

State of California
The Natural Resources Agency
Department of Water Resources
Division of Statewide Integrated Water Management
Water Use and Efficiency Branch

INDEPENDENT TECHNICAL PANEL ON DEMAND MANAGEMENT MEASURES

PUBLIC DRAFT REPORT

Recommendations Report to the Legislature
On Landscape Water Use Efficiency



February 13, 2016

ITP DRAFT RECOMMENDATIONS ON LANDSCAPE WATER USE REDUCTION AND EFFICIENCY

This Public Draft Report (Draft Report) was developed by the Independent Technical Panel (ITP) with staff assistance from the Department of Water Resources (DWR), California Urban Water Conservation Council, and the Center for Collaborative Policy, California State University, Sacramento.

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Public Draft Report Overview

The ITP's recommendations on landscape water use reduction and efficiency measures, contained herein, address a variety of issues determined by the ITP to be of critical and timely importance. The recommendations acknowledge the importance of functional and attractive outdoor spaces, while aiming to achieve a vision of California wherein cumulative water use for outdoor landscapes in 2035 is one-half the amount used today.

This Draft Report has been made available for the public to provide feedback on the ITP's recommendations. The Draft Report is available on the ITP Webpage <http://www.water.ca.gov/wateruseefficiency/sb7/committees/urban/u2/> and the DWR Water Calendar for March 4, 2016 (see further information below). The Draft Report contains a vision statement, and 18 recommendations, organized within seven topic sections. All contents in the body text of the document represent unanimous or majority approval of said text by the ITP, as per its decision rule memorialized in the ITP Charter (*May 2013*). The recommendations are presented such that each contains: a background statement, a general recommended action, and a detailed proposed action. Additionally, at the request of two ITP members, Appendix A presents a section not approved by a majority of the ITP but that said members support being made available for public review and comment.

Some sections have metric-based citations that have not been finalized. In such cases, the incomplete citation is presented as “ [citation pending] ” or “ [insert data or references for ...] ”. Incomplete citations will be completed and presented in the Final Report to the Legislature.

The Draft Report will be available for a 30-day public review period, after which, the ITP will consider all public comments, and will finalize the document into a Final Report. The Final Report, upon submission to the State legislature pursuant to California Water Code §10631.7, will contain additional supporting sections including, but not limited to:

- Introductory Section
- Key Strategies
- Glossary of Terms
- Appendices with Supporting Information

Submission of Public Comment

Comments on the Draft Report will be accepted during the period from **February 13, 2016 – March 13, 2016**. Comments may be submitted via email to Julie Saare-Edmonds at julie.saare-edmonds@water.ca.gov or hard mail to Julie Saare-Edmonds, Water Use and Efficiency, Department of Water Resources, P.O. Box 942836, Sacramento, CA 94236-0001.

The ITP will host a Public Meeting on **March 4, 2016** at the San Diego County Water Authority, from 8:30 am – 5:00 pm located at 4677 Overland Avenue, San Diego, CA 92021. Public participation in the meeting can be achieved in person or via the internet. Web-based meeting information will be made available on the ITP

Webpage <http://www.water.ca.gov/wateruseefficiency/sb7/committees/urban/u2/> and the DWR Water Calendar for March

4 <http://www.water.ca.gov/calendar/index.cfm?meeting=25370>. The purpose of this meeting is for the ITP to receive public comments, review and discuss this input, and determine next steps to prepare the Final Report.

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SECTION 3: ITP VISION STATEMENT

Achieving Sustainable Urban Landscapes Throughout California

In the grip of a drought that is truly unprecedented in California’s recorded history, communities throughout the State have been directed to curtail urban water use by 25 percent, and initial reporting indicates that most communities have met their goal thus far. Prior to these extraordinary reductions, approximately half of the urban water provided for all purposes in California was used outdoors, primarily for landscape irrigation. This staggering amount of potable water, roughly four million acre feet per year, illuminates the critical importance of the choices individuals and communities make about landscaping.¹

Functional and attractive landscapes are essential to our quality of life, providing places to recreate and relax, cooling the environment around buildings, offering wildlife habitat, and creating places of beauty. But the current drought is a reminder that the landscape designs we have brought to California, coupled with ingrained habits of water use, are not sustainable. Homes, businesses, and parking lots surrounded by vivid green turf make inordinate demands on the same water supplies we depend on for cooking, bathing, sanitation, and business activity. A cultural norm that originated in the English countryside is increasingly out of place in today’s California – let alone, in a more populous California with an even warmer climate in the years ahead.

A break with the past would involve at least three key changes for new landscapes—

- Attractive water-wise plants would be used in place of most turf in ornamental lawns.
- Outdoor water use would be separately measured to allow for careful water management.
- Rainwater would be largely retained on site or nearby for landscape use or groundwater recharge.

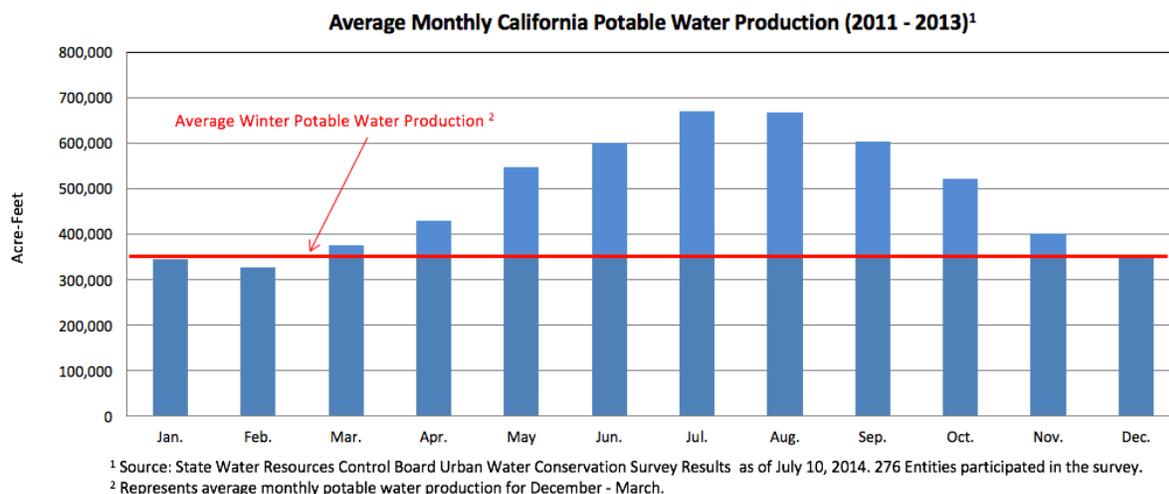
These same strategies can be applied to existing landscapes, albeit to a degree that is financially practical and at a pace that allows for public awareness and acceptance. The good news is that these practices are well known and available today. A growing selection of water-wise plant materials and more water-efficient irrigation equipment is available at home centers and nurseries around the state. A growing movement of landscapers and gardeners treat rainwater and stormwater as resources to be used on site, rather than as a nuisance to be quickly expelled from the property. And the remarkable enthusiasm for participation in turf conversion rebate programs is a sign that significant public interest is already here for making this transition.

Over the long term, water suppliers and their customers will benefit by a gradual but steady reduction in outdoor water use. Landscape water use is the most variable part of urban water

¹ Department of Water Resources. *California Water Plan Update 2013*. 2014. Section 3 – Resource Management Strategies. Chapter 3 – Urban Water Use Efficiency. 3-10.

demand – subject to wide swings in use between wet and dry years and from winter to summer. Nearly every urban water utility’s peak demands are shaped by landscape water use and these peak demands drive requirements for costly conveyance, treatment, and distribution capacity (see Figure 1). A less thirsty urban landscape would mean less volatility in demand throughout the year and from one year to the next, and provide greater revenue stability for water suppliers and lower peak-related costs to be recovered from customers. Ideally, for many water suppliers, reduced landscape water use will improve the reliability of water supplies, allowing additional water to be drawn upon during future droughts.

Figure 1



The professional landscape industry will benefit through new and profitable business models, incorporation of new technologies, efficiencies, and a better trained and educated workforce while still creating and managing outdoor areas for enjoyment, relaxation, habitat and social wellbeing.

A Goal for the State: Reduce potable water use on urban landscapes by half over the next twenty years

The purpose of this report is to provide a comprehensive and complementary set of recommendations for adoption of the policies and practices that will make landscape water use far more sustainable than today. The Independent Technical Panel recommends a goal to reduce potable water use on urban landscapes statewide on the order of 50 percent from pre-drought levels over the next 20 years. This will result in an average annual savings of more than two million acre-feet, or about four times the amount of water used by the entire City of Los Angeles. In broad terms, these savings will largely come from three sources:

- Approximately 800,000 acre-feet from the replacement of roughly 140,000 acres of ornamental turf – about seven percent of the state’s turf area – with water-wise plant material²
- Approximately 800,000 acre-feet from improved irrigation equipment, plant selection, soil health, and rainwater catchment at other existing residential and commercial landscapes [citation pending]
- Approximately 400,000 acre-feet from the application of stronger landscape water use standards for all new landscaping, as per the state’s Model Water Efficient Landscape Ordinance [citation pending]

By 2035, the use of potable water on urban ornamental landscapes will be much less common than today. Residential and commercial landscapes will be attractive and functional, and will be largely sustained by natural precipitation where it falls, harvested rainwater, and on-site sources of water acceptable for landscape use. Such landscapes will retain most precipitation for storage, direct use, or recharge, rather than generating runoff.³

The use of recycled water can contribute to the reductions in potable water applied to urban landscapes recommended in this report. Recycled water provides a drought-proof local water supply, the availability of which is not subject to variations in weather. Because of this, recycled water should play an expanded role in the State’s efforts to reduce potable water use on urban landscapes.

There is no single program that will achieve these results, and it is unrealistic to expect that all landscape conversions will be financed with public funds. The policies and practices that will achieve these results will involve a combination of market forces, targeted incentives, reasonable regulations, improved business models, workforce preparation, evolving social norms, and applied research. Specific recommendations for each of these areas are contained in the chapters that follow.

² Assumes 0.121 gallons of water saving per square foot per day. Metropolitan Water District of Southern California. Metropolitan’s Conservation Savings Model: Methodology and Assumptions, 2015 Integrated Resources Plan Update, Water Efficiency Workgroup. Draft. 04/13/2015. Page 8.

³ According to the California Urban Water Conservation Council’s *Achieving A New Normal in California Landscapes*, a watershed-based approach to urban landscapes promotes a balance between resource efficiency and protection, environmental stewardship and quality of life. It is a more collaborative and integrated way of managing water, soil, energy and air resources, as well as improving water quality, reducing runoff, protecting wildlife habitat, reducing waste and mitigating the effects of climate change.

SECTION 4: VOLUNTARY TURF REPLACEMENT

RECOMMENDATION #1: Turf Replacement Incentive Program

Background

According to the *California Water Plan 2013 Update*, the residential landscape and large landscape sectors account for approximately four million acre-feet, or 44 percent, of statewide urban water use per year.⁴ A large volume of the water used by these sectors is wasted due to leaks, overwatering, and poorly maintained irrigation systems. Contributing to the high water use is the prevalence of turf and other high-water-use plants.⁵

Many water suppliers around the state have offered customer incentives for turf since the mid 2000s and customer participation has been strong. Notably, the Metropolitan Water District (MWD) of Southern California has provided over \$300 million to support turf removal in Southern California. [\[insert data or references for MWD program\]](#), supplementing turf replacement incentives offered by many of its member agencies. In response to the Governor's April 2015 Executive Order, the Department of Water Resources (DWR) is also managing a program aimed at replacing 50 million square feet of turf. [\[insert data or references for DWR program\]](#).

The amount of turf in California is vast – over two million acres⁶. No incentive program or programs can provide financial incentives to convert this large area, and replacement of all turf is not necessary to greatly improve the efficiency of landscape water use. Nevertheless, the stop and start nature of turf replacement programs undercuts the development of strong practices and a capable workforce to accomplish the replacement of ornamental turf over the next two decades.

Purpose Statement

The purpose of this recommendation is to reduce the amount of water used to irrigate turf through a turf replacement incentive program. Turf replacement incentive programs are not intended to fund entire projects, but rather provide enough of an incentive for property owners to take action. Turf replacement incentive programs are also not intended to be available indefinitely. Instead, they are implemented to provide an initial boost to the landscape transformation process and initiate change in the marketplace. There are far too many acres of

⁴ Department of Water Resources. 2014. *California Water Plan Update 2013*. Volume 3 - Resource Management Strategies, Chapter 3 - Urban Water Use Efficiency, 3-10.

⁵ *Ibid.*, 3-12.

⁶ Total turf in California: 2.75 million acres plus or minus 25%. C. Milesi, et al, "Mapping and Modeling the Biogeochemical Cycling of Turf Grasses in the United States," *Environmental Management*, Vol. 36, No. 3, July 2005, p. 433.

turf in the state for a turf replacement incentive program to fund replacement of all turf. The transition from turf to sustainable landscapes will take years accomplish, but when complete, will dramatically reduce the amount of water used for landscape irrigation.

The Independent Technical Panel Recommends That:

1. Establishment of a five-year statewide turf replacement incentive program in the form of a non-refundable tax credit to encourage upgrades of existing landscapes to sustainable landscapes. The tax credit for individuals with single-family residential properties would be \$1 per square foot, and the credit for commercial and multifamily residential properties would be \$0.50 per square foot. The tax credit for single-family residential properties would be capped at \$1,500, and the tax credit for commercial and multifamily residential properties would be capped at \$10,000 per property.

