

LANDSCAPE MANAGEMENT *for* WATER SAVINGS

How to Profit from a Water Efficient Future

by Tom Ash

Sponsored by

Municipal Water District of Orange County

United States Bureau of Reclamation

Metropolitan Water District of Southern California

California Department of Water Resources

Irvine Ranch Water District

The California Landscape Contractors Association

Fall 1998

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ISBN# 0-9666557-0-2

Published by Municipal Water District of Orange County

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Introduction

“For the first time in recent history, Californians are finding that existing water management systems are no longer able to provide sufficiently reliable water service to users.” (Department of Water Resources, DWR, California Water Plan, 160-98)

Water is the single most important resource for every aspect of green industry business. In California, driven in part by population growth and public policy, water is becoming a limited and expensive commodity. Water efficiency is becoming the rule for every type of user, be they commercial, industrial, or agricultural business, homes and community landscapes.

The *Landscape Management for Water Savings* was developed in conjunction with the California Landscape Contractors Association and the Municipal Water District of Orange County. The book materials have been reviewed by the California Landscape Contractors Association Resources Management Committee, representatives from the University of California Cooperative Extension, the United States Bureau of Reclamation, the Metropolitan Water District, the Irvine Ranch Water District, green industry companies and horticultural consultants. The book is produced by the Municipal Water District of Orange County with participation by the California Department of Water Resources (DWR), the Metropolitan Water District (MWD) and the U.S. Bureau of Reclamation (USBR). The goal of this publication is to assist the commercial and home landscape contractor and related green industry businesses, in understanding state and local water issues, how they affect landscape business, how to achieve water and resource efficient landscapes, and how the green industry profits by offering this service to customers.

There are many fine texts, manuals and guides for landscape maintenance, plant materials, plant care, design and irrigation. This handbook is not intended to replace those valuable references. Instead, this book describes how to integrate a wide variety of efficient landscape maintenance techniques along with the marketing of water efficiency to create greater business opportunity. Success helps public agencies meet increasing demands for water.

Water conservation and resource efficiency does not mean an end to business for green industry companies. Just the opposite. A water efficient landscape offers tremendous opportunities to sell higher valued services, introduce new plants, new technologies, make site upgrades and attract new business. It also means the green industry becoming partners with public agencies to offer solutions for living within California’s water supply limits.

This handbook is not about eliminating landscapes to save water. It is about managing existing landscapes to be efficient so more water resources are available to meet population growth, economic development, and the public’s desire for more landscapes. This handbook is designed to help green industry professionals understand the water supply future and how to adapt green industry businesses to meet new customer needs. This handbook advises promoting the role landscapes play in maintaining the value of homes and communities and describes that without water efficiency there will not be reliable supplies of water to meet the demands of population and economic growth estimated for California.

This elementary school student poster tells the whole story.



The Problem:

- Limited water supplies

Green Industry Goals:

- Maintain successful businesses in a state with limited water supplies
- Increase business opportunities
- Increase standards of performance and professional standing
- Become partners in the public policy-making process as it relates to water resource use

This handbook is:

- A practical guide to a healthier, more water efficient and cost effective landscape
- A primer on marketing water services to customers
- Another resource for green industry businesses to help manage landscapes efficiently and market those services to help increase business



CHAPTER 1

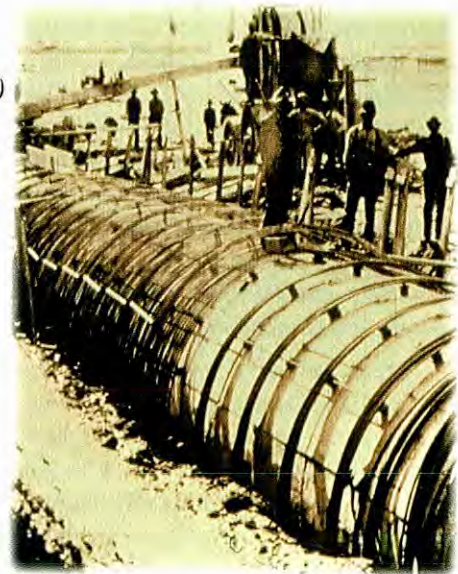
California Water and What It Means to Green Industry Business

This chapter summarizes water laws in the state and the direct impact public agencies have on water availability for landscapes.

The California Department of Water Resources (DWR) says, "For the first time in recent history, Californians are finding that existing water systems are no longer able to provide sufficiently reliable water service to users." (DWR California Water Plan, 160-98). The story is in the growing numbers. The population in California is expected to grow by 15 million people over the next 25 years, a 48% increase. Water demands are estimated to increase 37%. California also shares water from the Colorado River with other states. The population of these adjacent states is increasing, as is their need for water. Court actions have upheld the right of other states to take their share of water from the Colorado. That means California can expect to get less Colorado River water in the future.

California Urban Population by Hydrologic Region (millions) (DWR, Bulletin 160-98)

Region	1995	2020 (projected)
North Coast	0.6	0.8
San Francisco	5.8	7.0
Central Coast	1.3	1.9
South Coast	17.3	24.3
Sacramento River	2.4	3.8
San Joaquin River	1.6	3.2
Tulare Lake	1.7	3.3
North Lahontan	0.1	0.1
South Lahontan	0.7	2.0
Colorado River	0.5	1.1
Total	32.1	47.5

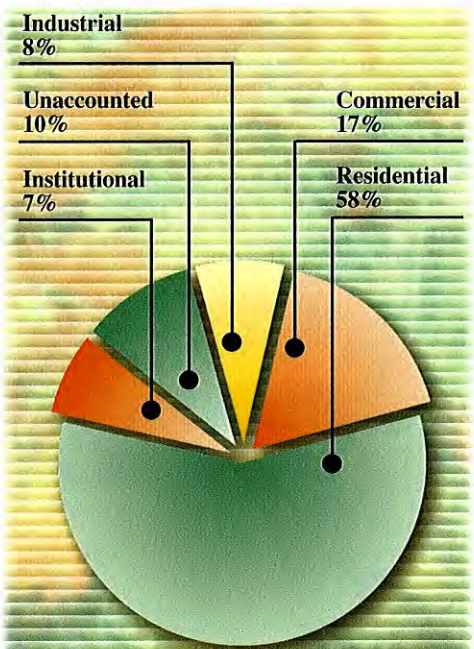


California's aqueduct system moves vast amounts of water to meet public need.

The California Department of Water Resources estimates that 'chronic' water shortages will happen soon after the year 2000. Without significant water conservation efforts, there will not be enough water to meet the needs of people, business and landscapes in the state in the near future.

The amount of water used for urban landscapes is currently estimated to be 5% of the total for all water used in the state. Every major customer group, including residential, institutional (schools, parks, etc.), commercial and industrial customers, use water for landscaping. For example, it is generally assumed that one-half of home water is used for irrigation. Currently, 82% of California's population lives in 'urban' areas. The desire and need for landscapes is high and will continue to grow as population grows. The need for water efficiency will also continue to grow.

And what about drought? Landscape water is the first water asked to be conserved during drought. Knowing how much water you use, how much water you need and how efficient a site is,



Every major urban water use group listed above uses water for landscaping. It is estimated that one-half of residential water is used outside. Commercial and industrial customers use landscapes (and water) to enhance their business sites; institutional water includes schools and city parks, an important water necessity for the urban sector. 82% of California's population lives in "urban" areas. The desire and need for landscapes is high and will continue to grow with population increases.

(Source: DWR, Bulletin 160-98)

could mean the difference between the survival of that landscape, and your business, during drought.

