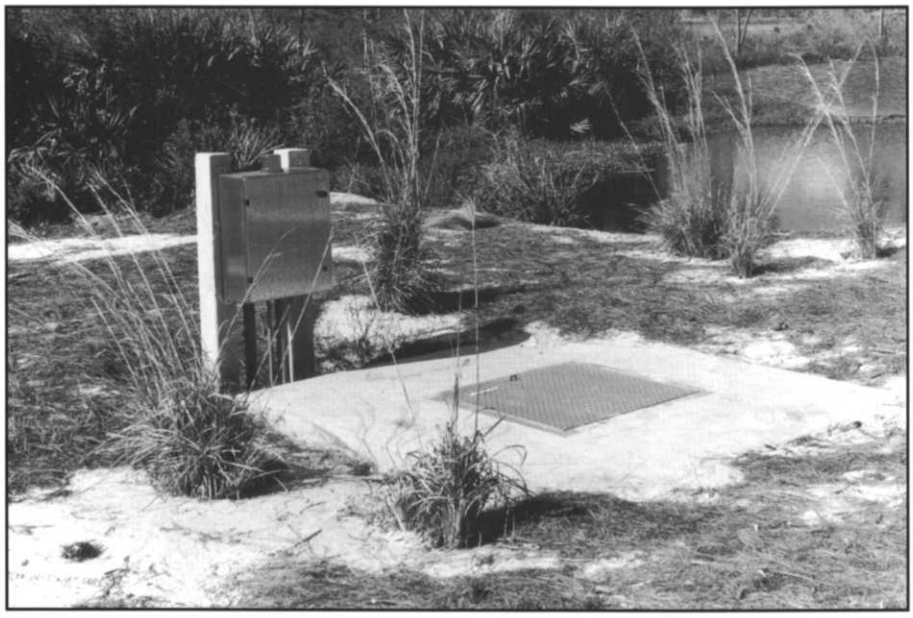
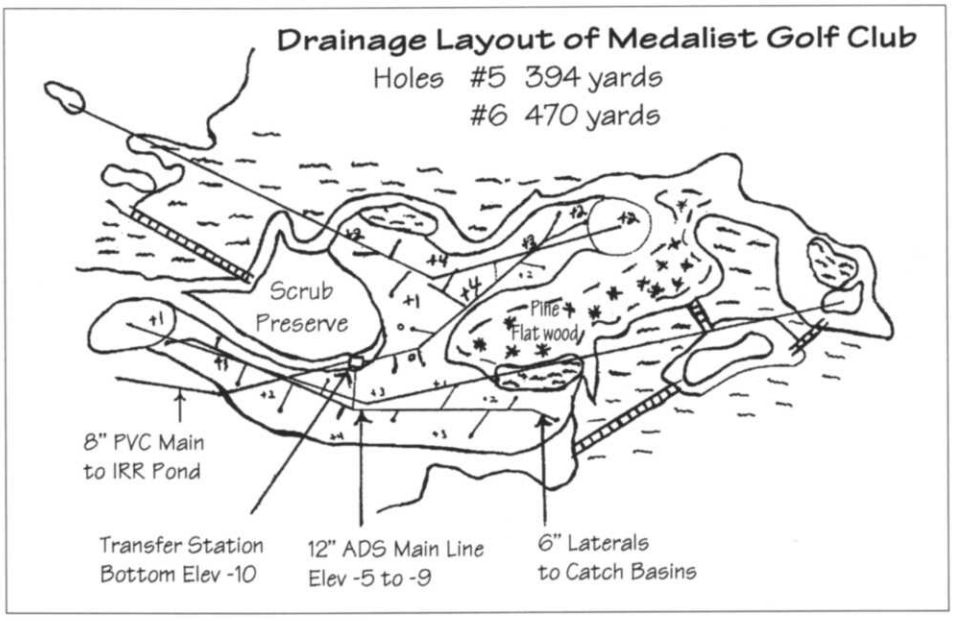
Water Recapture and Re-use



#18 Medalist Golf Cub. One of 11 lift stations.

Below, a diagram of drainage plan for holes 5 and 6 at the Medalist Club.



It has been estimated that we've been recycling somewhere in the neighborhood of 200,000 to 300,000 gallons per watering cycle during grow-in.

