Water Efficient Landscape Ordinance (AB 325): A Statewide Implementation Review

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Water Efficient Landscape Ordinance (AB 325): A Statewide Implementation Review

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A Report Submitted to the
California Urban Water Agencies

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Executive Summary

Background and Study Design

By all accounts, urban water conservation is expected to play a preeminent role in balancing California's future water demand and supply. Outdoor water conservation is especially important because of irrigation demand's disproportionate contribution to peak seasonal demand, a key driver of system capacity. Urban irrigation demand is a function of both landscape design and efficient management. Substandard landscape management can lead to excessive irrigation, just as improper choices about plant material, plant layout, and irrigation systems can result in very-expensive-to-maintain landscapes given the region's sparse water endowment. Outdoor water conservation therefore requires simultaneous progress on both the design and management fronts.

Landscape professionals have made substantial progress in identifying design and maintenance principles that lead to increased levels of water-use efficiency. These principles were codified in the Model Landscape Ordinance (AB 325), which was intended to promote the "design, installation, and maintenance" of water efficient landscapes. But the AB 325 legislation neither prescribed clear conservation goals, nor did it require meaningful levels of compliance. It also did not deal with pricing and enforcement issues. Interested observers have been curious about several aspects of this legislative initiative, such as, what features did various land use agencies include in their ordinance? How effective are these ordinances? What do planners and other stakeholders have to say about the implementation of this ordinance and its subsequent impact on water consumption? If implementation has been tardy, what remedies do various stakeholders propose?

Given the nature of the questions—some quantitative, some qualitative, some broad, some highly focused—we opted for a staged study design that included a telephone screening survey, a mail survey, and in-depth personal interviews. A total of 151 land-use agencies were selected at random for detailed study, including both city and county governments. The sample consists of agencies large and small, urban as well as rural. Each sampled agency was telephoned to identify and establish a point of contact, usually a planner in the city or county planning department. During this initial telephone screener a copy of the water efficient landscape ordinance was also requested. This strategy ensured that we had a copy of virtually every sampled land use agency's ordinance, even those that subsequently failed to respond to our mail survey, so that basic data about the various types of ordinances in use would not be plagued by non-response bias. During the next stage, surveys were sent to each established point of contact with the aim of obtaining more detailed information about each sampled agency, while we began the long process of reviewing and rating each ordinance. Finally, information from the reviewed ordinances was combined with data obtained from the returned mail surveys, and a few agencies were selected for detailed in-person interviewing. The personal interviews not only targeted city and county planners but also other third party stakeholders such as landscape architects, developers and contractors.

Findings and Recommendations

Although improving landscape water use efficiency through better design is clearly a step in the right direction, our analyses suggest that the Model Ordinance at its present level of implementation does not provide a complete answer to landscape water conservation, for three chief reasons. In increasing order of importance, these include: (1) inadequate coverage of the ordinance; (2) weaknesses in the structure of many ordinances; and (3) actual irrigation monitoring, or enforcement of the maximum water allowance virtually nonexistent. In other words, among the three goals of "design, installation, and maintenance," the last has received short shrift.

As mentioned, the first problem is the least serious—we estimate that close to 90% of new development between 1992 and 1999 has taken place in agencies that have adopted a water efficient landscape ordinance, resolution, or design guidelines. The second problem appears somewhat more serious—upon comparing each sampled agency's ordinance to the Model Ordinance on a four-point scale (exemplary, good, fair, poor) we find that the overall level of efficacy lies roughly halfway between fair and good, which is not terribly encouraging. But the true Achilles Heel is the third problem—lack of irrigation monitoring or enforcement of the maximum water allowance in the field. To be sure, over 90% of the surveyed agencies verify compliance between the designed and installed landscapes, but that is where the exercise of leverage by planners and landscape architects ends. Many stakeholders highlighted during the personal interviews that maintenance contractors rarely irrigate accurately no matter how efficient the design. During our interviews we discovered that few developers and contractors were even aware of the Model Ordinance. This lack of awareness, in a setting where water for the most part is still very cheap and agency monitoring nonexistent, makes wasteful irrigation virtually inevitable. It is therefore unsurprising that only a third of the mail survey respondents feel positively about the long-run effectiveness of their agency's water efficient landscape ordinance.

Roughly half of survey respondents offered open-ended comments, almost all emphasizing the need for more education among other things—more education of landscape architects and planners; of developers and contractors; and of the general public. Only 2 among the 66 responding agencies have an ongoing outreach program. The rest essentially depend upon the permitting process to disseminate information about their ordinance, which means the message rarely extends past the choir. Landscape architects have not found it difficult to work with various water conservation requirements and many find their landscape plantings have improved, but it is also clear from the personal interviews that most believe post-installation follow through is sketchy and ineffective at best. To remedy this situation many pointed to the need for economic incentives to promote water use efficiency, for example, through conservation rates. Surveyed agencies also cited insufficient staff as an important reason for not adopting a water efficient landscape ordinance in the first place, and for their city municipal water utilities not undertaking conservation programs in general.

The above deficiencies are not easy to fix. To ensure that the Model Ordinance leads to the "design, installation, and maintenance" of water efficient landscapes—"maintenance" at present being the weakest link—will require concerted action on many fronts. We do

not believe that revising and strengthening ordinances ought to be priority number one, although this issue needs to be addressed at a suitable point in the future. The key probably lies in more education, pricing, and better integration of enforcement efforts between land use agencies and water suppliers. To bring about such coordination will require additional staff and funding support, and may also require imparting a working knowledge of landscape design issues to water-utility conservation coordinators among other things. At present, less than a third of water retailers servicing the sampled agencies are signatories to the *Memorandum of Understanding Regarding Urban Water Conservation in California*. But as more acquire signatory status in the future and start to implement water conservation best management practices, the prevalence of conservation rate structures will likely increase as will the prevalence of dedicated irrigation meters, all of which will go far in promoting the effectiveness of the Model Ordinance.

Directions for Future Research

We recommend two lines of inquiry for future research. First, it would help if for roughly 40-50 landscapes from different regions of California, designed in accordance with the Model Ordinance (or a strong variant), and connected to dedicated irrigation meters, water use data were analyzed to assess just how much wasteful irrigation occurs in spite of efficient design. Our information suggests that enough such sites exist in Southern California alone. Second, the database constructed for this study could be fruitfully expanded to include detailed characteristics of water utilities serving the sampled land use agencies. Since the land use agency sample is representative of California as a whole, results could be reliably extrapolated to the state level. Such a database could serve as the basis for formulating policies aimed at fostering greater levels of cooperation and coordination between water suppliers and land use agencies in the water conservation arena.

1. Introduction

To better balance future water demand and supply in a way that minimizes both costs and environmental impacts, Californians widely recognize the need to increase water use efficiency—and many initiatives have been undertaken to further this goal. For example, a key initiative that affects water suppliers is the *Memorandum of Understanding Regarding Urban Water Conservation in California*, which lists several best management practices for signatory urban water agencies to follow. This study, however, focuses on a slightly different initiative that was targeted at land use agencies. Enacted in 1990, Assembly Bill 325 (AB 325), known as the "Water Conservation in Landscaping Act," directed the California Department of Water Resources (DWR) to develop a Model Water Efficient Landscape Ordinance (Model Ordinance) and directed local land use agencies to either adopt this Model Ordinance, or a variant better suited to their needs, or to side step the ordinance entirely if proper justification could be provided for such a course of action. The Model Ordinance is different insofar it targets land use agencies, not water utilities, and is intended to promote the "design, installation, and maintenance" of water efficient landscapes in new construction with over 2,500 square feet of landscape. The Model Ordinance implicitly recognizes that land use and water supply planning must be better integrated in the future. According to the California Department of Water Resources, the state's population is projected to cross 45 million by 2020. Most of this growth will likely occur in the hotter inland areas. Thus, to slow water demand growth it is essential to promote water use efficiency through as many means as possible.

Compliance data collected by Marsha Prillwitz and her colleagues indicate that by the time the ordinance went into effect (January 1, 1993), 60 land use agencies had formally filed for exemptions. The Model Ordinance or a closely related water budget approach was adopted by 257 land use agencies, with the remaining adopting other approaches such as a prescriptive point based system, turf limits or irrigation day and time restrictions. There were a total of 512 land use agencies (58 counties and 454 cities) in California when these data were first compiled, although the number of cities has since grown to 471.

Interested observers have been curious about several aspects of this legislative initiative, which by design abjured a one-size-fits-all approach, such as, what features did various land use agencies include in their ordinance? How effective are these ordinances? What do planners and other stakeholders have to say about the implementation of this ordinance and its subsequent impact on water consumption? If implementation has been tardy, what remedies do various stakeholders propose?