The Role of Water Agencies

The California Water Code declares that, "the waters of the state are a limited resource subject to increasing demands"; "the conservation and efficient use of water shall be actively pursued"; and, "the conservation and efficient use of urban water supplies shall be a guiding criterion in public decisions."



(Left) California expects a population increase of 15 million people in 25 years.

(Below) Spanish missionary landscapes fit the dry "Mediterranean" climate.

State and local water agencies are charged with the task of delivering a reliable supply of water to meet all customer's needs, setting water rates, insuring the health, safety, economics and environmental resources of California. Water supplies and now water use are governed by an intricate system



of federal and state laws. These laws, statutes, court decisions and contracts govern how water is developed, made safe for consumption and allocated for use.

State Water Use Efficiency: Article X, Section 2 of the California Constitution prohibits the waste of water. The use of water shall be exercised with a view to the reasonable and beneficial use thereof in the public interest and public welfare.

Urban Water Management Plan Act, AB 797 (1983): This act requires urban water suppliers to prepare water conservation plans, including estimating water use, identification of conservation measures and a schedule of implementation plans.

Water Conservation in Landscaping Act, AB 325 (1992): This act requires the adoption of a model water efficient landscape ordinance by cities and counties. The ordinance establishes methods of conserving water, water budget concepts, efficient designing, efficient irrigation and plant materials and site auditing.

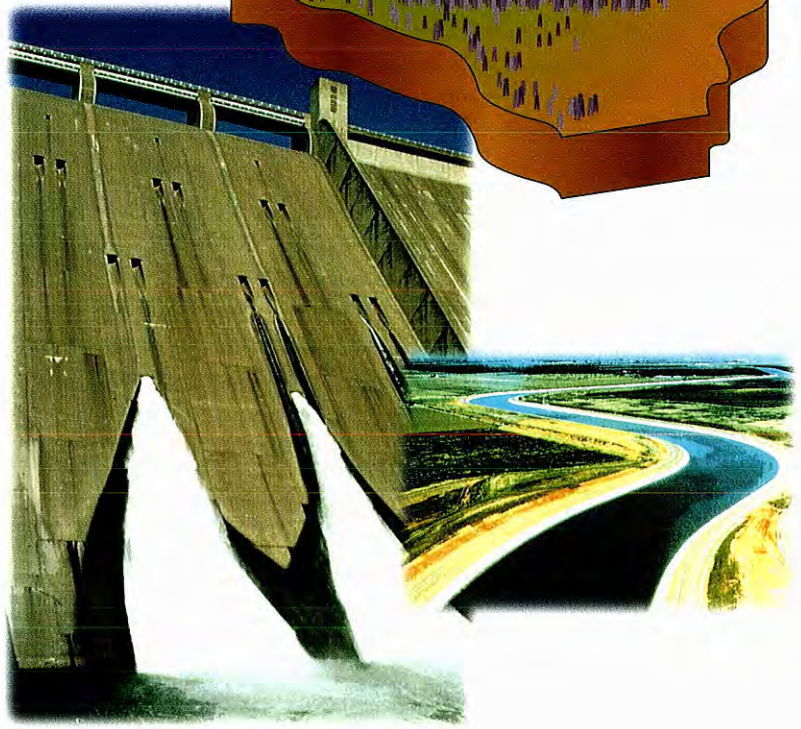
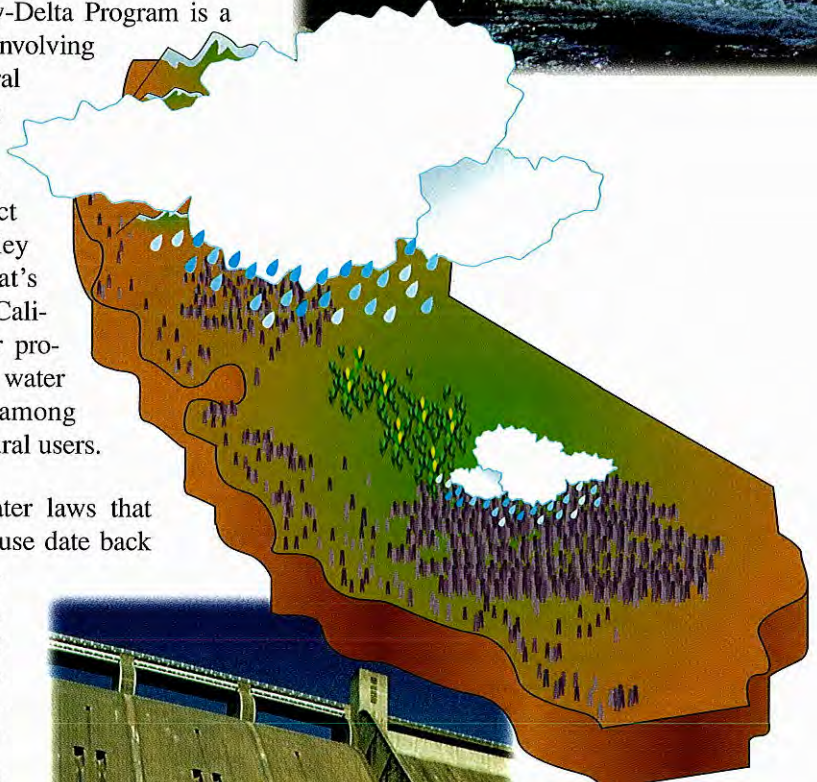
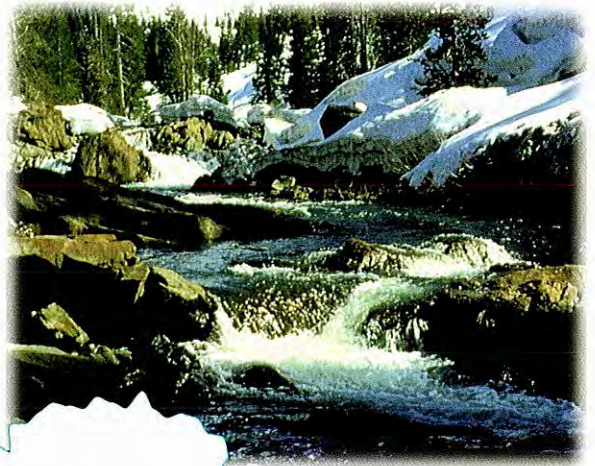
Urban Best Management Practices MOU

(BMPs, 1991): The BMPs established generally accepted practices among water suppliers that will result in water efficiency and the conservation of water. The 14 Best Management Practices are administered by the California Urban Water Conservation Council (CUWCC), an association of water agencies, environmental organizations and business groups such as CLCA.

CALFED (1992)/Proposition 204 (1996):

The CALFED Bay-Delta Program is a cooperative effort involving the state and federal government with responsibilities for coordinating State Water Project and Central Valley Project water that's used throughout California. The major project areas include water use efficiency among urban and agricultural users.