BY JASON MCCOY
AND DANNY FORE

Jason McCoy is Project Manager and Danny Fore is Golf Course Superintendent at the Medalist Golf Club in Hobe Sound

The drainage system at the Medalist Golf Club in Hobe Sound, Florida, is one of the most elaborate efforts yet by Architect, Pete Dye. The system has evolved since its inception at Old Marsh Golf Club in Palm Beach County.

The system at the Medalist Club is a complete recycling of excess water in all grassed areas. The system contains 11 transfer stations strategically placed through the golf course. Each system consists of a 10-foot deep concrete vault with a 10 HP ABS submersible pump on a slide rail which is capable of 1500 GPM.

There are electronic float switches which operate the system on and off. Each system has a double check valve which in turn lets us connect each together with an 8" PVC main discharge line which flows to the 30 mil VLDPE lined irrigation holding pond.

It has been estimated that we've been recycling somewhere in the neighborhood of 200,000 to 300,000 gallons per watering cycle during grow-in.

Each system is fed by a 12" N-12 ADS pipe-line with laterals to each basin in the turf. The irrigation system is also a vital entity to our drainage system. We have installed a Maxi V system with the new Eagle heads.

We have installed all part circle heads on fairways to keep any drift from getting into wetlands or upland buffers. With this type of irrigation heads, we feel we'll be able to retrieve as much as possible through our system.

Effluent —

from Page 44

this is the most significant problem with using treated effluent for irrigation. We are relatively lucky in that we receive only slightly more treated effluent in the winter than we do the rest of the year.

Despite this, we still receive more water than we need for irrigation in the winter and less than we need in the hot dry months. We also receive too much during the rainy season.

Our ability to store a lot of water helps us match supply and demand and the percolation areas we built help even more. We linked the two golf course irrigation mainlines and this gives us more demand, and therefore better balance during these difficult periods.

Lately, we have added spray disposal areas that we can irrigate without impacting playability. Still, it is sometimes a challenge to use all they send. Our initial costs were quite high.

We paid for the construction of the lined lake, the transfer lines from the plant, and the pump to pump the water to the property.

In exchange, we were to receive the water free for a period of time, with a negotiation process to determine a fair price set at a future date.

The reality is; everybody's deal is different. That's the way life works.

Educate yourself about the issues and negotiate as strongly as your position will allow.

Your course will probably have to sign an agreement that will dictate that you must take a certain quantity daily. Keep that number small and your storage large. Despite the difficulties of using treated effluent as an irrigation source, we are happy to have it during drought years.

This year has been challenging though, as we have received 66 million gallons of effluent in the first 10 months, and it has been a very rainy year.

During September, October and November, we were blessed with over 30 inches of rainfall. Still, the difficulties have been manageable and are offset by the relatively high quality of the water and the less restrictive covenants about how and when you can use it.

Maybe it will be drier next year.

Stop wasting water by pouring it down the drain

BY SHELLY FOY

Have you ever thought about how much water you use daily just on flushing toilets, washing your hands, and taking a shower? Each time your toilet is flushed, you use 5 to 7 gallons of water, and the normal faucet flow is 3 to 5 gallons of water per minute (gpm).

The average flow rate for showerheads is 6.5 gpm, meaning a 10 minute shower would use 65 gallons of water. Did you know that a leaking toilet can use 50 - 100 gallons of water per day?

If your faucet is dripping at the rate of one drop per second, you can waste 2,700 gallons of water per year.

The National Energy Policy Act, signed by the President in 1992, addresses water conservation through fixture requirements. As of January 1, 1994, all manufacturers are required to meet the criteria listed below (*See table*).

What can you do to save water if you have old fixtures, manufactured before January 1, 1994?

- **Place a plastic bottle** in your toilet tank (dishwashing soap, juice bottles, soda bottle, etc..) Take the label off, fill with water, put the cap on and place in the tank. You can put a few stones in the bottle to weight it down. You may need to experiment with bottle size. SAVINGS: 1-2 gallons per flush.
- **Put a displacement bag** in your tank. They're available free from some utilities or relatively inexpensive to buy at a hardware or plumbing store. Fill the bag with water and place it in the tank. SAVINGS: 1-2 gallons per flush.
- **Toilet Dams are plastic barriers** that isolate part of your tank so that the water in that section doesn't run out when you flush. Each dam can hold one gallon of water, and you can use 2 in a tank. They are also available at hardware and plumbing stores. SAVINGS: 1 gallon per flush.

