

# **Why Landscape Irrigation Auditing Doesn't Work and How to Fix It**

## **A White Paper**

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Landscape Irrigation Auditing has been around now for about 20 years. It is still immensely popular as a water conservation technique. The primary success of auditing has been in educating industry professionals in topics such as soil-plant-water relationships and uniformity. It is, however, time to face the fact that its usefulness as a tool to directly reduce water use has come up lacking.

I would like to address several components of the auditing program that have had a direct influence on its ineffectiveness. I will also list several ways in which it can be transformed into a valuable tool for utility and landscape professionals.

First, I wish to list my experience with irrigation auditing and other water conservation programs. I am a Certified Landscape Irrigation Auditor (CLIA) that I received 1992. I went to Cal Poly San Luis Obispo ITRC to attend the CLIA training class. I am also a Certified Golf Irrigation Auditor, Certified Irrigation Contractor (CIC), a Certified Site Water Planner (CSWP) and a Certified Irrigation Designer in Commercial, Residential and Agricultural Drip Micro.

In addition, I was the Irrigation Association's (IA) Education Director for 8 years from 1995 to 2003. During that time I created the current version of the IA's CLIA training class and manual. I taught the CLIA class all over the world to thousands of students in many different climates and economies. I have also performed numerous audits on both residential and commercial sites all over the world. I am also the author of *Site Water Management Planning, a Handbook for Landscape, Water Conservation, Golf and Irrigation Professionals, Sprinkler Scheduling in 15 Minutes* and at least a dozen other technical manuals on various irrigation topics.

As a consultant I have also had the opportunity to work with utilities that strongly promote the auditing program and in many cases offer rebates for it or offer landscape audits for free to their customers. I have had the opportunity to review reports from these programs and analyze their effectiveness. Because of these credentials and experiences I am uniquely qualified to comment on the auditing program and its effectiveness, or lack thereof.

The auditing program's primary ineffectiveness is tied to real world application and results, not the math or science behind it. The concepts behind auditing make sense and are based upon qualified research by respected universities. The issue is simply this: after the dust (or water) settles, does irrigation auditing save water? Or more importantly, when one evaluates the time, effort, money and other resources involved in auditing, does it have a return on investment? Does it save more money than it costs? Water conservation experts are constantly required to evaluate water conservation programs to see if they save more water/dollars than they cost. The ultimate question is: Does auditing deliver on its

promises? It is my contention that it does not. One of the primary (but not the only) reasons for this is that few people actually follow through with all of the steps of an audit.

While there are numerous issues and concerns with landscape irrigation auditing, this paper will focus on the following topics:

1. The site inspection and the site selection procedure
2. One audit or two?
3. The base schedule worksheet
4. Accuracy vs. time
5. Low Quarter Uniformity
6. The promise of auditing as a profit center
7. Smart controllers
8. Sustainability of savings
9. Root zone depth

#### **Conclusion - Real, practical solutions**

1. Let's begin our discussion with the first step of auditing, the **Site Inspection**. This is Chapter one of the IA's CLIA manual. To quote directly from the manual it says, "Once a site has been selected for auditing, the system should be tuned-up."

This "tune-up" phase is a critical weak point in the auditing program. What a Certified Landscape Irrigation Auditor (CLIA) is supposed to do is to perform an inspection and make a list of all of the problems with the system. Then the CLIA or the customer will take a week or two, or more, and perform all of the listed repairs. The logic is that since the end result of an audit is a detailed, accurate watering schedule then the system should be operating at its peak efficiency. This concept should be stressed: the real point of an audit is to create a detailed, accurate watering schedule.

Creating a detailed schedule, however, is not what most people do with their newfound auditing skills. Most people will just do a catch can test because they are curious as to what a site's uniformity is. Let's return to the site inspection. The key point that is conveniently overlooked is that most sites that are candidates for an audit have systems that are in horrible shape. This means that the site inspection will almost always turn up numerous costly repairs that will need to be made to the system.

These costly repairs have to be paid for by the customer, who is also paying for the audit. Now, besides having to pay for the audit itself, the customer is asked to pay two, three, four or more times the amount originally estimated for the audit to have the system repaired.

