

# **Sustainability Roadmap 2020-2021**

## **California Department of Fish and Wildlife**

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

California Natural Resources Agency

Gavin Newsom, Governor



**December 2021**

# **Sustainability Road Map 2021-2022**

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## **California Department of Fish and Wildlife (CDFW)**

Diane Brown-Tapia  
Cathy Roberts  
**Primary Author(s)**

James Robbins  
**Deputy Director, Administration Division**

Charlton H. Bonham  
**Executive Director**

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## **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 71 facilities, leases 49 and the rest of the properties are open wildlife areas with no structures or personnel attached.

CDFW has three main types of locations, fish hatcheries, ecological reserves and wildlife areas. Many of the reserves and wildlife areas have large pumps for wildlife that consume large amounts of energy, and the fish hatcheries often operate 24-hours and use large chillers that are necessary for fish health and safety.

CDFW has been working for several years now with the California Natural Resources Agency (CNRA) and various other partners to address climate change impacts on California wildlife and is a main contributor to the Safeguarding California Climate Adaptation Strategy. CDFW is working to incorporate climate science and climate adaptation strategies into its own programs and resource management activities. The department is also addressing climate risks to facilities by adapting its operational practices in ways that will reduce its overall carbon footprint and help to mitigate the sources of climate change.

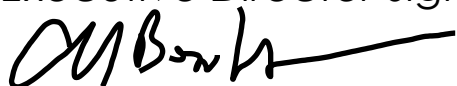
The department has building locations throughout the state and therefore will face many of the challenges related to climate change including rising temperature, increased precipitation and sea level rise. Given the variety of challenges, the department will need to be prepared to adapt its building management practices accordingly. Where feasible for leased spaces relocation may be an option, however

CDFW is somewhat limited with relocation as staff need to be where wildlife lives and thrives.

In addition to adaptation practices, CDFW has taken many steps to reducing its Carbon footprint. Roughly half of the department's owned buildings have updated to LED lighting and CDFW always looks for ways to improve efficiency in operations of its hatcheries and land operations. CDFW is currently in process of auditing sites for use of variable frequency drives on many of the department's pumps which save both energy and water. The department is also in the final stages of contracting for five solar projects to be completed over the next two years and is expected to reduce the department's energy use by 17 percent.

Over the past two years CDFW has continued its efforts to take action to save energy and water, increase use of renewable energy, and reduce GHG emissions. During the past two years, like many other Departments, CDFW has experienced challenges in advancing its efforts due to the global pandemic. During this period some operations have stopped or been significantly reduced, and many staff still remain on Emergency Telework. Due to the pandemic related changes in the use of our facilities, including very limited use by staff, much of the data reported for 2020 (most recent full year of data) are not representative of historic reporting periods. Areas most significantly impacted include water and energy use since during this period office occupancy has been significantly reduced. This has presented challenges in evaluating this data effectively. Please consider these impacts when reviewing the reported data and information.

*Executive Director Signature*

A handwritten signature in black ink, appearing to read "CH Bonham", with a long horizontal stroke extending to the right.

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**Charlton H Bonham**  
Executive Director



# **CHAPTER 1 - CLIMATE CHANGE ADAPTATION**

Executive Order B-30-15 directs State Agencies to integrate climate change into all planning and investment. Planning and investment can include the following:

- Infrastructure and capital outlay projects
- Grants,
- Development of strategic and functional plans,
- Permitting,
- Purchasing and procurement,
- Guidance development,
- Regulatory activity,
- Outreach, and education.

This template will focus on the first three of these activities, and follows the guidance created by the Technical Advisory Group developed under EO B-30-15 to assist State Agencies to complete this task. If appropriate, please consider the last five activities in your Roadmap.

Further, Executive Order N-19-19 directs the reduction of GHG emissions in state operations.

Facility climate risk data should be included in Facility Data Sheets as indicated. The climate projections informing an evaluation of climate risk are detailed below.

## **Climate Change Risks to Facilities**

For all infrastructure, it is important to assess the risk that a changing climate poses to an asset or project (e.g., sea level rise or increasing daily temperatures). It is also important to recognize the impact that an infrastructure project has on the surrounding community and the impacts on individual and community resilience (e.g., heat island impacts).

To determine how to consider climate change for a given project or plan or existing infrastructure, CDFW will consider the following screening questions when undertaking construction of a new facility or the start of a new project, where applicable.

1. What is the useful life of the facility, planned project or plan?
2. Could it be affected by changing average climate conditions or increases in extreme events over its lifetime?
3. What is the consequence of that disruption?

4. Will that disruption affect vulnerable human or wildlife populations, critical natural systems, critical infrastructure, or other assets?
5. Will that disruption cause irreversible effects or pose an unacceptable risk to public health and safety?

As previously stated, the mission of the department is to protect California's wildlife and other natural resources, and climate change has a huge impact on natural lands. When considering how the department's assets will be affected by a changing climate, CDFW must not only consider its developed infrastructure but also, the wildlife and open lands that the department manages as well.

CDFW working with California Natural Resources Agency (CNRA) has been addressing adaptation and climate change impacts on California wildlife for many years now and is a main contributor to the Safeguarding California Climate Adaptation Strategy. The department has a unit dedicated to climate change and incorporating climate science and adaptation strategies into all areas of wildlife and habitat planning and management. CDFW has made great strides with incorporating climate change planning into Land Management Plans (LMPs) and to assist with this effort, the department created 19 ecoregional reports that summarize climate change projections, vulnerabilities of species and vegetation communities, and adaptation opportunities for each ecoregion. These summaries are an example of how the department is developing resources that inform long-term planning and management to create a more resilient landscape. The Lands Program at the department has also updated its guidance for developing LMPs by adding a new section on how to incorporate climate change-related strategies.

CDFW is now also beginning to incorporate climate change adaptation planning into its existing facilities located on these lands. Using the information outlined in this roadmap, CDFW can better plan where to locate long-term leased facilities as well as new construction when the need arises. The questions above have been used to evaluate existing facilities and are a checklist going forward for new buildings. Once this data is analyzed, they will be shared with area managers as with the ecoregional reports, so that the area managers can make more informed decisions about their sites.

Further, CDFW has a Climate Adaptation Science Team. The team's purpose to evaluate staff and department needs on climate adaptation and to encourage climate considerations in the work that is being conducted by the department.

Since CDFW has other ways of addressing climate change within wildlife and habitat management, majority of this document will focus on the facilities located at these sites. For more information on what CDFW is doing to manage wildlife in these changing

conditions, please either see the [Safeguarding California document](#) or visit the [CDFW Climate Change Program's website](#).