The history of water laws that affect landscape water use date back to the California Constitution. Article X, Section 2 prohibiting the waste of water. The Urban Water Management Plan Act, AB 797 (1983), requires urban water suppliers to prepare water use and conservation plans. The Water Conservation in Landscaping Act, AB 325 (1992), requires the adoption of a model water efficient landscape ordinance by cities and counties. The ordinance established methods of conserving water in the landscape, measuring water budgets, requiring efficient site design,



Current State Best Management Practices (BMP's, 1998)

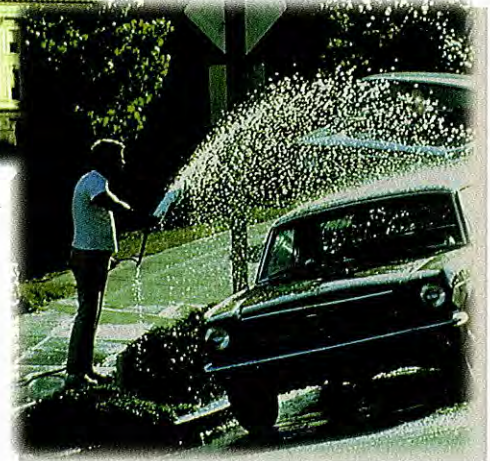
1. Residential Water Survey (audit) Programs (*home landscape efficiency*)
2. Residential Plumbing Retrofit
3. System Water Audits, Leak Detection and Repair
4. Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections (*leading to landscape water budgets*)
5. Landscape Conservation Programs and Incentives (*commercial landscapes with water budgets*)
6. High Efficiency Washing Machine Rebate Program
7. Public Information Programs
8. School Education Programs
9. Conservation Programs for Commercial, Industrial, and Institutional Accounts (*commercial landscapes, metered and unmetered*)
10. Wholesale (Water) Agency Assistance Programs
11. Conservation Pricing (*rewarding water use efficiency*)
12. Conservation Coordinator
13. Water Waste Prohibition
14. Residential Ultra Low Flush Toilet (ULFT) Replacement Programs



(Left) State laws seek to allocate water resources for protection and equity.

(Below) Inefficient water use will negatively impact California's economy.

efficient irrigation systems and site auditing. The latest public policy decisions center on Best Management Practices (BMP's) that will establish water use standards (water budgets) for landscapes (and other water users) across the state.



Why is knowledge of water laws important for the green industry? Because decisions are being made at the federal, state, regional and local levels that directly impact the designs of landscapes, the water available for landscapes and even if water will be available for new developments to be built. In the list above, BMP's 1, 4, 5, 9 & 11 will have a direct impact on home and commercial landscapes. Customers that pay water bills will be asked to use water efficiently. Those same customers will look to the landscape professional to manage and maintain the landscape under these new standards of water efficiency.

With limited water supplies and increasing population, water use, or water budgets, will be set by state mandates. In practical

terms, it means that each and every water user will be required to be efficient and meet water budgets in the future. Every water customer will have "Best Management Practices" to live and work by.

For the green industry, a reliable supply of water is the key to business success. The green industry opportunity, then, is to know the state and local water supply issues and offer services that help customers have healthy, attractive and resource efficient landscapes that meet the local public needs and standards. The green industry can offer solutions that maintain and beautify landscapes while meeting water budgets. Being part of the solution to California's water supply problems will mean new business opportunities for green industry businesses.

The legislative system is in place. Public agencies are moving forward to implement water efficiency standards. What will the response of your business be to the challenge of landscape resource efficiency?

CHAPTER 2

Property Value, Plant Use and Marketing for the Water Efficient Landscape



This chapter offers contractors tips and ideas they can champion in the pursuit of expanding business, raising industry standards and marketing the value of resource efficient landscape services to prospective customers.

“There are always opportunities through which businessmen can profit handsomely, if only they recognize and seize them.” J. Paul Getty

Landscaping as a Property Value Enhancement

We think it. We know it. Now we need to say it and sell it over and over again. Plants and landscapes make a significant contribution to the value of urban life, our homes, streets and communities. Picture a home, a street or a community without trees, grass and flowers. Landscapes define where we live and the quality of our local environment.

Landscape professionals can and should help their customers link the value of property with the quality of landscapes. Landscape contractors do not just mow, blow and go, they “manage assets,” as one contractor in southern California likes to say. Managing a home or business landscape “asset” implies a great trust on the part of the customer that has been placed in the hands of the landscape company professional. Asset management requires sophistication, attention to detail, consistent monitoring of trends, be they weather or market changes, keeping up with the latest technology and being responsive to customer needs. Sounds like Wall Street, but it applies just as easily to green industry businesses. If we believe in the value of landscapes, we must make the case with hard numbers, that quality installation, maintenance and upgrades keep up with market trends and achieve efficiency. That service, to maintain high quality landscapes, is what’s most valuable to the customer.

Functional Use of Plants

How many times are homes, businesses and streets built where we immediately look for plants to “soften,” “mitigate,” “screen” and “enhance” the impact of the urban setting? Every single time! Plants and landscaping perform that task.

One of the great benefits of plants is their functional use. Turf is necessary for recreation, walking, sitting, picnicking, etc. Trees screen and shade. Shrubs and groundcovers screen and provide color. All plants help control soil erosion. Sometimes, unfortunately, plants are used improperly. Poor landscape design leads to excessive costs, high water and high resource inputs, difficult maintenance and a low valued investment for the customer. Evaluate the landscape site for its functional needs. Is the landscape meeting those needs? How can it better meet customer needs? Look for the most resource efficient techniques to fit the functional need requirements for the site. That is the landscape that becomes a high valued asset for the customer

Evaluating the landscape for its best functional use with the right amount of water, fertilizer and

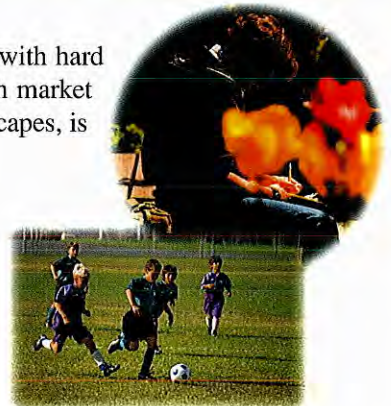
Benefits of Landscapes for homes and cities:

- Increased Property Values
- Increased Air and Environmental Quality
- Energy Savings from Shading Urban Heat Islands
- Increased Wildlife Habitat
- Positive Psychological Impact for People
- Major California Industry

Landscapes are important. Promote the need for landscapes. Water to maintain landscape plants is essential.

Functional Plant Uses:

- Trees that shade buildings, streets and parking lots (heat islands)
- Shrubs that fit into planter spaces without pruning
- Turf for activity or traffic areas
- Covering slopes to reduce erosion
- Creating an aesthetic image or comfort zones
- Colorful and edible gardens
- Restoration for wildlife habitat



labor, is another opportunity for understanding the true costs and benefits of a site and potentially increasing its value and adding new business.

Environmental Benefits of Plants

People generally recognize the environmental value of plant materials. However, poor landscape design with the wrong plants in the right places maintained with excessive water can offset the benefits of landscapes for the customer and contribute to environmental deterioration. Poor landscape practices increase green waste production, increase chemical use, use water inefficiently, increase soil erosion and produce unhealthy, unproductive, unattractive and more costly landscapes.

High quality, water efficient, healthy and environmentally sound landscapes go hand in hand. Those high quality landscapes don't just happen. It requires knowledge, sophistication, consistent monitoring and pride to deliver that high quality service. The environmentally sound, water efficient landscape sets a higher standard of value in the eye of the customer. Industries across the country have benefited in the marketplace by becoming more sensitive to the environment and marketing their environmental ideals. The green industry is the industry of environment. The green industry can and should use environmental quality as a guide to creating resource efficient landscapes for customers. The green industry can use environmental benefits as another tool to market high quality services to customers.

"New" Business

Where is new business for the green industry? With California's population predicted to grow by nearly 50% over the next 25 years, meeting growth demands will mean "new" business if there is enough water to sustain expected development.

New landscapes, based on state legislation, will need to be more water efficient. The majority of landscaping in the state (found in existing homes, communities and commercial landscapes) needs to be made as water efficient as possible. Why? All Californians will be asked to be water efficient. Landscapes will be one of the first "water users" to be required to meet water budgets to save water. Making landscapes efficient will certainly mean the need for new equipment and plant materials. But the main need will be for people with the ideas, the knowledge and the attitude to help customers become water efficient.