Given the nature of the questions—some quantitative, some qualitative, some broad, some highly focused—we opted for a staged study design that included a telephone screening survey, a mail survey, and in-depth personal interviews. The following section (Section 2) describes the components and rationale underlying our study design, while the subsequent sections discuss findings from each component of the study. The final section integrates these findings and makes recommendations.

2. Overall Study Design

The nature and breadth of questions posed to us precluded a simple surveying approach. Apart from the obvious need to collect detailed information about the ordinance and its implementation, it was also necessary to collect additional data about various contextual and mitigating factors to help understand why land use agencies reacted differently to the AB 325 initiative. It was also necessary to go beyond planning department staff to obtain feedback from third-party stakeholders, all of which could not have been combined in one survey.

That the first step would have to involve some sort of a telephone survey, at least to establish a point of contact within each sampled land use agency, was quite obvious. What was less obvious though was whether ordinance related information should also be collected over the phone. On the one hand, planning department staff are notoriously busy, therefore unwilling to answer too many questions over the phone unrelated to their primary mission. On the other hand, exclusive reliance on mail surveys after the initial telephone screener would have likely produced an incomplete and potentially biased picture due to low response rates. Thus, we opted for a staged study design involving telephone surveying, mail surveying, and in-person interviews, designed to address certain basic questions with a very high level of accuracy while at the same time reducing undue burden on land use agency planners.

Our goal was to select roughly 150 land use agencies at random for detailed study, with the expectation that if only half responded to the mail survey, we would still have an adequate sample. How the master set of land use agencies was developed, from which this representative sample was drawn, is described later. Each sampled agency was telephoned to identify and establish a point of contact, usually a planner in the city or county planning department. While establishing telephone contact the individual was educated about the purpose of the study and his contact information including mailing address, fax number and e-mail address if available were all taken down and compiled systematically. This initial screening call was also used to alert the established point of contact about the need to fill out a survey for our study, and was given the option of receiving it via regular mail or e-mail. Several opted for the latter. Finally, during this initial telephone screener a copy of the water efficient landscape ordinance was also requested, which some mailed in while others faxed or e-mailed to us. This strategy ensured that we had a copy of virtually every sampled land use agency's ordinance, even those that subsequently failed to respond to our mail survey, so that basic data about the various types of ordinances in use would not be plagued by non-response bias. By requesting and reviewing the ordinances ourselves, instead of asking detailed questions over the phone, or through the mail survey, we aimed to reduce the burden on the planner and improve their level of cooperation.

During the next stage, a survey was sent to each established point of contact, while we began the long process of reviewing and rating each ordinance. Information from the reviewed ordinances was combined with data obtained from the returned mail surveys, and a few agencies were selected—using criteria described later—for detailed in-person interviewing. The personal interviews not only targeted city and county planners but

also other third party stakeholders such as landscape architects, developers and contractors (who were identified partly with the help of land use agency planning staff).

Sample selection

Land use agencies exhibit a highly skewed profile in terms of population size. California consists of a few very large cities, many very small cities, as well as 58 counties—some with significant, some with sparse—unincorporated developments, subject to county land use regulations. The study sample was drawn in a way to make it nearly representative of the whole state and yet retain the ability to draw a rich picture not only of large agencies, but also of the middle and smaller agencies where most of future growth is likely to occur.

A pure population-weighted sampling approach was abandoned because the results were too heavily slanted toward the larger agencies. On the other hand, simple random sampling produced results too heavily slanted toward the smallest cities, some of which were too small to even appear in useful city-level databases of socio-economic and demographic information, such as, the US Census Bureau's *County and City Databook.* We wanted to develop our database in such a way that it could be linked and expanded to support additional future analyses. To balance all these considerations, we ended up selecting 151 agencies using simple random sampling, but from a truncated list of land use agencies. In other words, the very smallest of cities as well as counties with extremely sparse unincorporated developments were excluded. The truncated list includes 419 cities and 41 counties while California consists of 471 cities and 58 counties. The resident population of these 419 cities and unincorporated portions of 41 counties accounted for over 97 percent of California's population in 1999, as well as for over 97 percent of total population growth between 1992 and 1999, so the truncated list's coverage is still very good. Moreover, since each city included in our truncated list also appears in the Census Bureau's *County and City Databook* we preserve the option of future expansion and refinement. Table 1 shows the distribution of land use agencies by population size in both the state as well as the sample. The latter consists of 140 cities and 11 counties.

Table 1 Distribution of land use agencies by 1999 population

1999 population	Number of land use agencies in California	Number of land use agencies in sample
Less than 10,000	135	33
10,000 to 29,999	138	40
30,000 to 64,999	127	43
Greater than 65,000	129	35
Total	529	151

3. Review of Ordinances

Ranking Criteria

A total of 33 criteria were used to review and rank city and county ordinances. The first thirteen criteria were taken directly from the Model Ordinance—for example, does the ordinance require water budget estimates, landscape and irrigation design plans, irrigation audits, certificates of completion, and so on. Ordinances were also assessed on a set of twenty additional criteria—for example, does the ordinance include items pertaining to appropriate plant selection, automatic controllers, dedicated landscape meters, use of mulch, and so on. These additional criteria were modeled after the Department of Water Resources survey completed in 1997. Finally, reviewers prepared a brief comment summarizing their impression of each ordinance, which adds important insight into the overall tone and character of the ordinance. A summary chart (Appendix A) profiles each ordinance and its provisions, which forms the basis for our qualitative and quantitative assessment presented next.

Qualitative and Quantitative Assessment

The most distinctive guideline of the Model Ordinance is its heavy reliance on water budgets for both the design of water-efficient landscapes and subsequent irrigation management. Our qualitative assessment of ordinance effectiveness is primarily based upon how closely each sampled ordinance resembles the overall content and intent of the Model Ordinance, although to some degree clarity and thoroughness of the wording also play a part.

The qualitative ranking was organized into five primary categories: Adopted AB 325, Exemplary, Good, Fair and Poor. These categories are defined below:

Adopted AB 325	A strong ordinance based on water budget guidelines
Exemplary	Includes all or most of AB 325 provisions, and in some cases additional guidelines and actions
Good	Soundly based upon water budget and related conservation guidelines and approval actions, but lacks thoroughness
Fair	Conservation measures are addressed and encouraged; lacks thoroughness and approval actions for effective implementation
Poor	Very spotty provisions related to landscape water conservation and approval actions; poor effectiveness anticipated

A number of cities and counties reported not having a water efficient landscape ordinance, although in most instances it was difficult to ascertain whether in the past they had formally filed for an exemption or not—nobody seemed to know for sure—but our supposition is that many probably had. A few cities sent in general water conservation ordinances or landscape ordinances that do not specifically address AB 325 issues ("not applicable"), while a few have opted to promote outdoor water use efficiency through time of day and day of week irrigation limits instead of improved landscape design. Two cities neither responded nor submitted any documents.

Table 2 Qualitative assessment of ordinance effectiveness

Qualitative assessment	Number of land use agencies	Sample proportion
Adopted AB 325	15	9.9%
Exemplary	14	9.3%
Good	24	15.9%
Fair	30	19.9%
Poor	24	15.9%
Not applicable	3	2.0%
Irrigation limits (time of day and day of week)	3	2.0%
Did not adopt ordinance	36	23.8%
Did not respond	2	1.3%
Total	151	100.0%

Table 2 provides a tabulation of sampled ordinances according to their assessed level of likely effectiveness. Approximately 35% of sampled agencies appear to have adopted either the Model Ordinance or a relatively strong variant ("exemplary" or "good"), another 35% a "fair" or "poor" variant, while 24% report not having adopted one. In other words, roughly 70% of the sampled agencies have some sort of a water efficient landscape ordinance, resolution, or design guidelines in place. But this low proportion is somewhat misleading because non-adopting agencies also appear small, by implication accounting for little development activity. Since we do not have direct measures of building permits issued with over 2,500 square feet of landscape, we used the size and growth in population and single-family housing stock as proxies for the same. Fortunately, all four weighting variables produce very similar results. Weighting Table 2's information by either agency population or single-family housing stock in 1999, or by the growth in these two variables between 1992-99, suggests that 87-90 percent of new development in the sampled agencies is likely subject to a water efficient landscape ordinance. In other words, while only 70% of the sampled agencies have adopted an ordinance, close to 90% of new development appears subject to the requirements of one, albeit of varying efficacy. Therefore, the picture regarding ordinance coverage looks reasonably good.