## Understanding Climate Risk to Existing Facilities

Cal-Adapt is the most updated source of climate change data/projections for the State of California.

Background on Climate Projections: Global Circulation Models (GCMs) are used to project future climate conditions. Models project future climate conditions under different future emission scenarios that are called Representative Concentration Pathways (RCPs). Different RCPs essentially represent different rates and magnitudes of global greenhouse gas (GHG) emission reduction.

Of the 32 internationally recognized coarse-resolution GCMs, the State of California has chosen four models to utilize in its climate studies for the Fourth Assessment.<sup>1</sup> The following four models were selected to capture a range of different climate futures:

- Model 1: HadGEM2-ES characterizes a warm and dry future (warm/dry)
- Model 2: CNRM-CM5 characterizes a cool and dry future (cool/wet)
- Model 3: CanESM2 characterizes an average future condition (average)
- Model 4: MIROC5 provides a complement to the above models, and covers a range of outputs

How to apply to climate risk evaluation: When using Cal-Adapt, data should be collected using these four global circulation models (GCMs) and for a high emissions pathway. This pathway is represented by Representative Concentration Pathway (RCP) 8.5. These model results have been downscaled to provide projections of climate impacts on a finer scale across California.

Other climate data are available from some local research groups. They may be used as long as their use follows the spirit of the work described in the Planning & Investing for

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<sup>1</sup> Pierce, D.W., D.R. Cayan, L. Dehann. June 2016. Creating Climate projections to support the 4th California Climate Assessment.

a Resilient California guidance document. If alternative data selection methods are employed, please explain them and provide citations for where data was acquired.

Risk from Changing Extreme Temperatures:

Under a changing climate, temperatures are expected to increase – both at the high and low end. As a result, facilities will experience higher maximum temperatures and increased minimum temperatures. Please note, that for all tables and graphs in this report, WA stands for wildlife area, ER stands for ecological reserve and FH stands for fish hatchery. The following tables list CDFW facilities most affected by changing temperatures.

**Table 1.1: Top 5-10 Facilities that Will Experience the Largest Increase in Extreme Heat Events**

<b>Facility Name</b>	<b>Extreme heat threshold (EHT) °F</b>	<b>Average # of days above EHT (1961-1990)</b>	<b>Average # of days above EHT (2031-2060)</b>	<b>Avg. # days above EHT (2070-2099)</b>	<b>Increase in # of days above EHT by mid-century (2031-2060)</b>	<b>Increase in Avg. # days above EHT by end of century (2070-2099)</b>
IDR 6 – BALDWIN LAKE ER	85	4	27	27	43	39
IDR 6 – HOT CREEK FH	86	4	25	25	43	39
CR 4 – SAN JOAQUIN FH	107	4	25	25	41	39
CR 4 – CANEBRAKE ER	101	4	27	27	41	39
CR 4 – KERN RIVER FH	98	5	28	28	43	38

**Table 1.2 a: Top 5-10 Facilities Most Affected by Changing Temperature – Annual Mean Max. Temp**

<b>Facility Name</b>	<b>Historical Annual Mean Max. Temp. (1961 – 1990)</b>	<b>Annual Mean Max. Temp. (2031 – 2060)</b>	<b>Change from Historical to Annual Mean Max. Temp (2031-2060)</b>	<b>Annual Mean Max Temp. (2070-2099)</b>	<b>Change from Historical to Annual Mean Max. Temp (2070-2099)</b>
IDR 6 - IMPERIAL WA	89	94	63	98	98
SCR 5 - Upper Newport Bay ER	69	72	58	76	76
NR 1 - Northern HQ	76	80	55	84	84
NR 1 – Battle Creek WA	76	80	55	84	84
NR 1 – Red Bluff Screen Shop	76	80	55	84	84

**Table 1.2 b: Top 5-10 Facilities Most Affected by Changing Temperature- Annual Mean Min Temp**

<b>Facility Name</b>	<b>Historical Annual Mean Min. Temp. (1961 – 1990)</b>	<b>Annual Mean Min. Temp. (2031 – 2060) °F</b>	<b>Change from Annual Mean Min. Temp (2031-2060)</b>	<b>Annual Mean Min. Temp. (2070-2099) °F</b>	<b>Change from Annual Mean Min. Temp (2070-2099)</b>
NR 1 - BUTTE VALLEY WA	9%	18%	Unavailable	22%	41%
IDR 6 - SLINKARD/LITTLE ANTELOPE WA	10%	18%	Unavailable	21%	39%
CR 4 - HUNTINGTON LAKE PATROL CABIN	11%	19%	Unavailable	22%	38%
NCR 2 - HALLELUJAH JUNCTION WA	10%	17%	Unavailable	20%	35%
IDR 6 - HOT CREEK FH	9%	17%	Unavailable	18%	32%

When considering rising temperatures, CDFW considered both leased and owned facilities. Table 1.1 lists the five facilities with the largest increase in extreme heat events. All sites jump from a few days to over 30 days by mid-century. Table 1.2a lists the department's top five facilities that will have the highest annual mean maximum temperature in the timeframe of 2031 – 2060. While this is important, it was decided to also look at the top five ranked by highest average minimum percentage change (Table 1.2b). This data is significant because these areas are going to experience higher degree in change of warm temperature so a focus on adaptation at these facilities is needed. Some sites containing only water pumps, but no structures are also impacted (not listed). This report focuses on locations that contain structures and staff.

Most of the locations manage wildlife and hotter days means more water needed to provide for the wildlife and wetlands, as more water is pumped, more energy is used. Higher heat also causes problems for wildlife needing cooler habitats, shade, etc., and thus the department may need to build new structures or employ additional machines

or technology to assist. Staff located in these remote areas will need to find ways to stay cool and more use of air conditioning units will be needed. This may mean purchasing new units or larger units depending on the site. Further, there could be impacts on human health for staff working outdoors on extreme heat days which could result in illness or lost productivity.

In addition, there are three fish hatcheries on the list. These are 24-hour facilities that exist to grow and protect life. Higher heat days puts more strain on the grid which can produce black or brown outs thus causing power loss at these facilities. Back up energy generation will be necessary and with the possibility of being used more frequently. This causes more strain on the machines and higher costs. Likewise, at the hatcheries new machines may be required to pump extra water and or chill the water. Fish need certain temperatures to stay healthy and added heat days and minimums would require increased use of chillers and pumps. This causes increases in energy and the possibility of purchasing equipment that was not necessary in the past.

