

Sustainability Roadmap: Water Efficiency and Conservation

Progress Report and Plan for Meeting
the Governor's Sustainability Goals
for California State Agencies

**California Department of Fish
and Wildlife**

Edmund G. Brown Jr., Governor

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Department of Fish and Wildlife

Sustainability Road Map: Water Efficiency and Conservation

Diane Brown-Tapia

Sue Lee

Primary Author(s)

Gabe Tiffany

Deputy Director, Administration Division

Charlton H. Bonham

Director

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Acronyms

BMP	Best Management Practices
CALGREEN	California Green Building Code (Title 24, Part 11)
DGS	Department of General Services
EO	Executive Order
DWR	Department of Water Resources
ESPM	Energy Star Portfolio Manager
GHGe	Greenhouse Gas Emissions
GSP	Groundwater Sustainability Plan
LCM	The Landscape Coefficient
LEED	Leadership in Energy and Environmental Design
MM	Management Memo
MAWA	Maximum Applied Water Allowance
MWEO	Model Water Efficient Landscape Ordinance
SAM	State Administrative Manual
SGA	Sustainable Groundwater Agency
SGMA	Sustainable Groundwater Management Act
WMC	Water Management Coordinator
WUCOLS	Water Use Classifications of Landscape Species

Glossary

Backflow - is the undesirable reversal of the flow of water or mixtures of water and other undesirable substances from any source (such as used water, industrial fluids, gasses, or any substance other than the intended potable water) into the distribution pipes of the potable water system.

Back flow prevention device - a device that prevents contaminants from entering the potable water system in the event of back pressure or back siphonage.

Blowdown - is the periodic or continuous removal of water from a boiler to remove accumulated dissolved solids and/or sludge. Proper control of blowdown is critical to boiler operation. Insufficient blowdown may lead to deposits or carryover. Excessive blowdown wastes water, energy, and chemicals.

Compost - Compost is the product resulting from the controlled biological decomposition of organic material from a feedstock into a stable, humus-like product that has many environmental benefits. Composting is a natural process that is managed to optimize the conditions for decomposing microbes to thrive. This generally involves providing air and moisture, and achieving sufficient temperatures to ensure weed seeds, invasive pests, and pathogens are destroyed. A wide range of material (feedstock) may be composted, such as yard trimmings, wood chips, vegetable scraps, paper products, manures and biosolids. Compost may be applied to the top of the soil or incorporated into the soil (tilling).

Critical overdraft - a condition in which significantly more water has been taken out of a groundwater basin than has been put in, either by natural recharge or by recharging basins. Critical overdraft leads to various undesirable conditions such as ground subsidence and saltwater intrusion.

Ecosystem services - are the direct and indirect contributions of ecosystems to human well-being. They support directly or indirectly our survival and quality of life. Ecosystem services can be categorized in four main types:

- **Provisioning services** are the products obtained from ecosystems such as food, fresh water, wood, fiber, genetic resources and medicines.
- **Regulating services** are the benefits obtained from the regulation of ecosystem processes such as climate regulation, natural hazard regulation, water purification and waste management, pollination or pest control.

- Habitat services provide living places for all species and maintain the viability of gene-pools.
- Cultural services include non-material benefits such as spiritual enrichment, intellectual development, recreation and aesthetic values.

Grasscycling -refers to an aerobic (requires air) method of handling grass clippings by leaving them on the lawn when mowing. Because grass consists largely of water (80 percent or more), contains little lignin and has high nitrogen content, grass clippings easily break down during an aerobic process. Grasscycling returns the decomposed clippings to the soil within one to two weeks acting primarily as a fertilizer supplement and, to a much smaller degree, mulch. Grasscycling can provide 15 to 20 percent or more of a lawn's yearly nitrogen requirements

Hydrozone - is a portion of a landscaped area having plants with similar water needs that are served by one irrigation valve or set of valves with the same schedule.

Landscape Coefficient Method (LCM) describes a method of estimating irrigation needs of landscape plantings in California. It is intended as a guide for landscape professionals.

Landscape water budget - is the calculated irrigation requirement of a landscape based on landscape area, local climate factors, specific plant requirements and the irrigation system performance.

Model Water Efficient Landscape Ordinance (MWELo) - The Water Conservation in Landscaping Act was signed into law on September 29, 1990. The premise was that landscape design, installation, and maintenance can and should be water efficient. Some of the provisions specified in the statute included plant selection and groupings of plants based on water needs and climatic, geological or topographical conditions, efficient irrigation systems, practices that foster long term water conservation and routine repair and maintenance of irrigation systems. DWR adopted the Model Ordinance in June of 1992. One element of the Model Ordinance was a landscape water budget. In the water budget approach, a Maximum Applied Water Allowance (MAWA) was established based on the landscape area and the climate where the landscape is located. The latest update to MWELo was in 2015. MWELo applies to all state agencies' landscaping.