It is useless to perform an audit on a system that is in horrible shape. The reason being that the Distribution Uniformity (DU) number that is calculated from the catch can test will be used to calculate the system runtime. The lower the uniformity the longer the runtime will be. The longer the runtime the more water that will be wasted on the site.

Customers expect that the audit will reduce their water use, not increase it. In Chapter 5 of the auditing manual it has a site selection process that does, in fact, have a simple cost analysis section. The problem is that it only takes into account the cost of performing the audit itself, not the hundreds or thousands of dollars for the needed repairs discovered in the site inspection.

Why is this such an issue? If you are an auditor trying to convince someone to hire you to perform an audit of their site, you will want to justify your fees by promising savings that will be greater than your fees. If one follows the auditing program as outlined in the CLIA program you keep running into the brick wall of the site inspection. It is a Catch 22. You can't develop a watering schedule with a poor DU. If you do, then you run the risk of generating a watering schedule that will use more water than they are currently using. If you require that all or most of the repairs needed be made before you audit, the customer may balk at the expense and not hire you. Also, one can only estimate what the improved DU will be after the repairs are made.

The auditing program does not teach CLIA candidates how to properly do a Return on Investment (ROI) analysis before performing the audit.

To sum up this section, the site inspection and the repairs it brings to light, are not properly accounted for monetarily in the cost estimates for performing an audit. The result being that the step is skipped, or if the inspection is done, the required repairs are not. In addition, the main point of an audit is to calculate a detailed and accurate watering schedule. Many so-called "audits" never get beyond the catch can test.

**2. One audit or two?** The only way to know for sure what the DU improvement will be after the repairs would be to do two catch can tests; one test to verify what the existing DU is of the system before the repairs and then a second test after the repairs. The second catch can test would calculate how much the DU improved and it would generate a DU number that could be used in the Base Schedule Worksheet. Sounds good, but it is almost impossible to get customers to pay for one audit. How do you get them to pay for two?

What most people call an audit these days is not really a full blown audit as outlined in the CLIA program. Most people perform a catch can test of the system "as-is", then make recommendations for repairs and then leave. Ninety percent of the time the repairs are never done.

In summary, what most people want to know from an audit is what their DU is both before and after an audit. Few, however, want to pay for two catch can tests.

**3. The Base Schedule Worksheet.** There are several problems with this stage of the audit that need to be addressed:

- a. ET & Reference ET
- b. Assumptions
  - i. Species factor
  - ii. Micro-climate
  - iii. Soils and rootzone
  - iv. Allowable stress
  - v. Density
- c. Error multiplication

When we consider ET we have to face the fact that most areas of the U.S. as well as many other parts of the world do not have access to current, real-time ET information. Most auditors are forced to use Historical ET data that was published over 30 years ago. So the very first piece of information used, that all else depends on, is many times missing or inaccurate.

Once the auditor has ET data, many times they are unsure if they are looking at ETo (cool season turfgrass ET) or ETr (Alfalfa ET). To accentuate the error they now apply a species factor that may or may not apply. Sometimes the ET data supplied is already reduced for cool or warm season turf and the auditor unwittingly reduces it again. Auditing students are asked to estimate the species factor of the type of plant material being watered. This element allows for erroneous assumptions. The problem here is that this is the fundamental basis of the entire watering schedule. ET dictates how much or how long the system will water. If this is not done accurately then the entire schedule will be off.

Auditors are also asked to assume numbers for micro-climate, density and allowable stress. All of these can be very subjective and place decisions in the hands of people that may or may not have the experience to make such assumptions accurately.

Next the auditor is expected to analyze the soil and rootzone. This is an extremely critical part of the auditing procedure because it affects the frequency of the irrigation. With about 30 minutes of training the auditor has to classify the soil type and decide upon the average rootzone depth. Again the chance for erroneous assumptions is huge.