By using any of these conservation methods, you can save 8-16 gallons of water per day, based on the average 8 flushes a day. Those numbers may not sound that impressive, but if you think about 56-112 gallons a week, or 2,900 -5,800 gallons a year, that's a pretty significant water savings.

And on a golf course, you can believe that your toilets are flushed more than 8 times a day. If 10,000 people were to try one of these water conservation tips, we could save 29 to 58 million gallons of water a year! Now, that's impressive.

For your older faucets which use 3-5 gallons of water per minute, you can reduce this by 50% if you attach a low-flow faucet aerator.

The aerator mixes air into the water that leaves the tap, so it may look like you're using more water, not less. Ask the hardware or plumbing stores about these aerators or other water saving devices they may have for faucets. ➥

Fixture	National Energy Act	Prior Florida Law *1	Most Existing Fixtures *2
Tank-type toilets	1.6 G/Flush	3.5 G/Flush	6.0 G/Flush
Urinals	1.0 G/Flush	N/A	2.o G/Flush
Showerheads	2.5 GPM	3.0 GPM	6.5 GPM
Lavatory Faucets	2.0 GPM	3.0 GPM	5.0 GPM

*1 Chapter 553 Florida Statutes

*2 Maddaus, Water Conservation, AWWA, 1987

Below are several water saving tips from the Water Management Districts:

- **Never put water down** the drain when there may be another use for it.
- **Verify that your faucets** are leak free by reading your water meter before and after a 2 hour period when no water is being used.
- **Check for toilet leaks** by adding food coloring to the tank. If you have a leak, color will appear within 30 minutes. Don't leave the food coloring in to stain your tank however.
- **Want to get rid of a dead bug** or a used tissue? Throw them in the trash, not the toilet.
- **Take shorter showers.** Replace your showerheads with the ultra low volume version.
- **Be sure your irrigation system** isn't watering cart paths, roads, etc.
- **Make sure you have a rain sensor** device which cuts the irrigation cycle in case of rain.
- **Mulch to retain** moisture in the soil.
- **Plant native and/or drought** tolerant grasses, ground covers, shrubs and trees.

Since water demands are different in each district, check with your local utilities, municipalities and local Water Management District to see if they offer incentive programs for upgrading or retro-fitting your current fixtures.

Don't Waste water! Put it on the right target

Pine straw mulch has good water retention for beds.

Much ado about Mulching

BY SHELLY FOY

Mulch is defined as any organic or inorganic material placed on the soil surface to modify the soil environment and enhance plant growth. What can you use as a mulch cover?

Cypress mulch, pine bark, pine straw, grass clippings, gravel, plastic, just to name a few.

What are the benefits of mulching?

- Prevents water loss by evaporation
- Suppresses weeds
- Maintains uniform soil temperatures
- Prevents crusting of the soil surface
- Organic mulches can improve soil structure by decaying and adding nutrients to the soil
- Improves appearance
- Mulched plants produce more roots

So how do you know which mulches are better?

Let's compare a few of the most commonly used mulches. A survey by the University of Florida indicated that Cypress mulch is the favored material. It has a deep brown color and is known for its longevity.

Cypress mulch has a high water holding capacity which may reduce the amount of water reaching the plant. However, moist cypress mulch prevents loss by evaporation. In wind tests, 80 – 100% of cypress mulch remained intact.

In tests performed, ***grass clippings*** subsided more than any other mulch, they dry and decompose quickly, and are not good in terms of longevity. They change color rapidly, and in wind tests, only 20 – 40% of the grass clippings remained intact. While grass clippings may not make a good mulch for landscape plant beds, they are a good nitrogen source and can be used in out of play areas as a supplemental nutritional source.

Pine bark is another dark-colored mulch. The large size particles (1.5 to 3 inches in diameter) are more attractive and last longer. The larger material is also better for weed control than the smaller sized bark.

Pine straw has good water retention, holds color fairly well, and performed well in the wind tests. However, it decomposes rapidly and can contain weed seeds.

According to Florida's Solid Waste Management Act of 1988, yard trash (branches, leaves, or grass clippings) may not be disposed of in municipal landfills. Utilizing this material as a mulch is an alternative. One concern in using this yard trash however, is fungal contamination (mushrooms). Not only are these mushrooms not aesthetically acceptable, they may restrict water infiltration.