Program requirements for converted areas would include, but not be limited to, the following:

- Turf removed must have been existing prior to the effective date of the bill
- Only turf irrigated with potable water is eligible
- Turf replacement must take place after the effective date of the bill
- Minimum of 250 square feet of turf must be replaced
- Minimum of 50 percent of removed turf area must be replaced with plants
- Irrigation fixtures must be at least as efficient as high-efficiency nozzles and point source emitters
- Hardscape must be permeable, pervious, or porous
- Utilize a minimum of 3" of mulch
- New landscape materials must remain in place for at least five years
- On-site stormwater capture via rain gardens, bio-swales, dry streambeds, are to be installed where possible

2. A report to the Governor and Legislature be prepared and submitted by the Franchise Tax Board, in consultation with the DWR, on the number of projects, turf area, dollar value of credit, and projected water savings of the tax credits claimed during years one through four of the credit program, and from each agency regarding the extension or modification of the tax credit after year five.

SECTION 5: IMPROVEMENTS IN EXISTING LANDSCAPES

RECOMMENDATION #1: Require Irrigation System Evaluations as Part of Home Inspections for Single-Family Residential Properties

Background

Each year, roughly 400,000 existing homes are put up for sale in California. Before a sale is completed, most prospective purchasers contract for a home inspection to get a professional assessment of the condition of the home and its major systems. The inspector is typically on the property for a couple hours. The results of the inspection are provided to the prospective purchaser in a report that makes note of observed deficiencies, which serves to inform the purchaser before making an irrevocable commitment to purchase the property.

Home inspections offer a good opportunity to inform homeowners of deficiencies in landscape irrigation systems, and are far more numerous than all other types of landscape inspections provided by water suppliers and commercial landscape contractors. However, by one estimate, only 20% or so of home inspections include any assessment of the home's landscape irrigation system, thus missing a significant opportunity to alert homeowners to needed corrections of inefficient irrigation systems and water waste.

Purpose Statement

The purpose of this recommendation is to ensure that purchasers of existing homes are informed of significant deficiencies in landscape irrigation systems by requiring home inspections to include a basic assessment of the irrigation system. Without such an evaluation, the buyer may not be aware of the magnitude of the irrigation system's inefficiencies. The inspection is intended to identify gross deficiencies readily observable by a professional, rather than a deep analysis of schedules and equipment needed to optimize irrigation at the site. For a landscape inspection to be integrated with a home inspection, a high-level assessment can be accommodated while a more time-consuming analysis cannot.

This proposal imposes no new requirements on home sellers, homebuyers, realtors, lenders, or water suppliers. As with other findings in a home inspection report, the seller and buyer are under no obligation to correct any deficiency noted, but are informed with a list of matters that will require attention in the newly purchased home.

The Independent Technical Panel Recommends That:

Legislation be enacted to amend Chapter 9.3, Division 3 [Professions and Vocations Generally] of the Business and Professions Code by adding the following new section:

_____. (a) One year after the effective date of this Act, each home inspection of a dwelling unit on a parcel containing an in-ground landscape irrigation system, the operation of which is under the exclusive control of the owner or occupant of the dwelling, shall include the following:

- (1) Examination of the irrigation system controller (if present) for functional operation and proper installation.
- (2) Visual inspection of each valve/station/zone noting all visible signs of leaks – especially noting those that may cause any safety concerns (e.g. slip and fall, mold), and signs of water intrusion around the foundation.
- (3) Cycling of each irrigation valve for functional operation and inspect for leaks.
- (4) Inspection all of the components of overhead irrigation, noting sprinklers that are not performing properly.
- (5) Operation and inspection of drip irrigation for leaks caused by blown emitters, broken fittings, and tubing leaks.
- (6) Notation of each location of:
 - (1) irrigation spray being directed to hardscape
 - (2) irrigation water leaving the irrigated area as surface runoff
 - (3) ponding of irrigation water on the surface of the irrigated area
- (7) Notation if inspection is limited due to snow or ice.

(b) This section does not apply to any of the following:

- (1) An inspection performed by a city, county, city and county, or public water supplier.
- (2) An inspection performed at the direction of any court.
- (3) An inspection confined solely to a landscape area.
- (4) An appraisal for the purpose of preparing a report containing an estimated market value of a dwelling.

SECTION 5: IMPROVEMENTS IN EXISTING LANDSCAPES

RECOMMENDATION #2: Landscapes Over One Acre

Background

One limitation of the current and newly updated Model Water Efficient Landscape Ordinance (MWELo) is the ability to substantially reduce water use for existing landscapes. It is common knowledge that existing landscapes account for the majority of potential for over watering and waste. Upwards of 45% of current urban water use is attributed to landscape irrigation usage⁷. Therefore any process included in MWELo to manage and reduce the amount of water used and/or wasted from existing landscapes will provide significant savings to the State's water resources. Currently, Section 493.1 of MWELo addresses "Irrigation Audit, Irrigation Survey, and Irrigation Water Use Analysis" and states:

493.1. Irrigation Audit, Irrigation Survey, and Irrigation Water Use Analysis.

(a) This section, 493.1, shall apply to all existing landscapes that were installed before December 1, 2015 and are over one acre in size.

(1) For all landscapes in 493.1 (a) that have a water meter, the local agency shall administer programs that may include, but not be limited to, irrigation water use analyses, irrigation surveys, and irrigation audits to evaluate water use and provide recommendations as necessary to reduce landscape water use to a level that does not exceed the Maximum Applied Water Allowance for existing landscapes. The Maximum Applied Water Allowance for existing landscapes shall be calculated as: $MAWA = (0.8) (ETo) (LA) (0.62)$.

(2) For all landscapes in 493.1(a), that do not have a meter, the local agency shall administer programs that may include, but not be limited to, irrigation surveys and irrigation audits to evaluate water use and provide recommendations as necessary in order to prevent water waste.

It is currently difficult for many water providers to adequately account for and manage specific information about existing irrigation systems throughout their service area due to staff limitations and processes to gather and disseminate information. In the future, when Automated Metering Infrastructure becomes more widespread, water providers will have better access to real time water usage. Until then, a challenge remains in most of the State to identify and report on existing irrigation systems including how much water is actually being used especially at peak demand and how that usage compares to the water needs of the associated plant material.

⁷ Department of Water Resources *California Water Plan 2104*.

Purpose Statement

In keeping with section 493.1 of MWELo regarding existing landscapes, water efficiency strategies shall be applied to landscapes over 1 acre. These strategies should include the following: pragmatic regulation, conservation based pricing, and education and outreach. As such, reporting on the state and status of existing irrigation systems is crucial to managing landscape water use appropriately. Similar to California State-required smog checks for vehicles, inspections of existing landscape irrigation systems are necessary to determine those systems operating appropriately and those that are underperforming. Once identified, the local jurisdiction working with the property manager, owner and landscape company can determine the most appropriate approach to influence upgrades or compliance to local regulations. In the smog test example above, the onus is upon the owner/driver to present the vehicle to be inspected. The responsibility of the governing entity is to notify the owner of the need to perform the test. The third party, the mechanic is responsible to report the results and typically also performs necessary repairs. For an irrigation system report it will be the responsibility of the Local Agency or its representative (MWELo section 493.0) to notify the property owner that a report is required. The onus will then be upon the property owner to see that a report is submit to a DWR website created for this program. A third party such as the landscape service provider or property manager can manage the creation of the report on behalf of the owner.

The Independent Technical Panel Recommends That:

The Water Conservation in Landscaping Act (Government Code, Article 10.8, sections 65591 – 65599), be amended at the appropriate place to add the following:

Sec. _____. (a) Upon notice from the local agency or its representative, each owner or owner's agent of an irrigated landscape of more than one acre shall submit a landscape irrigation report once every three years to the Department of Water Resources.

(b) The first landscape irrigation report shall be submitted to the Department by:

(1) January 1, 2017 for multi-family residential, commercial, industrial, and institutional landscapes.

(2) January 1, 2020 for single-family residential landscapes.

(c) Each local agency, as such term is defined in section 491(oo) of Chapter 2.7, Title 23, California Code of Regulations, shall notify each owner of an irrigated landscape subject to the requirements of this section at least 60 days in advance of any date by which a landscape irrigation report shall be submitted.

(d) The Department, in consultation with the California Urban Water Conservation Council and the California Landscape Contractors Association, shall create a template for an irrigation

inspection report form, an internet portal for electronic submission of such report forms, and a database accessible to local agencies and water suppliers.

(e) Each landscape irrigation report shall include the following:

(1) Irrigation system overview: water meter number and type (if existing), assessor parcel number, irrigation zone map, zone description, plant factor by zone (MWELo defaults).

(2) Water budget as defined in MWELo: gallons per minute per zone, operating pressure by zone, expected peak month consumption.

(3) List of responsible parties: owner, landscape contractor, property manager.

(f) Not later than three years after the initiation of the on-line landscape reporting system authorized herein, the department shall submit to the Governor and the Legislature a summary of the data compiled together with any recommendations for revising reporting requirements or the provisions relating to existing landscapes in the MWELo.

SECTION 5: IMPROVEMENTS IN EXISTING LANDSCAPES

RECOMMENDATION #3: State Owned Facilities

Background

There are nearly three thousand publically owned facilities in the State of California⁸, with a cumulative approximation of XXX,XXX acres [citation pending] of landscaped area. In addition, there are approximately 2,300 properties leased by the State¹, and the State has some influence on the landscaping and landscape maintenance practices at these facilities.

Per Governor Brown's Executive Order (EO) B-18-12, all State operated facilities are required to report annual water use to the Energy Star Portfolio. According to 2012-2015 data, X amount of water [citation pending] is utilized by State facilities annually. In total, an estimated XX,XXX acres [citation pending] could potentially undergo landscape conversion to sustainable, drought-tolerant landscaping at publicly owned facilities. Estimated land conversion could result in savings of up to XX AFY [citation pending].

EO No. B-18-12 aimed to address landscape water use on State operated facilities. However, there was a lack of implementation resulting from funding difficulties. Overall, the budget estimate to support this effort is \$__ Million [citation pending].

The majority of the State's publicly owned sites are managed by either the State Architect or the California Department of Transportation (Caltrans). The State Architect oversees the building of all public, K-12 and University buildings. The State Architect has established their own version of the California Green Standards Building Code (CALGreen), and recently adopted an ordinance for water use in 2015.

There are approximately 2,400 higher education institutions throughout the State all overseen by the State Architect. Many of these institutions, such as University of California and California State University facilities, already operate at a high standard of landscape management and have dedicated staff for maintenance. There are also college water efficiency groups where staff on campuses work collaboratively to employ initiatives to cut water use. While the majority of campus water use is either indoors or for athletic fields, nearly all landscaped areas can be irrigated with a higher degree of efficiency.

CalTrans is also a primary water user of the State, with approximately 30,000 acres of land under their jurisdiction requiring approximately 9 billion gallons of water annually. CalTrans received a directive from the governor resulting from the severe drought conditions, though additional measures could be implemented.

⁸ Department of General Services, Statewide Inventory of Property as of February 1, 2016
<http://www.dgs.ca.gov/resd/Home/SPIhomepage/SPISummary.aspx>

Purpose Statement

The purpose of this recommendation is to ensure that landscapes of State owned facilities are meeting or exceeding water use efficiency standards. In this way, the State can lead by example, provide education on sustainable landscaping, and promote stewardship towards landscape water use efficiency.

It is recommended that facilities with customer service buildings be addressed with the highest priority as they are frequented by a significant number of people and thus have high visibility. Their “lead by example” demonstrations will further help to educate the public, demonstrating ideas of how beautiful California-friendly sustainable landscaping can be.

This recommendation is encouraged to be applied at federally owned facilities, and State university and college campuses.

The Independent Technical Panel Recommends That:

The Department of General Services, in collaboration with the State Architect:

- 1) Retrofit all State-owned buildings or facilities from traditional landscape/turf to sustainable landscaping within 20 years. Note that functional/recreational, or registered historical site landscape is exempted from this requirement.
- 2) Retrofit State-owned customer service buildings (any building that is open to the public and that agency customers commonly visit) from traditional ornamental turf to sustainable landscaping at a rate of 10% per year (to achieve complete retrofit in 10 years)⁹. Note that functional/recreational, or registered historical site landscape is exempted from this requirement.
- 3) Install demonstration/educational signage identifying sustainable landscaping and water resulting water savings on select landscapes, primarily around customer service buildings.
- 4) At minimum, require all state owned facilities to comply with Model Water Efficient Landscape Ordinance (MWELO) including water budget requirements pursuant to Section 493.1 by January 1, 2021. Said compliance should include mandatory rainwater and/or stormwater capture where site conditions permit.
- 5) Require educational training for State-employed landscape managers on irrigation efficiency, water budgets and landscape management that includes sustainable landscaping as the focus.

⁹ The State Capitol has historical gardens with some high water use plants. MWELO has an exception for existing plant collections that are part of botanical gardens and arboretums, such as these gardens.

DWR (or other entity) to develop universal training curriculum hosted online, including a library of educational materials and landscape design templates¹⁰.

- 6) Require State agencies to review and give preference to the most qualified landscape managers bidding on new projects/contracts, and not only consider the lowest bids when selecting contractors as has often been done historically.
- 7) Encourage the optimized use of recycled and non-potable water on landscapes.

¹⁰ CalTrans has a large platform developed for online training of Best Management Practices (BMPs). This training platform can be utilized to provide water training to other state agencies. This would leverage the financial investment the State has already made.

SECTION 6: STATE MODEL WATER EFFICIENT LANDSCAPE ORDINANCE (MWELo) FUTURE REVISIONS & PROCESS UPDATES

RECOMMENDATION #1: MWELo Future Revisions for the Next Review Cycle

Background

In response to the Governor Brown's emergency water conservation Executive Order B-29-15 in April 2015, the Department of Water Resources (DWR) undertook an extensive and expedited revision of the Model Water Efficient Landscape Ordinance (MWELo). The Independent Technical Panel (ITP) contributed a set of recommendations to DWR during the revision process in the summer of 2015. Many, but not all, of the ITP's suggested revisions were integrated into the new MWELo, released in July 2015. DWR has expressed a desire to regularly update MWELo to ensure that the model ordinance stays relevant while advancing water conservation and efficiency. The following recommendations support DWR in this goal by providing: 1) specific recommendations for the next MWELo update that will continue to maximize landscape water savings; and 2) a general recommendation for DWR to examine and improve the scope and impact of MWELo as it applies to existing landscapes.