CDFW is aware of these possibilities and is taking actions to help mitigate the effects of extreme climate change conditions. One of these actions is the department is assessing all sites for the possibility of implementing microgrids using onsite renewable energy generation, battery storage, and generators. Microgrids will allow for the sites to be independent from the grid, when needed and will greatly reduce the use of fossil fuel in generators. Onsite renewable energy generation (most likely solar photovoltaic panels) reduces the energy load and costs, as well in some areas provides shade to the sites and fish needing shelter for the extreme temperatures. Another action that the department is taking is to conduct energy audits and where feasible, energy efficiency upgrades at all sites. The department will also routinely audit and upgrade into the long-term future as necessary to address extra energy required. Also, routine maintenance and replacement of old less efficient units will assist as well. Finally, adaptation measures can be incorporated into planning of facilities and landscapes at the facilities to address these issues into the future. For example, planting more trees where consistent with land management objectives and not paving or paving with impervious lots will also assist with decreasing some of these effects at the site. Ensuring that the buildings are efficient, insulated and have proper shading will assist as well.

For those sites that are leased, and where practicable to move staff, the department will relocate offices to other areas. Unfortunately, when it comes to most sites within the department, relocating is not an option as the staff need to be on those habitat areas where wildlife lives and thrives.

### **Heating and Cooling Degree Days**

A Heating Degree Day (HDD) is defined as the number of degrees by which a daily average temperature is below a reference temperature (i.e., a proxy for when heat

would be needed). The reference temperature is typically 65 degrees Fahrenheit, although different utilities and planning entities sometimes use different reference temperatures. The reference temperature loosely represents an average daily temperature *above which* space heating is not needed. The average temperature is represented by the average of the maximum and minimum daily temperature. Similarly, a Cooling Degree Day (CDD) is defined as the number of degrees by which a daily average temperature exceeds a reference temperature. The reference temperature is also typically 65 degrees Fahrenheit, and different utilities and planning entities sometimes use different reference temperatures. The reference temperature loosely represents an average daily temperature *below which* space cooling (e.g., air conditioning) is not needed.

To start to understand how CDD and HDD could affect facilities' operations and costs, complete the following table for all facilities, using data from CalAdapt. In identifying facilities most at risk, considerations should include location and criticality of facility, operations and criticality of its operations, impacts of current temperature events, sensitivity of operations to temperature changes, the impact of disruption, and sensitivity/vulnerability of the population or area served by a facility. Table 1.3 lists the top facilities that will be most impacted by HDD/CDD for CDFW.

**Table 1.3: Top 5-10 Facilities that will be Most Impacted by Projected Changes in Heating and Cooling Degree Days (HDD/CDD)**

Facility Name	Heating/Cooling Degree Days (1961-1990) (HDD/CDD)	Heating/Cooling Degree Days (2031-2060) (HDD/CDD)	Heating/Cooling Degree Days (2070-2099) (HDD/CDD)
IDR 6 – IMPERIAL WA	938/3958	430/5368	203/6558
SCR 5 – UPPER NEWPORT BAY ER	1727/407	908/963	452/1759
SCR 5 – RANCHO JAMUL ER	1770/1161	981/1981	534/2794
IDR 6 – SAN JACINTO WA	1903/1659	1062/2787	664/3707
SCR 5 - CANADA DE SAN VICENTE ER	2206/957	1290/1820	772/2608



## Urban Heat Islands

Urban heat islands are areas with localized spikes in temperature, which impact human health, increase pollution, and increase energy demand. Urban heat islands occur during the hot summer months in areas with higher percentages of impervious surface and less vegetation. This is likely in areas with large parking lots, dense development, and lower tree density and shading. Urban heat islands can be mitigated (i.e., reduced) through tree planting and other greening measures, cool roofs (e.g., lighter roofing materials that reflect light), cooler pavements, and other measures.

**Table 1.4: Facilities Located in Urban Heat Islands**

Facility Name	Located in an urban heat island (yes/no)
IDR 6 - SAN JACINTO WA	Yes
SCR 5 - RANCHO JAMUL ER	Yes
BDR 3 - BAY DELTA HQ'S	Yes
NCR 2 - NORTH CENTRAL HQs - with American River Fish Hatchery	Yes
BDR 3 - NAPA-SONOMA MARSHES WA	Yes
CR 4 - ELKHORN SLOUGH ER	Yes
BDR 3 - PETALUMA MARSH WA	Yes

Twenty four percent of CDFW-owned facilities are in urban heat islands. Of these locations, about half are wildlife areas and ecological reserves. These locations are generally wide-open undeveloped spaces with a small building footprint, and therefore, contribute very little to the urban heat island. For these leased buildings there is little the department has control over, but when the lease agreements are up for renewal, CDFW can request the landlords modify buildings to increase energy efficiency. It is also possible to request some of these improvements in new lease agreements. Of the owned office buildings, CDFW will look for opportunities to incorporate impervious surfaces, cool roofs, etc. CDFW's owned facilities are very small and have much less of a contribution to the urban heat islands. Nonetheless, the department wants to do its part and will do whatever possible to incorporate these strategies.

## Risks from Changes in Precipitation

The impacts of climate change on the amount of precipitation that California will receive in the future are slightly less certain than the impacts on temperature. However, it is expected that California will maintain its Mediterranean climate pattern (dry summers and wet winters), but more precipitation will fall as rain than as snow. It is also likely that extremes will intensify, both drought and heavy precipitation events. Larger rains can result in flooding but will also result in shifts in runoff timing (earlier) and runoff volumes (higher). It will also result in decreased snowpack.

**Table 1.5: Top 5-10 Facilities that will be Most Impacted by Projected Changes in Precipitation**

Facility Name	Annual Mean Max. Precip. (1961 – 1990) (in/yr)	Annual Mean Precip. (2031 – 2060) (in/yr)	Percent Change by mid-century	Annual Mean Precip. (2070 – 2099) (in/yr)	Percent change by end of century	Extreme Precip (1961-1990) (in/day)	Extreme Precip (2031-2060) (in/day)	Extreme Precip (2070-2090) (in/day)
IDR 6 - MT. WHITNEY FACILITY	5.46	6.65	22%	7.83	43%	14	16	18
IDR 6 - BLACK ROCK SPRINGS FH	4.6	5.65	23%	6.47	41%	18	21	23
IDR 6 - SLINKARD/LITTLE ANTELOPE WA	19.54	23.84	22%	26.82	37%	10	11	14
BDR 3 - KNOXVILLE WA	24.86	30.92	24%	33.65	35%	13	17	19
NR 1 - DEER CREEK FA	17.53	22.1	26%	23.71	35%	14	18	21

Table 1.5 lists the department's facilities that will be most impacted by projected changes in precipitation, because they are projected to experience the highest increase in percent change of precipitation. These facilities include wildlife areas, fish hatcheries, and fishing access locations. CDFW has other sites without structures that will also be affected by precipitation changes (not listed above): including Eden Landing Ecological Reserve, South Spit Wildlife Area, Fay Slough Wildlife Area, and Knoxville

Wildlife Area. Though these locations may not contain structures or house staff, they are still monitored and managed by the department.