The development of "new" business, expanding markets and increasing profit margins is the continuous challenge for every business in every industry. The greater demand for water and resource efficiency opens a door for green industry businesses who are ready and willing to answer the challenge. California's population projections and water demands show this challenge will **never** go away.

Landscapes are an important community and business enhancement.



What is Evapotranspiration (ET)?

Evapotranspiration (ET) is the combined process of both evaporation from the soil and plant surfaces and water transpiration through plant materials. The measurement of water evaporation from the soil and transpiration through plant leaves by weather stations provides daily, weekly and monthly water replacement values. ET is measured in terms of inches of water per day, week, month or year. ET changes constantly with the weather.

What is a Water Budget?

- A water budget sets targets for water use in a landscape. Water budgeting is the practice of applying only the amount of water required by plants for healthy growth and appearance.
- The water budget concept was developed by researchers, green industry professionals and public agencies. It was utilized as the guide for making landscapes efficient through the state Water Conservation in Landscaping Ordinance (AB 325) in 1992.
- The water budget standard is based on reference evapotranspiration (ET_o) as measured by California Irrigation Management Information System (CIMIS) weather stations. The water budget for a site can be determined by the following equation, including the weather (ET), the crop coefficient (K_c), where K_c is the relative water requirement of the plant species to be irrigated, a factor for irrigation efficiency and the site size. The equation for a site water budget is written as

$$\frac{(ET) (K_c) (Area)}{(\text{irrigation efficiency})} = \text{Site water budget}$$

Keys to Better Business in a Water-Short State:

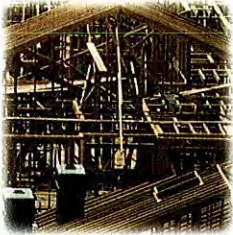
- Knowledge of the issues and public policy affecting green industry business
- Willingness to learn and use plant/water research, local ET, and the use of advanced cultural practices to optimize resource efficiency
- Business attitude of seeking to provide the best possible service to customers by delivering water and resource efficient landscapes

CHAPTER 3

The Green Industry Opportunity: Making Water Efficiency Work for You — Case Studies from the Commercial, Homeowner Association, City and Landscape Markets

This chapter presents real world examples of landscapes and management practices that have resulted in efficient and high quality landscapes.

Population growth will require water efficiency in new development.



Water is becoming a limited resource in California due to the increasing demands of every water using group. State legislators have enacted regulations aimed at the efficient use of water by all water users. Local water agencies will pass along water use targets by enacting ordinances, policies or pricing structures aimed to conserve water supplies. To some, this may seem a reason to leave the green industry. Others will seize the opportunity to provide higher valued services and profit from meeting customer needs in a changing market.

Will there be enough water for urban landscapes? Yes! If a wide variety of water supply projects are implemented, including the expanded use of recycled water and increasing the ability to move and store water during wet periods. However, water conservation and meeting water efficiency targets will always be key to insuring a reliable supply of water for urban landscapes.

Will urban landscapes dry up under such regulations? Will business suffer? BMPs, water budgets and conservation pricing is already happening in communities in California. The example of Irvine offers a very positive outlook for green industry business in a water budget future:

Landscape water use decline is attributed to conservation pricing (water use above the ET water budget is priced at increasing block rates), financial incentives and education programs for customers and landscape professionals. Over 7,000 acres of landscape areas are measured, have separate meters and are billed according to how well they meet a real time 100% ET water budget (historical ET for the area is 4.1 AF/AC/Yr). A 43% increase in landscape water efficiency (water savings) from 1990 to 1997 has been achieved. The community is considered green and lush and maintains high property values.

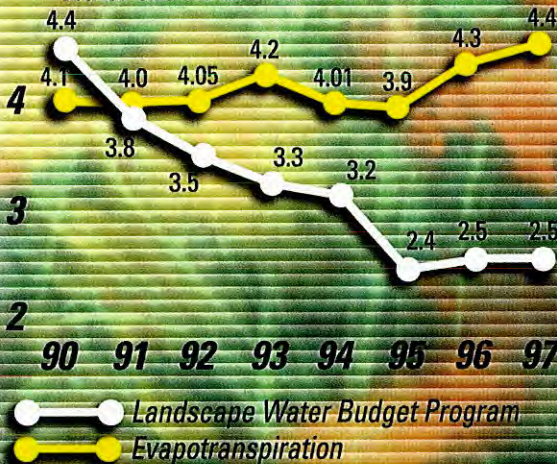
“New” business for the green industry was created in this community specifically to address landscape water use and efficiency standards, based on ET water budgets, set by the public agency. What has been the impact of the water budget system on the landscape water users in Irvine?

The Winners: The bill paying customers. They have significantly reduced water bills and gained healthier landscapes at the same time. All local businesses, including commercial, manufacturing, nursery growers, agricul-

Irvine Ranch Water District Landscape Accounts Water Use History

(includes all commercial, school, city, park, and homeowner association landscape acres)

Water Use in Acre-Feet Per Acre Per Year



1990 — (Water use per acre before the landscape water budget program)

1991 — (Water budget and water pricing structure implemented)

1997 — (A 43% decrease in water use from 4.4 to 2.5 Af/Ac/Yr)

*1995 experienced high rainfall, all other years were average or below average rainfall

1997 — hot year with long dry period



Landscapes add to property value and environmental quality.

ture, the city, the school district and homeowners benefit from paying the lowest water rates in the county. Water rates have not increased in five years, and the low water rates are a direct result of district management and water efficiency being practiced in the area.

The Water District: Meets state guidelines (BMP's) for efficient water use among customers. The district has helped create more knowledgeable customers with a water conservation ethic and actively partners with customers and the green industry to achieve low water bills.

The Landscape Contractor: Contractors have become part of the water conservation solution. Local contracting companies profit from water district incentive programs that help pay for upgraded irrigation systems and landscapes. Landscape Contractors use more sophisticated tools with which to manage their sites. They use successful, water efficient sites to market their skills and services to potential new customers. The impact of setting and meeting water efficiency standards in Irvine has been a financial and marketing benefit to contractors that recognize water efficiency as a business opportunity.

The following real life case studies show how specific customers and contractors in homeowner associations, homes, cities, and business parks have responded to regulations for water budgets.

Case Study No. 1

Commercial, City and Homeowner Association Case Studies

25 Acre Homeowner Association landscape, 90% turf, 25 years old

The Problems: \$90,000 in over-allocation (ET) water penalties in one year; poor turf appearance; little landscape color; woody and heavily pruned shrubs; street pavement erosion due to water run-off.

The Goals: Use water at or below the water budget allocation (ET), eliminate water penalty costs, improve turf appearance, increase site color, reduce water damages to pavement, fences and structures.

The Solution:

- Create a site master plan for phasing of landscape upgrades
- Upgrade old irrigation controllers and make spray heads uniform
- Convert the water source to recycled water
- Manage for the predominate warm season turf species, Bermuda
- Install a centralized irrigation control system
- Irrigate turf and shrub areas at proper ET/Kc level
- Read meters weekly to track water use and schedule irrigation to replace water loss
- Read meters and compare to ET to help identify leaks quickly
- Phase-out the removal of sheared shrubs and phase-in selective pruning
- Remove over-planted trees to reduce yearly trimming costs and improve turf conditions
- Rewrite landscape contract to specify high valued maintenance tasks and water management requirements



completed project designed to show savings and payback in water and maintenance savings in six years.