Mulch - Mulch is a layer of material applied on top of soil. Examples of material that can be used as mulch include wood chips, grass clippings, leaves, straw, cardboard, newspaper, rocks, and even shredded tires. Benefits of applying mulch include reducing erosion and weeds and increasing water retention and soil vitality. Whenever possible, look for mulch that has been through a sanitization process to kill weed seeds and pests.

Trickle flow - A device that allows users to reduce flow to a trickle while using soap and shampoo. When the device is switched off, the flow is reinstated with the temperature and pressure resumes to previous settings.

Sprinkler system backflow prevention devices - are devices to prevent contaminants from entering water supplies. These devices connect to the sprinkler system and are an important safety feature. They are required by the California Plumbing Code.

Submeter- a metering device installed to measure water use in a specific area or for a specific purpose. Also known as dedicated meters, landscape submeters are effective for separating landscape water use from interior water use, evaluating the landscape water budget and for leak detection within the irrigation system.

Water Budget - A landscape water budget is the calculated irrigation requirement of a landscape based on landscape area, local climate factors, specific plant requirements and the irrigation system performance.

Water-energy nexus - Water and energy are often managed separately despite the important links between the two. 12 percent of California's energy use is related to water use with nearly 10 percent being used at the end water use. Water is used in the production of nearly every major energy source. Likewise, energy is used in multiple ways and at multiple steps in water delivery and treatment systems as well as wastewater collection and treatment.

Water Shortage Contingency Plans - each urban water purveyor serving more than 3,000 connections or 3,000 acre-feet of water annually must have an Urban Water Shortage Contingency Plan (Water Shortage Plan) which details how a community would react to a reduction in water supply of up to 50 percent for droughts lasting up to three years.

EXECUTIVE SUMMARY

The California Department of Fish and Wildlife's (CDFW) mission is to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public.

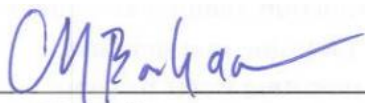
CDFW is responsible for over 1,000,000 acres of fish and wildlife habitat, managed through 722 properties throughout the state. These properties provide habitat for a rich diversity of fish, wildlife, and plant species and comprise habitats from every major ecosystem in the state. In addition to managing wildlife areas and ecological reserves, CDFW operates 24 fish hatcheries to provide sportfish stock for anglers in California. The department is also responsible for other programs, such as private lands conservation programs that assist landowners with the management of wetlands, riparian habitats, native grasslands and wildlife-friendly farmlands.

Due to the variety of programs and services CDFW offers, its portfolio is very diverse. There are approximately 576 structures located on lands owned by CDFW. Some of these buildings include small hunter check stations, residences, and large offices. The wide variety of locations include labs, fish hatcheries, ecological reserves, wildlife areas, field offices and many more. Of the 722 properties, CDFW owns 86 facilities, leases 116 and the rest of the properties are open wildlife areas with no structures or personnel attached.

Due to diligence of CDFW staff conserving water where possible and the drought grant funded complete indoor fixture upgrade of all owned facilities, the department has met the mandated goal with a 22 percent reduction. The fixture upgrades to be completed at the end of 2017 is estimated to save the department roughly 3 million gallons per year.

CDFW knows how important water is and therefore, will continue to investigate water savings opportunities and will ensure that staff is diligent about leaks and reducing water waste. CDFW will continue to seek new technologies and equipment to manage wildlife and habitats in a more water conscious way, to the fullest extent possible. One example, is with the new Fish Hatchery being built near Fresno. The new hatchery will use new circular fish tanks instead of the traditional rectangle ones. The circular ones are extremely water efficient and energy efficient as they recirculate water more efficiently, thus saving water and energy.

CDFW has some challenges with reporting water that the department is working through. The majority of water use comes from wells, which are unmetered and hard to estimate accurately. In addition, water used for wildlife purposes is exempt under EO B-18-12, however often it is hard to separate this use from facility use and is counted as part of the consumption numbers. CDFW is currently auditing its data in Energy Star Portfolio Manager (ESPM) to ensure accuracy and the reporting protocols are being followed. CDFW is committed to excellence and will do everything it can to continue to reduce water usage conserve resources as much as possible.