The bad news, however, is efficacy. To examine efficacy we assigned a score of 4 to agencies with either the AB 325 Model Ordinance or an "exemplary" version, 3 for a "good" version, 2 for a "fair" version, 1 for a "poor" version, and finally zero for all the remaining categories. Weighting these efficacy scores (excluding nonrespondents) by either agency population or single-family housing stock in 1999, or by the growth in these two variables between 1992-99, suggests that new development on average is subject to an ordinance with an efficacy score between 2.2 and 2.4, or just above "fair." Even within just the 107 adopting agencies, the weighted efficacy score is not that much better—2.5 to 2.6 depending upon the weighting variable. These results make it somewhat difficult to believe *a priori* that the Model Ordinance has significantly improved landscape water use efficiency.

Model Landscape Ordinance and the MOU

Could land use agencies with fairly weak landscape ordinances be promoting water conservation by other means? We wanted to shed light on this potential connection since many cities operate their own municipal water utilities and thus may have become signatories to the *Memorandum of Understanding Regarding Urban Water Conservation in California (MOU)*, or alternatively a city may be receiving water from a MOU signatory water utility. For the analyses that follow we focus only on the 140 cities in our sample, the balance 11 representing county land use agencies.

Information about each city's water supplier(s) was obtained over the phone—according to this information 145 different agencies retail water in the 140 sampled cities. Many suppliers retail water in more than one city, while some cities are serviced by multiple retailers. It is purely coincidental that the number of water retailers (145) and sampled cities (140) is nearly equal. Names of cities and water retailers were then collated against a list of MOU signatories obtained from the *California Urban Water Conservation Council (CUWCC)*.

Among the 140 sampled cities, 16 (11%) are signatories to the MOU, while among the 145 water retailers operating within these cities, 40 (28%) have signatory status. A total of 70 (50%) cities either are themselves MOU signatories, or are supplied by *at least* one signatory water retailer. Table 3 shows the cross tabulation of cities by their signatory status and likely level of ordinance effectiveness.

Table 3 Ordinance effectiveness versus MOU signatory status

Qualitative assessment	Total number of cities in the sample	Number of signatory cities	Signatory cities, or cities supplied by *at least* one signatory water retailer
Adopted AB 325	15	1	11
Exemplary	12	2	9
Good	20	2	12
Fair	29	7	15
Poor	23	2	10
Not applicable	3	1	2
Irrigation limits (time of day and day of week)	3		
Did not adopt ordinance	33	1	9
Did not respond	2		2
Total	140	16	70

Only in the case of cities with a "fair" ordinance can one discern a disproportionate number that are also signatories to the MOU. Otherwise it is difficult to make a compelling case in favor of the substitution hypothesis, namely that agencies with weak ordinances may be taking a more comprehensive approach to water conservation. But, overall, Table 3 does suggest that MOU-signatory water retailers include within their orbit close to 40% (34/85) of cities with a "fair," "poor" or no ordinance. Although

greater cooperation between land use and water agencies is generally desirable and especially necessary to detect and fix wasteful irrigation, in cities with weak ordinances it could be additionally meaningful. Perhaps this synergy will be fully realized in the future as more water agencies start implementing water conservation best management practices including conservation rates and dedicated irrigation meters.

4. Mail Survey

Those that requested surveys by e-mail were targeted first, partly because we wanted to solicit feedback about survey clarity from this group given the relative ease of doing so via e-mail. None reported problems with question wording or format. In the second round, surveys were mailed to the remaining agencies, addressed to the point of contact established during the telephone screener. Reminder calls (up to three per respondent) were made periodically to improve the response rate. This process ultimately yielded a total of 66 completed surveys (60 city, 6 county) for an overall response rate of 44% (66/151). Population data suggest that smaller agencies showed a somewhat greater propensity to respond to our survey. For example, median land use agency population in 1999 among the 151 sampled agencies was 30,606 while it was 29,951 among the 66 respondents.

Separate questionnaires were developed for city and county land use agencies because many questions appropriate for the former were not appropriate for the latter. These questionnaires and tabulated responses are presented in Appendix B. For the discussion presented below, however, responses to questions included in both instruments are combined to present a composite picture.

Proportion of city built out. On average the responding cities are 79% built out, but this average conceals a wide spread ranging from a minimum of 20% to a maximum of 100%. Roughly half of the responding cities are over 90% built out. We examined whether ordinance efficacy was correlated with the percentage a city is built out, but were unable to detect any strong pattern (Table 4). For example, roughly 42% (13/31) of cities less than 90% built out have adopted a fairly strong ordinance ("adopted AB 325," "exemplary," and "good") compared to 38% (9/24) among those that are more than 90% built out. Similarly, 48% (15/31) in the former group report either not having adopted an ordinance or having adopted a "fair" or "poor" one compared to 50% (12/24) in the latter group.

Table 4 Ordinance effectiveness by percent city built out

	Percent city built out	
Qualitative assessment	**<= 90 percent**	**>90 percent**
Adopted AB 325	4	2
Exemplary	3	2
Good	6	5
Fair	6	5
Poor	5	2
Not applicable		1
Irrigation limits (time of day and day of week)	3	
Did not adopt ordinance	4	5
Did not respond		2
Total	31	24

Recycled water. Recycled water is gaining in prominence—14 out of the 66 respondents (21%) report having adopted an ordinance promoting the use of recycled water. Out of these 14 land use agencies, 5 even go so far as to require separate plumbing in new large developments to accommodate recycled water in the future.

Irrigation limits. Four cities place time of day and day of week restrictions on landscape irrigation. Although not a large proportion, irrigation limits represent an alternative way of conserving water, affecting both new and existing landscapes, and for this reason three of these cities report not having adopted a water efficient landscape ordinance. The key to success with this approach is obviously implementation, and although all four cities report monitoring water wastage in one form or another (staff drive-through, citizen complaints), and some even report punishing repeat offenders, it is difficult to gauge just how effective irrigation limits are in practice.

Water efficient landscape ordinance. Out of the 66 responding agencies, 15 report neither adopting an ordinance, nor a resolution nor a set of design guidelines. The non-adopting proportion among survey respondents (23%) is very close to that in our study sample (24%). Key reasons for non-adoption in decreasing order of importance are low growth, adequate water supply, and insufficient staff, which is consistent with our earlier determination (Table 2) that agencies with ordinances account for 87-90% of new development activity.

Of the 51 responding agencies with either an ordinance, resolution or design guidelines, 43 (84%) mandate the water efficiency requirements while 8 (16%) only recommend them. Finally, 47 (92%) agencies verify compliance between the approved plans and the installed landscapes.

Only 2 agencies have mounted outreach efforts to educate landscape architects, developers and contractors about AB 325 requirements. The vast majority of responding agencies rely only upon the permitting process to perform this function. Only 3 responding agencies report landscape architects experiencing some difficulty understanding either the ordinance requirements or difficulty in meeting the prescribed maximum water allowance. Thus, on the whole, landscape architects have accepted the thrust of the Model Ordinance quite well.

Respondents were queried about the likely effectiveness of water efficient landscape ordinances, and their responses reveal that only 17 (33%) believe that these ordinances will significantly reduce water demand, 14 (27%) believe that they will not, while 20 (39%) were unsure ("don't know"). The most important reasons cited by the 14 skeptics include "city built out" and "weak enforcement."

Finally, respondents were asked an open-ended question about which elements are key for raising landscape water use efficiency, and over half of the 66 respondents offered their thoughts. Most emphasized the importance of education; of landscape architects and developers to help them design water efficient landscapes; of maintenance contractors to help them irrigate appropriately; and of the general public to help them understand proper irrigation techniques and the importance of water conservation in general. A few pointed to the usefulness of water efficient landscape demonstration

projects for public education. Other frequent observations include promoting the use of appropriate plant material through plan checks, assuring compliance between the approved and installed landscapes, and promotion of conservation water rates. Other less frequent but nonetheless relevant observations include instituting turf limits, promoting higher density housing, upgrading old irrigation systems, promoting reclaimed water and separate irrigation meters where possible, and working with large homeowner associations to reduce water wastage.

Water supply characteristics. Among the 60 responding cities, 23 (38%) receive water from the city's own municipal water agency, 19 (32%) from another public water agency, 11 (18%) from a private water company, and 7 (12%) from a combination of the above. Overall, the distribution of water use across customer class appears fairly representative of the state as a whole (60% single-family; 15% multi-family; 25% commercial and other), but these averages conceal a fairly large spread. For example, the reported single-family proportion varies from as low as 34% to as high as 90%. Generally, respondents had difficulty identifying the proportion of total consumption accounted for by dedicated irrigation, which suggests that utilities have not yet begun to promote dedicated irrigation meters extensively, or to track this end use accurately.