Now we get to the part where the auditor makes less than accurate assumptions with the above listed data. The bigger problem is that the Base Schedule Worksheet allows the user to take one error and multiply it by another error and so on. By the time one gets to the bottom of the worksheet the possibility of the schedule being seriously inaccurate is immense. Combine that with the opportunity for simple math mistakes and we have a recipe for disaster.

What is being attempted here is to try to use complicated concepts with a lot of math in an attempt to make the scheduling process accurate. Instead, what happens is that we have created a process rife with opportunity for errors and false assumptions.

As an instructor of auditing classes for years, I would commonly see different students perform a catch can test on the same irrigation zone and come up with drastically different watering schedules. The reason being is that the selection of variables for the numerous formulas is so subjective.

In summary, the Base Schedule Worksheet is complicated and time consuming and is filled with subjective assumptions that can easily compound one on the other to create inaccurate and inconsistent watering schedules.

**4. Accuracy vs. time.** Even if false assumptions and error multiplication was not an issue the other key problem with the current auditing/scheduling process is one of time. Under ideal conditions one would develop a schedule for each zone on a system that would allow for weekly changes in weather. This would mean completing a base schedule worksheet for each zone, for each week of the irrigation season. Again, it needs to be stressed that this is the prime goal of the CLIA program: to develop a detailed, accurate watering schedule for the site in question.

Even with software tools this is a difficult and time consuming process that few, if any, professionals do. Even if the schedule was only changed monthly it is still a massive amount of calculations to deal with. This is one of the key reasons that we see trained auditors only going as far as doing a catch can test and stopping there. They simply lack the time to perform all of the calculations to complete a schedule for a client. One of the most common statements that I have heard over the years at the end of a CLIA class from students of the auditing program is, “Who has time for all of this?” or, “My customers will not pay me to do this”. The sad fact is that they are right. Few customers will pay extra for detailed schedules. Granted, the customer expects a detailed schedule, but the typical maintenance contractor will not be compensated for the time it takes to calculate one using the standard audit procedures.

To sum up this point, the industry keeps making scheduling more and more difficult and complicated. Very few professionals are doing detailed scheduling with the current practices, so why do we as an industry keep making it more complicated and difficult? If the current programs are not being implemented by the industry because of its difficulty and complexity, then we should simplify it and be willing to sacrifice some accuracy for user friendliness.

**5. Low quarter uniformity.** The premise of the current auditing program is based on the principle that in the landscape we need to water to the weak areas so as to avoid dry spots. The way this is done is by laying out catch cans, running the system and then analyzing the data. One looks at the water in all of the cans, but separates out the lowest 25% . At this point, one divides the catch can readings from the low 25% by the readings from all of the cans. The purpose for this is to focus the watering runtimes for the driest 25%. What ends up happening is that we end up with schedules that are almost always “fat”, meaning that they require longer runtimes than what is really needed. To compensate for this, the auditor is encouraged to trim back the watering times according to their subjective judgment of the site appearance.

The irony here is that we have just instructed the student in how to perform detailed site tests. We then teach them to use complicated calculations using more math than they have used in their jobs in years. Now, when this is all completed we tell them to “go out and observe the appearance and turn the time up or down as needed.” Isn’t there a contradiction here?

Another problem with developing a schedule using the low quarter method is that it does not allow for lateral movement or capillary movement of water from wet to dry areas. Even though the catch can test data says that one area is receiving less water from a certain sprinkler head, this issue is often mitigated by water movement in the soil. In this case we tell users to increase their watering time to overcome the dry spots unnecessarily.

To further confirm the problem with this we can simply look to the IA’s Certified Golf Irrigation Auditor program where they use a lower half calculation.

To summarize, The Low Quarter Uniformity method quite often over compensates and creates watering schedules that can result in longer runtimes than what the site is currently using.

**6. The promise of fame and fortune.** One of the key benefits of becoming an auditor is that candidates are told that they will now have a new skill set that will allow them to earn more money. They are told that there is considerable work in the industry doing audits for hire. This has proved to be a dismal failure.