Charlton H. Bonham
Director

SUSTAINABILITY GOALS

The Governor has directed California State Agencies to demonstrate sustainable operations and to lead the way by implementing sustainability policies set by the state. Sustainability includes the following general initiatives:

- Greenhouse Gas Emissions Reductions
- Building Energy Efficiency and Conservation
- Indoor Environmental Quality (IEQ)
- Water Efficiency and Conservation
- Monitoring Based Building Commissioning (MBCx)
- Environmentally Preferable Purchasing (EPP)
- Financing for Sustainability
- Zero Emission Vehicle (ZEV) Fleet Purchases
- Electric Vehicle Charging Infrastructure
- Monitoring and Executive Oversight

The Governor has issued numerous executive orders directing sustainable state operations. The orders relevant to water are:

Executive Order B-18-12

Executive Order ([EO B-18-12](#)) and the companion *Green Building Action Plan* require state agencies to reduce the environmental impacts of state operations by reducing greenhouse gas emissions, managing energy and water use, improving indoor air quality, generating onsite renewable energy when feasible, implementing environmentally preferable purchasing, and developing the infrastructure for electric vehicle charging stations at state facilities. The Green Building Action Plan also established two oversight groups; the staffs level Sustainability Working Group and the executive level Sustainability Task Force, to ensure these measures are met.

Executive Order B-18-12 requires State agencies to reduce agency-wide water use 10 percent by 2015 and 20 percent by 2020 as measured against a 2010 baseline. The 2015 and 2020 targets reinforce the SB X7-7 requirement that State agencies reduce water use at facilities they operate to support local water suppliers in meeting their targets.

On February 28, 2013, the California Department of Water Resources issued its Water Use Reduction Guidelines and Criteria, pursuant to Executive Order B-18-12. Each applicable agency was required to take actions to reduce water use in facilities and landscapes that are operated by the state, including facilities owned, funded or leased. State operated facilities are defined as facilities where the agency has direct control of the buildings' function, maintenance and repair. For leased facilities, the Green Building Action Plan directed at that time that new and renegotiated leases include provisions for water conservation, reporting water use and installation of sub-meters to the extent possible and economically feasible.

All the following sections in this water plan and the accompanying worksheet only repeat the initial criteria and guidelines issued at that time. Only the MWELo requirements have been updated since that time. Additionally, other Executive Orders have followed, strengthening and elaborating on the issues contained in EO B-18-12.

EO B-18-12 requires that beginning January 2013, agencies shall regularly report current water use into the water tracking database. Since January 2014, annual water use reports have documented progress towards the 2015 and 2020 targets using the ESPM http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager_benchmarking to track energy and water use and to submit annual reports to DGS. (Sustainability Manager, Department of General Services, 707 Third Street, 8th Floor, West Sacramento, CA 95798-9052). Additionally, for facilities with landscape areas over 20,000 sq. ft. the landscape water use must be tracked with a water budget program.

Executive Order B-29-15

[EO B-29-15](#) directs state agencies to take actions in response to the ongoing drought and to the State of Emergency due to severe drought conditions proclaimed on January 17, 2014. The Governor directed numerous state agencies to develop new programs and regulations to mitigate the effects of the drought, and required increased enforcement of water waste state wide. Agencies were instructed to reduce potable urban water use by 25 percent between 2013 and February 28, 2016.

Executive Order B-30-15

[EO B-30-15](#) declared climate change to be a threat to the well-being, public health, natural resources, economy, and environment of California. It established a new interim statewide greenhouse gas emission reduction target of 40 percent below 1990 levels by 2030, and reaffirms California's intent to reduce greenhouse gas emissions by 80 percent below 1990 levels by 2050. To support these goals, this order requires numerous state agencies to develop plans and programs to reduce emissions.

Executive Order B-37-16

[EO B37-16](#) builds on what were formerly temporary statewide emergency water restrictions in order to establish longer-term water conservation measures, including permanent monthly water use reporting, new permanent water use standards in California communities and bans on clearly wasteful practices such as hosing off sidewalks, driveways and other hardscapes. The EO focuses on using water more wisely, and eliminating water waste by taking actions to minimize water system leaks. DWR estimates that leaks in water district distribution systems siphon away more than 700,000 acre-feet of water a year in California - enough to supply 1.4 million homes for a year.

The EO further strengthens local drought resilience and looks to improve agricultural water use efficiency and drought planning. State agencies are to cooperate with urban water management plans which include plans for droughts lasting for at least five years by assuring that the water efficiency and conservation plan has drought contingency actions.

State Administrative Manual & Management Memos

The following sections of the State Administrative Manual (SAM), and associated Management Memos (MM), currently impose sustainability requirements for water on the department under the Governor's executive authority:

SAM Sections

- Landscaping practices 1821.5
- Drought moratorium 1821.4

Relevant Management Memos

- MM 15-06 State Buildings And Grounds Maintenance And Operation
- MM 15-04: Energy Use Reduction for New, Existing, and Leased Buildings
- MM 14-02 Water Efficiency and Conservation
- MM 14-07: Standard Operating Procedures For Energy Management In State Buildings
- MM 14-09: Energy Efficiency in Data Centers and Server Rooms

Relevant Legislation

Sustainable Groundwater Management Act of 2014 - The [Sustainable Groundwater Management Act](#) (SGMA) directs the Department of Water Resources (DWR) to identify groundwater basins and sub basins in conditions of critical overdraft. Conditions of critical overdraft result from undesirable impacts, which can include seawater intrusion, land subsidence, groundwater depletion, and/or chronic lowering of groundwater levels. As defined in the SGMA, "A basin is subject to critical overdraft when continuation of present water management practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts."