The average price of water among cities with their own municipal water agencies is fairly typical ($1.3-1.4 per HCF), but once again there are agencies charging as low as $0.47 or as high as $2.23 per HCF. Of the 19 cities reporting price information, 6 have conservation rates in place for residential and commercial customers with the top tier being between $1.05 and $2.75 per HCF. It is notable that 4 of these 6 cities with conservation rates are themselves either MOU signatories or are supplied by signatory water retailers.

Regarding the importance of reclaimed water, overall it is still a very small proportion of total water demand (0.5%), but was reported being as high as 5% in exceptional cases. Given that over a fifth of all survey respondents have adopted ordinances to promote recycled water use, we can expect reclaimed water demand to grow rapidly in the future.

Water conservation. Among the 23 cities with their own municipal water agencies, only 14 (61%) report actively promoting water conservation programs. The most common types of programs being implemented include residential toilet retrofits, residential audits, and conservation rates. Among the remaining 9 that report not promoting water conservation, the most frequently cited reasons in decreasing order of importance include insufficient staff, insufficient funds, adequate water supply, and low growth.

Development activity. Among the 66 responding agencies, 52 report having approved at least one plan with over 2,500 square feet of landscape since the Model Ordinance went into effect. But the scale of permitting activity varies considerably, shown below (Table 5) cross-tabulated with the ordinance effectiveness rankings. It is heartening to note that agencies that approved over 50 building permits in 1999 with landscape exceeding 2,500 square feet all had either a "good" or "exemplary" ordinance, while the bulk of agencies without an ordinance approved only five or less permits. But this favorable picture is tarnished somewhat by agencies with "poor" and "fair" ordinances, where the level of permitting activity cannot necessarily be deemed insignificant.

Table 5 Ordinance effectiveness by scale of development activity

	Permits issued in 1999 with more than 2,500 sq. ft. landscape								
Qualitative assessment	**None**	**1-5**	**6-10**	**11-20**	**21-35**	**36-50**	**51+**	**DK**	**Total**
Adopted AB 325	2	2	2						6
Exemplary	2	1	1	1	1		1		7
Good	1	4	3				4	2	14
Fair	4	4	1	2				1	12
Poor		5	1			1		1	8
Not applicable	1								1
Irrigation limits (time of day and day of week)	1	2							3
Did not adopt ordinance	7	5	1						13
Did not respond	2								2
Total	20	23	9	3	1	1	5	4	66

5. In-Person Interviews

To explore AB 325 implementation issues in depth we conducted several in-person interviews with planners, landscape architects, irrigation designers, developers and contractors. Telephone or mail surveys were unlikely to serve as effective vehicles for addressing these issues. Our primary aim was to understand how parties with a stake in landscape water conservation have adapted to the post AB 325 world.

Candidate Selection

A total of 12 land use agencies were selected for the purpose of conducting in-person interviews. These cities and counties are dispersed across California including the Bay Area, Central Valley, and Southern California. Agencies were selected based upon population size, growth, and quality of the landscape ordinance. The interviewing effort was deliberately directed at agencies with strong landscape ordinances ("Adopted AB 325" or "exemplary" and "good" variants) that also have been growing at an above average rate—in other words, the types of agencies upon whom greatly must rest any overall assessment of the entire Model Ordinance initiative. We suspect implementation weaknesses identified in agencies with strong ordinances will only likely be worse elsewhere.

1. Brentwood
2. Fontana
3. Lake Elsinore
4. Menlo Park
5. Oceanside
6. Rancho Cucamonga
7. San Jose
8. Union City
9. West Covina
10. Merced County
11. Orange County
12. Ventura County

On average three in-person interviews were conducted per agency. We spoke with planners, landscape architects, irrigation designers, developers and contractors working in or with these cities and counties. City and county planners were contacted to solicit names of professional offices that prepare landscape designs for projects under their jurisdiction, which helped to focus the interviews on the appropriate stakeholders.

Issue Areas Targeted

A series of questions were prepared to structure the in-person interviews with planners, landscape architects, irrigation designers, developers and contractors (Appendix C). The intent was to gain insight into the impact of AB 325 through the experiences and recommendations of these stakeholders. Summarized below are the key issue areas that were explored; however, other comments and issues were also noted during the interview.

- How has AB 325 contributed to water conservation?
- What are the most difficult problems encountered?

- Do you see an increasing demand for water conservation?
- What changes would you make to the ordinance?
- Have the new conservation requirements changed the way you design landscapes?

Findings from In-Person Interviews

The results of the in-person interviews have been organized into two parts: overall observations and specific observations. Overall observations include common views expressed by all interviewees. Specific observations reflect views for each stakeholder group, that is, planners, landscape architects, irrigation consultants, developers and contractors.

Overall Observations

- AB 325 began a new era in landscaping that has had statewide impact. Water conservation must be addressed and is now part of the planning and design process. Some communities were already addressing these issues before AB 325, but now it is an issue everywhere.
- The single greatest impact has been the reduction in the use of turfgrass as a result of budget and prescriptive approaches to landscape standards.
- Standards are inconsistent from one city/county to another, as is implementation, compliance and follow-through.
- The impact of AB325 stops at the planning and design level; post-construction auditing and water management in areas of landscape maintenance is not addressed.
- Greatest impact has been upon planners, landscape architects and irrigation consultants due to nature of the law and adopted ordinances. Developers and contractors are seldom involved.
- Planners and landscape architects are now familiar with most ordinance requirements and find it to be part of regular work procedures.
- Planners and designers did not recommend making any major changes to existing ordinances or guidelines; the weak link in the process occurs after a project is built because there are few actions required to track and manage the use of water.
- Growth and construction is occurring at record levels. Most interviewees felt people have largely forgotten about water conservation because we are not in a drought. There is plenty of money and development out there and water is too cheap. The best tool for water conservation is higher cost of water.

Planners

- Planners seem quite satisfied with their ordinances and implementation. Most are satisfied with the benefits of more water conserving plant material and efficient irrigation equipment and feel that this is contributing to water conservation. Overall, better quality designs are being submitted because ordinances are more thorough regarding landscaping.
- At first planners viewed the ordinance as an encumbrance but now it is part of their daily work routine.
- Most planners see the impact of AB 325 diminishing after the project is built; there are very few post-construction requirements and assurances.
- Some jurisdictions perform a final inspection after installation to insure compliance with approved plans. Other areas just don't have the manpower to perform these inspections.

- Some areas put the burden of final inspection on the landscape architects, requiring certification from them. No one that we interviewed performed the 5-year water audits.

Landscape architects

- Landscape architects appear to applaud the spirit and intent of the ordinance, and many would like to see its implementation improved. Many see plan checkers as being too rigid in its enforcement, getting too detail oriented until the spirit of the ordinance is lost. They think plan checkers should be more flexible and focus on the design as a whole.
- No consistency found among requirements. Some see a need to standardize ordinances among jurisdictions and find it difficult to comply with many different requirements.
- Most landscape architects see the ordinance falling apart in the field because maintenance contractors overwater regardless of design efficiency. They see little or no enforcement by local jurisdictions—the ordinance lacks teeth. Lack of post-installation monitoring was repeatedly expressed.
- Designers agree that more education should be targeted at maintenance contractors and at the general public. Most feel that designers are doing all they can do (designing efficiently with state-of-the-art irrigation equipment) and that big changes in water conservation will have to come from maintenance contractors.
- Many landscape architects find their irrigation schedules ignored in the field.

Irrigation Consultants

- We received many positive comments about how irrigation equipment manufacturers have raised efficiency and quality. Many landscape architects and contractors did not think too highly of drip irrigation. It still requires intensive maintenance and is costly to install and maintain.
- Irrigation design and water budget calculations work well with the evolution of computer technology. CADD drawing is becoming an industry wide practice for commercial projects; both design and project revisions are easier to complete. Water budget calculations and water schedules are made easy with computer software.
- Some irrigation manufacturers are very helpful in planning and servicing centralized control irrigation systems, which is improving water management on large-scale projects.

Landscape contractors and developers

- Most landscape contractors we interviewed did not even know about an AB 325 Water Efficient Landscape Ordinance. They simply install what they bid on, but most had noticed a change insofar the newer projects seem to use more drought tolerant plant species and efficient irrigation equipment. They were, however, aware of restrictions on the time of day they could water and policing actions by local municipalities on overspray.
- Developers also had not heard of the AB 325 landscape ordinance. They rely on consulting landscape architects to comply with local requirements.