Purpose Statement

Although the latest update to MWELo has taken effect only recently, several revisions or additions to the ordinance were previously recommended to DWR by the ITP or have been brought to the ITP's attention during the past year. Previously submitted recommendations were largely not accepted because they were outside the language of the Governor's Executive Order and/or the complexities of the proposals required more vetting by stakeholders than could be accomplished in the expedited timeframe for the 2015 MWELo update.

To increase the efficacy and relevance of MWELo, it is recommended that DWR incorporate the proposed changes to MWELo in Table 1 below in the next revision of MWELo, incorporating them as proposed amendments in a draft circulated for public comment. The most consequential of these recommendations are:

- That MWELo provide a statewide minimum standard for rooftop rainwater retention in new development, giving a boost to the "watershed approach" to sustainable landscaping and providing a consistent floor for any additional stormwater control measures that may be instituted through other means at the local, regional, or State level.
- That the additional water allowance first authorized in 1992 for "special landscape areas" be reduced to take into account two decades of progress in irrigation technology and plant propagation for lower water use.
- That landscapes associated with buildings undergoing major renovations be covered by the requirements of the ordinance.

The specific revisions are intended to strengthen the power of MWELO, when implemented and enforced, to achieve functional, high value, multi-benefit landscapes.

The ITP also reaffirms its recommendation that MWELO should effectively address water use efficiency on existing landscapes. It is recommended that DWR examine the structure of MWELO as it applies to existing landscapes. While it is critically important for MWELO to guide efficiency improvements in newly developed and renovated landscapes, the vast majority of landscape water use is – and will continue to be – attributable to landscapes installed before 2015. The ITP shares the view of many stakeholders that the standards for existing landscapes in the current MWELO are not actionable, and that a practical pathway to the application and enforcement of these standards needs to be found.

The Independent Technical Panel Recommends That:

- (1) DWR incorporate the changes recommended in Table 1 below in the next update of the MWELO, and
- (2) DWR examine the structure of the MWELO as it applies to existing landscapes, and report within one year to the Governor and legislature on its findings and recommendations for improving its effectiveness.

Table 1: Specific sections recommended for revision in the next MWELO update; an (ITP) annotation indicates the recommended revision was previously included in the Panel’s recommendations to DWR for the 2015 MWELO update.

| Topic & Recommendation | References | Language | Justification |
|---|------------|---|---|
| Applicability – expand MWELO triggers for existing landscapes to include high-cost building renovations | §490.1 | (ITP) <i>addition:</i> (a)(3) <u>existing landscapes with a landscape alteration greater than 500 square feet associated with any additions or renovations to the building with a valuation exceeding \$200,000.00 requiring a building permit.</u> | This additional MWELO cost trigger would capture smaller but significant landscape renovations that would otherwise be excluded based on the 2,500 sq. ft. renovation size threshold. When major renovations are happening to a building, it is as if a new development is being constructed, and therefore this cost trigger is simply capturing landscape renovations that are similar in scope to new development at the same size threshold as the new development MWELO provision (500 sq. ft.). |
| Evapotranspiration Adjustment Factor (ETAF) for Special Landscaped Areas – reduce from 1.0 to 0.8 | §491 | (ITP) (s) The ETAF for a Special Landscape Area shall not exceed 1.0 <u>0.8</u> . | Irrigation efficiency and water conservation should be cultivated as a standard practice for all irrigated plantings, including special landscaped areas that are capable of thriving with an ETAF of 0.8. By decreasing the ETAF for these areas from 1.0 (a level first adopted in 1992) to 0.8, MWELO would account for improvements in plant husbandry and irrigation technology and help instill a consistent conservation ethic, rather than maintaining a loophole for over-watering. |
| Special Landscaped Areas – expand the designation to include all areas irrigated solely with non potable | §491 | (ttt) “Special Landscape Area” (SLA) means an area of the landscape dedicated solely to: edible plants; recreational areas; | By designating landscaped areas irrigated solely with non-potable water as ‘special landscaped areas, MWELO would incentivize the use of alternate water sources beyond municipality-provided recycled water such as graywater and |

| | | | |
|--|---------------------------------|--|---|
| water sources including graywater and harvested rainwater | | areas entirely irrigated with recycled water, <u>graywater, or harvested rainwater</u> ; or water features using recycled water | rainwater. Additionally, areas partially or periodically irrigated with potable water should not receive this additional water allowance. |
| Turfgrass Slope – reduce allowable turf slope with spray irrigation from 25% to 10% | §492.6 | (a)(1)(D) Turf is not allowed on slopes greater than 25% <u>10%</u> where the toe of the slope is adjacent to an impermeable hardscape and where 25% <u>10%</u> means 1 foot of vertical elevation change for every 4 feet <u>10 feet</u> of horizontal length. | Irrigating turf with overhead spray on slopes of 25% without generating runoff is difficult. Additionally, turf areas with slopes of 25% are often not ‘functional’ in that they do not support many or most recreational activities. Given that MWELo seeks to eliminate overspray and runoff, and encourage alternatives to non-functional turf, it follows that turf should not be allowed on such steep slopes. |
| Pool/Spa Covers – require pool/spa covers | §492.6 | (a)(2)(D) Pool and Spa Covers are highly recommended <u>required</u> . | Having pool and spa covers required on new development/renovations would increase their appropriate use by the end user. This is a straight-forward requirement that can significantly reduce pool and spa water consumption. As with any new pool, covered pools should be surrounded by a barrier of appropriate height and secure entry. |
| Irrigation Schedule & Hydrozone Maps – require that a copy of the hydrozone map is left on site with the automated irrigation controller itself | §492.10 and Appendix C (Part 3) | (a)(6) <i>addition:</i> <u>Current versions of landscape hydrozone maps shall be placed and maintained in the appropriate irrigation controller housing and shall include relevant information necessary to adjust the scheduling as needed considering all the parameters listed in §492.10(a)(4) and (5).</u> | The inclusion of readily accessible and detailed hydrozone map and scheduling tools - physically associated with the irrigation controller – would make it easier for landscape managers (internal staff or third-party contractors, e.g., auditors) to identify key scheduling factors and to set up and maintain an irrigation system to efficiently meet the needs of the landscape. The necessary institutional knowledge would be at the finger-tips of the individual(s) who is best able to implement best practices with the information provided. Although some ET-based controllers will keep the irrigation schedule embedded in its system, for conventional controllers, irrigation schedules are necessary. |
| Irrigation Efficiency – require no overspray or runoff to receive certificate of completion | §492.12 | (c)(2) <i>addition:</i> <u>Prevention of overspray and runoff must be confirmed during the irrigation audit in order for the local agency to accept the certificate of completion.</u> | Though the requirement for no overspray or runoff is implied throughout MWELo (e.g., §492.7 (a)(1)(U)(3)), it should be stated clearly that a local agency is not to approve a certificate of completion without an audit report that confirms the absence of overspray and runoff under regular irrigation scheduling conditions. If the irrigation system is not achieving efficient watering immediately after installation and original scheduling, it is unlikely to ever achieve compliance by improving efficiency over time. |
| Audit Sampling – Add provisions for sample selection and acceptance criteria for landscapes approved on the basis of sampling | §492.12 | (b) In large projects or projects with multiple landscape installations (i.e., production home developments) an auditing rate of 1 in 7 lots or approximately 15% will satisfy this requirement.[revisions to be developed during MWELo update] | There is no allowance for audit sampling for large projects to ensure the appropriate selection of the landscapes to be sampled for audit, the criteria for acceptance of aggregated results of sampling, and requirements for unaudited sites if any sampled sites fail the audit. |
| Rainwater Retention – require the retention of rainwater from roofs | §492.16 | (d) It is strongly recommended that Landscaped areas <u>must</u> be designed for capture and infiltration capacity that is sufficient to prevent runoff from impervious <u>roof surfaces (i.e., roof and paved areas)</u> from either: the one inch, 24-hour rain event, or the 85th percentile, 24-hour rain event [...] | A discrete and actionable step towards making the use of alternate water sources a common practice, this recommended revision would require property managers/developers to act on a downspout re-direct, moving their roof drainage into permeable ground or rainwater cisterns. This revision would augment potable water supplies used for irrigation and would help to replenish groundwater and lighten the burden on already-stressed stormwater systems. |

Public Education – provide information on how to hire trained landscaped professionals

§492.17

(ITP) (a)(2), (b)(2)
addition: Information available shall include detailed specifications on how to hire trained and licensed landscape architects, contractors, designers and maintenance workers and the benefits of using such professionals.

Permitted renovation applicants and model home owners should be provided with constructive educational material on how to hire qualified landscape workforce. These workforce hires should be qualified individuals who are capable of maintaining an MWELo-compliant landscape at peak efficiency and prime aesthetic appeal. It is well understood that landscapes need quality maintenance, and a homeowner provided with the information on how and why to hire qualified workforce has an advantage in achieving or sustaining the potential water efficiency benefits associated with MWELo compliance.

SECTION 6: MODEL WATER EFFICIENT LANDSCAPE ORDINANCE (MWELo) FUTURE REVISIONS & PROCESS UPDATES

RECOMMENDATION #2: MWELo Revision: Aligning with the CALGreen Title 24 Revision Process to Maximize Enforcement

Background

One of the most significant areas of uncertainty regarding the effectiveness of California's Model Water Efficient Landscape Ordinance (MWELo) pertains to enforcement. Numerous stakeholders appearing before the Independent Technical Panel (ITP) voiced concerns about the rigor and consistency of enforcement by local land use and housing agencies.

In April 2015, Governor Brown's Executive Order (EO) B-29-15 brought new attention and urgency to landscape water use enforcement issues:

- In response to Directive 11 of the EO, the Department of Water Resources (DWR) initiated an update of MWELo effective December 1, 2015 with new requirements for local agencies to report to the State on enforcement activities;
- In response to Directive 7 of the EO, the Building Standards Commission (BSC) and the Department of Housing and Community Development (HCD) conducted an emergency rulemaking that for the first time placed water budget requirements in the mandatory portion of the CALGreen state building code (CCR Title 24, Part 11).

Placing landscape irrigation hardware and water budgeting requirements inside the code books used by the statewide network of local building code officials raised the prospect of more consistent and effective enforcement of MWELo – not immediately, but over time. However, since the CALGreen revisions were completed in late May, while the MWELo revision process extended through June and July, there arose almost immediately a concern that CALGreen would be left with provisions that were not consistent with MWELo as subsequently revised. Indeed, some provisions of the final 2015 version of MWELo were not the same as the emergency additions to CALGreen adopted in May. By year's end, HCD was considering proposals to *remove* certain landscape provisions from CALGreen that had just been adopted in 2015. Removal without replacement would represent a potential setback for MWELo enforcement.

The ITP has been informed by DWR staff of interest in the Department to establish a regular periodic review of MWELo to consider and adopt revisions as technology and other circumstances impacting landscape water use continue to evolve in California. The ITP welcomes this concept, and believes that the benefit of periodic review of MWELo could be amplified greatly if the cycle of review were harmonized with the triennial code review cycle of the CALGreen building code.

CALGreen and other state building standards are required by statute to be updated at least once every three years.¹¹ The ITP believes that statutory direction to establish a similar timetable for MWELo review would provide assurance to all State and local agencies, code officials, and other stakeholders that DWR will be a reliable and consistent partner in updating building standards that improve landscape water use efficiency. Coordination with CALGreen should begin as soon as possible, on a schedule that is mutually agreeable to State agencies.

Purpose Statement

The purpose of this recommendation is to maximize MWELo enforcement, and maintain steady progress toward improved landscape water efficiency, by establishing a standardized MWELo revision process on a triennial cycle that complements the CALGreen Title 24 triennial revision cycle. The MWELo revision cycle should be coordinated with the CALGreen cycle in order to finish MWELo revisions in advance of the finalized CALGreen revisions, such that MWELo revisions could then be adopted in the pending round of CALGreen revisions. This standardized revision process between MWELo and CALGreen would allow for building departments to upgrade MWELo enforcement while avoiding uncoordinated, unanticipated, and excessive or redundant administrative update processes that seek to occasionally adopt various new regulations in a confusing or *ad hoc* manner.

Coordination between DWR, the BSC, and other code adopting agencies should begin as soon as practical. A cooperative agreement harmonizing MWELo review with triennial code review should be entered into before the end of 2016.

The Independent Technical Panel Recommends That:

The Water Conservation in Landscaping Act (Government Code, Article 10.8, sections 65591 – 65599), be amended at the appropriate place to add the following:

Sec. _____. (a) At an interval no greater than once in every three years, the department, after holding one or more public hearings, shall:

- (1) by regulation, update the model water efficient landscape ordinance adopted pursuant to Chapter 1145 of the Statutes of 1990; or

¹¹ Section 18942(a) of the *Health and Safety Code* states in part: The [Building Standards Commission] shall publish, or cause to be published, editions of the code in its entirety once in every three years. In the intervening period the commission shall publish, or cause to be published, supplements as necessary.

(2) make an affirmative determination that an update to the model ordinance at such time is not a useful or effective means to improve either the efficiency of landscape water use or the administration of the ordinance.

(b) Not later than December 31, 2016, the department shall enter into a cooperative agreement with the Building Standards Commission, the Department of Housing and Community Development, and the Division of the State Architect in the Department of General Services setting out the timetables and mutual responsibilities for the coordination of the department's ordinance update process with the triennial revision cycle of state building standards, including Title 24, Part 11.