The irrigation system equipment upgrades and recycled water conversion have been completed. A central irrigation control system is operating and schedules are per the ET based water budget allocation. Over-water use penalty costs for the customer have been eliminated. Trees have been removed and new, more appropriate species have been installed. New turf maintenance and cultural practices have been implemented. The landscape contract has been rewritten and became the guide for bidding and maintenance work.

The Winners: The homeowner association. The owners gain a more attractive and cost-effective landscape with a six year payback time. Residents are improving their own gardens, showing newfound pride in the overall association landscape upgrades.

The Water District: Sees a 52% decrease in water use, saving 17 million gallons of potable water per year.

The Landscape Contractor: Performs over \$750,000 worth of “extra” upgraded work; gains an updated irrigation system with which to manage the site; participates with the customer and water district to achieve site water efficiency.

Case Study No. 2

4.5 Acre Homeowner Association, 205 condo units, small landscape planters consisting of trees, shrubs and groundcovers, little turf, 15 years old



(Left) Street erosion due to landscape water inefficiency.

(Above) Before: No color, plants don't fit planting space, tree root damage.

The Problems: High water bills and over-allocation (ET) use; generally unattractive landscape with bare soil spots; weeds; no flower color; severely sheared shrubs; over 200 trees with disease and/or causing hardscape damages from roots; streets and parking areas with paving erosion from water run-off; frequently leaking irrigation system; parked cars often sprayed by irrigation system; generally poor community aesthetics.

The Goals: Convert spray irrigation system to drip irrigation; renovate and replace plant materials; remove diseased trees; eliminate hardscape and street damages; add color, increase community shade and overall community aesthetics.

The Solutions:

- Produce a site master plan that addressed each of the listed problems
- Received a \$50,000 zero-interest loan from the water district to begin the project
- Used close collaboration between association board, landscape committee, residents, property manager, water agency and landscape contractor during every step of the project

The Results: A total site renovation; irrigation retrofit from spray to drip; a landscape upgrade including over 6,000 new container plants, 500 flats of groundcovers, at a total cost of \$85,000; a new look for the association; project payback of 6.5 years; water use potential of 50% to 70% of the local ET and reduction of high water bills; elimination of hardscape damages (a hidden cost of landscape and water inefficiency to the association) due to poor original plant and irrigation design, water overspray and runoff.

The Winners: The Homeowner Association. Gains a colorful new look while eliminating landscape induced water and hardscape damages; water bills reduced; tree/hardscape problems eliminated; overall landscape costs reduced.

The Water District: Gains water efficiency from a historically wasteful site, saving 2.6 million gallons per year.



After: A complete site retrofit provides color, low maintenance and helps property value.

The Landscape Contractor: Performed an “extra” \$85,000 worth of work and gained a new contract with higher valued specifications for water management and cultural practices; the site is efficient and needs less contractor time for constant “fixes”; the landscape no longer needs to be “managed by crisis”.



HOA park that meets water budget

Case Study No. 3

Homeowner Association, 38 landscape acres, 4,000 single family and condo homes, 85% turfgrass, 10 years old

The Problems: Over \$100,000 in over water budget (ET) penalty charges over 3 years; unusable, muddy parks; algae-stained stucco walls; stunted tree growth; consistent turf “hot spots”.

The Goals: Eliminate water use penalties, reduce water over-spray on walls; improve overall turf and tree health and achieve goals with no turf or plant material changes.

The Solutions:

- Use of ET water budget irrigation scheduling
- The use of cultural practices to improve turf quality, including regular aeration, turf top dressing with organic material, grasscycling and root development techniques
- Contracted for water management services with an outside specialist
- Instituted a preventative irrigation system maintenance program including pressure regulation and spray head adjustments, weekly meter reading, weekly scheduling adjustments and retrofitting of improper spray heads

The Results: Water use reduced 32%; water penalties eliminated; parks are dry and playable; algae-stained wall damages eliminated; turf “hot spots” reduced; hardscape damages and costs were reduced; the turf has more uniform appearance and the parks are no longer muddy; accomplished with no change of plant materials.

The Winners: The homeowners association. Enough money was saved to lower resident dues and build new tennis courts;

The Water District: Gains water efficiency with a large customer and saves 15.8 million gallons per year without any financial incentives invested in the site.

The Landscape Contractor/Consultant: Provides irrigation upgrades that make site management easier; learns and utilizes advanced cultural practices to improve turf water efficiency and appearance. The contractor becomes a major player in solving customer problems and saving customer dollars.

Case Study No. 4

Business Center Landscape Study, 8 acre study site (128 acre business park landscape), 95% turf, turf streetscapes on modest slopes with compacted clay soil; 7 years old.

The Problems: A high tech, exclusive business park with 128 acres of turf-oriented streetscapes and themed entrances with 50,000 cars passing through daily. When the water budget allocation system was adopted in 1991, the landowner experienced high water penalty costs. Turf, even with significant over-watering, was showing consistent “hot spots” causing unacceptable turf appearance. The landscape contractor blamed site problems on the “unfair” water budget allocation system imposed by the water district.

The Goals: Conduct a study to determine if the site could meet the 100% ET water budget; create a management plan to eliminate over-allocation water penalties; improve turf health and appearance. The site owners wanted to maintain the original plant design.



(Below) Study of irrigation efficiency, root depth, maintenance and scheduling.

(Bottom) Business park streets meeting ET water budgets.



Historical Water Use Attitude:

Excessive water has traditionally been used to compensate for or mask poorly designed, old, inefficient or poorly maintained irrigation systems.

New Water Use Attitude:

With the need to make urban water use as efficient as possible, water will no longer be able to be used to cover-up the weaknesses of a landscape design, irrigation system or poor management. Water will be applied at the right level, weather (ET) x plant requirements (Kc) for each hydrozone in the landscape. If site irrigation weaknesses appear, it is understood that system upgrades and/or management changes are needed. These upgrades and/or changes begin the process of the contractor helping to solve problems in the landscape for the customer. Water efficiency means more work, higher valued work, more irrigation materials and potentially more plants sold and installed, healthier and more attractive landscapes for contractors to promote. Recognize and practice efficient water management and promote that valuable service to increase business opportunity.

The Solutions:

- Conduct a comprehensive, independent study on the ability of the sites turf streetscapes to meet 100% ET water budget allocations. (The study was conducted over a one year period covering representative landscape hydrozones, 48 test sites in all, across 8 acres of the business park.)
- Analyze site test results and compare to visual appearance rankings
- Develop detailed maintenance specifications for water and turf management

The Results: All 48 test sites met or used less irrigation water than the 100% ET water budget allocation standard set by the water district. Test sites that incorporated advanced cultural practices and ET water budget irrigation scheduling provided the highest quality and best looking turf, increasing turf root depth by 66%. Water use on the test sites was reduced 51% from previous years. Turf appearance and health is better at the end of the study with a 90% of ET water budget than during years when 200% of the ET was applied.

The property management company incorporated the water management and recommended cultural practices into maintenance contracts across the entire 128 acre business complex landscape. The water efficiency program has reduced water bills by \$1.3 million from 1993 to 1996. It has meant the saving of 53 million gallons of water in four years. The turf is healthier with deeper root systems and less unsightly "hot spots". There is also reduced hardscape damages to streets and parking lots from water run off and overspray.

The original site contractor, claiming that water budget allocations were not adequate to meet site needs, was replaced. The new site contractor has a positive attitude toward using ET water budget irrigation scheduling to manage a landscape. This same contractor has been rewarded by the landowner with a doubling of landscape acreage under their management. The new site contractor has continued to improve on the business center water efficiency success and added "new" business to the books.