Recommendations from planners, landscape architects, irrigation designers, developers and contractors

- Cities and counties should be encouraged to identify a job position or staff person dedicated to AB 325 requirements.

- Professional firms can be certified and provide plan checking services for cities/counties.
- Water agencies and cities can become more involved in water planning issues and landscaping requirements.
- Metering, monitoring and water use records are greatly needed to clarify the actual use of water in landscapes and to bring closure to the AB 325 process. As things stand now, AB 325 does not provide an adequate basis to measure actual landscape water use or to determine which actions lead to increased water use efficiency.

6. Conclusions and Recommendations

Improving landscape water use efficiency through better design is clearly a step in the right direction, but our analyses suggest that the Model Ordinance has yet to fully live up to its expectations, for three chief reasons. In increasing order of importance, these include: (1) inadequate coverage of the ordinance; (2) weaknesses in the structure of many ordinances; and (3) virtually no field monitoring of actual irrigation, or enforcement of the maximum water allowance.

As mentioned, the first problem is the least serious—we estimate that close to 90% of new development between 1992 and 1999 has taken place in agencies that have adopted a water efficient landscape ordinance, resolution, or design guidelines. The second problem appears somewhat more serious—comparing each sampled agency's ordinance to the Model Ordinance on a four-point scale (exemplary, good, fair, poor) suggests that the overall level of ordinance efficacy lies roughly halfway between fair and good, which is not terribly encouraging. But the true Achilles Heel is the third problem—lack of irrigation monitoring or enforcement of the maximum water allowance in the field. To be sure, over 90% of the surveyed agencies verify compliance between the designed and installed landscapes, but that is where the exercise of leverage by planners and landscape architects ends. Many stakeholders highlighted during the personal interviews that maintenance contractors rarely irrigate accurately no matter how efficient the design. During our interviews we discovered that few developers and contractors were even aware of the Model Ordinance. This lack of awareness, in a setting where water for the most part is still very cheap and agency monitoring nonexistent, makes wasteful irrigation virtually inevitable. It is therefore unsurprising that only a third of the mail survey respondents feel positively about the long-run effectiveness of their agency's water efficient landscape ordinance.

Over half of those that responded to our survey emphasized the need for more education—more education of landscape architects and planners; of developers and contractors; and of the general public. Only 2 among the 66 responding agencies have an ongoing outreach program. The rest essentially depend upon the permitting process to disseminate information about their ordinance, which means the message rarely extends past the choir. Landscape architects are for the most part already well disposed toward the whole AB 325 effort since they played a significant role in crafting the Model Ordinance. In fact, only 3 agencies report landscape architects experiencing difficulty in understanding the ordinance requirements, or difficulty in meeting the maximum water allowance. But it is also clear from the personal interviews that most landscape architects believe that post-installation follow through is sketchy and ineffective at best. To remedy this situation many pointed to the need for economic incentives to promote water use efficiency, for example, through conservation rates. Surveyed agencies also cited insufficient staff as an important reason for not adopting a water efficient landscape ordinance in the first place, and for their city municipal water utilities not undertaking conservation programs in general.

The above deficiencies are not easy to fix. It will take concerted action on many fronts, most notably through better enforcement, to extract the full promise of the Model Ordinance. We do not believe that strengthening and revising ordinances where at

present they appear weak ought to be the first priority, although this issue needs to be addressed at a suitable point in the future. The key probably lies in more education, pricing, and better integration of efforts between land use agencies and water suppliers. To bring about such coordination will require additional staff and funding support, and may also require imparting a working knowledge of landscape design issues to water-utility conservation coordinators among other things. At present less than a third of water retailers servicing the sampled agencies are signatories to the *Memorandum of Understanding Regarding Urban Water Conservation in California*. But as more acquire signatory status in the future and start to implement water conservation best management practices, the prevalence of conservation rate structures as well as dedicated irrigation meters can be expected to increase. As a point of reference, it is noteworthy that out of the 6 cities (with their own municipal water utilities) reporting the presence of inclining rates, 4 are MOU signatories. Future research must try to better understand the linkages between land use and water agency policies so that their independent efforts can both be fostered and integrated to maximize synergy and overall effectiveness.

Appendix A—Water Efficient Landscape Ordinance Characteristics

	QUALITATIVE RANKING								AB 325 MODEL ORDINANCE PROVISIONS/REQUIREMENTS												
Agency ID	Adopted AB 325	Exemplary	Good	Fair	Poor	No Response	No Ordinance	Irrigation limits	Water Conservation	Calculation of MAWA	Calculation of EAWU	Calc. Of Estimated	Landscape Design Plan	Irrigation Design Plan	Irrigation Schedules	Maint. Schedule	Irrigation Audit	Grading Design Plan	Soil Analysis	Certificate of Completion	Education
1				x								x									
2							x														
3							x														
4	x																				
5					x								x								
6																					
7				x										x	x						
8							x														
9					x							x	x	x	x						
10			x										x	x						x	x
11	x																				
12			x							x	x		x	x	x		x		x		
13					x								x	x						x	
14				x									x	x		x		x			x
15		x								x	x						x			x	x
16					x								x	x							
17				x												x					
18																					
19			x									x	x								
20		x							x	x	x	x	x	x	x	x	x	x	x	x	x
21			x						x	x	x	x	x	x	x	x				x	
22					x																
23					x								x		x				x		
24							x														
25	x																				
26				x									x	x		x					x
27	x																				
28					x										x				x		
29				x					x								x		x		
30	x																				
31					x							x	x	x						x	x
32							x														
33				x									x	x		x			x	x	
34							x														
35							x														
36			x						x	x	x	x	x	x	x				x	x	x
37							x														
38			x						x	x	x		x	x					x		x
39							x														
40	x																				
41				x																x	x
42					x																
43			x										x	x	x	x			x	x	
44					x								x	x		x					
45							x														
46			x							x	x	x	x	x	x		x				x
47							x														
48	x																				
49							x														
50				x					x				x	x							
51	x																				
52							x														
53							x														
54					x																
55					x																
56							x														
57				x									x	x					x	x	x
58	x									x	x										x
59			x						x	x	x	x	x	x	x	x	x	x	x	x	x
60							x														
61	x																				
62			x						x	x	x	x	x	x	x						
63			x							x	x	x	x	x	x	x		x	x		
64	x																				
65								x													
66					x								x								
67							x														
68								x							x						
69				x									x	x	x	x				x	x
70				x									x	x	x						
71				x									x	x	x						
72								x							x						
73		x							x	x	x	x	x	x	x	x	x	x	x	x	x
74				x								x									
75				x									x	x	x	x					
76	x																				
77							x														

	QUALITATIVE RANKING								AB 325 MODEL ORDINANCE PROVISIONS/REQUIREMENTS												
Agency ID	Adopted AB 325	Exemplary	Good	Fair	Poor	No Response	No Ordinance	Irrigation limits	Water Conservation	Calculation of MAWA	Calculation of EAWU	Calc. Of Estimated	Landscape Design Plan	Irrigation Design Plan	Irrigation Schedules	Maint. Schedule	Irrigation Audit	Grading Design Plan	Soil Analysis	Certificate of Completion	Education
78							x														
79							x														
80			x							x			x	x	x		x		x		x
81				x																	
82		x										x	x	x	x	x	x	x			
83				x									x	x	x	x		x			
84							x														
85		x							x	x	x	x	x	x	x	x	x	x	x	x	x
86		x																			
87		x							x	x	x	x					x				
88							x														
89																					
90				x											x				x		x
91			x										x	x	x	x			x		
92			x												x			x	x		x
93							x														
94			x						x	x		x	x	x			x	x	x	x	
95			x										x	x	x						x
96				x						x	x		x	x				x	x		
97	x																				
98							x														
99					x					x	x										
100			x								x		x	x	x				x		x
101				x									x	x	x	x	x			x	x
102				x									x	x	x						
103				x									x	x						x	x
104		x											x	x							x
105					x								x	x		x					
106							x														
107		x							x	x		x	x	x	x	x	x	x	x	x	x
108						x															
109		x							x	x	x	x	x	x	x	x	x	x	x	x	x
110				x						x	x		x	x	x				x	x	x
111					x								x								
112						x															
113					x																
114					x																
115							x														
116	x																				
117		x										x	x	x	x	x	x		x		
118			x						x				x	x	x	x					
119							x														
120				x					x				x	x	x	x				x	
121		x										x	x	x	x	x	x	x			
122				x					x												x
123							x														
124					x																
125							x														
126							x														
127				x																	
128				x									x	x			x	x	x		
129	x																				
130					x																
131				x															x		x
132					x																
133							x														
134			x										x	x			x			x	
135					x								x	x	x				x		
136				x						x											
137			x										x	x	x			x	x	x	
138					x								x					x			
139							x														
140							x														
c1							x														
c2				x							x		x		x						x
c3							x														
c4			x										x	x	x				x	x	x
c5			x										x		x				x	x	
c6			x												x	x		x	x	x	
c7							x														
c8			x										x	x	x				x		x
c9					x								x	x							
c10		x							x	x	x	x	x	x	x	x	x	x	x	x	x
c11		x							x	x	x	x	x	x	x	x	x	x	x	x	x
	15	14	24	30	24	2	36	3	19	24	22	23	64	57	47	28	21	20	35	29	34