SECTION 6: STATE MODEL WATER EFFICIENT LANDSCAPE ORDINANCE (MWEL) FUTURE REVISIONS & PROCESS UPDATES

RECOMMENDATION #3: State Facility Leadership for New Landscapes

Background

There are a number of opportunities for the state to take leadership in improving water efficiency in state facilities. In recognition of these opportunities, state requirements including a 2012 Governor's Executive Order are now in place for state buildings to become more water efficient, with some pertaining to improvements in sustainable landscaping and on-site water management. However, the implementation of these policies and requirements are lacking due to insufficient funding availability by numerous State Departments and Board that comprise the Sustainable Building Task Force.

A summary of governing policy and procedures that include or support the sustainable landscape requirements that are currently in place include the following:

- *Executive Order B-18-12 (04/25/2012)*: Calls for state agencies to reduce water use, monitor and report that use consistent with goals of the 20x2020 Water Conservation Plan.
- *Senate Bill 1812*: Presiding water use guideline document for state agencies to meet the 20x2020 water use requirements.
- *Green Building Action Plan (05/07/2012)*: A detailed implementation guide to achieve goals of B-18-12.
- *Water Use Reduction Guidelines (02/28/2013)*: Guidelines written by Department of Water Resources (DWR) Water Use Efficiency (WUE) staff to provide additional guidance to state agencies.
- *Management Memo (MM) 14-02 (01/13/2014)*: 2014 MM14-02 from the State Administrative Manual describing exactly what agencies must do to reduce water use and track progress, where DWR WUE Office had lead authorship in writing the memorandum.
- *Management Memo (MM) 15-06 (10/15/2015)*: 2015 MM15-05 from the State Administrative Manual describing building and grounds maintenance, which instructs state agency landscape managers to manage to a water budget. DWR had minimum input into this document.

Based on information provided by the DWR along with a review of the documents listed above, the ITP recommends strengthening the requirements, budget priorities, and implementation for designing, installing and maintaining sustainable landscaping at state facilities. There are mutual benefits to improving water use efficiency above the state code requirements at all new and majorly renovated state facilities, especially those with high visibility due to customer service functions or other drivers for visitation. It is an important catalyst in changing social

norms for leadership to be shown by the state, even if benefits cannot be quantified (i.e., where some renovated facilities are not metered).

Currently, new and majorly renovated state buildings are subject to compliance with the *Green Building Action Plan – For Implementation of Executive Order B-18-12*. For water conservation, the standard is found within Section 7 of the Plan:

Section 7. New and major renovated State buildings and build-to-suit¹² leases larger than 10,000 square feet shall obtain LEED “Silver” certification or higher, using the applicable version of LEED.

7.1. Certification to an equivalent or higher standard is acceptable when approved by the Sustainable Building Task Force.

7.2. Buildings smaller than 10,000 square feet authorized to begin design after January 1, 2013, shall meet applicable California Green Building Standard’s Tier 1 measures.

Section 12.

State agencies shall reduce water use at the facilities they own by 10% by 2015 and by 20% by 2020, as measured against a 2010 baseline.

12.2. All new and renovated State buildings and landscapes shall utilize alternative sources of water wherever cost-effective. Sources may include, but are not limited to: recycled water, graywater, rainwater capture, stormwater retention, and other water conservation measures.

12.3. Landscape plants shall be selected based on their suitability to local climate and site conditions, and reduced water needs and maintenance requirements.

The water efficiency standards for LEED are relatively minimal and focused more on indoor water use, where landscape benefits are generally through implementation of either (a) Option 1: to contain no supplemental irrigation on site or (b) Option 2: to save 30% from a baseline peak month demand using the EPA WaterSense Water Budget Tool. It should be noted that the LEED requirements for indoor are less stringent than the current CALGreen Building Codes for California and 30% savings on outdoor peak month irrigation only is less stringent than the current MWELo that saves 20% on an maximum applied water allowance with irrigation efficiency requirements.

Given California Department of Transportation (Caltrans) has the most irrigated landscape area of the state agencies, it seems prudent to expand on the online training required for storm water best management practices by identified Caltrans maintenance employees as part of

¹² Build-to-suit is defined as when the building owner will specifically customize the building interior to suit the tenants’ needs.

compliance with the Caltrans National Pollutant Discharge Elimination System (NPDES) permit¹³. It is assumed that given Caltrans has the most irrigated area in the state and numerous other facilities have stormwater requirements, that there would be significant overlap and therefore mutual benefit with DWR, the State Board and Caltrans collaborating on the implementation of this directive.

Purpose Statement

This proposal focuses on new and renovated state facilities only.¹⁴ The ITP is recommending to strengthen the requirements for sustainable landscape design and maintenance policies and commitments on the same level commitment as Energy Section 2.0 of the Green Building Action Plan (see Appendix XX [To be determined in Final Report] for Net Zero Energy Approach, where on the same 10-year implementation schedule that buildings be designed with landscaping requiring no supplemental potable irrigation beyond the maximum two year establishment period (LEEDv4 Water Efficiency, Outdoor Water Use Reduction, Option 1).

The Independent Technical Panel Recommends That:

1. The Department of General Services (DGS) in consultation with DWR and the State Water Resources Control Board (State Board) set up a training and certification similar to State Board's Storm Water Monitoring and Report Tracking System (SMARTS) online database. The SMARTS program should include all landscape designers and practitioners to participate in a program similar to the requirements for Qualified SWPPP Developers (QSDs) and Qualified SWPPP Practitioners (QSPs)¹⁵ by the State Board.
2. The State "lead by example" through innovative design of new and majorly renovated buildings, which will further help to educate the public, and provide ideas about how to beautifully apply water efficient California-friendly landscaping.
3. DGS, Resources Agency (DWR), CalEPA (SWRCB) and CalTRANS, seek near-term funding from the Governor, such as a Supplemental Budget Request by July 1, 2016, or an alternative source of funding (e.g., Cap Trade Program¹⁶) for the full and complete multi-year effort to implement the EO B-18-12 Green Building Action Plan. This should follow the completion of the "Roadmap" to meet EO B-18-12 (being worked on by the all the State Departments as of February 2016).

¹³ http://www.dot.ca.gov/hq/construc/stormwater/swppp_training.html

¹⁴ Note Recommendation 5.3 focuses on retrofitting existing state customer service buildings for educational purposes, which includes a mandated watershed approach, and demonstration type gardens that would include detailed signage explaining the landscaping and identifying various features in the garden (versus other facilities with small signs).

¹⁵ http://www.waterboards.ca.gov/water_issues/programs/stormwater/training.shtml

¹⁶ <http://www.arb.ca.gov/cc/capandtrade/capandtrade.htm>

4. By January 1, 2017, the State Architect shall in consultation with DWR Water Use Efficiency Office, be required to prepare landscape design templates that are accessible to new building developers for all new state facilities. This follows the same approach used by City of Los Angeles and elsewhere for their municipally owned facilities, and to the extent practical these resources should be leveraged to expedite application of MWELo given the on-going drought conditions.
5. By January 1, 2017, the State Architect shall in consultation with DWR Water Use Efficiency Office, establish a landscape and irrigation system Water Efficiency Building Commissioning Protocol, such that proper installation occurs and transfer to the landscape maintenance staff is successfully completed.
6. By January 1, 2018, the State's Green Building Action Plan Sections 7 and 12, shall be updated by DGS in consultation with DWR and other appropriate state agencies, associated with the landscape related requirements in Sections 12.2 and 12.3, which shall include:
 - a. Aligning with the state's Net Zero Energy policy in the Green Building Action Plan outlined in Section 2.0 for all new state buildings and major renovations, projects beginning landscape designs after January 1, 2025 shall be constructed as **maximum practicable**¹⁷ to implement the watershed approach, through eliminating supplemental potable irrigation on site, maximizing of non-potable water sources where cost effective, rainwater infiltration, and on-site reuse.
 - b. As an interim target, 50% of new facilities beginning design after 2020 should be targeted to achieve this goal in line with LEEDv4 Water Efficiency Outdoor Water Use Reduction, Option 1, or only use reclaimed water for supplemental irrigation.
 - c. Where practical and feasible, these facilities should include demonstration gardens with accompanying, appropriate educational signage.
 - d. Institute a process that allows for hiring qualified contractors and maintenance workforce professionals through waiving minimum low-bid selection requirements.

¹⁷ Insert definition for maximum practicable.

SECTION 7: COMPLEMENTARY POLICES AND REGULATIONS

RECOMMENDATION #1A: Product Standards for Irrigation Equipment – Controllers

Background

A number of studies, many of which are summarized in a 2014 Lawrence Berkeley National Laboratory (LBNL) report,¹⁸ have shown the potential for significant water savings from landscape irrigation controllers that adjust irrigation schedules based on weather data and/or ability to shut off during rain events. The estimates contained in the LBNL report suggest savings of approximately 15%, although savings attributable to rain shut-off devices may not be representative of California conditions.

There are significant regulatory gaps that diminish the widespread installation of efficient irrigation controllers. Some existing California regulations, such as the Model Water Efficient Landscape Ordinance (MWELO) and CALGreen, now address landscape irrigation controllers. However, not all new landscape installations are covered by MWELO or CALGreen, nor do these regulations cover sales of replacement controllers for an existing landscape. Replacement controller sales are likely to make up the majority of product sales, since the lifetime of a new building (30 or more years) substantially exceeds the lifetime of a controller (approximately 10 years). Replacement controller sales are not currently regulated, and most replacement units sold in California do not contain the types of water efficiency features recommended here.

Additionally, even where controller installations are covered, MWELO and CALGreen do not contain performance standards or reference test methods.

Purpose Statement

The ITP recommends that the California Energy Commission (CEC) adopt Title 20 water and energy efficiency standards for landscape irrigation controllers. The Title 20 standards would address the regulatory gap that exists for replacement units and for units serving new landscapes not covered by MWELO. The Title 20 standards would also have the effect of addressing the current lack of performance requirements for units installed in new landscapes since Title 20 applies to all product sales in California.

The recommended standards should at least require controllers to be sold with either weather-based features or an automatic rain shut-off device. Note that this is not identical to the requirements for new landscape controllers in MWELO, which requires the new controller to be either Evapotranspiration (ET)-based or soil moisture-based, plus have a rain sensor. Thus, the proposed Title 20 standard would allow the sale of controllers with a rain shut-off system in lieu

¹⁸ Lawrence Berkeley National Laboratory. 2014. Williams, A., Fuchs, H., and Dunham Whitehead, C. 2014. "Estimates of Savings Achievable from Irrigation Controllers", Lawrence Berkeley National Laboratory. <https://ees.lbl.gov/sites/all/files/lbnl-6604e.pdf>.

of ET-based controls, which would not meet the requirements of MWEL0, but would offer a significant step up in performance over many replacement controllers sold in California today, and would apply to a much large set of controller installations. Additionally, the performance requirements and test methods in the Title 20 proposal would help ensure that *all* newly-sold products were capable of meeting the specific standard.

For weather-based controllers, the proposed Title 20 standards would require manufacturers to meet the US Environmental Protection Agency's (EPA) WaterSense® Specification Version 1.0.¹⁹ For controllers with rain shut-offs, manufacturers would be required to meet a performance standard based on data showing that rain shut-offs can detect at least 95% of significant precipitation events.²⁰ The test method would be based on an Irrigation Association method plus additional specifications to turn the testing protocol into a test method. These changes include adding a lower simulated precipitation rate that is based on California's climate, and specifications for the quality of water used to simulate rainfall events.

Additionally, CEC should be encouraged to track future development of soil moisture sensor (SMS) testing procedures. Recently, the EPA announced²¹ its intention to release a draft WaterSense® test method and specification in the summer of 2016 for controllers that adjust irrigation in response to SMS data. This WaterSense® specification will be based upon a test method under development by the American Society of Agricultural and Biological Engineers. A future WaterSense® certification for SMS-based controllers could potentially plug current information gaps and serve as the basis for allowing SMS as a Title 20 compliance option in the future, if and when WaterSense® certifies these products. If the Irrigation Association, WaterSense®, and/or other organizations or agencies develop well-established testing procedures, CEC should consider updating the Title 20 standards for irrigation controllers to include an SMS compliance option in addition to, or instead of, the ET-based option, as envisioned by MWEL0. Until a recognized and verifiable standard and test method is developed, stand-alone SMS-based controllers ought not be sold in California.

Further, CEC should also develop standby power consumption standards. Reports from the Natural Resources Defense Council and others show levels ranging from one to eight watts.²² The higher end of this range is significantly higher than standby standards for many other comparable products.

¹⁹ *WaterSense Specification for Weather-Based Irrigation Controllers*. Volume 1.0. November 3, 2011.

²⁰ For instance see Cardenas-Lailhacar, B., and M. Duke. 2008. "Expanding Disk Rain Sensor Performance and Potential Irrigation Water Savings." *Journal of Irrigation and Drainage Engineering*. February 2008. [134(1), 67-73]; and Meeks L., et al. 2012. "Long Term Expanding-Disk Rain Sensor Accuracy." *Journal of Irrigation and Drainage Engineering*. January 2012. [138(1), 16–20]

²¹ http://www3.epa.gov/watersense/products/soil_moisture_based_technologies.html

²² Delforge, P., Schmidt L., Schmidt, S. 2015. "Devices Wasting Huge Amounts of Electricity when Not in Active Use." Natural Resources Defense Council. Issue Paper. May 2015; [LBNL] 2009. Lawrence Berkeley National Laboratory. Brown, R. "Energy Consumption of Irrigation Controllers." Environmental Energy Technologies Division, June 1, 2009.

http://www.energy.ca.gov/appliances/irrigation/documents/2009-06-01_workshop/presentations/Brown_Rich_LBNL_Irrigation_Controls.pdf

Finally, CEC should be encouraged to consult with the Department of Water Resources (DWR), as well as other relevant agencies and stakeholders, regarding the proposed standards. In addition, DWR should include information on the proper installation and configuration of irrigation controllers in the MWELo training and guidance materials that would improve compliance of the Title 20 standards.