Mulches can be used through entire landscape beds or around trees and shrubs.

This cypress mulch walkway suppresses weeds ands keeps a high-traffic profile area looking neat.

Those surveyed in the University of Florida tests were interested in using a combination of a layer of the expensive cypress mulch on top of this yard trash material. The combination of the two helps cut down on the cost and also provides an avenue for disposal of this yard trash material.

Perhaps some test areas of this combination can be tried on your golf course to see what the effects would be. Inorganic mulches such as gravel, pebbles and stone are occasionally used. They are permanent, fireproof and there are many colors available to pick from to better blend in with their surroundings.

The disadvantages would be that mowers could be damaged by this material or flying debris could possibly hurt someone. They also reflect solar radiation, and therefore would create a very hot environment during the summer.

Plastic films are good for weed control, however they don't allow water or air movement and therefore can deplete the soil over time. They would need to be covered with an organic mulch to make them aesthetically pleasing. They are not recommended for poorly draining areas because they would keep the soil too wet and might result in disease problems.

Can you restore color to mulches? You can apply a thin (1-inch or less) layer of fresh mulch, however this can be costly. You can rake the existing mulch and restore its appearance. There is also a mulch colorant, which is a dye that is sprayed on to restore color. If a colorant is used, apply carefully because they can cause skin and eye irritations.

So now that we have familiarized ourselves with some different mulch materials, where, when and how do we use them?

Mulches can be used through entire landscape beds, or around trees and shrubs. For trees, create a circle of mulch 2 feet in diameter for each inch of trunk diameter. Increase this area as the tree grows.

Keep mulch 1 to 2 inches away from stems and trunks of plants in order to minimize possible disease outbreaks. If using wood or bark mulches, do not exceed 2 or 3 inches in depth. Too much mulch can result in shallow rooted plants suffocating. Pine needles and pine bark can be as deep as 4 inches because they allow good air movement.

Mulches can be applied any time. How often to mulch would depend on which material is used. Cypress mulch, pine bark and wood chips only need to be replenished every 1 - 2 years.

Applying for Certification
Audubon Cooperative Sanctuary Program

The certification guidelines you receive when you become an ACSP member gives you an overview of water conservation and the information needed to apply for certification in this category. The following example will give you a feel for the level of detail required. Hopefully this will help and encourage you to apply.

Water Conservation Irrigation System

Goal: Maintain the system to keep it as energy efficient and accurate as possible.

A. We have installed a computer controlled irrigation system which regulates the amount of water used on a daily basis. Use of this system has reduced the normal watering cycle from 12 to 8 hours. We are using low pressure irrigation heads which reduce drift and lower the volume of water used.

B. The system has a rain hold module which will shut the system off when the rain equals the evaporation transpiration rate.

Water source

The source of irrigation water is primarily "effluent", which we receive from a nearby utility. If the effluent supply is reduced or is down, we can use canal water on a temporary permit from the water management district. When this is not available, we have a well we use in emergencies.

Watered Areas and Frequency

Water will be distributed on an as needed basis with an emphasis on deep, infrequent watering to support healthy turf. We keep our turf on the dry side for playability and agronomics. We scout turf areas daily and use a soil probe and weather data to determine watering needs. Based on this information we water as needed, generally at about 70% of the ET rate.

Top priority is given to greens, then tees and fairways. Roughs are watered less often, and clubhouse grounds are on a drip irrigation system to conserve water. out of play areas and environmentally sensitive areas do not receive irrigation.

Watering takes place between 3 a.m. and 8 a.m. to reduce evaporation and promote drying of the leaf blade.

Water Recapture and Reuse

Special drains throughout the property capture runoff and pump it back into the irrigation pond, which is then reused through the irrigation system.

Turfgrasses

Greens and collars are Tifdwarf bermudagrass. The fairways, roughs and tees are Tifway (419) bermuda. Most of the out of play areas are native plant beds, which require minimum water.

Water Distribution

Our irrigation system uses smaller watering heads and requires less pressure to operate. Since the system is computerized, it is constantly being monitored. Irrigation heads are checked daily to insure that the correct amount of water is being placed in the correct areas.

Mulches

We use cypress mulch in all plant beds to conserve water. We have a chipper which we use periodically when we lose trees and use this chipped material in out of play areas as well.