E = Encouraged

ADDITIONAL CONSERVATIONS PROVISIONS/REQUIREMENTS																				
Agency ID	hydrozone grouping	appropriate plant	minimization of turf	planting of native	recommended plant list	dedicated landscape	automatic controllers	rain sensing devices	soil moisture sensing	separate valves for	no runoff or overspray	irrigation efficiency	use of recycled	provisions for recycled	use of CIMIS	Soil amendments	Mulch	Waste prevention	Encourages actions	Requires actions
1	x	x	x				x	x		x			E			x	x			x
2																				
3																				
4																				
5					x															
6																				
7		x	x		x		x	x		x	x	x				x	x			
8																				
9	x		x		x		x										x		x	
10	x	x	x	x	x		x	x	x						x	x				
11																				
12	x	x	x		x		x	x	x	x						x				x
13	x																		x	
14	x		x			x	x	x	x	x	x	x				x	x		x	
15							x	x								x	x			x
16		x									x	x	E						x	
17	x	x	x			x	x	x	x								x			
18																				
19			x		x	x	x	x		x	x					x	x			x
20	x	x		x	x	x	x	x	x	x	x	x	x	x	x		x			
21	x					x	x	x	x	x	x		x	x			x			
22				x	x		x												x	
23	x	x	x				x			x	x						x		x	
24																				
25																				
26	x				x	x	x	x	x	x	x							x		x
27																				
28			x	x		x				x	x		x	x		x	x			
29	x		x	x						x			x			x				x
30																				
31	x	x					x		x	x							x			
32																				
33		x	x	x			x							x			x		E	
34																				
35																				
36	x	x		x		x	x	x	x	x	x	x		x	x		x			x
37																				
38	x			x	x	x	x	x		x	x			x			x		x	
39																				
40																				
41	x	x				x		x	x	x	x	x		x		x	x			x
42																				x
43	x	x	x	x	x		x	x	x	x	x	x				x	x			
44					x		x												x	
45																				
46	x	x				x	x		x		x	x		x	x		x			x
47																				
48																				
49																				
50	x	x	x		x		x	x	x			x		x	x	x				x
51																				
52																				
53																				
54		x					x	x	x	x									x	
55																			x	
56																				
57	x	x				x	x	x	x	x	x				x	x				x
58																				
59	x	x		x		x	x	x	x	x	x	x	x	x	x		x			x
60																				
61																				
62	x						x				x	x				x			x	
63	x	x	x	x	x		x				x	x				x	x		x	
64																				
65																				
66	x	x	x				x			x	x	x					x			x
67																				
68																				x
69	x	x	x	x		x				x	x	x					x			x
70		x	x				x			x	x	x					x		x	
71	x	x		x	x	x	x	x	x	x	x		x	x			x			
72																				x
73	x	x	x	x		x	x	x	x	x	x	x	x	E	x	x	x			x
74	x																			x
75	x	x	x				x				x	x				x	x			x
76																				
77																				

	ADDITIONAL CONSERVATIONS PROVISIONS/REQUIREMENTS																			
Agency ID	hydrozone grouping	appropriate plant	minimization of turf	planting of native	recommended plant list	dedicated landscape	automatic controllers	rain sensing devices	soil moisture sensing	separate valves for	no runoff or overspray	irrigation efficiency	use of recycled	provisions for recycled	use of CIMIS	Soil amendments	Mulch	Waste prevention	Encourages actions	Requires actions
78																				
79																				
80	x	x	x			x	x			x	x	x	E	E			x			x
81		x	x		x							x				x	x			x
82	x	x		x	x	x	x	x	x	x	x	x		x	x	x	x			
83		x	x		x		x	x	x	x	x	x			x	x	x			x
84																				
85	x	x					x	x	x	x	x	x	x	x	x		x			x
86																				
87							x							x	x					
88																				
89																				
90			x		x		x			x	x	x		E		x	x		x	
91	x	x		x		x	x	x	x	x	x	x	x		x				x	
92	x	x	x		x		x	x		x	x	x					x			x
93																				
94						x					x	x					x			
95	x	x					x	x	x	x			x			x	x	x		
96	x					x	x		x			x								
97																				
98																				
99	x				x	x								x			x			
100	x	x	x				x	x		x		x				x	x			x
101	x	x		x			x	x		x	x		x	x	x					
102	x	x	x	x			x	x	x			x		x			x			x
103	x					x	x	x	x	x	x									
104	x	x	x	x	x				x			x		x		x	x			
105	x																			
106																				
107	x	x				x	x	x	x	x	x	x	x		x			x		
108																				
109	x	x	x		x	x	x	x	x	x	x	x	x	x	x		x	x		x
110					x		x			x	x	x							x	
111	x	x	x	x													x			
112																				
113	x	x	x			x	x	x	x	x	x		x	x						
114		x	x	x				x	x								x			
115																				
116																				
117	x	x	x	x	x	x	x		x	x	x	x	x			x	x			x
118	x	x	x	x					x	x	x	x					x			
119																				
120	x	x					x			x	x	x					x			
121	x	x		x	x	x	x	x	x	x	x	x		x	x	x	x			
122	x		x				x	x	x			x	x		x	x	x			x
123																				
124		x			x															
125																				
126																				
127	x		x				x	x	x	x			E				x			x
128		x		x	x		x	x	x		x	x	x		x		x		x	
129																				
130																			x	
131	x	x	x				x			x	x								x	
132																				
133																				
134	x	x	x	x	x	x	x	x	x	x	x	x	E	E		x	x			x
135	x	x	x				x			x	x	x					x		x	
136			x			x					x									
137	x	x	x		x	x	x	x	x	x	x	x	x			x	x			x
138																				
139																				
140																				
c1																				
c2	x	x	x				x			x	x	x					x			x
c3																				
c4	x	x				x	x	x	x	x	x					x	x			x
c5	x	x	x	x		x	x	x			x			x		x	x			
c6	x	x					x	x	x					x	x		x			
c7																				
c8	x	x			x		x	x	x	x			x	x		x				x
c9					x		x					E							x	
c10	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x
c11	x	x				x	x	x	x	x	x	x	x	x			x	x		x
	64	59	44	28	33	35	68	47	44	53	53	45	21	26	21	33	58	6	21	38

Agency ID	COMMENTS CHARACTERIZING KEY VALUE OF ORDINANCE
1	Very basic but does cover some budgeting
2	No ordinance
3	No ordinance
4	Adopted AB 325
5	No mention of water conservation at all
6	absolutely nothing on water conservation
7	Very brief - doesn't hit the issue hard
8	No ordinance
9	not much here
10	very complete
11	Adopted AB 325
12	Has enforcement clause for MAWAs
13	Water conservation is encouraged where "feasible"
14	Point system, mild, doesn't seem that dedicated
15	Adopted and Adapted AB 325 with turfgrass limits
16	Vaguely encourages
17	minimal standards
18	A lot about water conservation but not relating to landscapes or AB 325
19	complete, no-nonsense - everything "shall be required"
20	concise, thorough compliance
21	very thorough on irrigation req's but not much on landscaping
22	hardly mentions anything to do with AB 325
23	not much there at all
24	No ordinance
25	Adopted AB 325
26	minor deviations permitted
27	Adopted AB 325
28	vague encouragment - no mention of AB325 or water budgeting
29	concise, straight forward
30	Adopted AB 325
31	lackadaisical - not much there
32	No ordinance
33	minimal standards with "flexible" application
34	No ordinance
35	No ordinance
36	good overall - emphasis is on irrigation
37	No ordinance
38	guidelines only, nothing appears to be required
39	No ordinance
40	Adopted AB 325
41	point system, very concise, deviations are allowed
42	they required good water conservation but nothing about landscape
43	Monterey County jurisdiction-concise,mandatory conservation-no MAWAS
44	doesn't address the issue at all - diff. Levels for scale of project
45	No ordinance
46	adequate compliance
47	No ordinance
48	Adopted AB 325
49	No ordinance
50	point system - thorough but no MAWA or EAWU
51	Adopted AB 325
52	No ordinance
53	No ordinance
54	Very Poor-evades the issue altogether
55	what they sent has nothing to do with AB 325 intent at all
56	No ordinance
57	Applies to new projects only -point system that allows deviation- minimally a
58	Users guide requires compliance with AB 325
59	very good but no mention of turf limits or minimums -basic adaptation of AB 3
60	No ordinance
61	Adopted AB 325
62	good examples for MAWA calculations - minimal compliance
63	basic accomodation - stressed but not obvious
64	Adopted AB 325
65	No ordinance
66	very little on water conservation - some briefly mentioned
67	No ordinance
68	addresses water conservation and waste but addresses none of the issues in AB
69	thorough and sincere to water conservation
70	touches upon water conservation - not obvious and strong
71	encourages water budgets and audits but does not require anything in specific
72	only a fax of watering hours - nothing else!
73	exemplary!!
74	presents an incomplete water budget with a very high water allowance
75	a good shot at conservation but still lacking a comprehensive plan
76	Adopted AB 325
77	No ordinance