As required in the SGMA, basins designated as high or medium priority *and* critically overdrafted shall be managed under a groundwater sustainability plan or coordinated groundwater sustainability plans by January 31, 2020. All other high and medium priority basins shall be managed under a groundwater sustainability plan by January 31, 2022.

WATER EFFICIENCY AND CONSERVATION REPORT

This Water Efficiency and Conservation Report demonstrates to the Governor and the public the progress the Department has made toward meeting the Governor's goals. This report identifies successful accomplishments, ongoing efforts, and outstanding challenges.

Introduction

California experiences the most extreme variability in yearly precipitation in the nation. In 2015, California had record low statewide mountain snowpack of only 5 percent of average while 2012-14 were the 4 driest consecutive years of statewide precipitation in the historical record. Now, the 2017 water year (October 1, 2016-September 30, 2017) is surpassing the wettest year of record (1982-83) in the Sacramento River and San Joaquin River watersheds and close to becoming the wettest year in the Tulare Basin (set in 1968-69). These potential wide swings in precipitation from one year to the next show why California must be prepared for either flood or drought in any year.

Therefore, using water wisely is critical. The E.O.s and SAM sections listed in the previous section help demonstrate the connection between water and energy use, (the water-energy nexus), water and climate change, and water and landscaping. Further, the impact of water uses by state agencies goes beyond the scope of these E.O.s and SAM sections and DGS management memos as these documents do not address such related issues as water runoff from landscaping and various work processes and the potential for water pollution or the benefits of water infiltration, soil health and nutrient recycling. However, by using holistic water planning, a well-crafted water plan can not only meet all state requirements but add considerable value and benefits to the organization and surrounding communities.

Department Mission and Built Infrastructure

The mission of the California Department of Fish and Wildlife (CDFW) is to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public. CDFW is the steward of over 1,000,000 acres of land managed through 722 properties throughout the state, 86 of these properties are owned by the department and include structures of various types and uses.

There are 576 structures located on these 86 sites with an approximate combined square footage of 1,107,416 square feet. CDFW has a variety of types and functions of its structures.

The majority of the water the department uses is for fish and wildlife in hatcheries, wetlands and other wildlife areas. CDFW reports water for 60 locations; and of those, 48 receive water from wells. Very few wells are metered and therefore the water use must be estimated.

Most of the water use reported is considered indoor use; the department has few traditional landscaped areas. The department's owned locations try to incorporate and leave untouched as much of the natural terrain that exists as possible. Due to the facility types at most department

locations and the restrictions placed on them for wildlife and recreational value, there are few landscaped areas at owned sites. Most of the landscaped area on owned locations are small yards in front of residences located on the property to house the caretaker or warden and their family.

Some wildlife areas recycle their water through the areas, but they are not metered and the amount of recycled water cannot be determine at this time. Most of the hatcheries recirculate the water, use it for wildlife then put it back into the ground, rivers, etc. There is very little to no water consumed at many of these sites, as it is put back into the earth when finished.

Table 1: Total Purchased Water

Purchased Water	Quantity	Cost (\$/yr)
Potable	40,486,700	\$ n/a
Recycled Water	0	\$ n/a
	40,486,700 Gallons	\$ n/a

Table 2: Properties with Largest Water Use Per Capita

Building Name	Area (ft ²)	Total Gallons	Total Irrigation in Gallons (if known)	Gallons per Capita
Crystal Lake FH	27,486	4,582,300	n/a	966
Butte Valley Wildlife Area	26,798	400,400	n/a	548
Mojave Fish Hatchery	21,508	3,334,900	n/a	481
Fish Springs FH	17,189	2,332,700	n/a	426
Total for Buildings in This Table	101,016 ft ²	13,819,700		
Total for All Department Buildings	1,192,312 ft ²	40,486,700		---
% of Totals	10 %	34 %		---

For CDFW, per capita is not as useful of a metric because employee numbers are often disproportionate to water use at sites because the water used for wildlife is not always separately measured. Also, most use is estimated and not metered. Furthermore, it is not useful to measure and compare locational water consumption between locations as locations have very different functions and are in unlike geographic regions. So, an additional table (2a) that was more useful to determine high water users in this department was included. The table assesses water use over time across each location and displays the locations with the largest increase. CDFW will then investigate the increase as well as make comparisons to like type locations (fish hatcheries, wildlife areas, ecological reserves, other) and across like geographic locations (inland desert, coastal, central valley, etc.)