The Winners: The landowner/developer. The owner gains a more cost effective landscape. With a more efficient landscape site, the developer is able to keep leases and site costs lower for an improved competitive advantage. The improved turf health and overall landscape appearance is believed by the developer to be key to marketing the office space to potential business tenants. The developer is now confident, based on the study results, that this and any landscape site can be irrigated efficiently, meet 100% ET water budgets and have high quality appearance at the same time. Some \$1.5 million in water bills has been saved for the site owner since 1994.

The Water District: Gains the confidence of the areas major developer that a water budget can meet the needs of an existing turf landscape. For all customers and contractors in the water district, the study proves the ability of ET water budget allocations to meet the needs of difficult landscape sites. The water district gains the savings of 11.3 million gallons of water per year in the business park.

The New Landscape Contractor: They have significantly increased acreage under their management, and now actively promote the water management abilities of the company.

The Loser: The previous landscape contractor. Lost a highly visible 128 acre site contract. The water use prior to the study was 50%-100% over the 100% ET water budget allocations for the site. The contractor consistently blamed the ET water budget allocations as "not enough water" to adequately maintain the site. The real site problems turned out to be (1) avoided irrigation system maintenance, (2) avoided cultural practices based on plant needs, and (3) excessive water use that damaged plant root systems.

Case Study No. 5

City Landscape Water Management Program, 350 water meters, 558 acres of streetscapes, parks and parkways; new to 30 years old; a variety of contractors perform City maintenance work

The Problems: Over water use. In 1994 alone the City had accumulated \$184,000 in water penalty costs (water used over 100% ET budget); the wasted water, some 70 million gallons, caused damages to streets and the landscape; the turf streetscapes often exhibited "hot spots"; trees were suffering or stunted; City costs were going up while City revenues, due to a slow economy, were going down.

The Goals: Eliminate or reduce water use penalty costs; improve landscape appearances; implement more sustainable and less costly practices.

The Solutions:

- The City initiated a comprehensive water management plan that tracked the irrigation scheduling of every landscape water meter on a monthly basis
- Irrigation schedulers (city staff and contractors) were held accountable for managing water at 100% ET levels (private contractors going over the 100% ET water budget are responsible for paying water penalties)
- Upgraded training of water managers
- Revised maintenance contracts to specify cultural practices that provided improved plant health, deeper turf roots, fertilizer reductions, green waste recycling, water and resource efficiency
- New street landscape design guidelines prioritize greater sustainability, green waste reduction and water efficiency

The Results: Water use has been reduced 46%; water bills have stabilized compared to other utility costs; landscape appearance and health has been maintained; City staff understands that water budgets can be met; landscape specifications have been rewritten to include more advanced cultural practices (and bid at virtually the same price as previous contracts); City realized that well trained people were more important to achieving goals than technology; City realized that 80% of water penalties and water damages to streets came from areas of turfgrass and overhead spray in street medians; City identified that an effective maintenance program never ends and should never cut corners; use of soil tests reduced fertilization 60%; City found that proactive programs are more cost effective and preferable to reactive programs to avoid landscape problems and costs.

The Winners: The City. They have gained a more sophisticated and cost effective approach to understanding how best to maintain their valuable landscapes. They have maximized appearance and minimized budgets while City taxpayers see more colorful and diverse streetscapes. The City can justify these efforts by the reduction of costly erosion on streets and reduced water bills.

The Water District: Sees 70 million gallons of water saved per year. City landscape water efficiency helps keep water rates low for all customers.

Future City Landscape Contractors: They gain precise City contracts on which to bid and perform work.

The Losers: The landscape contractor who under-bids to get the work and can't profit due to the specialized contract responsibilities; contractors who don't meet water budget allocations pay water penalty charges and ultimately lose City contracts.



Home Landscape Case Studies

Case Study No. 1

A seven-year-old, inland home with one-half acre of landscape (22,650 square feet) of which 12,600 square feet (56%) is turfgrass



The Problems: High water bills, poor turf appearance and consistent turf “hot spots”.

The Solutions:

- The landscape contractor and local water agency developed an appropriate water budget for the site
- An audit of the irrigation system was performed to determine inefficiencies and system needs
- The irrigation system was adjusted and upgraded as recommended by the audit
- An ET water budget irrigation schedule was implemented
- The landscape water efficiency effort, including site audit and system upgrades, cost the homeowner \$1,500.

The Results: Water use at the home was reduced 30%, saving 430,000 gallons of water in one year. Turf appearance improved and “hot spots” were eliminated.

The Winners: The homeowner saved enough water to pay for the landscape audit and upgrades in the first year. The landscape appearance and quality, especially the turf, improved. The landscape contractor performed extra or “new” work driven by the customer need to meet local water budget goals and reduce water bills.

Case Study No. 2

A 30 year old, 3,000 square foot home garden



This traditional garden consisted of the common design of the time, a large expanse of cool season lawn, foundation shrubs against the house and the occasional tree planted in the turf. The garden plants have varied over the years as the owners tastes and budgets allowed. The original design was neat and attractive, but lacked color or special interest that would set this home apart from any others. Increasingly higher amounts of water, fertilizer and labor were being used to maintain the garden.

The Problem: The homeowners wanted less garden maintenance, more color, lower water bills, environmental sensitivity and a more interesting appearance for enhancing the property value for future sale.

The Solution:

- **Planning:** The landscape contractor listened to the customer needs and desires, and helped develop a phased plan of garden changes. The plan recognized the site microclimates, areas of high water use and labor costs, and set priorities for retrofitting irrigation and using new plant materials.
- **Installation:** The specific work included soil testing, plant removal, soil amending, increasing perennial beds and fruit tree plantings, using drip irrigation in all shrub and tree areas and mulching all non-turf areas on a regular basis.
- **Maintenance:** Included using a soil probe to test for moisture before irrigating, using fertilizers only as soil tests suggested, using slow release fertilizer for the turf in warm months with iron to slow growth and maintain deep green color; less time was spent pruning and mowing

and more time was spent keeping the irrigation system operating efficiently and keeping mulch built up.

The Results: The home garden saves 40,000 gallons of water per year; the addition of perennials adds seasonal color and attracts wildlife; new shade trees cool the hot southwest side of the house and reduces energy bills; flowers and fruit are now products of the garden; curb appeal is high (cars slow to look at the garden as they drive by).

The Winners: The homeowner saves money on water and utility bills, gets a more colorful and contemporary landscape. The added pleasure and use of the garden increases the value of the garden for the owners as well as for the future resale value.

The landscape contractor assisted the homeowner with bringing their needs and desires to life; gains “new” retrofit work; provides higher value maintenance services and gains an attractive “model” for marketing home garden upgrades and resource efficient maintenance practices to future customers.

Case Study No. 3

Using advanced cultural practices to maintain the home garden

The Problem: An eight year old home with 2,000 s.f. of landscape needed to reduce water to meet local water budget allocations, but had no budget for significant irrigation or plant material changes.

The Goal: Meet water budgets with cultural and maintenance practices only.

The Solution:

- The contractor used a soil probe to monitor soil moisture before irrigating
- The local newspaper’s weekly ET information was tracked to “check” irrigation water replacement needs
- Irrigation heads were adjusted for clearance over turf
- All heads were straightened and cleaned to maximize uniformity
- Heads were consistently adjusted to eliminate overspray
- Pressure was checked and pressure regulating devices were used to reduce misting (paid for by the overall savings in water bills)
- Turf was mowed with a mulching mower (mulched clippings help retain moisture and add slow release nutrients)
- Turf fertilization was changed from high nitrogen to iron-based balanced fertilizer (reducing growth rate and need for excess water while maintaining deep green color)
- Irrigation run-off time was determined to set the limits of irrigation run-times
- All shrub beds were mulched and watered one-half as much as the turf (checked by using a soil probe)

The Results: The home garden meets the local water budget, saving 75,000 gallons per year; the landscape health improves (no chlorosis, deeper rooted turf, more shrub flowering); less green waste produced.