Changing hydrologic regimes (e.g., the change listed above – less snowpack, shifts in timing and magnitude of peak flows) may also negatively impact the quality of aquatic habitat and water throughout the state, with consequences/ impacts for our hatchery operations and recreational fishing opportunities.

Facilities in remote places or have assets contained outside would be most impacted by the changing precipitation patterns. When a facility is in a remote area, the trail may become too dangerous to travel or working out in the field may pose too dangerous for scientists. In general wildlife areas with more precipitation is not a bad thing, it means less pumping and often is good for the wildlife. However, if precipitation increases too much and snowpack melts too fast there flooding occurs. Flooding can destroy or damage structures and equipment as well as cause inaccessibility to areas.

Further, flooding in areas near the ocean and bays creates the potential for increase saltwater contamination to fresh water supplies. In many areas, humans and wildlife depend on this fresh water for drinking. If drinking water is contaminated other sources will need to be brought in or piped in, which causes increased GHG emissions from transport, increased infrastructure needs and increased costs. If wildlife does have access to proper water, they could die or leave the area.

The Mount Whitney Hatchery is an example of how severe precipitation has seriously impacted a facility. In 2008, heavy rains broke down four buildings, killed all the rainbow trout and ruined the habitat ponds. To this day, restoration has not been resumed due to the location of this facility. Thankfully with tools provided by the CNRA and the information located in this roadmap, CDFW can make better informed decisions about where to locate their facilities.

There are many actions the department is taking to mitigate the effects of precipitation increases. One such action is creating rain capture systems. For example, one of the wildlife areas where salt contamination is a current threat, has created an extensive roof rain capture system that feeds into a large capture pond that is used for watering the facilities and water for the wildlife. The pond can hold two years' worth of water. Other locations are using or investigating rain capture systems as well. Another action the department can take is to locate facilities on higher ground to protect them from flooding, especially where expensive equipment is stored in lower areas. Consideration will be given to relocating leased sites. However due to specific habitat needs of wildlife, alternative sites may not be available.

## Risks from Sea Level Rise

Increasing global temperatures are contributing to rising sea levels. Rising sea levels will result in inundation of coastal areas and increased flooding due to storm surges. The California Ocean Protection Council (OPC) has issued the [State of California Sea-Level Rise Guidance \(Guidance\)](#) for State agencies on what level of sea level rise projections to consider in planning.

The Guidance provides estimates of sea level rise for the California Coast for all active tide gauges based on a range of emission trajectories, which are based on the report, *Rising Seas in California: An Update on Sea-Level Rise Science*. These data provide projections for use in low, medium-high, and extreme risk aversion decisions. Current guidance from the CA Coastal Commission suggests using the medium-high risk aversion or extreme risk when assessing the vulnerability of critical infrastructure.

**Table 1.6 : All Facilities at Risk from Rising Sea Levels**

Facility Name	Tide Chart Region	2050 Water Level (ft)	Exposed at 2050? (y/n)	2100 Water Level (ft)	Exposed at 2100? (y/n)
BDR 3 - PETALUMA MARSH WA	San Francisco Bay	1.80	2.24	3.02	3.53
BDR 3 - EDEN LANDING ER	San Francisco Bay	1.80	2.24	3.02	3.53
BDR 3 - NAPA-SONOMA MARSHES	San Francisco Bay	1.80	2.24	3.02	3.53

Similar to the flooding that occurs from increased precipitation, sea level rise has the potential to cause flooding that would require relocation of sites or other adaptation actions. Unfortunately, it is not possible to relocate all projects and locations that fall in these areas as this is where wildlife lives. However, measures can be taken to minimize the effects, such as locating buildings and other sensitive equipment on higher ground, and elevation of natural and manmade infrastructure to accommodate the projected rise. As mentioned before, climate change adaptation has been incorporated into wildlife planning for some time in this department, and an example of this is a project that required to repair an earthen wall for a wetland restoration. When it was rebuilt, the project took considerations of how the sea level would rise in that area and built the wall higher than was previously projected to accommodate the rise. CDFW is beginning

to incorporate this planning on the facilities side as has already been done with wildlife projects. Managed retreat (planned retreat of facilities away from the shore) and living shorelines are other strategies that may need to be employed at coastal properties.

**Risks from Wildfire**

Wildfire is a serious hazard in California. Several studies have indicated that the risk of wildfire will increase with climate change. Importantly, we are already seeing more extreme wildfire seasons that are longer and with more extreme wildfires. By 2100, if greenhouse gas emissions continue to rise, one study found that the frequency of extreme wildfires would increase, and the average area burned statewide would increase by 77 percent.

Wildfire hazard is also a critical present issue. Five of California's six largest fires all occurred in 2020<sup>2</sup>. 2017 and 2018 previously set records as the most destructive fire seasons in California's history<sup>3</sup>. To contextualize how wildfire hazards already impact California's facilities, consider that 1 in 5 California children were affected by wildfire-related school closures during the 2018-2019 school year<sup>4</sup>. To start to understand how wildfire could affect facilities, complete the following tables for all facilities. The first table is meant to give an indication of current risk, based on CALFIRE data for Fire Hazard Severity Zones. This is presented as low, medium, high, or very high. For future risk, the table uses data from CalAdapt to project acres burned in your facilities' area.