Table 2a: Properties with highest percent increase since 2013

Building Name	Address	City	% Change since 2013
R2 - NORTH CENTRAL HQs - with American River Fish Hatchery	2102 Nimbus Road	Rancho Cordova	29%
Marine Wildlife Vet & Care Research Center	1451 Shaffer Road	Santa Cruz	22%
Bolsa Chica Ecological Reserve	17783 Graham	Huntington Beach	4%
Crystal Lake Fish Hatchery	Baum Lake Road	Cassel	3%

It should be noted that while the fish hatcheries are the largest users of water per Energy Star Portfolio Managers, it is because the measurement is taken only when water is pumped from the wells/purchased from suppliers. The amount of water put back into the system is not measured, and therefore does not reflect the true consumptive water use at the hatchery locations.

Table 2b is not applicable, as the department does not have large landscaped areas.

Table 2b: Properties with Largest Landscape Area

Building Name	Area (ft²)
N/A	Xx
	Xx
	Xx
	Xx
	Xx
Total for Buildings in This Table	A ft²
Total for All Department Buildings	X ft²
% of Totals	A/X %

One of CDFW's challenges towards meeting the water goals include outdated equipment and accurate reporting capabilities. The majority of CDFW's equipment that is used to maintain and manage lands is old and lacks the ability to accurately measure water use. CDFW does replace equipment as funding becomes available. For example, the majority of the water used comes from wells, few of which are metered. Another challenge is the type of facilities CDFW manages. Fish hatcheries and wildlife habitat restoration water use is exempt from the executive order, however the water use cannot always be separated from facility water use.

Table 3: Department Wide Water Use Trends

Year	Total Occupancy /year	Total Amount Used (Gallons/year)	Per capita Gallons per person per day
Baseline Year 2010	1,647	52,485,800	87
Baseline Year 2013	1,647	46,209,600	77
2016	1,647	40,486,700	67
2020 Goal			

For CDFW owned facilities, the department has met the 20 percent reduction goal from the 2010 baseline by reducing its water use by 22 percent for the 2016 year. Gallons per person per day has also been reduced by 20 gallons per person per day. CDFW is very close to meeting the 25 percent reduction goal of EO B 29-15; however some sites saw increases in water use since 2013 as they had to add extra tanks and water systems for the purposes of rescuing fish stranded by drought conditions. While this water use is considered exempt, it cannot always be separated from total water use at some locations and therefore was included.

Table 4: Total Water Reductions Achieved

Total Water Use Compared to A: 2010 Baseline	Goal Met	Reduction Achieved	Total Amount Used (gallons per year)	Annual Gallons Per capita
2010 baseline: 20% Reduction Achieved	Yes	22%	52,485,800	87
2013 baseline: 25% Reduction Achieved	No	12%	46,209,600	67

Most projects completed at CDFW are maintenance repairs/replacements on an as-needed basis. When CDFW is able to complete these repairs the department does make sure to replace water fixtures with more efficient models to the extent possible. In 2015, CDFW inventoried its facilities for indoor water fixtures and received funding through the Department of General Services (DGS) Drought Grant to replace all fixtures with more efficient ones. CDFW is currently using these funds to replace over 1,900 water fixtures throughout its facilities. CDFW expects an annual water savings of 3 million gallons after all fixtures are replaced.

Currently under construction is a new fish hatchery located near Fresno that will be used for aquaculture. The new hatchery will use new circular fish tanks instead of traditional rectangular ones. Circular tanks are highly water and energy efficient, as they recirculate water more efficiently allowing the chillers to run at lower temperatures, thus saving water and energy.

Even though the department has met the 2010 goal, staff will continue to look for water savings and remain diligent about detecting water leaks and waste. Furthermore, the portfolio is being looked at as a whole to try to detect where possible opportunities lie for increased savings.

Finally, as new technology becomes available CDFW will take advantage of as much possible as funding will permit.

Starting September 2015 and ending in 2017 for all indoor water fixture replacements, CDFW has replaced 626 toilets, 59 urinals, 965 faucet aerators, and 419 showerheads for a total of an estimated water savings of 3 million gallons after all fixtures are replaced, annually.

Table 5: Summary of Indoor Water Efficiency Projects Completed or In Progress

Year Started	Water Saved (Gallons/yr)	Cost Savings per Year
2015	Work Began	-
2016	-	-
2017	3 million	N/A

CDFW's owned locations do not have boilers and there is no data available at this time on chillers.

Water Shortage Contingency Plans and Critical Groundwater Basins

Urban water suppliers are required to maintain Water Shortage Contingency Plans that are customized to local conditions. These plans include a staged response to water shortages and droughts lasting up to three years. When implementing the stages of the Water Shortage Contingency Plan, the water supplier will require increasingly stringent reductions in water use.

State agencies are to be aware of their water suppliers' Water Shortage Contingency Plan and the potential impact each stage may have on their water use. State agencies are to have their own contingency plans in place for their building and landscaping water use in order to respond to any stage implemented by the water supplier.