The Winners: The homeowners reduce water bills and improve the health of the garden at no additional cost. The landscape contractor meets the challenge of reducing site water use without any extra cost or plant changes. The savings from reduced fertilization, reduced dump fees and less weeding time covers the cost of more advanced cultural practices. The landscaper is seen as a more valued partner in meeting the customer’s needs.



Who is responsible for high water bills from this inefficient irrigation system? The homeowner and the landscaper. Solution: add pressure regulation, adjust heads.

CHAPTER 4

"Change" in the Landscape

This chapter describes attitudes that companies can build to more effectively market efficiency as a "new" business opportunity.

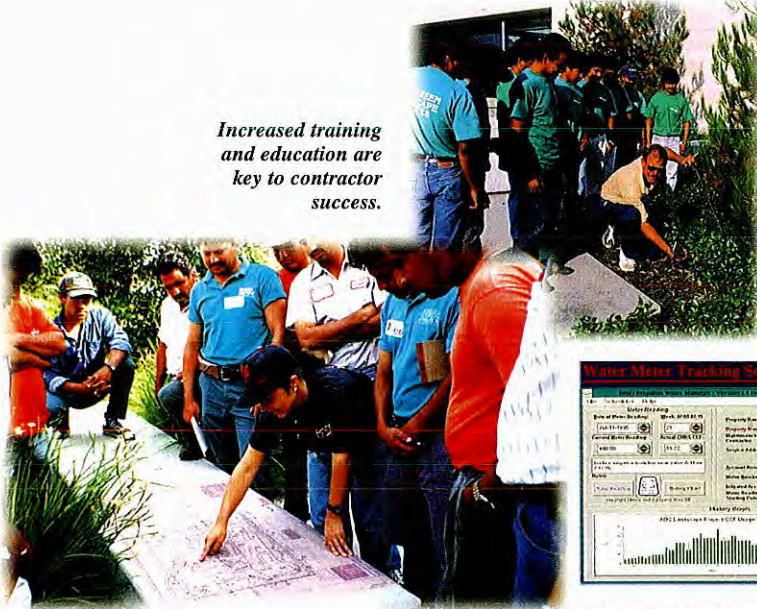
The previous case studies provide real world examples of what can happen when public agencies initiate water budget and water conservation programs in their areas. For landscape contractors, there is the potential to partner with customers and agencies to solve costly problems found in landscapes. Of course, there is also the option to try to hold on to old maintenance habits, resist change and ignore the genuine public need to use water and resources wisely.

The real change taking place is in the knowledge and attitude that contractors take to their sites. Seeing is believing, and contractors that practice effective water management see that water efficiency and water budgets do not destroy sites they manage. The belief in the credibility of the water budget science developed by university research programs, and the knowledge of real plant water needs is the important first step in gaining landscape water efficiency. It has become evident that the real change that is needed is not necessarily to replace high water use plants with lower water use plants, or to retrofit spray irrigation systems to drip systems, but to change the attitude of maintenance company owners and employees. Water efficiency makes sense today, tomorrow and in the future for green industry professionals. Understanding the issues and building the knowledge of how to care for a site in the most efficient way will help to make the green industry leaders in dealing with California water limitations.



The use of drip irrigation and mulch in parking lot and street applications

Increased training and education are key to contractor success.



Know how much water a site uses.

Integrating New Attitudes and Practices

The reality is that all water users, including landscapes, need to be water efficient in California. It is an essential belief for changing and potentially expanding business opportunity. The attitude within a company that resource efficient landscaping is the "right thing to do" environmentally, economically and competitively, is important when trying to integrate new approaches into company practices. Customers respond when site upgrades make economic sense and eliminate costly problems.

The first step is to find out the facts about your local area and your sites. Start by contacting the local Cooperative Extension office for weather, soil and plant data. Find out where you can get local ET weather data and how you can access that data every day (for example, weather data is available on the Internet). Look for educational opportunities for employees. Contact the local water agencies to learn about their water pricing and conservation programs.

With this information, evaluate how work is performed, on a site-by-site basis. How is irrigation scheduled and how often is it changed? Does it match the changes in weather? What is the local ET. How wet (or dry) is the soil? With this type of information, the landscape contractor can begin to formulate a plan of how to increase profits through increased labor efficiency, water efficiency and improved customer service for every contract site. Landscape contractors that apply resource efficient techniques on their sites save valuable

labor time, save resources, can increase profits and improve the appearance of the landscape. Customers see a consistently attractive landscape with less problems.

Most importantly, find out everything you can regarding your sites.

That information includes:

Site Information:

- Site water use history
- Landscape square footage (by meter)
- Irrigation equipment inventory and condition
- Site hydrozone water requirements (site map of irrigation stations and plants)
- Crop coefficient (Kc) or plant factor (water need) information on the plants at the site
- Local ETo (reference evapotranspiration) on a weekly basis
- Formulas (or software) for turning weather (ET) data into irrigation schedules
- Local water prices, billing information and conservation programs
- Irrigation system efficiency level
- Soil type, soil nutrient levels and water infiltration ability
- Take consistent soil probe samples to monitor turf root depth and soil moisture
- Listing of any site problems (hardscape damages, signs of water overspray or runoff, turf quality, green waste generation, fertilizing schedule, etc.)
- Site goals from the customer standpoint
- Site goals from the contractor standpoint
- Site budget

Contact the California Irrigation Management Information System (CIMIS) on the Internet:
www.ceresgroup.com



Specific site knowledge enables you to use water and resource efficiency to work for you and your business.

Selling the Water Efficient Landscape

It's in the numbers that will convince customers to use your services and fund water and resource efficiency upgrades you recommend for a site. What numbers are we talking about and where do you find them? Every site is unique and will have its own set of numbers to gather.

Here is an example of how numbers can illustrate opportunities for a green industry company and help solve a customer problem. A homeowner association replaced eight-year-old wood fencing due to serious water damages. The cost was \$550,000 for the fence replacement throughout the entire complex. Two months after the new fence was installed, water over-spray was beginning to discolor and destroy the second fence system. The

Other Important Site Numbers to Know:

- The cost to your customer for site maintenance (overall and itemized)
- The hidden costs of the site (i.e., street/paving erosion, fence damages, hardscape damages, root damages, over-water use cost, etc.)
- The cost to upgrade the site (irrigation system and/or plant materials)
- Customer pay-back time (total upgrade cost / yearly savings)



*(Top) Old fence with water damage.
(Above) New fence with water damage.*



More “New” Business for the Green Industry

New business for landscape contractors traditionally comes from the development of new homes and businesses with more landscape acreage installed. With the California population estimated to increase by 15 million people by the year 2020, there will be significant “new” business to meet demand. However, the recession of the early 1990’s showed that counting on new development for increasing production can be a precarious business approach. Drought also slows or stops “new” landscape installations.

As population grows and water supplies are stretched, new development may be contingent upon **if** there is enough water available to meet existing and new urban demands. Currently 40%–70% of home water use goes to landscapes, depending on the local climate. **Making existing landscapes as water and resource efficient as possible is the best way the green industry can contribute to helping urban water supplies meet new development demands.** There is an estimated 1.0 to 1.5 million acres of existing landscaping in the state. Over the next 20 years, with a 48 % increase in population expected, some

landscape contractor, armed with a new attitude and numbers, presented the association with a plan to retrofit and upgrade the entire landscape, changing the original plant and irrigation design to eliminate overspray problems causing the fence damage. The contractor showed that they could not only eliminate fence water damages, but street and parking lot paving erosion from water run-off. Water bills were also estimated to be reduced by at least 35%. The cost for a total landscape renovation was estimated to be \$150,000, or 73% less expense than to replace the fencing (\$550,000 plus inflation) again in eight years. The decision was made easy for the association by the landscaper.