There are hundreds and hundreds (if not thousands) of CLIAs out in the world, especially in North America. Of those, less than 1% actually do audits on a regular basis as part of their job. Of those that do audits as part of their job an even smaller percentage earn a living just from doing audits. There are a few reasons for this:

- a. Because we do not teach auditors how to do a detailed Return on Investment (ROI) analysis for their customers, auditing still remains a hard sell for most people. There is simply not a large demand from the market for audits for hire.
- b. Many utilities offer audits for free. It is very common for a utility to hire some college interns for the summer and have them receive a few hours of training and then they go out and perform audits for free to the utility’s customers. Why would someone hire a CLIA for money when they can get it for free?
- c. In some states or locales regulations have been put into place to require audits. In many cases such as in California with the AB 325 statute, hundreds of professionals got CLIA certification in anticipation of this regulation and yet it was never enforced.

There are some areas where audits are required by local regulations. While this is admirable it is often viewed as an unnecessary regulatory inconvenience and the bare minimum is done to pass the audit. In these cases, schedules are rarely inputted and

followed. The cold, hard fact is that of all the trained CLIAs in the world, few, if any, have made significant profits from auditing.

**7. Smart Controllers.** A simple definition of this would be using some type of weather or soil moisture sensor to automatically adjust an irrigation system's watering schedule to more closely match actual plant water use. This is an emerging technology that is becoming widely accepted and promoted. It deserves some discussion since it has great promise, but its misuse could be wasteful, at worst, unproductive at the least. This technology is a relatively new tool in our efforts to reduce landscape water use. Many different companies and approaches to this technology have cropped up in the last few years.

The very fact that this technology exists and that it is being promoted so heavily is confirmation of most of the concepts discussed here. Irrigation auditing and detailed, complicated scheduling techniques are not producing the desired savings, so the market is turning to technology for the answer.

If you have been in the green industry for a while you have seen many fads and "great ideas" come and go with mixed success. Maybe you have been considering using some type of Smart Controller technology yourself. Perhaps you are unsure if it works and if it will be around five years from now.

One of the reasons that Smart Controller technology has taken off in recent years is because many water conservation experts and water district/agency leaders have become discouraged with behavioral efforts to lower water use. For at least 25 years now most of the industry's efforts at water conservation have been geared towards *educating* the public and professionals on how to design, install, maintain, repair and schedule irrigation systems. In other words, our efforts have been focused on trying to change the *behavior* of the people who interact with irrigation systems.

Irrigation education and training has been a pillar of the industry's efforts and has produced some very well-trained and professional experts for the green industry. The issue isn't that education and training has not been beneficial to those persons who have chosen to participate in classes. The issue is this...Has it resulted in sufficiently lowering water use in the landscape? Notice that the word "sufficiently" is used. There is no doubt that there has been some reduction of water use because of efforts to change the user's behavior.

When looking at results from a more clinical perspective there are some shortcomings. Training and education, or behavior modification efforts have different levels. Following is an example of how a problem might be addressed using training as the solution.

*Premise:* A problem is identified and it is decided that training or a change in behavior is the solution to the problem. In this case, the problem is wasting water in the landscape. Therefore, we send our employees to classes. During and after the classes students will pass through these next four levels. Some pass through all, others never make it to Level one.

- Level One -** Students enjoy the class or training and they have a good time.
- Level Two -** Students actually learn something and remember it.
- Level Three -** Students change their behavior and begin using what they have learned in their job.
- Level Four -** The change in behavior gives the results that initiated the reason for the training in the first place. In this case, the training results in lower water use.

Levels 1 and 2 are fairly easy to evaluate. Level 3 is a little harder since follow-up after the training is needed. Level 4 is very difficult to evaluate without quite a bit of research.

Many top water conservation experts feel that we never really reach Level 4 in regard to water use reduction. To put it bluntly, many feel that attempts at trying to change behavior in regard to water use have not produced the results desired. We may have reached Level 3 and there may have been some Level 4 successes, but many feel that we have not effectively conserved water at the levels that will be required of us in coming years.