The Sustainable Groundwater Management Act (SGMA) established a new structure for managing California's groundwater resources at a local level by local agencies. SGMA requires, by June 30, 2017, the formation of locally-controlled groundwater sustainability agencies (GSAs) in the State's high- and medium-priority groundwater basins and sub basins (basins). A GSA is responsible for developing and implementing a groundwater sustainability plan (GSP) to meet the sustainability goal of the basin to ensure that it is operated within its sustainable yield, without causing undesirable results. For those facilities located in critical groundwater basins, state agencies are to work with the local GSA plan.

CDFW will ensure that its locations meet the water shortage contingency plans of its suppliers. Since a majority of department facilities use well water, CDFW will provides resources to facilities to ensure the guidelines in management memo 14-02 are met.

There are six facilities located in areas of critical groundwater basins. The department is looking into potential water saving opportunities where possible.

Table 6: Buildings receiving Water from Utility Providers that have Water Shortage Contingency Plans

Buildings with utility providers that have urban water shortage contingency plans	Address	City	Water provider	Stage of Water Shortage Contingency Plan
R2 - North Central HQs - with American River Fish Hatchery	2102 Nimbus Road	Rancho Cordova	Golden State Water	<u>1</u>
Feather River Fish Hatchery	5 Table Mountain Blvd	Oroville	Elk Grove Water Works	<u>0</u>
R1 - Northern HQ's	601 Locust St	Redding	California Water Service	<u>1</u>
Red Bluff Screen Shop	1760 Bidwell St	Red Bluff	City of Redding	<u>1</u>

CDFW will be reaching out to these locations (see table 6 & 6a) and identifying water supplier's plans to ensure that either the location is aware of the plan, or if no plan exists, then will work with location managers to ensure they have a plan. CDFW is also looking at the water use at these locations and will work with the managers to have full water audits done through the water supplier, where applicable, to ensure that these sensitive areas are conserving as much as possible.

Table 6a: Facilities in Critical Groundwater Basins

Facility Name	Address	City	Ground Water Basin
Elk Horn Slough ER	1454 Elkhorn Rd	Watsonville	Salinas Valley - 180/400 Foot Aquifer
Los Banos WA	18110-3 Henry Miller Rd	Los Banos	San Joaquin Valley - Delta-Mendota
Mendota WA	NE4 SW28 14 15	Mendota	San Joaquin Valley - Delta-Mendota
North Grasslands WA	Lander Ave	Gustine	San Joaquin Valley - Delta-Mendota
San Joaquin FH	17372 Brook Trout Drive	Friant	San Joaquin Valley - Kings
San Joaquin River ER	2020 E Birkhead Ave	Fresno	San Joaquin Valley - Kings
Total amount of water used by facilities in critical groundwater basins (Gallons)			4,529,500

Buildings and Inventories Summaries

Indoor Hardware Inventories

CDFW has replaced 626 toilets, 59 urinals, 965 faucet aerators, and 419 showerheads. This was made possible by the 2015 water conservation grant awarded by DGS. CDFW approached this project by first identifying what types and how many water fixtures were at each state owned facility. CDFW then identified the flow rate and efficiency of each water fixture. Any water fixture not efficient to California Energy Commission standards was replaced. Total project cost was \$456,596.00. The project timeframe spanned about two years (starting September 2015 and ending 2017) for all water fixture replacements.

By the end of 2017, CDFW will have replaced all fixtures in need of replacement through the use of the 2015 DGS grant and CDFW deferred maintenance funds. Another area to be considered is the various equipment used onsite for wildlife purposes which is much more complex and will need to be looked at more in detail to develop a cost effective and feasible strategy to upgrade or replace for energy efficiency.

Heating and Cooling Systems Inventories Summary

CDFW's owned locations do not have boilers and there is no data available at this time on chillers. CDFW is pursuing HVAC optimization/maintenance programs with the utilities to ensure the equipment is as efficient as possible. Once these programs are able to be started there will be more data on the equipment available, as well as opportunities to address replacements using utility rebate programs.

Irrigation Hardware Inventories Summary

Landscaping typically uses 50 percent or more of an agency's total water use. While landscaping serves critical functions, the accompanying irrigation hardware, if not properly installed and maintained, can contribute to water waste. By reviewing and inventorying all irrigation hardware, it is possible to achieve significant water savings.

CDFW's landscaped areas are very small. For the few places that have landscapes and have systems installed, a best practices list will be sent that will need to be reviewed no less than quarterly. Due to the small size of CDFW's landscaped areas, no inventory was conducted/needed.