Each site will be different, with a variety of slope, irrigation, tree, hardscape, plant material, age, soil, green waste, root, color, and/or budget problems. With experience, you will find opportunities for efficiency and marketing to take from site to site. Remember, you the maintenance contractor did not design the site landscape. But you, the landscape contractor, are the only one capable of remedying site problems and maintaining site value for the customer. Get to know the numbers for each site you manage.

*(Below) New streetscape with sub-surface irrigation.
(Bottom and below, next page) Streetscape before; and after, with 50 percent less water and reduced paving damages.*



500,00 to 750,000 acres of **new** landscape could be in demand by the public. The opportunities for green industry solutions for water efficiency are everywhere. In new landscapes with new designs, with new irrigation systems and new plant materials that increase water efficiency. But, more importantly, in **existing** landscapes that need new designs, upgraded irrigation systems, new plant materials and advanced maintenance practices to achieve water efficiency. Making existing landscapes water efficient represents a significant opportunity for the green industry to add “new” business. Retrofitting existing landscapes to be water efficient is a relatively untapped market for green industry businesses. And, improving a landscapes water efficiency will help make water available for new development. Practice water efficiency on every site for every customer, new or old.

Create marketing tools and materials that highlight your company’s abilities. Market your services that protect and enhance the customers property values. Don’t just talk about a healthy landscape, create efficient and cost-effective landscapes that use actual site numbers that show the results you can bring to your current and prospective customers.

Customer Service

Read any book on business success and it will tell you that what makes the difference between success and failure is **QUALITY CUSTOMER SERVICE**. Interviews for this handbook with landowners, developers, city staff, homeowner associations, and landscape professionals revealed that the customer perception of service provided by landscape contractors is considered low. Customers do not understand the scope of managing the dynamic changes presented by “nature” in the landscape. Customers do have problems in their landscapes. Those problems can be expensive and a challenge to correct. The one business that can educate, unravel and solve the customer’s landscape problems is the landscape contractor. That fact alone should lead to higher valued contracts and greater confidence in the industry.

Practice high quality customer service. Do that by using site specific numbers on the costs to maintain a high quality landscape. Point out the hidden costs of a poorly maintained landscape and the benefits of a top quality maintenance program for the customer. Without quality customer service, the public develops a perception of landscape maintenance that undervalues the important services offered by the landscape professional.



When presented with real numbers and the vision of an upgraded, efficient and attractive asset (the landscape), customers will make the cost effective choice. It is up to the contractor to make that case for the customer. Higher quality service **does** pay for itself for the customer. Show the customer how...

A case in point is a homeowner association with 38 acres of landscape, 25 years old with large slopes, thousands of trees, meandering turf greenbelts and foundation plants up to the homes. The landscape contractor is under pressure from the association board because water costs and the incidence of irrigation failures and fixes have continued to rise. Wood fences and street paving is consistently damaged by water. The turf, shrubs and groundcover plantings were not meeting the visual

expectations of the association.

How does the contractor meet the customer expectations, reduce rising costs, upgrade the landscape appearance and retain the site contract?

- **Step 1** – Analyze the site costs for water, repairs of the irrigation equipment, upgrades of old, inefficient heads and hidden costs.

Example Marketing Tools:

- Water use histories of your sites compared to weather and water budgets
- Cost savings you have accomplished for customers in graphic form
- Photos of water efficient sites
- Before and after photos of cost-effective retrofits
- User friendly weekly/monthly irrigation scheduling reports
- Step by step water management program/services your company offers

- **Step 2** – Listen to the customer’s desires and educate the customer on the “real” reasons behind the failing landscape (i.e. design, age, vandalism, etc.). *Note: It is important that the real site problems don’t become excuses by the contractor. Many problems are caused by external forces over which the contractor has no control. The contractor should take responsibility for the role maintenance has in causing problems and help the customer understand what it takes to eliminate them. Often, the cost to supply a service, say water management, is less than the cost of excess water use to the customer.*
- **Step 3** – Analyze the contract. Is it specific as to the customer’s desires and does it provide enough time to perform high quality service for the customer? *(Don’t continue to work sites that cost you money and tarnish your reputation.)*
- **Step 4** – Come armed with facts. Don’t go to meetings with customers unprepared or defensive. Know what the water use of the site is and what the local ET says it should be. The difference in those two numbers is money that can be saved for the customer. Bring solutions for getting water spray off of fences and streets and know how much it will cost. Find out what the hidden costs are for hardscape damages, fences, street paving, etc. As money is always an issue for customers, devise a phased retrofit plan of attack for the customer, and remember that every efficiency upgrade should immediately begin to save either water or labor time or both. That translates into better customer service, better customer relations, higher profits and a more successful site. *(It may be helpful at this point to bring in an outside horticulture consultant to act as a facilitator between the contractor and the customer.)*

What happened on the 38 acre homeowner association site? The landscape contractor enlisted the help of an outside horticultural consultant to meet the customer and walk the site. The outside consultant was needed to play the part of a facilitator to assist with the site assessment, educating the customer for the site potential and estimates of savings and help develop a site master plan. The efforts included:

- Educating the customer regarding opportunities for savings
- Helping the customer identify the goals for the site
- Making the customer’s goals the goals of the contractor
- Helping the customer understand the need to implement



Site retrofit that solved customer problems of high water bills, tree root surfacing, water damage to fences, and lack of color.

(Top right) Before—uninspiring landscape. (Immediate right) Turf sculpting around trees, old shrubs removed. (Far right) New plant placement with drip irrigation.





(Top) Before—the uninspiring, colorless landscape.

(Above) Retrofit, upgraded landscape cut water bills by 50%, cut maintenance cost 20 percent, improved property value, solved a variety of customer problems

the solutions to the site problems (as opposed to the crisis management approach of fixing the symptoms instead of curing the problem)

- Suggesting substantial changes for the long-term landscape health, not band-aid fixes. This was done by using the site “numbers” to show the cost effectiveness of “doing it right” versus “doing it quick and cheap”.

Did the effort work in terms of upgrading the landscape and keeping the

contractor on the site? Yes. The association agreed to a master plan that detailed the types of irrigation system upgrades to perform, what plant material changes to make to increase color and reduce maintenance time, what areas to treat as priorities and how to phase the implementation of the upgrades to accommodate the association budget. The contractor not only kept the job but also became a partner with the

customer to remedy site problems. The landscape contract was revised to detail the highest valued work and pay the contractor for more sophisticated work.

Once the customer understood the high and never ending costs for band-aid fixes to an old and poorly designed site versus the costs for long-term solutions, the relationship and efforts between the contractor and customer changed for the better. A new level of customer service began with understanding the site numbers and looking for solutions that would be cost effective for the customer. With this type of approach, contractors can perform more retrofit work (new business), gain higher customer acceptance (raise industry standards) and increase profits.

This example, and previous case studies, show that analyzing site problems, looking for cost saving opportunities and listening to the customer needs translate into higher quality customer service. Customer service pays. Every landscape customer in California will have the need to be water efficient in the coming years. That need will grow as population increases. The green industry, and particularly the landscape contractor, has the unique position to offer solutions to each and every customer. Those solutions should be viewed as customer service, not just water management, or grass-cycling, or mulching, or matching irrigation heads. Every landscape customer will need higher quality, integrated landscape services. That need, like the need for water, will never go away.