**Table 1.7: Top 5-10 Facilities Most at risk to current wildfire threats**

Facility Name	Fire Hazard Severity Zone (low, medium, high, very high)
BALDWIN LAKE ER	Very High
CINDER FLATS WA	Very High
COLDWATER CANYON ER	Very High
CURRY MOUNTAIN PA	Very High
KAWEAH ER	Very High
LIMESTONE SALAMANDER ER	Very High

2 [https://www.fire.ca.gov/media/4jandlhh/top20\\_acres.pdf](https://www.fire.ca.gov/media/4jandlhh/top20_acres.pdf)

3 <https://www.fire.ca.gov/incidents/2017/> ; <https://www.fire.ca.gov/incidents/2018/>

4 <https://calmatters.org/projects/california-school-closures-wildfire-middleton-paradise-disaster-days/>

WALKER CANYON ER	Very High
INDIAN VALLEY WA	Very High
LEWISTON FA	Very High
COON HOLLOW WA	Very High

**Table 1.8a: Top 5-10 Facilities that will be Most Impacted by Projected Changes in Wildfire**

Facility Name	Acres Burned (1961-1990)	Acres Burned (2031-2060)	Acres Burned (2070-2099)
SCR 5 – RANCHO JAMUL ER	31	45	56.7
NR 1 – LAKE EARL WILDLIFE AREA	28.9	41.2	43.6
NR 1 – CRYSTAL LAKE FH	33	40.8	59.8
NR 1 – TRINITY RIVER FISH HATCHERY	23.2	40.5	64.3
NR 1 – IRON GATE FISH HATCHERY	34.4	38.8	24.9

**Table 1.9b: Facilities Impacted by Public Safety Power Shutoff (PSPS)**

Facility Name	CITY	PG&E or SCE Territory?
NR 1 – BATTLE CREEK WA	ANDERSON	PG&E
NR 1 – MOUTH OF COTTONWOOD CREEK WA	COTTONWOOD	PG&E
NR 1 – DARRAH SPRINGS FH	PAYNES CREEK	PG&E
NR 1 – TEHAMA WA	PAYNES CREEK	PG&E
NR 1 – RED BLUFF SCREEN SHOP	RED BLUFF	PG&E
NR 1 – DEER CREEK FISH SCREENS	VINA	PG&E
NR 1 – MAD RIVER FH	ARCATA	PG&E
BDR 3 – NAPA FO (SILVERADO FISHERIES BASE)	NAPA	PG&E

CR 4 – CANEBRAKE ER	ONYX	SCE
CR 4 – KERN RIVER FH	KERNVILLE	SCE
IDR 6 – FILLMORE FH	FILLMORE	SCE
IDR 6 – HOT CREEK FH	MAMMOTH LAKES	SCE
IDR 6 – SAN JACINTO WA	LAKEVIEW	SCE

**Table 1.10c: CDFW Properties Burned by Wildfire in 2020**

<b>Region</b>	<b>Property Name</b>	<b>Acreage</b>
1	Bass Hill Wildlife Area	512.78
1	Doyle Wildlife Area	69.01
1	Silver Creek Wildlife Area	2,066.33
2	Antelope Valley Wildlife Area	91.36
2	Feather River Wildlife Area	12.69
2	Hallelujah Junction Wildlife Area	5,563.68
2	Spenceville Wildlife Area	10.10
3	Greyhound Rock Fishing Access	421.37
3	Putah Creek Wildlife Area	26,537.82
4	Curry Mountain Public Access	334.44
4	Kinsman Flat Wildlife Area	518.93

4	North Carrizo Ecological Reserve	911.43
5	Portal Ridge Conservation Easement	129.95
6	East Walker River Wildlife Area	5.68
6	San Jacinto Wildlife Area	274.42
6	Santa Rosa Wildlife Area	88.01
6	Slinkard / Little Antelope Wildlife Area	3,777.46

**Table 1.11d: CDFW Properties Burned by Wildfire in 2021**

<b>Region</b>	<b>Property Name</b>	<b>Acreage</b>
2	East Fork Carson River Fishing Access	28.48
2	Butte Creek House Ecological Reserve	330.60
2	Coon Hollow Wildlife Area	554.04
2	Leek Springs Ecological Reserve	150.91
2	Bear River Fishing Access	38.87
2	Crocker Meadows Wildlife Area	160.64
2	Warner Valley Wildlife Area	702.50



2	Smithneck Creek Wildlife Area	3.47
2	Spenceville Wildlife Area	225.88
4	Coles Levee	0.49
4	Carrizo Plains Ecological Reserve	1.27
6	Santa Rosa Wildlife Area	80.04

Wildfires pose a serious risk to CDFW. Many of our facilities are in remote locations. Several of our sites are in high fire risk areas. Even if the area isn't located in the immediate fire risk area, several locations are located far enough out of major urban areas that smoke may still pose a serious problem. Due to wildfires in past years, many of our sites had to shut down or reduce operations because of dangerous smoke levels. This impacts operations and the health and safety of staff. In 2020-2021 there were a total of 30 properties burned by wildfires with a total acreage burned for the department of roughly 43,610 acres. Tables 1.8c and 1.8d list the properties damaged by wildfire.

Further, to decrease the risk of fire, the utilities are implementing power safety shutdowns where they will preemptively shut down power due to high risk of wildfire. These shutdowns can last anywhere from a couple hours to up to a week. These power shutdowns cause loss of productivity, hardships to the staff that live in these areas and force the department use more fossil fuels to power generators. Further, several of the areas at risk are fish hatcheries that need to maintain operations 24 hours per day to keep the fish alive. Routine back up power at these sites is usually limited to approximately 48 hours, anything longer means contingencies must be put in place. Power shutdowns to these sites can be especially dangerous and costly.

A task force was created in 2019 within the department to address and plan for emergencies, especially wildfire situations. In addition, the department is researching longer term solutions such as Microgrid technology to decrease reliance on the grid and ensure self-sufficiency should the need arise.

**Summarizing Natural Infrastructure Actions to Protect Existing Facilities**

EO B-30-15 directs State agencies to prioritize the use of natural and green infrastructure solutions. Natural infrastructure is the *"preservation or restoration of ecological systems*

*or the utilization of engineered systems that use ecological processes to increase resiliency to climate change, manage other environmental hazards, or both. This may include, but need not be limited to, flood plain and wetlands restoration or preservation, combining levees with restored natural systems to reduce flood risk, and urban tree planting to mitigate high heat days" (Public Resource Code Section 71154(c)(3)).*

Given the mission of CDFW much of the work done within the department is habitat and wetlands restoration and management. In addition, the department manages many other wildlife areas and ecological reserves. Much of the actions undertaken to fulfill the department's mission is the essence of using natural and green infrastructure processes.

Further, restoring wetlands provides a natural buffer to sea level-rise as coastal wetlands can act like a sponge, buffering adjacent communities from extensive flooding. Rather than using sea walls or 'grey' barriers, living shorelines can protect coastal infrastructure while accommodating natural change and growth over time. These may be strategies that CDFW can explore or employ where feasible.