That takes us into the Smart Controller technology thrust that we are seeing today. Water conservation experts are turning to technology to pick up where behavior has left off. The sentiment is that if green industry professionals won't effectively cut back on water use then maybe we should let technology take over the control and monitoring of irrigation water use. Many want to remove behavior from the water conservation equation.

There are additional benefits for water agencies that wish to spend money and resources on reducing water use through Smart Controller technology use. Investing in Smart Controller technology is clean, clear and measurable, compared to evaluating the results of training and behavior modification.

It is possible that the pendulum is swinging too far towards technology. Many organizations and agencies are placing too much emphasis on technology alone. There is a risk that they will not find the results that they seek and that this wonderful technology will suffer a bad reputation.

We might compare it to the introduction of drip irrigation to the landscape in the '80s. This new technology called "drip" was all the rage when it was first introduced in the landscape



market. Just as we are seeing today with Smart Controller technology, many people saw drip as a "hardware" solution to over-watering. It soon became apparent that drip, by itself, would not magically save the world from all of its water problems. What we learned was that this new thing called drip needed to be manufactured well, designed and installed by competent professionals and maintained on a regular basis. We learned this only after many disasters and failed systems. To this day, there are still many green industry professionals who refuse to use drip because of those earlier failures.

Too many people pushed too hard and too fast to see the new technology implemented without the oversight of industry experts and proper training. The result was poor performance, bad press and industry reluctance to embrace it. Quite often water conservation experts are too quick to remove the human influence and try to bypass the experts with technology.

Smart Controllers will never be a "low flush toilet" for the landscape. Smart Controllers will not absolve us from learning and implementing basic system evaluation and scheduling techniques. Every Smart Controller that I have seen requires that a base schedule be programmed into the controller and that certain parameters be setup initially. This requires expertise. However, by combining Smart Controllers with simplified scheduling techniques we can make these products very successful.

Effective short-term and long-term water reduction can result from placing good, relevant technology in the hands of trained professionals. It is then monitored, checked and adjusted by humans. As much as we might like a "low flush toilet" for our landscape water problems we will have to arrange a marriage between behavior and technology.

Smart Controller technology is a very good thing. It should be used when possible. However, please remember the three ways to save water in the landscape:

- Improve System Efficiency
- Reduce Net ET<sub>0</sub> Requirement
- Improve Irrigation Scheduling

Smart Controller technology only addresses water savings in one of the three areas: improving irrigation scheduling. Do not expect it to do more than it is designed to do.

**8. Sustainability of savings.** Research has shown that even with sites that did have documented water use reductions because of a landscape irrigation audit, the savings are not sustained over time. About 12 years ago the Contra Costa Water District did a study that showed that on average, after 3 years, any water savings achieved by an audit was lost. This is because the money and time required to keep the site in peak condition was not maintained due to a change in staff or contracting companies. Or the site could not, or would not, maintain the budget to keep the system in peak operating condition.

The level of difficulty in updating and maintaining the schedules as well as the system hardware requires a significant commitment of time and money.

- 9. Rootzone depth.** When developing a watering schedule the soil dictates the frequency of irrigation. The more water holding capacity of the soil or the deeper the root zone depth of the plant material, the longer one may go between irrigation cycles. One of the most common problems on sites that are audited is that the end users have been watering too shallow. They tend to irrigate too frequently for too little time and because of this they have developed very shallow rootzones. When one does an audit of these systems a soil sample is taken and the rootzone depth is recorded. The problem is that the rootzone that is recorded on the auditing worksheet is what is actually found at the site, which is typically too shallow for a healthy turf.

As a result, a watering schedule is developed that simply perpetuates the same rootzone. In other words, the watering schedule that is developed from the base schedule worksheet is developed around the existing rootzone thereby encouraging the continuance of the shallow rootzone. It becomes a catch 22. If one inserts a deeper rootzone into the schedule than what is actually present at the site then the turf can be stressed or go into permanent wilting.

What is needed is a documented process for slowly extending the rootzone depth. This needs to be part of the audit and the base schedule worksheet. Students are encouraged to develop deep rootzones, but there is no detailed, documented procedure in the program for accomplishing this.