The Independent Technical Panel Recommends That:

1. CEC adopt Title 20 standards for landscape irrigation controllers that address the following points:
 - 1) Landscape irrigation controllers must be shipped and sold with either a weather-based system or an automatic rain shut-off device (or both).
 - 2) Weather-based controllers must meet the requirements in the EPA's WaterSense® Specification for Weather-Based Irrigation Controllers Version 1.0, including testing for irrigation adequacy and irrigation excess.
 - 3) Automatic rain shut-off devices must be tested and certified using a proposed test method based on the Irrigation Association's Smart Water Application Technologies "Turf and Landscape Irrigation System Smart Controllers Climatologically Based Controllers: 8th Testing Protocol" (September 2008) along with additional elements specified by the Title 20 standards to address rainfall rates that are more common in California. Automatic rain shut-off devices as shipped must detect 95 percent of rainfall events of 1/4 inch or 6 millimeters.
 - 4) The controller shall be capable of accommodating watering restrictions as follows:
 - a) Operation on a prescribed day(s)-of-week schedule (e.g., Monday-Wednesday-Friday, Tuesday-Thursday-Saturday; any two days; any single day, etc.).
 - b) Either even day or odd day scheduling, or any day interval scheduling between two and seven days.
 - c) The ability to set irrigation runtimes to avoid watering during a prohibited time of day (e.g., between 9:00 a.m. and 9:00 p.m.).
 - d) Complete shutoff (e.g., on/off switch) to accommodate outdoor irrigation prohibition restrictions.
 - 5) The controller shall be capable of preserving the contents of the irrigation program settings when the power source is lost and without relying on an external battery backup.
 - 6) The Title 20 standards should also include limits on standby power loss consistent with other California and European product standards.
 - 7) CEC should consult with DWR, as well as other relevant agencies and stakeholders, regarding these proposed standards.

8) CEC should set a standard for soil moisture sensor-based controllers upon the completion and publication of an acceptable test method for such products.

2. DWR provide information on the proper installation and configuration of landscape irrigation controllers to better ensure that potential water savings from both Title 20 standards and MWELO will actually be achieved.

SECTION 7: COMPLEMENTARY POLICES AND REGULATIONS

RECOMMENDATION #1B: Product Standards for Irrigation Equipment – Sprinkler Bodies

Background

Sprinkler bodies and other types of landscape irrigation emission devices can be purchased either with or without water saving features. It is well known in the landscape industry that the most common overhead popup spray-type sprinkler bodies sold are not efficient with regards to pressure regulation and the ability to prevent low head drainage. This is a documented source of water waste in many landscapes and can lead to misting and runoff. For instance, a recent study shows that one model of pressure regulating spray body achieves 14% less water use at 60 pounds per square inch inlet pressure (psi) and 19% less water use at 80 psi.²³

Millions of pop-up sprinkler bodies are sold in the State of California each year. However, the large majority of these products lack basic water conservation efficiencies that built-in pressure regulators and low-head drainage check valves provide.

There are significant regulatory gaps that diminish the widespread installation of water efficient emission devices. The Model Water Efficient Landscape Ordinance (MWELO) requires that landscape irrigation emission devices meet the requirements of the American Society of Agricultural and Biological Engineers (ASABE) and International Code Council (ICC) Landscape Irrigation Sprinkler and Emitter Standard (ASABE-ICC 802-2014). However, not all new landscape installations are covered by the MWELO, nor does the MWELO cover sales of replacement units for an existing landscape. Replacement units are likely to make up the majority of product sales, since the lifetime of a new building (30 or more years) substantially exceeds the lifetime of most emission devices (perhaps 5-10 years). Since replacement sales are not currently regulated, most replacement units purchased in California do not contain the types of water efficiency features recommended here.

Additionally, ASABE-ICC 802-2014 contains test methods for a variety of products and features but relatively few performance standards (it does contain anti-burst requirements, for instance). Notably, requirements for integral pressure regulation are limited to sprinkler bodies for spray nozzles but not for bodies used with rotors.

²³ The Metropolitan Water District of Southern California (MWD) awarded Rain Bird Corporation an Innovative Conservation Program (ICP) grant for a blind study conducted by the University of Arizona. Project results are contained in the Final Executive Summary for Innovative Conservation Program Project 143542: "Project PRS: Study of Pressure Regulated versus non-Pressure Regulated Sprays and Rotors." Excess pressure leads to excessive water application, misting, and potentially worse distribution uniformity and excessive throw distances.

Purpose Statement

The Independent Technical Panel recommends that the California Energy Commission (CEC) adopt Title 20 water efficiency standards for landscape irrigation emission devices. The Title 20 standards would address the regulatory gap that exists for replacement units and for units serving new landscapes not covered by MWEL. The Title 20 standards would also have the effect of addressing the current gap in performance requirements for units installed in new landscapes since Title 20 applies to all product sales in California.

Additionally, the US Environmental Protection Agency (EPA) is considering a WaterSense® specification for pressure regulated sprinkler bodies and high-efficiency nozzles.²⁴ Potential EPA test data and proposed WaterSense® standard(s) and test method(s) could help inform the CEC's efforts.

The Independent Technical Panel Recommends That:

- 1) CEC adopt Title 20 standards requiring pressure regulation and a built-in low-head drainage check valve for new sprinkler bodies.
- 2) CEC evaluate additional potential standards for features and product types addressed by ASABE-ICC 802-2014 performance standards and/or test methods.
- 3) CEC consult with EPA WaterSense® staff, the Department of Water Resources, as well as other relevant agencies and stakeholders, regarding these proposed standards.

²⁴US Environmental Protection Agency, *WaterSense* Notice of Intent (NOI) to Develop a Draft Specification for Landscape Irrigation Sprinklers, May 22, 2014. http://www3.epa.gov/watersense/docs/irrigation_sprinklers_NOI_508.pdf

SECTION 7: COMPLEMENTARY POLICIES & REGULATIONS

RECOMMENDATION #2: Permit Required for Irrigation Installation

Background

It has been the goal of the State since at least 1990 that new landscapes and major renovations of existing landscapes should be designed and installed to be water-efficient. The state's Model Water Efficient Landscape Ordinance (MWELO), now in its third iteration, carries standards and criteria for new and renovated landscape projects that are included in projects that require a local permit, plan check or design review such as the construction of a new building, the extension of electric or natural gas lines from an existing building, or major excavation and regrading. However, the coverage of MWELO as specified in the Model Ordinance has a major gap that leaves a very significant portion of new landscape projects not subject to any standards. This is because it is common practice in most parts of the state for home builders to leave the back yards of new homes un-landscaped. What's more, in some parts of the state, it is common for front yards to be left un-landscaped by home builders as well. Thus, in many cases the building permit for the new home does not include the landscape, and the owner-initiated landscape projects that may follow new home construction by anywhere from a few months to a few years are *not subject to the Model Ordinance* because in most localities, the installation of landscape materials and an irrigation system as a stand-alone project do not themselves require a permit.

Purpose Statement

The proper design, installation, and control of automatic landscape irrigation systems is essential to the efficient use and avoidance of waste of water. Stand-alone landscape projects are common in California, and should not be exempt from permitting. While the planting of landscape materials can take place over an extended period of time, the irrigation system largely controls the delivery of water to the landscape. Thus, the installation of an irrigation system for a large landscape is itself an appropriate "trigger" for a permit subject to all requirements of MWELO. Unpermitted installations would be evident, as the difference between irrigated and unirrigated space can be readily identified, either on-site or through aerial imagery. Developer-installed landscape projects would continue to be covered by a building permit, without requiring a separate permit for the irrigation system.

The third version of MWELO took effect on December 1, 2015, and DWR has indicated a preference for a multi-year revision cycle. We recommend that the Legislature directly incorporate a requirement for the permitting of stand-alone irrigation installations for commercial and large residential landscapes into the Water Conservation and Landscaping Act.

The effect will be to bring stand-alone landscape projects under the scope of the revised MWELD in all local jurisdictions without further rule-making action by DWR.

In light of the diverse and challenging conditions in which ornamental landscapes are installed, and the frequent changes in irrigation technology and plant varieties, the avoidance of waste requires that all large new landscapes and major renovations should require a permit.

[The Independent Technical Panel Recommends That:](#)

The following be added at the appropriate place in the Water Conservation in Landscaping Act (*Government Code*, Article 10.8, sections 65591 – 65599):

_____. (a) On or after July 1, 2018, the installation or replacement of any automatic irrigation system, or the expansion of an existing automatic irrigation system to increase the irrigated area by 25% or more, for a landscape project subject to this article and not otherwise within the scope of a local agency permit shall require a written permit, *provided that*, such irrigation system is to serve:

(1) a non-residential landscape, except a cemetery; or

(2) a residential landscape of 10,000 square feet or greater.

(b) Before issuing any permit required by this section, the governing body of a local agency may adopt an ordinance prescribing fees for filing an application for such permit, but the fees shall not exceed the amount reasonably required by the local agency to issue such permits, and shall not be levied for general revenue purposes.

SECTION 7: COMPLEMENTARY POLICIES & REGULATIONS

RECOMMENDATION #4: Piloting Connection Charges that Promote Landscape Efficiency

Background

In the single-family residential sector, landscape water use is a major factor in the capacity required to provide water service to a new home. In turn, landscape water use drives the peak season demand for nearly all urban water suppliers in California. The 2015 revisions to the Model Water Efficient Landscape Ordinance (MWELO) reduce Evapotranspiration Adjustment Factor (ETAF) by over 20%, which should have the effect of reducing the requirements for capacity to serve new MWELO-compliant homes. Landscapes installed and maintained to better-than-MWELO standards should provide even greater savings.

Most public water suppliers have a set of one-time charges for a new dwelling to connect to the public water system. Some small portion of these charges may relate to the cost of a meter, a short service lateral, and costs associated with adding a new customer account. The majority of these charges, however, are typically for the recovery of the costs of water system capacity – capital costs associated with supply, transmission, treatment, and distribution of water – that are assigned to new connections as a matter of equity with existing customers. These one-time charges for system capacity are separate from the recurring charges for water service. Any differentiation in these charges is typically based upon meter size categories, with connections requiring larger meters facing a higher charge.

In California, connection charges range from modest to quite high.²⁵ The average water connection charge for single-family homes reported in the 2013 survey by the Cal-Nevada Section of American Water Works Association (AWWA) was \$3,656, while the highest was \$28,600. The forthcoming 2015 survey is likely to show even higher figures.

The Independent Technical Panel received a presentation at its April 2015 meeting by Western Resource Advocates (WRA)²⁶ on a forthcoming report (subsequently released) on the role that water connection charges can play in encouraging water efficiency in new growth.²⁷ Based on an examination of four case studies, the report found that meter size alone is an imprecise predictor of the capacity requirements imposed on the system, when dwellings served by comparable meters can have substantially different peak season water demand profiles. Case studies found strong interest by homebuilders in bringing to market, new homes that qualify for lower connection charges based on locally determined water efficiency criteria.

²⁵ One exception: Investor-owned water companies that are regulated by the California Public Utilities Commission are not authorized to assess connection charges.

²⁶http://www.water.ca.gov/calendar/materials/incentivizing_water_conservation_with_connection_fees_nuding_18966.pdf

²⁷ A. Nuding, S. Leurig, J Hughes, *Water Connection Charges: A Tool for Encouraging Water-Efficient Growth*, Western Resource Advocates, University of North Carolina Environmental Finance Center, and Ceres. August 2015. Available for download at <https://www.ceres.org/resources/reports/water-connection-charges-a-tool-for-encouraging-water-efficient-growth/view>

The WRA report recommended that:

- Utilities should consider refined, multi-factor connection charges to encourage water efficiency of new developments and capture the true costs of new development.
- Utilities should consider putting in place mechanisms to ensure longevity of water savings.
- Utilities should invite customers and developers into the connection charge design process.
- Local policymakers and planners should recognize the importance of connection fees in shaping future water demand and development patterns, and in managing costs of this fundamental service.

In essence, connection charges that are differentiated based on the construction of new homes and landscapes that effectively shrink the capacity footprint of a new customer represent an alignment of interests between the homebuilder, the water supplier, and the new occupants. When new homes and landscapes are built to standards that ensure lower peak demand than business-as-usual construction, real savings are created and an opportunity exists for shared savings among all stakeholders.

In California, MWELO 2015 and the incorporation of landscape standards into the mandatory portion of the CALGreen state building code signify a potential sea change in outdoor water use in new development. The benefit of this change can be readily monetized if water suppliers with connection charges take these new regulations into account when connection charges are next reviewed. MWELO 2015 lowers the ETAF for new residential landscapes from 0.7 to 0.55, a reduction of 21%. So the standards are more stringent and the enforcement of these standards should improve. DWR should assist water suppliers to evaluate the impact of MWELO on peak demand and system capacity, and water suppliers may take this into account when setting or revising their connection charges.

Additionally, water suppliers willing to explore this concept should be supported through state financial assistance to consider landscape design or performance standards of the water suppliers' own devising that would define a *better-than-code* landscape that would be sufficiently *more* water-conserving that it would allow for a specific reduction in the connection charge that applies to all code-minimum connections. This would be designed by the water supplier, and would have to be durable enough to give the agency confidence that a lower connection charge is warranted.

Purpose Statement

Connection charges that are based on a reasonably predictable reduction in peak demand of new buildings and landscapes are a new concept in California, but represent a strategy with unknown potential to achieve further reductions in water use. The purpose of this proposal is to secure assistance to local water suppliers that are willing to 1) identify the demand-reducing effects of 2015 MWELO and CALGreen revisions; and, 2) explore the development of better-

than-code landscape criteria that would support a differentiated connection charge for eligible new homes.