## **Understanding the Potential Impacts of Facilities on Communities**

It is also important to recognize the impact that an infrastructure project has the surrounding community and the impacts on individual and community resilience (e.g., heat island impacts).

Climate change disproportionately impacts vulnerable communities, with certain populations experiencing heightened risk and increased sensitivity to climate change and have less capacity to recover from changing average conditions and more frequent and severe extreme events. A number of factors contribute to vulnerability, often in overlapping and synergistic ways. These can include a number of social and economic factors, and be determined by existing environmental, cultural, and institutional arrangements. Vulnerable populations can include, but are not limited to, people living in poverty; people with underlying health conditions; incarcerated populations; linguistically or socially isolated individuals; communities with less access to healthcare or educational resources; or communities that have suffered historic exclusion or neglect.

While there is no single tool to identify vulnerable populations in an adaptation context, there are a number of state-wide, publicly available tools that when overlaid with climate projection data can help identify communities most at risk to a changing climate. Some of these tools, including a definition for vulnerable communities, are

available in a [resource guide](#) developed by the Integrated Climate Adaptation and Resiliency Program in the Office of Planning and Research

### Disadvantaged Communities

California is required to invest certain funding streams in disadvantaged communities (DACs). Many state programs that have DAC funding requirements use CalEnviroScreen, a tool that ranks census tracts based on a combination social, economic, and environmental factor, to identify DACs. While it does not capture all aspects of climate vulnerability, it is one tool that is available, and does include several relevant characteristics. The department's facilities located in these communities can contribute or alleviate the vulnerability of these Disadvantaged Communities.

**Table 1.12: Facilities located in disadvantaged communities**

Facility Name	CalEnviroScreen Score	Is it located in a disadvantaged community? Yes/No
CR 4 - NORTH GRASSLANDS WA	91-95%	Yes
CR 4 - LOS BANOS WA	91-95%	Yes
CR 4 - MENDOTA WA	86-90%	Yes

Eleven percent of CDFW's owned facilities are in disadvantaged communities based on CalEnviroScreen scores. CDFW interacts with the communities in many ways, providing recreation, access to natural lands and wildlife and education. In addition, through hunting and fishing, the department provides communities access to food. The department also supports the communities by assisting with mitigation of urban heat islands through the addition of greenspaces and natural infrastructure. The department also provides the communities with education on the natural environment, climate change and actions that individuals can take to help mitigate the problem. In the event of an emergency, CDFW will assist however possible, however, it is likely in the event of flooding and such, these locations will be the first to flood. CDFW is also seeking other ways to address these communities, and one way is to put in EV chargers at many of the locations in these areas to assist with the increased adoption of ZEVs. In addition, many of our solar projects will be in these areas, which will also help to decrease emissions.

Finally, several of CDFW grant programs fund projects that directly and/or indirectly benefit DACs (e.g., Prop 1 and the Wetland/GHG program). This information is usually

collected during project proposal submission (as a question in the project guidelines and potentially as a scoring criterion.

## Understanding Climate Risk to Planned Facilities

Currently, CDFW has only one planned new facility in design/construction, Construction was started in 2017 and is still in progress on a new fish hatchery in San Joaquin County. The tables 1-10 a-g address various climate risks to this new facility.

**Table 1.13 a-g: Climate Risks to New Facilities**

**a.1**

Facility Name	Historical Annual Mean Max. Temp. (1961 – 1990)	Annual Mean Max. Temp. (2031 – 2060)	Change from Historical to Annual Mean Max. Temp (2031-2060)	Annual Mean Max Temp. (2070-2099)	Change from Historical to Annual Mean Max. Temp (2070-2099)
CR 4 – San JOAQUIN RIVER RESTORATION PROGRAM	77	82	47	52	unavailable
SANTA CRUZ PROJECT	72	76	43	46	unavailable

**a.2**

Facility Name	Historical Annual Mean Min. Temp. (1961 – 1990)	Annual Mean Min. Temp. (2031 – 2060) °F	Change from Annual Mean Min. Temp (2031-2060)	Annual Mean Min. Temp. (2070-2099) °F	Change from Annual Mean Min. Temp (2070-2099)
CR 4 – San JOAQUIN RIVER RESTORATION PROGRAM	107.7	4	31	27	unavailable

b.

Facility Name	Annual Mean Maximum precipitation (1961-1990) (in/yr)	Annual Mean precipitation (2031-2060) (in/yr)	Extreme Precip (1961-1990) (in/day)	Extreme Precip (2031-2060) (in/day)
CR 4 – San JOAQUIN RIVER RESTORATION PROGRAM	12.8	14	10	12

c.

Facility Name	Extreme heat threshold (EHT) °F	Average number of days above EHT (1961-1990)	Average number of days above EHT (2031-2060)	Increase in number of days above EHT
CR 4 – SAN JOAQUIN RIVER RESTORATION PROGRAM	107.7	4	31	27
SANTA CRUZ PROJECT	93	4	5	1

d.

Facility Name	Coast, San Francisco Bay, Delta)	Sea Level Rise 0.0 m	Sea Level Rise 0.5 m	Sea Level Rise 1.0 m	Sea Level Rise 1.41 m
CR 4 – SAN JOAQUIN RIVER RESTORATION PROGRAM	N/A	N/A	N/A	N/A	N/A
SANTA CRUZ PROJECT	N/A	N/A	N/A	N/A	N/A

e.

Facility Name	Current Fire Hazard Severity Zone (low, medium, high, very high)
N/A	

f.

Facility Name	Acres Burned (1961-1990)	Acres Burned (2031-2060)
N/A		

g.

Facility Name	Heating/Cooling Degree Days (1961-1990) (HDD/CDD)	Heating/Cooling Degree Days (2031-2060) (HDD/CDD)
N/A		

**Table 1.14: New Facilities and Disadvantaged Communities and Urban Heat Islands**

Facility Name	Located in a Disadvantaged Community (yes/no)	Located in an urban heat island (yes/no)
CR 4 – San JOAQUIN RIVER RESTORATION PROGRAM	No	3,330

### Full Life Cycle Cost Accounting

EO B-30-15 directs State agencies to employ full life cycle cost accounting in all infrastructure investment. Lifecycle cost accounting includes:

- Considering initial investment costs, as well as lifetime operation and maintenance costs under changing climate conditions, including changing average conditions and increases in extreme events.
- Applying non-market evaluation methods such as travel cost, avoided costs or contingent valuation to capture hard to quantify benefits and costs

CDFW understands the importance of lifecycle cost accounting and will incorporate it into all planning where feasible and is beginning to incorporate lifecycle cost accounting into its facility and fleet planning. The department is evaluating different tools and technologies to assist with this effort. One area CDFW has already

# Integrating Climate Change into Department Planning and Funding Programs

EO B-30-15 extends beyond infrastructure to broader planning efforts. The tables below discuss CDFW's efforts to incorporate Climate Change into department planning.