## Summary

The above listed problems outline the key issues with the landscape irrigation auditing program. The main points being:

- A. The system tune-up is listed as a minor obstacle to be dealt with quickly and then dismissed, while the reality is that repairing the system is really one of the main benefits and expenses of an audit, to make system improvements.
- B. The program requires that, in many cases, significant repairs be made to the system without any detailed cost benefit analysis being provided to the end user.
- C. To give someone a clear idea of pre and post audit performance two catch can tests are needed but this is not explained and most users would not pay for two tests. In consequence, most sites never get a full audit just a catch can test to see “where they stand”.
- D. The base schedule worksheet is difficult for most users. It is complicated while at the same time subjective and rife with potential errors and the multiplication of errors. It is, in essence, a *mathematically enhanced guess*.
- E. The audit process strives for extreme accuracy which severely complicates the procedures and yet does not deliver the accuracy desired.

F. The Low Quarter Uniformity method develops watering schedules that are too long and in many cases cause the exact problem they are supposed to solve, over watering.

G. The auditing program was supposed to be a great way for contractors to make extra money. There was supposed to be a big market for landscape audits all over world. That lucrative market never materialized and very few professionals make any money from audits.

H. Smart Controllers are great. They help simplify the scheduling process and their very existence shows that programs like auditing are not working. If auditing was saving billions of gallons of water and the program managed water as promised, what need would there be for Smart Controllers?

J. Most water savings that materialize from audits evaporates within a few years. It takes a hefty, sustained commitment of time and money to sustain the water savings.

K. Rootzones that are too shallow (Most sites have this problem) result in too frequent of irrigation. This issue is not addressed in the audit program and the watering schedule that is developed from the base schedule worksheet simply perpetuates this problem.

## Solutions That Will Work in the Real World

Now that we understand the weaknesses and problems, what are the solutions?

First, we need to make a clean break. The CLIA program as currently structured needs to be done away with completely. As an educational tool in teaching professionals about scheduling concepts it has had its benefits. As a program to dramatically reduce landscape water use it has been, in my opinion, a failure. Let's not mince words.

The current program should be replaced with two separate programs:

- a. System evaluation
- b. Irrigation scheduling

What auditing tries to do currently is to do both of these, but it does them poorly.

**System Evaluation.** Professionals need to be trained on how to evaluate a system's current water use and compare it to past historical usage. They need to be able to evaluate not just the irrigation system, but the landscape as well. They need to be taught how to develop a water management plan for a site and to provide customers with a ROI analysis that justifies spending money on site and system improvements. In this process they need to be instructed on how to evaluate a system's health and to choose conservation measures that will match the problems identified.

Customers deserve to see detailed tables and charts showing past system usage, projected water budgets and estimated capital expenditures and realistic, researched, potential savings. A catch can test may, or may not, be one of the tools used by the professional in this process.

We need to train the professionals in the business end of water conservation. Until water conservation is shown to be profitable, few organizations and companies will embrace it.

**Irrigation Scheduling.** The second program will now be focused on irrigation scheduling. This process needs to be broken down into *basic* and *advanced*.

During my years of training professionals I would repeatedly run into the same problem; I would train professionals in detailed, complicated scheduling methods only to discover later that while the student enjoyed the training and learned quite a bit, they rarely, if ever, put those skills into practice in the field. Their excuse would be that they never seemed to have the time.

The other problem is, as mentioned earlier, the industry keeps making scheduling more and more complicated. So much so that the only professionals that attend this training and pay any attention to it are the upper tier successful contractors and then it is only upper management or owners that invest the time in these skills. The problem here is that these companies represent a very small percentage of the business and they, as individuals, are

not the ones who are actually in the field programming controllers. Current scheduling practices are usually far too complex for the average laborer working out on the jobsite.

What we are creating is an elitist, “country club” mentality for these skills. Some certifications are high-level and serve to separate the serious professional from the amateur. This is fine for some areas of expertise. However, water conservation skills need to be developed for the masses if they are to be used and to be truly effective.