The Independent Technical Panel Recommends That:

1. The Department of Water Resources (DWR) develop and test one or more methods for relating improvements in the water efficiency of new landscapes required by MWEL0 2015 with the peak demand and system capacity requirements of new buildings and landscapes connecting to a water system.
2. DWR develop a grant solicitation specifically to fund innovation in differentiated connection charges. Specifically, grant funds should be made available to cover a portion of the discount from standard connection charges that are offered to new homes and landscapes meeting locally-developed better-than-code installation and durability criteria for water efficiency.

SECTION 7: COMPLEMENTARY POLICIES & REGULATIONS

RECOMMENDATION #5: Plant Labeling

Background

To ensure that landscape water use goals will be met, living plant material must be properly identified and categorized by water use. This information is needed at both point of sale for “Do-It-Yourself” projects and point of installation for contractor-installed projects.

Current plant labeling requirements are inconsistent and inadequate. The California Food and Agricultural Code (section 53481) states that all nursery stock sold in California “shall be labeled . . . if so required by regulations.” However, the current regulations for Nursery Stock Grades and Standards California Code of Regulations (CCR), Title 3 (and reproduced in the Nursery Inspection Procedures Manual , Item 5 do not require nursery stock labeling. CCR section 3061 stipulates that plants sold in the State *may* be labeled, and if so, must then comply with the Food and Agricultural Code’s labeling requirements. CCR section 3062 then adds that nursery stock offered for sale *need not* be graded or tagged, at the discretion of the person offering the stock for sale. Clearly, improved labeling requirements are needed for all ornamental plant materials sold and installed in California.

Labeling the Water Use of Ornamental Plants Sold at Retail

An estimated 41% of the households (47 million) in the United States consider themselves gardeners (National Gardening Association, *What Gardener’s Think*, 2009). Of these gardeners, it is estimated that only 9% are Master Gardeners and Garden Enthusiasts, who are considered to be plant knowledgeable, which demonstrates the need and the importance of providing horticultural information (botanical and common name and cultural information) at the point of sales for all consumers. Independent gardening surveys indicate that one of the most important considerations when purchasing a landscape plant is that the plant purchased is accompanied with an informative label containing specific plant information.

Ornamental plants are labeled by the wholesale nursery and floricultural growers to provide consumer information, for example: a) botanical name; b) common name; c) cultivar name; d) plant description; e) location (sun or shade); f) water requirement; g) climate zone; h) growth habit. This information is provided by either the plant label manufacturer or from their customer (wholesale grower) and derived from horticultural references. Horticultural references are most often written by horticultural experts whose basis of information is from landscape experience and not by field based-research. Therefore, specific to plant water use (very low, low, medium or high), there is very little field, science-based research (statistical) that exists for ornamental plants in California. Adding to the complexity for specific plant water use or requirement is that myriad climate zones (24) and soil types in California, which affects plant water use and availability.

There is no legal or scientific authority that provides landscape water use requirements of ornamental plants in California. The Water Use Classification of Ornamental Species (WUCOLS) is one of the required resources by the Model Water Efficient Landscape Ordinance (MWELO) that provides water use information for 3,546 plant taxa in six climate regions of California based on the California Irrigation Management Information System (CIMIS) evapotranspiration zones. The assignment of plant water use in WUCOLS was conducted by horticultural and academic professionals with many years of landscape experience who served in committees representing six California regions. Based on a qualitative research approach, professionals employed the consensus process for assigning water use classifications to plants in six regions of the state. If no horticultural experience or knowledge of a plant's water use was known, the professionals passed on assigning a water use rating. While WUCOLS represents 3,546 plant taxa, less than 6% have been scientifically researched for water use and there are thousands more plants sold in California that are not in WUCOLS, nor have been scientifically researched.

Labeling of Ornamental Plants at Point of Installation and Inspection

For installation of ornamental plants at a permitted project, MWELO requires that plant palettes be chosen according to the landscape hydrozone and plant water usage. MWELO prescribes a Maximum Applied Water Allowance that must be calculated and may not be exceeded during the design and permit approval stage. Specific plants are chosen, approved and installed to meet the MWELO requirements. The newly updated MWELO calls for a third party audit to ensure that every landscape subject to the ordinance is installed per plan, including plant material.

The typical process for most landscape projects is for containerized ornamental plants to be delivered directly to the job site. The landscape contractor then installs these plants according to the landscape design. Once planted, it is typical to remove plant labels, leaving these plants with no identification. Therefore, unless the building inspector, water conservation specialist, or MWELO auditor is thoroughly knowledgeable in plant identification and nomenclature, verification of installed plants as consistent with MWELO ordinance requirements might not be possible without the installed plants being labeled.

[The Independent Technical Panel Recommends That:](#)

Water Use Labeling: Require that all plant taxa sold in California be identified at the point of sale by water use (low, medium, high) by an approved process (WUCOLS, science-based research or a Department of Water Resources [DWR] approved process) and organization.

Point of Installation Identification: Require that representative plants delivered to a landscape job site remain labeled until the project is inspected and signed off.

Programmatic: Revise State regulations to make labeling for plant identification and water use mandatory, rather than voluntary.

Proposals (Administrative):

For the Department of Food and Agriculture: The Plant Health and Pest Prevention Services Division should use its current authorities to modify its Regulations for Nursery Stock Grades and Standards to ensure that all taxa of ornamental landscape plants are properly identified and characterized as to water use, both at retail and upon installation in a landscape subject to MWELo. Specifically, CCR, Title 3, Section 3061 pertaining to plants being sold should be amended to replace the words “may be labeled” with “shall be labeled”. Additionally, CCR section 3062 should be amended to change the words “Nursery stock, when offered for sale, need not be graded and tagged at the discretion of the person offering the stock for sale;” to the following: “Nursery stock, when offered for sale, shall be graded and tagged;”. These changes should become effective January 1, 2017.

For the Department of Water Resources (1): DWR should commission a stakeholder group to develop a project plan with deliverables and a timeline that will enable all ornamental plant material sold in California to be labeled as per MWELo water use ratings.

1. Commission qualified an academic project representative as the project leader for project plan development, implementation and database management.
2. Identify stakeholder groups (landscape professionals [designers, architects, and contractors], academics, non-governmental organizations, wholesale plant growers and retailers, plant label manufacturers) and convene such representatives to identify requirements for labeling all ornamental plants with water ratings.
3. Identify current methodology for classifying plants for water use (WUCOLS process, science-based research, American Society of Agricultural and Biological Engineers [ASABE] X623 or other) and choose what method or methods to be used for evaluating plant water use.
4. Define project plan deliverables and timeline once the methodology for validating plant water use is accepted.
5. As part of the project plan, the Independent Technical Panel recommends investigation of the following requirements:
 - a. Plant database (WUCOLS or equivalent) & ongoing maintenance
 - b. Quick Response (QR) code technology
 - c. GIS technology
 - d. Plant photographs (seasonal)
 - e. Plant descriptions
 - f. Link to existing database (UC Integrated Pest Management) for pest and disease information

For the Department of Water Resources (2): DWR should modify MWELo to require that at least one or two representatives of each selected plant species planted in every landscape meeting MWELo requirements be identified by a label affixed to the plant(s) itself with the correct nomenclature to ensure that plants can be verified as per approved MWELo plan during final inspection or audit process.

Proposal (Legislative):

The following provisions of Division 18, Chapter 5 (Nursery Stock Grades and Standards) of the Food and Agricultural Code should be revised as indicated:

Article 4. Regulations

53391. The director may adopt regulations which may be necessary to carry into effect the purposes of this chapter and each section of it, and may issue in relation to this chapter explanatory data and charts.

53392. The director by regulations may provide for grade sizes of the different kinds of nursery stock, and may provide that nursery stock shall be labeled with grade sizes which are established by such regulations. The director may make such other regulations as are necessary to carry out the provisions of this chapter.

53393. Not later than January 1, 2017, the director shall adopt regulations to implement sections 53481(e), 53482, and 53483 of this chapter.

Article 7. Labeling

53481. When nursery stock is sold, it shall be labeled plainly and legibly as to the grade size, if so required by regulations, and as to the correct name and water use characteristics as follows:

(a) The correct name for ornamentals, except roses, fruit trees, and annual or herbaceous perennial ornamental plants, shall be the botanical name including subspecies, hybrid, cultivar or variety (if any).

(b) The correct name for fruit trees shall be the recognized common name and cultivar.

(c) The correct name for turf shall be the kind and cultivar.

(d) The correct name for roses, annual or herbaceous perennial ornamental plants, dormant bulbs, tubers, roots, corms, rhizomes, pips, and other kinds of nursery stock shall be the cultivar name and botanical name (if available), except that the recognized common name (if any) shall be required whenever no cultivar name has been given or can be determined.

(e) The correct water use classification for any taxa listed in the Water Use Classification of Ornamental Landscape Species.

53482. In order to identify nursery stock properly, whenever it is shipped, delivered, or transported to any purchaser, each plant shall be individually labeled as to the correct name. The director may create exceptions to this section by regulation, consistent with the need to

correctly identify plants that are subject to inspection after installation in a landscape subject to the Model Water Efficient Landscape Ordinance or any local landscape ordinance.

53483. Nursery stock on display for sale at retail ~~may~~ shall be individually labeled ~~by a sign on any block of stock of the same kind and species,~~ except that plants of the same taxa when packaged inseparably together may be identified by a single label on each such package. Turf shall be labeled by a sign showing the required correct name of the stock on display.

SECTION 7: COMPLEMENTARY POLICIES & REGULATIONS

RECOMMENDATION #7: Upgrades to the California Irrigation Management Information System

Background

The California Irrigation Management Information System (CIMIS) is a program unit in the Water Use and Efficiency Branch, Division of Statewide Integrated Water Management (DSIWM), California Department of Water Resources (DWR) that manages a network of over 150 automated weather stations in California. Archived data is also available for additional 92 inactive stations that have been disconnected from the network for various reasons. CIMIS was developed in 1982 by DWR and the University of California, Davis (UC Davis). It was designed initially for agriculture to assist irrigators in managing their water resources more efficiently but has since grown to include landscaping, water providers and even fire fighters. Efficient use of water resources benefits Californians by saving water, energy, and money.

Thirty years ago, scientific research successfully responded to the need for improving irrigation efficiency and management for agricultural use with the development of the CIMIS program. This program provided evapotranspiration (ET) data used by farmers for creating a water budget for a specific agricultural crop. The use of ET data has resulted in significant agricultural water savings through improved irrigation efficiency in agriculture throughout California. Through out its tenure, the CIMIS network has also become useful to other interests such as the landscape industry. A peer reviewed article written in 1997 points out the history, usage, benefits and potential future of CIMIS (*California Agriculture* 54(3):21-25. DOI: 10.3733/ca.v054n03p21. May-June 2000). During the past 14 years, irrigation manufacturers have focused on testing and introducing to the market, weather-based irrigation controllers that utilize the same CIMIS ET data for improving irrigation efficiency as agriculture. These “smart” controllers access and utilize ET data to achieve landscape water savings by creating a water budget for a specific urban landscape. Therefore, the more accurate and consistent the ET data, the more opportunity for agricultural and landscape water savings through efficiency.

In its time, the CIMIS program and network has become the standard for scientifically measuring ET to assist in crop and landscape water usage and budgeting. With the current and future drought emergencies, landscape and agricultural water usage are and will be under scrutiny. Providing science/research and standardized metrics provides the consuming public confidence that the landscape and agricultural sectors are properly managing water.

Unfortunately, the CIMIS program is consistently underfunded and is not able to meet the obligations set forth in its charter. There are gaps in the system making for an incomplete picture of ET rates. It is not designed for urban and suburban areas and attempts to infill gaps within its current structure (as stated, it was originally intended for agricultural applications) rely on spatial data that is not accurate enough. There are too few standard weather stations and a need to create new modified or different weather stations aimed at urban and suburban

areas plus a way to link them all together. The way the information is retrieved by professionals needs to be looked at as well.

Purpose Statement

Although the program has shown a steady growth over the years to accommodate the needs of over 50,000 primary registered users and thousands more secondary and non-registered users, the current system still has spatial data gaps due to the lack of CIMIS stations in certain regions of the State. While satellite information is being used in conjunction with active CIMIS stations and spatial data is available down to a 2 kilometer area, the accuracy of the spatial CIMIS data depends on the density of ground stations and accuracy of station data. Adding more stations with quality data can significantly improve CIMIS's usefulness as a water conservation tool. Finding an appropriate site for new CIMIS stations is one of the limiting factors in the expansion of the CIMIS network. An ideal CIMIS site would require a well-watered cool-season grass with adequate fetch of about 600-ft in all directions. Providing an incentive in the form of a tax break or exemptions from certain ordinances can motivate landowners to provide the required field.

Despite significant increases in user base and CIMIS data uses, the operational budget for the program has remained about the same for more than three decades. Currently, CIMIS has less than five full-time employees statewide that deal with installation and maintenance of the stations, data quality analyses and monitoring, research and development, and user assistance. This makes it very difficult for the program to provide quality services to its users and to respond to station problems in a timely manner. At a time where California is in the fourth year of an unprecedented drought, the viability of the CIMIS program is critical.

The CIMIS user interface can also be improved by upgrading the system using current technologies. CIMIS provides an invaluable weather information for landscape water budgeting and irrigation scheduling as prescribed by the Model Water Efficient Landscape Ordinance (MWELO). A simpler method (for example a user dashboard)should be determined and implemented to create and link CIMIS information to irrigation professionals as well as the general public to provide guidelines for crop and landscape water scheduling among other uses. This should include an appropriate number of reporting stations, an upgrade in technology and adequate funding for a reliable program.

With the importance of reducing water waste in California, and recognizing the large amount used for irrigation of crops and landscapes, tools such as the CIMIS network are important to water managers in meeting State mandated water budgets for agriculture and landscapes meeting state guidelines and MWELO requirements.