**Table 1.15: Integration of Climate Change into Department Planning**

Plan	Have you integrated climate?	If no, when will it be integrated?	If yes, how has it been integrated?
Safeguarding California	Yes		CDFW is the Department lead for identifying adaptation goals and strategies for the biodiversity and habitat sector of the Plan. As part of the state plan, CDFW is also required to document department adaptation actions.
Land Management Plans (LMP)	Yes		Several LMPs have already included climate change to some degree. As LMPs are updated, or as new ones are created, climate change is being addressed. The ecoregional summaries will assist with this effort.
2015 State Wildlife Action Plan	Yes		Climate change was addressed in the selection of conservation targets and in the development of associated conservation strategies.

**Table 1.16: Engagement and Planning Processes**

<b>Plan</b>	<b>Does this plan consider impacts on vulnerable populations?</b>	<b>Does this plan include coordination with local and regional agencies?</b>	<b>Does this plan prioritize natural and green infrastructure?</b>
<u>Natural Community Conservation Planning</u>	Yes	Yes	Yes
<u>Regional Conservation</u>	Yes	Yes	Yes
<u>Investment Strategies Program</u>			

Table 1.14 is a list of direct grants, proposition funding, and local assistance programs that CDFW has incorporated Climate Change into the funding process.

**Table 1.17: Climate Change in Funding Programs**

<b>Grant or funding program</b>	<b>Have you integrated climate change into program guidelines?</b>	<b>If no, when will it be integrated ?</b>	<b>Does this plan consider impacts on vulnerable populations?</b>	<b>Does this program include coordination with local and regional agencies?</b>
Fisheries Restoration Grant Program	Yes	N/A	N/A	Yes
Proposition 1 Restoration Grant Program	Yes	N/A	N/A	Yes
Wetland Restoration for GHG Reduction Grant Program	Yes	N/A	N/A	Yes
Land Acquisition	Yes	N/A	N/A	Yes



Evaluation practices				
Utility Programs	N/A	N/A	Yes	No

## Measuring and Tracking Progress

Changing climate conditions necessitate an adaptive management approach. An adaptive management approach is informed by tracking changing climate conditions and the performance of a plan or project. Building check points into a project or plan timeline can help to create a system for regular review and, if needed, adjustments.

Even though CDFW has been incorporating climate change thinking into land management plans and other projects for wildlife there is more to be done. Tracking resilience and adaptation can be tricky given that the results are happening over long periods of time, however measuring how species are thriving in the wildlife areas in general is a way to track progress. Depending on the type of wildlife and location, there are different targets, goals, and plans to ensure that species are thriving. The department is still in the early stages of implementing life cycle cost into planning and implementing adaptation measures for facilities. On the facilities side, the department intends to continue using the current tracking systems Energy Star Portfolio Manager for energy and water usage and The Climate Registry Information System for GHG emissions to assess progress. The department will incorporate new technology as it becomes available and is cost effective.

## **CHAPTER 2 – ZERO-EMISSION VEHICLES**

### **California Department of Fish and Wildlife Report and Fleet Plan**

This Zero Emission Vehicle (ZEV) Report and Plan demonstrates to the governor and the public the progress CDFW has made toward meeting the governor's sustainability goals related to ZEVs and reduction of GHGs. This report identifies successful accomplishments, ongoing and future efforts, and outstanding challenges.

CDFW employees utilize vehicles in a variety of applications for law enforcement, emergency response, land management, fish hatchery support, scientific, and administrative functions. Common vehicle usage includes, but not limited to, traveling to long distant remote sites, towing equipment over one thousand pounds, planting fish, and transporting wildlife on remote off-road terrain.

The wildlife officers (CDFW law enforcement officers) and Oil Spill Prevention and Response (OSPR) employees use 4-wheel drive pickups and sport utility vehicles (SUVs) to access remote areas of the state, patrol the back country, respond to oil spills and other deleterious materials, and ensure regulatory compliance with federal and state laws. Additionally, vehicles are often used to tow trailered boats, all-terrain vehicles (ATVs) and snowmobiles for patrol and response on the state's 1,100 miles of coastline, 30,000 miles of streams, and other state, and public off-road lands not accessible by standard vehicles.

Scientific and non-scientific field employees also use 4-wheel drive pickups and SUVs to access remote areas of the state. Their duties consist of conducting field studies of fish and wildlife populations, assessing the impacts of activities with potential impacts to habitat, conducting surveys of hunters and anglers, transporting supplies and a variety of additional activities. CDFW staff at fish hatcheries would use their vehicles for transporting equipment and deploying fish into lakes or other waterways. Vehicles are used daily in peak season and less often during off-season. Vehicles may be seen towing trailered boats, ATVs, snowmobiles, sprayers, pumps, and a variety of scientific equipment.

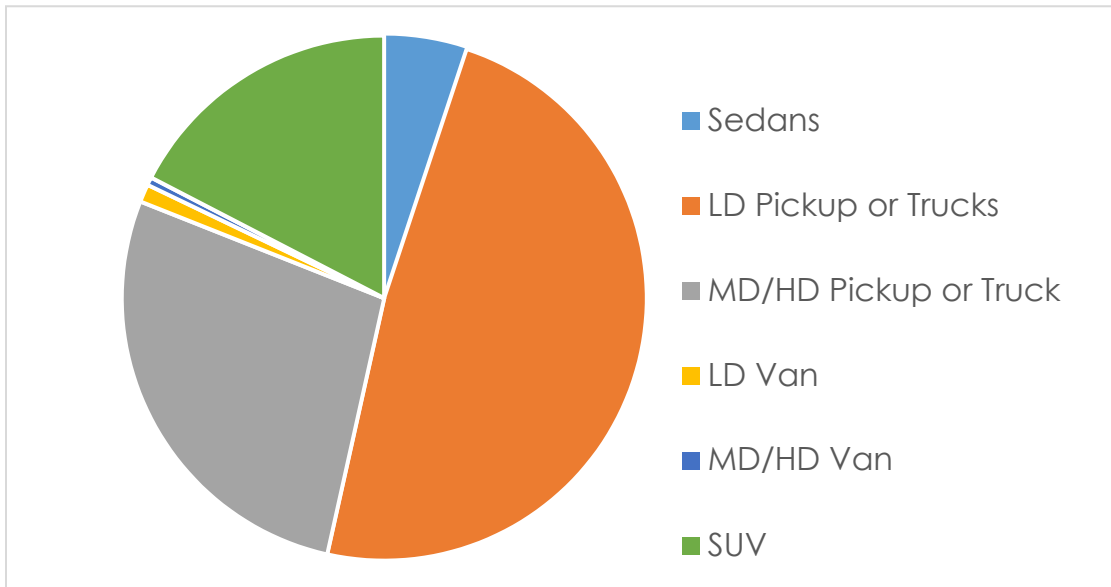
Administrative staff working from regional headquarters and field offices use sedans, SUVs and vans to travel to meetings and perform routine day-to-day functions such as meetings, site visits, and trips to local post-offices, and banks. These vehicles are pooled and are also used by scientific staff when needed.