I have on several occasions been dragged into arguments with students during classes over whether one should use .80 or .815 in a specific calculation. Or, I have sat in committee meetings where an expert is discussing the need to train professionals in the details of how certain fertilizers, when applied to specific soils, will increase the Ph and therefore the soil tension, thereby increasing the osmotic pressure force required by the plant by 3.758%..... Are you kidding me? By and large, the automatic systems that I have evaluated and done audits on are in very bad shape. They are over-watering by a factor of 4 or 5.

We have systems that are wasting so much water that almost any conservation measure will reduce the site’s water use. There is a lot of low-hanging fruit out there and we are arguing over such inane technical details to the point that it is almost comical. I would compare this to someone being brought into an emergency room after a car accident and they are bleeding to death while the doctors argue over whether cotton or synthetic bandages soak up more blood.

We need to drastically simplify the scheduling process so that almost any low-level field worker or homeowner could put a basic schedule into a controller. Would this basic scheduling technique be as accurate as what we are attempting now? No, of course not. However, considering that almost no one is doing the more detailed and complicated scheduling that we expect of them, what do we have to lose?

Certifying organizations need to let go of their egos in regard to water conservation programs and create simpler, more user-friendly programs that the lowest common denominator can learn and use quickly and easily.

In the future I see two scheduling programs:

- i. A simple one that sacrifices some accuracy for simplicity.
- ii. An advanced one for those who have the time, money, inclination and customers to justify the time and expense in performing detailed scheduling.

So now we will have professionals trained and certified in system evaluation, inspection and cost justification (ROI). This will provide the professional with skills in developing water management plans for properties and the matching of conservation measures with identified problems.

In addition, we will have two scheduling certifications. One simple one that will get sound basic schedules used on a regular basis by the masses, and an advanced one for the professionals that wish higher learning and recognition.

The real question here is, can we let go of our egos and admit that landscape auditing, in its current form, is not working? Only by letting go of this can we explore completely new ways to get system evaluation and scheduling skills into the hands of the common contractor and professional and actually see them used.

### **The human dynamics of change in the industry.**

The key to any new program will be **money** and **simplicity**: **Money**, because any new program will need to generate documented money savings for the end user, and income for the contractor. **Simplicity**, because any new program needs to be targeted to the crew member out in the field, not the owner or top management.

At this point, we are like an old vinyl record stuck in the same groove. Even now I see new regulations and programs being introduced using auditing as the primary solution. The current Model Water Efficient Landscape Ordinance recommends auditing. The ordinance's difficulty and complexity will, I believe, lead it to implode upon itself. The industry keeps doing the same thing, because it keeps asking the same people if it is going in the right direction. It is human nature to surround ourselves with people who think the way we do.

Over and over again I have seen a common scenario play out with government agencies and associations. Focus groups and committees are formed and meetings are held to discuss ideas and new programs. The problem is simple economics. In our industry contractors who can afford to volunteer large amounts of time to focus groups, committees and trade associations are more profitable and successful. That is why they have the time to volunteer. They have been in business a while and are not worried about whether they can make payroll or feed their family tonight. They are also interested in protecting their business interests and are frustrated by small, "fly by night" businesses that undercut them.

What happens is that the real meat and potatoes professional is rarely represented at these focus groups and committee meetings and associations. Most of the time we do not even know they exist, where they work, or how to find them. However, these are the companies and individuals who are working on the vast majority of the systems. They are the ones with their hands on the controllers setting the schedules and fixing the broken heads.

The result being that the same group of successful contractors or professionals with their strong opinions are asked to serve on groups, and committees or boards. When these groups try to go in new directions and develop new programs, the "old guard" tends to discourage this. And when government agencies and associations ask their members if they are doing things right and meeting their needs, the answer is almost always, yes. This is because they keep asking the same people the same questions.

To take water conservation to the next level will require new, innovative, simple and cost effective methods. To succeed we may need to “dummy” down our efforts, not make them more complicated.

In conclusion, let me state that while auditing has had some intellectual benefits, it has not produced the immense water savings that was alluded to when it started out almost 20 years ago. It is time to swallow our pride and let it go and replace it with simple programs that work for the masses.

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