Water reduction

We have reduced our water consumption by 10% over the last 2 years. We hand water when needed in dry areas. We have eliminated 2 acres of turf by returning this area to native plant materials. All landscape material planted on the golf course is native and therefore requires less water. We do everything in our power to limit our usage because it makes good agronomic and environmental sense.

Our Watered-Down Game

Turn Off the Sprinklers and Play Some Real Golf

BY BRAD FAXON

Golf in America is too green.

I'm serious. What American golf needs is a good old-fashioned water shortage. Green is pretty. It's beautiful. It's pleasing to look at. I like green. But it doesn't make golf courses play the way they should — the way they were meant to play.

Green means lush. Green equals soft. And soft isn't good. Over-watered golf courses have become standard in America. The word "roll" isn't even in an American player's vocabulary anymore. I think that's unfortunate. The scope of the problem, however, goes way beyond the setup of PGA Tour courses.

America's obsession with green has changed golf. The way American courses are maintained has changed the way equipment is made, the way courses are designed and the way people swing.

Look at the courses. All of a sudden, we're playing courses where you've got to hit the ball up in the air and stop it. Architecture went from Tillinghast, Mackenzie and Ross to Nicklaus and Dye. The game went from horizontal to vertical.

Look in your bag. Perimeter-weighted clubs make the ball go higher. (The better to play those new courses.) Square grooves make the ball spin and stop quicker out of the rough. And then there's the lob wedge. (The better to escape Pete Dye death-bunkers.) The old Brits never had an L-wedge. They never needed one off those tight lies.

Look at the swings. We went from swings like Ben Hogan and Byron Nelson to more upright swings like Tom Watson and Jack Nicklaus, guys who hit the ball real high. The current popular swing has become more upright.

Go back to the history of golf in Scotland. Courses were just laid out on the ground somewhere near the coast. They had no irrigation. They relied totally on the weather. Golf was played along the ground. The elements made the conditions tough. And you had a sand-based soil that was easy to keep firm. There were a lot of tight, hard fairway lies and you had to bump the ball along the ground and allow for roll.

I'm not blaming American superintendents. If there's a brown spot on a country club these days, the greens committee calls an emergency meeting. I think club members see the Bob Hope Classic or the Masters on television and say, "That's what we ought to have."

So their courses look great but they don't play the way they should. I grew up on a classic old Donald Ross course, Rhode Island CC. The first hole is a short par 4, open in front of the green. When I started out as a caddie, the members would hit a 5- or 6-iron, land it 10 or 15 yards short of the green and let it bounce onto the putting surface. That's how you played. You used the contours and allowed for them.

When I went back to play there during college, maintenance had changed the course. I hit 5-irons out of the rough that backed up. Balls stuck on the greens. The course was so much softer and easier. People at the club said, "Brad, this is the best this course has ever been." I said, "No, this is the greenest it's ever been." And they didn't know what I was talking about.

Green is OK if it's firm. That isn't usually the case in the U.S., where overwatering reigns. Warwick Hills, home of the Buick Open, is one of the longest courses we play and always gives up some of the lowest scores. I played there Monday after the tournament and talked to the head pro. He told me the superintendent is scared to death the tour will starve his course and he won't be able to keep it green after the tournament. So he drenches it for two weeks before, but we had rain this year, our drives plugged and we played preferred lies the first few rounds.

You want to know why foreign players are dominating professional golf? Because they play firm courses in the wind and still play bump-and-run shots and have a lot of imagination. American players have had those shots taken from them. The courses are too lush.

Remember what Jose Maria Olazabal did at the final hole of the Masters? He pulled his iron shot and it ran down the slope. He was past the hump in the middle of the green. He played what I think was the shot of the tournament, a bump-and-run down the hill, and saved par. It was an incredible shot. If that had been the Buick Open, say, he would've just pulled out a sand wedge, flipped it up and stuck it next to the flagstick. Where's the challenge in that?

The United States GA has the right idea. When it was deciding whether to go back to Newport CC, a true links, for the 100th anniversary of the U.S. Amateur, the club's membership was in favor of the idea and said, "Don't worry, we'll make sure you get a sprinkler system in by 1995." The USGA told them, "If you put in a sprinkler system, we're not going to hold the event there."

That's the way golf was meant to be. Now, what do you say we turn off the sprinklers and play some real golf?