Agency ID	COMMENTS CHARACTERIZING KEY VALUE OF ORDINANCE
78	No ordinance
79	No ordinance
80	pretty good conservation standards
81	very strict on water usage but not much in the way of AB325
82	Marin County jurisdiction-exemplary w/ sample forms
83	pretty comprehensive with penalty for non-compliance
84	No ordinance
85	exemplary - requires compliance
86	Ventura County jurisdiction - very good
87	Eastern Municipal Water District-strict-issues non-compliance penalties--good
88	No ordinance
89	says nothing about what we are looking for
90	mild encouragement
91	Good - fairly comprehensive but mostly "encouraged"
92	strict on drought tolerant and efficient irrigation
93	No ordinance
94	No summer daytime watering allowed - adequate compliance
95	Point system- minimal requirements for a permit
96	Example MAWAs- stresses irrigation over landscape design or plant selection
97	Adopted AB 325
98	No ordinance
99	Very confusing, difficult to read charts-not sure if anything is required-has
100	Basic but covers most points
101	Reclaimed water is required but you can still have 50% turf
102	Point system - basic one page document
103	Point system but doesn't require it in all cases
104	Point system - excellent ,easy to read- good examples
105	minimal compliance
106	No ordinance
107	Fairly comprehensive, requires reclaimed water but doesn't mention plants
108	Did not Respond
109	Thorough- heavy on irrigation but not much on landscape design- good overall
110	Minimal compliance from the state capital
111	Mentions a few xeriscape concepts - nothing to do with AB 325
112	Did not Respond
113	Guidelines only
114	extremely minimal - nothing about AB 325
115	No ordinance
116	Adopted AB 325
117	Well-organized - good native plant list
118	Water conservation checklist is required only for projects that have to go th
119	No ordinance
120	OK - different standards for different levels of square ft.
121	Marin County jurisdiction - exemplary w/ sample forms
122	Point system - achieves a minimum standard
123	No ordinance
124	Even numbered pages missing - nothing about water conservation
125	No ordinance
126	No ordinance
127	Point system - addresses some issues but not all
128	A lot of "should consider" - good but no bite
129	Adopted AB 325
130	Mentions water complience but lacks anything specific for the landscape
131	Minimal compliance-serious on what they require but require little-have their
132	NON-COMPLIANT
133	No ordinance
134	Point system-serioius avaout water conservation but no MAWA or EAWU
135	Minimal compliance if at all
136	A few stringent sounding rules - no MAWA or EAWU
137	Point system-very good, but no requirement for complying w/ attached budgets
138	NON-COMPLIANT - no mention of water at all
139	No ordinance
140	No ordinance
c1	No ordinance
c2	Some budgeting - OK but basic
c3	No ordinance
c4	Puts a cap on supp. water (30"), have their own water budget
c5	good
c6	Good overall-prescribes water audits before cert. of use is issued
c7	No ordinance
c8	Hits the high points - allowed to exceed MAWA if reclaimed water is used
c9	NON-COMPLIANT- doesn't really address water conservation at all-only in passi
c10	Very good - very compliant
c11	Good overall- only things missed were plant recommendations

Appendix B—Mail Survey Questionnaires and Responses

Model Water Efficient Landscape Ordinance (AB-325) Survey

Name of Respondent: _____

Name of City: _____

General Information

1. What was the city's population in 1992 and 1999?
   M=35761; SD=32364 M=40019; SD=35409 (n=60)
   1992 1999
2. At present, approximately what percentage of the city is built out?

   PERCENT *M=79%; SD=24%* *(n=55)*

Recycled Water

3. Has the city adopted an ordinance or resolution regarding use of recycled water?

   YES 12 NO 48 (if no, go to Q6)

4. Does the ordinance or resolution mandate the use of recycled water under certain circumstances?

   YES 6 NO 6

   If YES describe_____

5. Does the ordinance or resolution require separate plumbing in new development to accommodate the use of recycled water?

   YES 4 NO 8

Irrigation Limits

6. Does the city limit irrigation to fewer than seven days per week through an ordinance or resolution?

   YES 4 NO 56 (If no, go to Q9)

   If YES, how many days per week? *3 to 4*

7. How does the city detect noncompliance with these irrigation limits? (check all that apply)

   NONE (VOLUNTARY COMPLIANCE) (skip Q8)
   CITIZEN COMPLAINTS 3
   RANDOM STAFF DRIVETHROUGHS 4
   WATER BILL ANALYSIS 1
   OTHER regular patrol 1

8. Upon detection of noncompliance, what corrective action is targeted at the customer? (check all that apply)

   RECEIVES A CALL 3
   RECEIVES A CITATION 2
   IS OFFERED A LANDSCAPE AUDIT
   REPEAT OFFENDERS ARE FINED 3
   OTHER _____

Water Efficient Landscape Ordinance

9. Is new development in the city subject to a city or water utility sponsored water efficient landscape ordinance, resolution, or a formal set of landscape design guidelines? (check one)

   ORDINANCE 38 (skip Q10)
   RESOLUTION 2 (")
   DESIGN GUIDELINES 5 (")
   OTHER use permit 2 (")
   NONE OF THE ABOVE 13 (answer Q10, goto Q17)

10. What best explains why city or water utility has adopted neither ordinance, nor resolution, nor guideline? (check all that apply)

    ADEQUATE WATER SUPPLY 7
    LOW GROWTH 11

MOSTLY SMALL LOT SIZES	*4*
CONSERVATION LOW PRIORITY	
INADEQUATE FUNDS	*2*
INSUFFICIENT STAFF	*7*
CITY COUNCIL/BOARD DECISION	*3*
OTHER _____	

11. Before issuing new building permits, does the city mandate or recommend meeting the requirements of the landscape ordinance/resolution/guideline?

MANDATES	*39*
RECOMMENDS	*8*

12. Upon completion of a project does the city (or water utility) verify compliance between the approved plan and the installed landscape?

YES 43 NO 2 MISSING 2

13. How does the planning department educate consulting landscape architects and building contractors about the requirements of the ordinance/resolution/ guideline (check all that apply)?

OUTREACH	*2*
PERMITTING PROCESS	*44*
OTHER _____	*1*

14. Have consulting landscape architects expressed any difficulty in meeting the requirements of the ordinance/resolution/guideline (check one)?

YES 3 NO 41 MISSING 3

If YES, please explain.

_____

15. In the long run, do you expect the city's (or water utility's) ordinance/resolution/guideline to have a significant impact on water demand?

YES 14 NO 13 DON'T KNOW 20

If NO, which of the following reasons best explains why? (check all that apply)

CITY BUILT OUT	*9*
MOSTLY SMALL LOT SIZES	*3*
CONSERVATION LOW PRIORITY	*3*
WEAK ENFORCEMENT	*4*
INADEQUATE FUNDS	*2*
INSUFFICIENT STAFF	*2*
OTHER _____	

16. In your view, what are the key elements of an effective strategy for promoting water efficient landscapes? (use additional sheets if necessary)

_____

_____

Water Supply Characteristics

17. Please identify which type of agency retails water in the city (check one)?

CITY WATER UTILITY	*23*	*(go to Q18)*
OTHER PUBLIC WATER UTILITY	*19*	*(skip to Q24)*
PRIVATE WATER COMPANY	*11*	*(")*
LEASED SYSTEM		*(")*
COMBINATION OF ABOVE	*7*	*(")*
OTHER _____		*(")*

Name of each retailer. _____

18. If the city is a water retailer, how is municipal water use distributed across customer class (approximate percentages)? Please write in customer class if the ones provided below are inappropriate.