Living Landscape Inventory and Large landscape water use

Far from being just an aesthetic or ornamental feature, landscaping plays a critical role around public buildings and facilities. From providing safety and security, to reducing local heat islands, suppressing dust, reducing water runoff, maintaining soil health, aiding in water filtration and nutrient recycling, landscaping around public buildings is essential. Further, landscaping in public places frequently surrounds historic places and public memorials as well as provides pleasant public gathering spaces. The health and proper maintenance of these landscapes is vital to the physical wellbeing of California's people as well as to its social, cultural, political and historical life.

Additionally, the many vital ecosystem functions carried out by living public landscaping are critical in helping California meet its goals for greenhouse gas reduction, climate adaptation, and water and energy efficiency and water conservation.

Urban forests are vital to improve site conditions for occupants and visitors to buildings and the surrounding community.

Large landscape water use often represents a significant percentage of a facility’s water use and significant water savings can often be achieved through better irrigation scheduling or inexpensive improvements in irrigation hardware. As part of the Water Use Guidelines and Criteria, the water use for landscape areas over 20,000 sq. ft. shall be tracked through a water budget program.

Due to the nature of the types of owned locations, CDFW, has often kept the areas around the buildings as close to their natural state as possible, or they have been restored to their natural state for ecological purposes. At these locations, the emphasis is on natural/native, rather than creating a landscape for aesthetic purposes. As a result there is little to no turf or other non-native plants installed. Instead the department works with what is already there, or supposed to be there. For the few areas in a more urban setting, trees were kept to the extent possible. For new construction, CDFW will ensure that DGS follows these protocols to ensure the landscape remains natural and living. CDFW has little authority over the landscaping at leased facilities, however when searching for a new location, the facilities management unit will ensure that a living landscape is one of the factors considered.

Table 7: Summary of Living Landscape Inventory

Landscape >500Sq. ft.)	Turf (Sq. ft.)	Number of historical sites Or memorials	MWELo landscape area (Sq.ft.)	Climate appropriate landscape area (Sq.ft.)
None	None	None	None	Majority

CDFW does not have any large landscapes (over 20,000 sq. ft.) that would qualify at owned facilities. Leased facility landscapes are managed by the property manager, and CDFW has no authority over those.

BMPs

Indoor, Landscapes and Living Landscape Areas

Building Best Management Practices (BMPs) are ongoing actions that establish and maintain building water use efficiency. State agencies are required by DGS Management Memo 14-02 to implement the building BMPs outlined below.

CDFW will put together a best practices guide to send to all locations. This guide will be sent annually and reviewed no less than quarterly by the facility manager for compliance. Many department locations have small residences to house caretakers of the properties and wardens.

It is essential that these buildings and employees have a list of the BMPs. While it is impractical to monitor whether everyone adheres to every one of these BMPs, monitoring of monthly water use will be conducted to identify locations where water use is increasing and potential problems may exist. This method is the best way the department can track whether locations are adhering to the BMPs, or not.

Building Heating and Cooling Systems BMPs

CDFW does not have any properties with boilers and many without chillers. For the properties that do have chillers, CDFW is investigating the use of utility HVAC optimization programs, to ensure that the equipment is properly maintained and operating as efficiently as possible. Nonetheless, a BMP guide will be distributed to all locations and a quarterly compliance review will be required by the responsible facility manager.

Most of the landscaped area is very small and exists at residence properties that house the property caretakers and wardens. These properties do not require large systems. For the residences that do have sprinkler systems installed, they will be given a BMP guide and asked to identify any leaks present and notify their facility/area manager immediately.