The Independent Technical Panel Recommends That:

The Department of Water Resources work in conjunction with academic institutions and others to create a user friendly, public domain process to identify, collect and distribute weather information (such as ET data, precipitation, and soil temperature). To accomplish this, the CIMIS network shall be updated to current technologies and more reporting stations installed including the creation and installation of stations for urban and suburban areas as well as improved development of spatial CIMIS. Pursuant to the CIMIS program charter, DWR will request and the Governor will propose that the State Budget will fund these improvements by providing necessary funding for DWR to restore, update, expand, operate and manage the program as a complete budget beginning with the 2017 budget as part of the overall importance of managing agricultural water use and reducing potable water use for landscapes in California.

SECTION 8: WORKFORCE TO ACCOMPLISH THE TRANSFORMATION

RECOMMENDATION #1: Certification of Professionals

Background

In 2005, the Assembly Bill (AB) 2717 Landscape Task Force recommended “a common foundation for the education, training, and certification of landscape professionals across the disciplines involved in designing, installing, maintaining, and managing water-efficient landscapes.” The California Urban Water Conservation Council arrived at a similar conclusion by identifying the need for more workforce education in the landscape industry in their draft 2015 report on *Sustainable Landscaping: Market Transformation Framework*. During its investigative process and discussions with horticultural industry professionals and public officials the Independent Technical Panel (ITP) found a strong case for a more comprehensive education program for landscape professionals that would lead to certification.

Given the ITP’s vision to have enhanced, functional, aesthetically pleasing water wise landscapes, transforming the workforce is necessary to help accomplish this goal. One objective to meeting this goal is to enforce the recent expansion of the Model Water Efficient Landscape Ordinance (MWELo) to include smaller new and renovated irrigated landscape areas including thresholds that now trigger compliance needed by a much larger number of residential property owners. Design and approval of landscape designs includes aspects of site drainage that when aligned with the watershed approach (i.e., to enhance on-site rainwater infiltration), requires qualifications that need to be substantiated by an authoritative State agency or directed non-profit organization with State agency oversight. This certification is also necessary as there are health and safety considerations when designing water wise landscapes such as minimizing standing water for mosquito abatement, slope for site drainage, trip and fall hazards in public spaces, etc.

A certification program can address a critical need that is lacking in transforming California’s landscapes. Currently, approvals for MWELo are only allowable per Section [redacted] by qualified professionals (namely landscape architects). The ITP understands that it is now incumbent upon the Department of Water Resources (DWR) to review the eligibility criteria for approvals of landscape designs and based on Recommendation [redacted] in this report, if implemented, the approval of irrigation system permits. It is the ITP’s goal to also have a clearer point of entry for landscape design professionals from this certification process or another means to have their qualifications validated for participation in the MWELo and other applicable processes to aid in compliance with MWELo.

One example of a State agency program of this type is California’s Electrician Certification Program. Electricians employed by a licensed electrical contractor are required to be certified pursuant to certification standards established by the Division of Labor Standards Enforcement in the Department of Industrial Relations. Electricians must pass a test and renew their certification by completing 32 hours of continuing education every three years. Community

colleges, public school districts, other public educational institutions, and approved Electrician Trainee Schools may provide this education. The Division contracts with a provider to conduct its examination program.

While the Electrician Certification Program requires electricians to be certified, not contractors or business owners, it is recommended that a State certification in water-efficient landscaping apply to business owners only and for those businesses subject to meeting MWELo requirements.

Purpose Statement

The State of California should require certification in water-efficient landscaping for all businesses that design, install, manage, audit or repair landscape irrigation systems as a means to improve industry knowledge about landscape water efficiency and to achieve better water use savings as a result.

The Independent Technical Panel Recommends That:

The State require specific certification in water-efficient landscaping for all businesses that design, install, manage, audit and or repair landscape irrigation systems. Further, this certification shall be linked to the MWELo in its scope and continuing education units required to maintain certification. DWR shall by 2018 (or prior to the next MWELo update cycle) complete the following actions:

1. Identify and review current certification programs and higher education program/degrees.
2. Develop metrics for evaluating current certification programs and higher education programs/degrees. Identify what is working, what is not working and where the gaps are in the certification and or degree programs.
3. Select the criteria for creating the program along with continuing education requirements needed for ongoing certification.
4. Complete a public process with other appropriate State agencies to solicit input from landscape professionals (designers, architects, and contractors), University of California, California State Universities and community colleges, non-governmental organizations, irrigation manufacturers and brokers, agencies, industry trade organizations and consultants in the certification program design process
5. Define project plan deliverables and timeline for program design, development, testing and implementation along with identifying a process to audit the program once established.

6. Work with the appropriate State agency (or contracted non-profit) to implement the certification program and update MWELo to cite this certification(s) eligible for approval of landscape planning, documentation and permits.
7. Create an online database or other references for local agencies to check to ensure that appropriate certifications are in place when enforcing MWELo.
8. Design and implement a certification program evaluation process that ensures ongoing program updates and improvements as per the MWELo update cycle.

SECTION 8: WORKFORCE TO ACCOMPLISH THE TRANSFORMATION

RECOMMENDATION #2: C-27 Examination Questions Covering Water Use Efficiency and Sustainable Practices

Background

In 2005, the Assembly Bill 2717 Landscape Task Force recommended “a common foundation for the education, training, and certification of landscape professionals across the disciplines involved in designing, installing, maintaining, and managing water-efficient landscapes.” The California Urban Water Conservation Council arrived at a similar conclusion by identifying the need for more workforce education in the landscape industry in their draft 2015 report on *Sustainable Landscaping: Market Transformation Framework*. During its investigative process and discussions with horticultural industry professionals and public officials, the Independent Technical Panel (ITP) found the need for a more comprehensive education program for landscape professionals and the need to update current curriculum trade exams to be consistent with new landscape practices and regulations.

In the State of California there are three license classifications able to provide landscape installations. These are General Contracting A and B categories and specialty license C-27 (specifically for landscape contractors). The Contractors trade exam for individuals applying for a license which allows for landscaping currently consists of about 100 questions, similar to the exams for the other license classifications. These trade exams must cover a very broad spectrum of industry knowledge depending upon the type of license being applied. Landscaping practices are changing or will soon change as a result of the drought and recent actions taken by DWR to update the Model Water Efficient Landscape Ordinance (MWELO) as well as the state agencies that oversee building standards. Therefore, it follows that the trade exam should be updated to be consistent with changing landscape practices and updates to building codes.

Purpose Statement

The purpose of this recommendation is for the California State Licensing Board (CSLB) to be directed to include questions with more sustainable landscape content and to add a resource on sustainable landscape construction to its list of recommended study materials for the exam.

The Independent Technical Panel Recommends That:

The CSLB work with the California Landscape Contractors Association to revise the existing exams for General contracting classes A and B and the C-27 license to include questions in the trade portion regarding water use efficiency and sustainable practices. As such, the CSLB will add MWELO into the reference study material.

SECTION 9: PUBLIC PERCEPTIONS & SOCIAL NORMS

RECOMMENDATION #1: Defining Professionals: Recognition of Examples of Low Water Use Landscapes and a Sustainable Statewide Approach to Outreach and Information.

Background

During its investigative process and discussions with horticulture industry professionals and public officials, the Independent Technical Panel found a significant lack of information into the process and procedures to locate and hire the correct level of professional for residential landscaping. The differences between landscape designers, Landscape Architects, Landscape Contractors, garden centers and irrigation professionals is typically not known or clear to homeowners in need of landscape services. Often and unknowingly, homeowners turn to unlicensed operators using cost to determine who to hire. The end result is often a landscape that is not designed and installed to industry standards, and therefore, not as water-efficient or aesthetically pleasing as desired. In the end, it is every homeowner's responsibility to be a water manager, both inside and outside of their home. When asked, nearly all homeowners say they conserve water. Unfortunately, when pressed further about their water conservation activities, it becomes apparent that most homeowners lack even basic information on water use efficiency. In addition, most do not measure or track their actual water use nor are they knowledgeable about their irrigation systems or the type of plant material in their yards. The Save Our Water website provides examples of low water using landscapes from throughout the State and includes dialogue from the owners of the properties. However, additional information would increase the website's usefulness. That information includes details about the landscape, including before and after photos, how the landscape was designed, a list of the plants used, irrigation system information, type of hardscape features and material used, type of mulch, and whether the installation was done by the homeowner or a professional. In addition, a methodology for a sustainable (long-term) approach to educate and communicate to homeowners with respect to the items discussed above, including information on how to identify the appropriate landscape professional for each type of project, should be developed.

Purpose Statement

The definitions, roles and requirements of and for landscape professionals should be made easily available to homeowners in order to provide them with informed choices when considering landscape services. Examples of well-designed and correctly installed low water using landscapes should be readily available and recognized on a local level. The Water Use Classification of Ornamental Species (WUCOLS) website and plant list should also be readily available and easy to use.

The Independent Technical Panel Recommends That:

1. The Department of Water Resources, in partnership with the Association of California Water Agencies (Save Our Water), convene a work group with representatives from academia, the California Urban Water Conservation Council, industry and others to develop an educational campaign for homeowners that identifies the variety of professional horticulture services available in the marketplace. The campaign will also identify and make available to homeowners, examples of properly designed and installed low-water use landscapes for each of the state's climate zones. The campaign will provide information on how homeowners can access and utilize the WUCOLS plant list.
2. The Department of Water Resources request funding to complete the following:
 - a. Convene representatives from horticulture groups (landscape designers, architects, and contractors), academia, irrigation manufacturers and distributors, nurseries (wholesale and retail), water agencies, industry trade organizations and consultants.
 - b. Review of and search for existing definitions and campaigns and current levels of funding.
 - c. Identify services performed by each type of landscape professional.
 - d. Identify a process to obtain examples of low water use landscapes.
 - e. Consider the role of invasive plants.
 - f. Consider the role of and how to address concerns related to unlicensed operators (e.g. lack of insurance, etc.).
 - g. Develop metrics to evaluate residential type of work for current professionals. Identify who typically does what and what is working, what is not working and where the gaps are in the different roles.
 - h. Develop marketing campaign to promote WUCOLS plant list and its use (reference Section 10.2).
 - i. Select the criteria for creating the information and identify how to best disseminate (e.g. through the realtor community, water agencies, cities, retail garden stores, etc.).
 - j. Develop an implementation plan that includes a timeline for program roll-out, a list of deliverables, roles and responsibilities, and impact evaluation to measure effectiveness.
 - k. Continue operating the Save Our Water campaign, or similar statewide program.

SECTION 10: RESEARCH AND DOCUMENTATION NEEDS AND SUPPORT

RECOMMENDATION #1: [Title Pending]

Background

Both the 2013 California Water Plan and 2016 California Water Action Plan call for reducing water now and in the future as a first strategy to meeting the state’s future water needs.

There is broad agreement that the state’s water management system is currently unable to satisfactorily meet both ecological and human needs, too exposed to wet and dry climate cycles and natural disasters, and inadequate to handle the additional pressures of future population growth and climate change. Solutions are complex and expensive and they require the cooperation and sustained commitment of all Californians working together. To be sustainable solutions must strike a balance between the need to provide for public health and safety (e.g., safe drinking water, clean rivers and beaches, flood protection), protect the environment, and support a stable California economy. (Update California Water Plan, 2016)²⁸

With seven million more people projected to live in California by 2035 (Table 10-1), and in order to have a resilient environment and expanding our \$2 trillion economy, we need more advances in water use efficiency and conservation strategies.

Table 10-1. Projected California Population Growth

| 2015 | 2020 | 2025 | 2030 | 2035 |
|------------|------------|------------|------------|------------|
| 38,896,969 | 40,619,346 | 42,373,301 | 44,085,600 | 45,747,645 |

Source: California Department of Finance, Table P-1, Last accessed: January 28, 2016.²⁹

The 2013 California Water Plan cites that its **“imperative to invest in innovation and infrastructure”** in its state integrated water resource management strategies the calls for need for **“advancement in water science and technology”** (Figure 10-1). This must apply to water conserving and/or efficiency technologies and approaches given with more than two to three decades of active conservation programs in many communities, the easier water efficient solutions have been employed.

²⁸ http://resources.ca.gov/docs/california_water_action_plan/Final_California_Water_Action_Plan.pdf

²⁹ <http://www.dof.ca.gov/research/demographic/projections/>

Figure 10-1. State Integrated Water Management Categories (Box 1-1).

VOLUME 1 - THE STRATEGIC PLAN

Box 1-1 State Integrated Water Management Investment Categories

Innovation:

- Governance of State integrated water management (IWM) improvements.
- Planning and public engagement improvements.
- Strengthening government agency alignment.
- Information technology (data and analytical tools) improvements.
- Water technology and science advancements.

Infrastructure (human and ecosystem), implemented at the following scales:

- Local.
- Groundwater basin.
- Watershed.
- Regional.
- Interregional.
- State.
- Interstate.
- International.
- Tribal.

Source: 2013 California Water Plan, Volume 1, Chapter 2, Imperative to Invest in Innovation and Infrastructure. Last accessed: January 29, 2016

This is most certainly true extending beyond 2020, when SB X7-7 targets are met saving an estimated 2 Million Acre Feet³⁰ as presented in Figure 10-2 below. Approximately half of the conservation savings are estimated in the landscape sector that has significant needs for scientific and technological research.

Figure 10-2. Projected Water Savings by Sector from SB X7-7

Table 3-4 Projected Savings by Sector^a

| Demand Reduction Sectors | Reduction | Projected Savings in 2020 |
|---|----------------|---------------------------|
| Large landscape | 3 gpcd | 148,000 af |
| Commercial, industrial, and institutional | 5 gpcd | 170,000 af |
| Residential Indoor | 15 gpcd | 739,000 af |
| Residential landscape | 16 gpcd | 789,000 af |
| Water loss control | 5 gpcd | 200,000 af |
| Total | 44 gpcd | 2,046,000 af |

Notes:
 af = acre-feet, gpcd = gallons per capita per day
^a The figures in this table are a summary of projected savings that are detailed in preceding pages.