SINGLE FAMILY	*M=60%;*	*SD=14%*	*(n=18)*
MULTI FAMILY	*M=15%;*	*SD= 8%*	*(n=18)*
COMMERCIAL	*M=17%;*	*SD= 8%*	*(n=18)*
DEDICATED IRRIGATION	*M= 6%;*	*SD= 5%*	*(n=12)*
OTHER	*M= 9%;*	*SD= 6%*	*(n= 8)*

19. What is the price of water charged in the city (please provide base and highest price if rates are tiered or seasonal)?

RESIDENTIAL	*M=$1.4/HCF; SD=$0.6 (n=19)*
COMMERCIAL	*M=$1.3/HCF; SD=$0.6 (n=19)*
DEDICATED IRRIGATION	*M=$1.4/HCF; SD=$0.6 (n=15)*

20. Of the city's total water demand in 1999, what proportion was accounted for by reclaimed water?

PERCENT M=0.5%; SD=1.0% (n=19)

Water Conservation

21. If the city is a water retailer does the city actively promote water conservation?

YES 14 NO 9 (if no, skip to Q23)

22. If yes, which of the following water conservation programs are at present being promoted (check all that apply)?

RESIDENTIAL TOILET RETROFITS	*10*
RESIDENTIAL AUDITS	*6*
LARGE LANDSCAPE AUDITS	*3*
COMMERCIAL/INDUSTRIAL/INST.	*5*
CONSERVATION RATES	*6*
OTHER	*5*

23. If no, which of the following best explains the city's reasons for not promoting water conservation (check all that apply)?

ADEQUATE WATER SUPPLY	*3*
LOW GROWTH	*3*
INADEQUATE FUNDS	*3*
INSUFFICIENT STAFF	*5*
CITY COUNCIL/BOARD DECISION	*2*
OTHER	*1*

Development Activity

24. Since 1993, has the city approved any new or redevelopment projects with landscape exceeding 2,500 square feet?

YES 46 NO 8 DON'T KNOW 6

25. How many projects with landscape exceeding 2,500 square feet did the city approve during 1999? (check one)

NONE	*20*
1 TO 5	*21*
6 TO 10	*7*
11 TO 20	*2*
21 TO 35	*1*
36 TO 50	*1*
51 AND OVER	*4*
MISSING	*4*

Study Report

26. Would you like a copy of the final study report?

YES 44 NO 16

NOTE: M=Mean; SD=Std. Dev.; n=# of respondents

Model Water Efficient Landscape Ordinance (AB-325) Survey

Name of Respondent: _____

Name of County: _____

General Information

1. What size population lived in the county's unincorporated portion during 1992 and 1999?

   M=67981; SD=54598 (1992) *M=77637; SD=70875* (1999) *(n=6)*

Recycled Water

2. For its unincorporated areas, has the county adopted an ordinance or resolution regarding use of recycled water?

   YES 2 NO 4 (if no, go to Q5)

3. Does the ordinance or resolution mandate the use of recycled water under certain circumstances?

   YES 2 NO 0

   If YES describe_____

4. Does the ordinance or resolution require separate plumbing in new development to accommodate the use of recycled water?

   YES 1 NO 1

Irrigation Limits

5. For its unincorporated areas, does the county limit irrigation to fewer than seven days per week through an ordinance or resolution?

   YES 0 NO 6 (If no, go to Q8)

If YES, how many days per week? _____

6. How does the county detect noncompliance with these irrigation limits? (check all that apply)

   NONE (VOLUNTARY COMPLIANCE) (skip Q7)
   CITIZEN COMPLAINTS
   RANDOM STAFF DRIVETHROUGHS
   WATER BILL ANALYSIS
   OTHER _____

7. Upon detection of noncompliance, what corrective action is targeted at the customer? (check all that apply)

   RECEIVES A CALL
   RECEIVES A CITATION
   IS OFFERED A LANDSCAPE AUDIT
   REPEAT OFFENDERS ARE FINED
   OTHER _____

Water Efficient Landscape Ordinance

8. For its unincorporated areas, has the county adopted a water efficient landscape ordinance, or resolution, or a formal set of landscape design guidelines? (check one)

   ORDINANCE 2 (skip Q9)
   RESOLUTION 1 (")
   DESIGN GUIDELINES 1 (")
   *OTHER*_____ *(")*
   NONE OF THE ABOVE 2 (answer Q9, then go to Q16)

9. What best explains why county has adopted neither ordinance, nor resolution, nor guideline? (check all that apply)?

   ADEQUATE WATER SUPPLY 1
   LOW GROWTH 1
   MOSTLY SMALL LOT SIZES
   CONSERVATION LOW PRIORITY

INADEQUATE FUNDS
INSUFFICIENT STAFF
COUNTY SUPERVISOR'S DECISION
OTHER _____

10. Before issuing new building permits, does the county mandate or recommend meeting the requirements of the landscape ordinance/resolution/guideline?

MANDATES	*4*
RECOMMENDS	*0*

11. Upon completion of a project does the county verify compliance between the approved plan and the installed landscape?

YES *4* *NO* *0*

12. How does the planning department educate consulting landscape architects and building contractors about the requirements of the ordinance/resolution/guideline (check all that apply)?

OUTREACH	
PERMITTING PROCESS	*4*
OTHER _____	

13. Have consulting landscape architects expressed any difficulty in meeting the requirements of the ordinance/resolution/guideline?

YES *0* *NO* *4*

If YES, please explain

_____

14. In the long run, do you expect the county's ordinance/resolution/guideline to have a significant impact on water demand?

YES *3* *NO* *1* *DON'T KNOW* *0*

If NO, which of the following reasons best explains why? (check all that apply)

LOW GROWTH	
MOSTLY SMALL LOT SIZES	*1*
CONSERVATION LOW PRIORITY	
WEAK ENFORCEMENT	
INADEQUATE FUNDS	
INSUFFICIENT STAFF	
OTHER _____	

15. In your view, what are the key elements of an effective strategy for promoting water efficient landscapes? (use additional sheets if necessary)?

_____

_____

_____

Development Activity

16. Since 1993, has the county approved any new or redevelopment projects with landscape exceeding 2,500 square feet?

YES *6* *NO* *0* *DON'T KNOW* *0*

17. How many projects with landscape exceeding 2,500 square feet did the county approve during 1999?

NONE	
1 TO 5	*2*
6 TO 10	*2*
11 TO 20	*1*
21 TO 35	
36 TO 50	
51 AND OVER	*1*

Study Report

18. Would you like a copy of the final study report?

YES *6* *NO* *0*

NOTE: M=Mean; SD=Std. Dev.; n=# of respondents

Appendix C—Personal Interview Questions

Interview Category: City and County Planners

1. How has AB 325 contributed to landscape water conservation?
2. What is the greatest difficulty in implementing your landscape ordinance?
3. What is the greatest benefit gained from your ordinance?
4. How do you verify compliance between the approved plan and the installed landscape?
5. Is the demand for water conservation increasing?
6. Why was – or wasn't – a water budget approach adopted?
7. Is AB 325 seen to be a desirable or encumbering requirement?
8. What are the key complaints you hear from designers, contractors, developers?
9. Approximately how much do AB 325 requirements inflate the cost of the permitting process?
10. Has the local water company shown any interest in coordinating efforts and promoting outdoor water conservation?
11. Other comments or recommendations?

Interview Category: Landscape Architects

1. How has AB 325 contributed to landscape water conservation?
2. Have the new water conservation ordinances changed how you do planting design or irrigation design?
3. What is the most difficult problem in meeting conservation requirements?
4. What change would you make to the ordinance to achieve greater better results?
5. Is the demand for water conservation increasing?
6. Are AB 325-compliant designs perceived as being aesthetically more or less pleasing to clients?
7. Additional comments or questions?

Interview Category: Landscape/Maintenance contractors

1. How has AB 325 contributed to landscape water conservation?
2. How has AB 325 affected your work?
3. How do you schedule irrigation to conserve water?
4. Is the demand for water conservation increasing?
5. Is it less work or more work to maintain AB 325-compliant landscapes?
6. What is the greatest difficulty in achieving water conservation in landscaping?
7. Do AB 325 requirements inflate the cost of the permitting process? How Much?
8. Do you see any savings to your water use? How much?
9. Additional comments or recommendations?