Monitoring, Reporting and Compliance

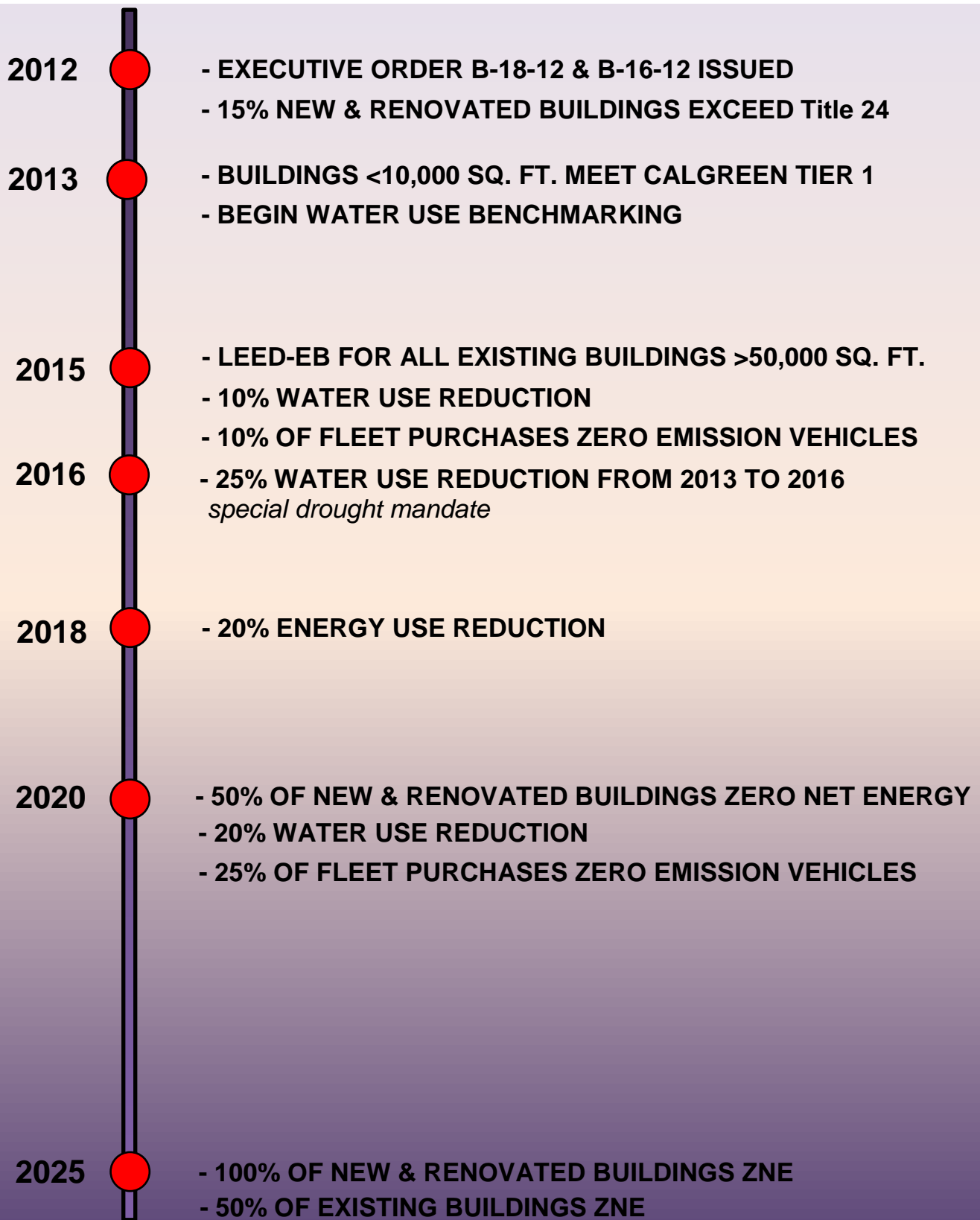
Each state agency is responsible for monitoring water use and reporting baseline and annual water use for compliance with the water use reduction targets. Water use shall be measured at facilities that have meters and submeters.

CDFW reports on 58 state owned facilities that have water usage for structures. The rest of the properties either have no structures and/or water is used for wildlife purposes. Of the 58, 48 receive their water from wells. Well water numbers are estimated based on the previous month's usage. CDFW is currently auditing its data in ESPM to ensure accuracy and that the guidelines put forth are met. CDFW needs water meters installed to accurately track water usage for the facilities with well water. The cost for each water meter and installation is around \$5,000 with approximately 200 needed for a total of \$1 million. CDFW is investigating the feasibility of adding new meters.

CDFW tries to enter data into ESPM on a monthly (or as frequently as billing cycle) basis. By March first of each year, CDFW ensure the previous year's water data has been entered into ESPM. This data is then reflected on the State's Green Buildings website, which displays CDFW's progress toward the water goals.

Currently, because of the change to Fi\$Cal, the legacy system that captures data is no longer available and Fi\$Cal is unable to capture usage information as required in ESPM detail. CDFW is currently creating a new means of obtaining usage information and entering it into ESPM, however this has caused some delays. CDFW has committed to ensuring that data is accurately reflected by March 2018.

SUSTAINABILITY MILESTONES & TIMELINE



RESPONSIBLE DEPARTMENT, PROGRAMS AND EMPLOYEES

Indoor Water Efficiency Projects In Progress First initiative	
Individual / Manager	Title
Rob Benson	Senior Civil Engineer
Sandra Morey	Deputy Director

Boilers and Cooling Systems Projects In Progress	
Individual / Manager	Title
Diane Brown-Tapia	Sustainability Manager
Gabe Tiffany	Deputy Director

Landscaping Hardware Water Efficiency Projects In Progress	
Individual / Manager	Title
Diane Brown-Tapia	Sustainability Manager
Gabe Tiffany	Deputy Director

Living Landscaping Water Efficiency Projects In Progress	
Individual / Manager	Title
Diane Brown-Tapia	Sustainability Manager
Gabe Tiffany	Deputy Director

Buildings with Urban Water Shortage Contingency Plans In Progress	
Individual / Manager	Title
Diane Brown-Tapia	Sustainability Manager
Gabe Tiffany	Deputy Director