Source: 2013 California Water Plan, Volume 3, Chapter 3, Urban Water Use Efficiency. Last accessed: January 29, 2016

³⁰ 2013 California Water Plan, Volume 3, Chapter 3, Table 3-4. Last accessed January 31, 2015. <http://www.waterplan.water.ca.gov/cwpu2013/index.cfm>

In the last five years, there has not been funding by state agencies to adequately support quantitative water conservation and water efficiency research, including landscape related research needs. The need for California to provide funding for research is now critical to understand where investments by the state through statewide rebates, programs and services are best prioritized and also have research adaptable to benefiting individual water utilities and other interested researchers and planners.

To date in 2015, millions of dollars have been allocated by state and local agencies on turf removal programs resulting in millions of square feet of turf removed and replaced with water conserving plants without the ability to clearly to demonstrate or quantitate water savings through science-based research. The California Urban Water Conservation Council (CUWCC) cited in their report, "Turf Removal & Replacement: Lessons Learned", that "without sophisticated metering, let alone designated landscape meters, attributing water savings directly to turf replacement can be nearly impossible". To quote the distinguished mathematician and physicist, Lord Kelvin (1824-1907), "To measure is to know." If you cannot measure it, you cannot improve it. The need for science-based quantitative research is paramount to understand the impact of purported landscape conservation programs and initiatives. The extremely limited less than two dozen various landscape water conservation studies completed in California are dated with many more than 10 years old and have been primarily locally funded. As a result, most information to planners, governmental officials and others on estimated water savings is anecdotal and not objective, lacking basic scientific methodology (statistical design, treatment replication and reproducibility). Multi-year research is needed to minimize the effects of seasonal variation and to understand if water savings through conservation and efficiency can be sustained overtime.

In January 2010, MWELo was revised and one of the new requirements was to reduce the Evapotranspiration Adjustment Factor (ETAF) from 0.8 to 0.7 for a new landscape over 2,500 square feet, which would have resulted in a 12.5% reduction in the required water budget. To date, there has been no study with data to confirm the benefits of water savings or other beneficial impacts or unintended consequences associated with the ETAF reduction. On December 1, 2015, the ETAF was decreased another 21+%, again resulting in significantly less water allowable water for the water budget of a new landscape. Again, there is no research on the horizon that will substantiate the reduction of the 0.7 ETAF to 0.55 for residential and 0.45 for commercial landscapes. With the "newly" revised MWELo statute, there will be a significant shift in how California landscapes will be designed, implemented and maintained in the future. How much shift has occurred in quantifiable water savings on landscapes through quantitative research is critical to understand where additional water savings are most feasible from outdoor urban water use. We need both pilot scale and readily transferable research findings given the diversity and complexity of our California environment and both existing and new urban landscapes.

An example of a state agency research program is the Research and Development Program under the California Energy Commission. This program has annual funding for energy research and has in place Electric Program Investment Charge as the sustainable funding source. It is

time to invest in and provide leadership for a sustainable water conservation research program for California, particularly focused on landscape. Given the embedded energy in the water supply, especially when pumping on peak to meet irrigation demands, this is a topic that mutual benefits and should either be allowed to have shared resources with the energy sector or have a stand-alone sustainable funding source.

Purpose Statement

The Independent Technical Panel (ITP) recommends that the Department of Water Resources (DWR) collaborates with the CUWCC and academia such as the University of California (UC) to convene stakeholder meeting(s) to identify the priority needs for research that will result in short-, medium- and long-term conservation water savings. The CUWCC currently has a research and evaluation and landscape committees that may assist in this effort. This effort could be a follow-on effort of the process used to develop the CUWCC's Market Transformation Framework for Sustainable Landscapes. It is envisioned that academic researchers would have a central role in facilitating the dialogue among stakeholders.

Prior to convening meeting(s), the DWR or other organizations will conduct a science-based literature review for identifying research conducted on best management practices for water conservation, with a key emphasis for landscape, and a synopsis of what specific research has resulted in significant landscape water conservation through best management implementation. The outcome of this research could become a part of the CUWCC's new Water Conservation Wiki and also shared and leveraged by DWR.

The Independent Technical Panel Recommends That:

1. State Legislature appropriate \$5 million to the DWR for creating and implementing a road map for funding priority research needs that will result in water conservation. Furthermore, the ITP recommends that research money is identified for funding priority science-based research. Research projects will need to be multi-year and will need to demonstrate impact of research findings with empirical data and statistical analysis on the same scale and rigorousness as applied to and invested in the energy sector.
2. DWR convene an industry stakeholder committee that will confirm priority research topics and defined requirements for proposal solicitation. A sample list of key topics is provided along with an example of a high priority research focus:

Potential Topics:

1. Irrigation Technology
 - a. Low-cost, consumer friendly "standard" irrigation controller that can comply with one- or two-day mandatory water restriction. Having a "standard"

controller for the majority of all residential homes will facilitate irrigation controller education by many organizations, industry professionals and institutions.

2. Social/Behavioral Modification (incentives)
 - a. Effective stewardship messaging causing social/behavior change for promoting responsible water use without waste
3. Documentation
 - a. Providing protocol manual for evaluation, measurement and verification of landscape water conservation
4. Programs (training and education)
5. Landscape Design (plants and hardscape)
6. Soil Technology
7. Irrigation Management
 - a. Research to determine if existing and new landscapes can perform to the MWELO ETAF
8. Gray and Treated Water

SECTION 10: RESEARCH AND DOCUMENTATION NEEDS AND SUPPORT

RECOMMENDATION #2: Water Use Classification of Landscape Species IV (WUCOLS IV) Support

Background

The publication Water Use Classification of Landscape Species (WUCOLS) is a guide to the water needs of landscape plants in California. First developed in 1991, the document has been revised/updated twice, with the third edition (WUCOLS III) being supported and published by the California Department of Water Resources (DWR) in 1999. In each new edition, additional species were evaluated and included. Since 2010, this publication has become a standard reference for selecting the most water-efficient plants and is the de facto reference source by the California Model Water Efficient Landscape Ordinance (MWEL0; AB 1881).

In 2013, under the leadership of the California Center for Urban Horticulture, University of California Davis, the WUCOLS III plant list was reviewed and updated with an additional 1600 plus taxonomic plant groups (taxa), bringing the total to 3,546 taxa in the database. Funding support for that project (WUCOLS IV), was provided by DWR and stakeholders in the California horticulture industry and allowed for the development and implementation of an online searchable database³¹. The WUCOLS IV database has been online for two years and Google Analytics metrics have increased by 200% for the number of sessions, and by 228% for the number of users for 2014-2015.

Leveraging internet technology enabled the WUCOLS IV plant list to be accessible not only to horticultural professionals, but also to the general public. Feedback on the WUCOLS IV database from horticultural professionals has been overwhelmingly positive. The ability to search by specific city, water use (very low, low, moderate & high) and by plant category allows the user to create custom downloadable plant lists, which facilitates irrigating plants with similar water needs efficiently in the landscape. The most frequent request voiced by horticultural professionals is the need for an institutionalized process for updating and adding to the online plant list. Such a process does not exist. Over time, the lack of a predictable process for adding new plant varieties and their water use information to the WUCOLS list could discourage further investment in the development and commercialization of new water-efficient plants in California.

Feedback from the general public has been less positive than from the horticultural professionals, for the general public lacks the horticultural knowledge of plant appearance and cultural information. Unfortunately, WUCOLS IV funding could not support the addition of plant photographs and descriptions to the database, features that would enable the general public to utilize this online resource tool. Thus, the addition of plant photographs and descriptions to the WUCOLS IV database is considered by the Independent Technical Panel to

³¹<http://ucanr.edu/sites/WUCOLS/>

be a critical enhancement to WUCOLS, offering essential information to the gardening public for identifying and selecting water-wise plant material for California landscapes.

Purpose Statement

The purpose of this recommendation is to ensure that WUCOLS is made more useful to the general public and is kept up to date to accommodate new varieties of water-efficient plants. To enhance the consumer utility of the database and to ensure that a stale list does not inadvertently prevent the introduction and installation of new water-efficient plants, legislation should authorize and direct DWR to review, update, and improve the WUCOLS IV online database, including each of the following:

- Expansion of the entries in the database to include a photograph, narrative description, and key cultural information (i.e., full sun, partial shade, etc.) for each entry;
- Establishment and implementation of a regular process to add new plant taxa to the listing, and to make corrections to existing listings where necessary.

The Independent Technical Panel Recommends That:

The Water Conservation in Landscaping Act (*Government Code*, Article 10.8, sections 65591 – 65599), be amended to direct the DWR to do the following:

1. Review and revise the WUCOLS list to consider the addition of unlisted plant taxa and to correct known errors in existing listings, no less frequently than once every three years.
2. Provide the following additional information for each listed plant taxa in the WUCOLS database:
 - a) a photograph
 - b) a narrative description, and
 - c) key cultural information.

Information specified by this paragraph shall be added to the database within five years at a rate not less than 20% of entries per year in each fiscal year beginning July 1, 2017.

APPENDIX A: Additional Review Materials

The following proposed section was created, reviewed, and voted on by the ITP (4 votes for, 2 votes against, 1 Member absent). Based on the ITP decision rules, the vote did not receive majority support (a minimum of 5 votes in favor of a proposal constitutes a majority) to be included as an ITP recommendation. As also defined in the ITP Charter, ITP Members are allowed to prepare statements to be included in the Legislative Report that express their perspectives about a recommendation. Two ITP members expressed a desire to ensure that this draft section be included in this Public Draft Report as a means to solicit public review and comment on this proposal. The following text is provided as a means to ensure public comment is received on this section.

SECTION 7: COMPLEMENTARY POLICIES & REGULATIONS

RECOMMENDATION #8: Water Budget Performance Reporting

Background

The State has responded to the current extraordinary drought with a mandatory 25% reduction in urban water use statewide, implemented through emergency regulations adopted by the State Water Resources Control Board (SWRCB). In 2014, emergency regulations banned certain types of wasteful use and instituted monthly reporting requirements regarding water production by purveyors. In May 2015, emergency regulations implemented the Governor's directive for a 25% reduction by assigning individual water suppliers a water use limit based in part on their relative levels of residential gallons per capita per day (R-GPCD).

Even before the current drought took on such a critical dimension, the State's Water Action Plan of 2014 called for conservation to become a "California way of life". With the State's economy rebounding and population growing, coupled with a growing awareness that past levels of water withdrawals from the Sacramento and Colorado River Basins may not be sustainable, state officials, water suppliers, and non-governmental organizations are now beginning to direct attention to long-term (non-drought) conservation and efficiency standards for urban water suppliers.

Many water suppliers have expressed concern about various aspects of the current emergency regulations based on R-GPCD. While the public response had been exceptionally strong, the longer the emergency regulations are in place, the more likely that inequities will arise based on differentials of economic and population growth, and weather effects, among other factors. While R-GPCD may be viewed as a relative measure of water efficiency in the residential sector, it is not a metric that measures water efficiency in an absolute sense.

In early November, the Inland Empire Utilities Agency (IUEA) and several other water agencies (along with California Building Industry Association) wrote to the State Board proposing a

permanent (non-drought) performance standard for water suppliers based on the water budget concept. Their underlying premise is that it is now becoming both technically possible and far less costly for water suppliers to maintain (and update) parcel-level irrigated area, for integration with individual customer water use data and localized ET (not static, reference ET) to measure actual water use against an ET-based water budget. IUEA and their cosigners point to the water budgets adopted in new MWELo as the logical and appropriate standard to apply to determine whether water suppliers are meeting a state-established efficiency target.

This approach is being enabled by the rapid advancement and commercialization of aerial imagery acquisition, automated land cover assessment, parcel map digitization, and water customer database integration. Currently, a vendor is working for IUEA and the local agencies in the Santa Ana Basin to assemble all this information and provide dashboards for each utility to access the data. Other firms are beginning to offer similar services.

Taken together, these developments offer an answer to the urgent need to effectively codify and enforce water efficiency for existing landscapes based on the water budget and ETAF specified in MWELo, which in the past has been difficult to track and largely lacking in enforcement.³² At least one pathway for doing so, now suggested by several water agencies, is for there to be a state regulation that establishes a water use standard grounded in MWELo for each urban water supplier. While the IEUA proposal extends beyond landscape water use to encompass all water uses, the Panel recommends that landscape water use be addressed in a regulation based on the water budget concept, either on its own or in combination with a more comprehensive efficiency standard for water suppliers.

Purpose Statement

The purpose of this recommendation is to ensure that steady progress is made toward reducing unnecessary landscape water use. This would be accomplished by the annual reporting of the aggregate landscape water use in the service area of each urban water supplier for comparison with a standard based on the ET-based water budget applicable to landscapes in the service area based on current MWELo.

The Independent Technical Panel Recommends That:

The State Water Resources Control Board, following stakeholder involvement and comment, develop and adopt a non-drought regulation for the efficiency of landscape water use. After funding appropriations to support development of base maps by DWR to aid in development of the reports, and after sufficient notice and opportunity for data gathering, each water supplier may report landscape water use on an annual basis to DWR and the State Board in line with SBX7-7 Method 2 along with the ET-based water budget applicable to all landscapes in the

³² It should be noted that since its inception in 1993, MWELo has specified an ET adjustment factor of 0.8 for existing landscapes, although the mechanism for monitoring, verifying, and enforcing this standard was never prescribed.

service area for that year based on current MWELO, together with steps taken, or to be taken, to bring excessive landscape water use down to the levels specified in MWELO. For other particulars of such a regulation, including phase-ins and exceptions, we defer to the Board and stakeholders.