CDFW staff that access remote areas or go off-road face various road conditions. Off-road conditions vary by climate, weather, and topography. Common road conditions include dirty or dusty roads, wet mud, flooded surfaces, uneven surfaces, snow, and

rocky or sandy roads. Along with the poor road conditions, hauling or carrying equipment or supplies can exceed one-way distances over 200 miles.

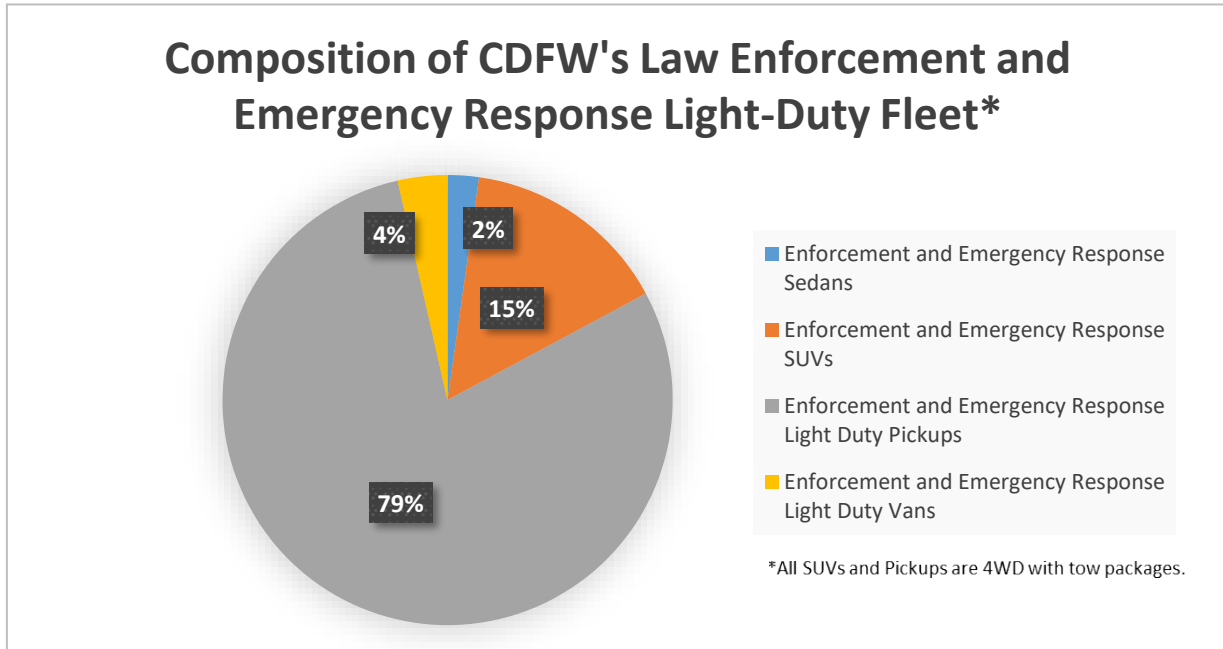
The following graphs show the breakdown of CDFWs fleet by composition as well as a deeper look at the individual categories of light duty, medium duty, etc.

**Graph 2.1: 2020 Composition of Vehicle Fleet**



Sedans	LD Pickup or Trucks	MD/HD Pickup or Truck	LD Van	MD/HD Van	SUV
83	790	449	18	8	284

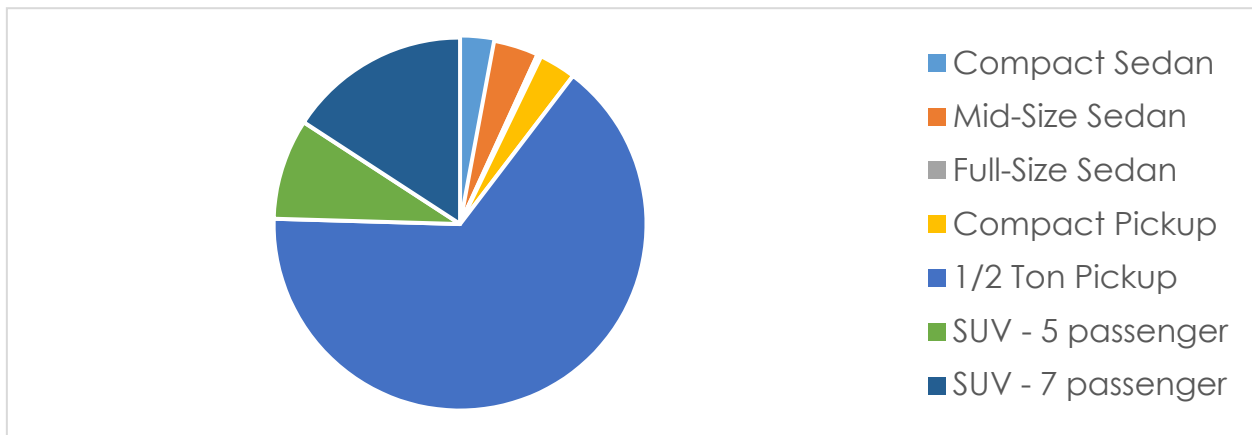
**Graph 2.2: Composition of Department's Law Enforcement and Emergency Response Light-Duty Fleet**



\*15.54% of the CDFW MD/HD fleet is Law Enforcement and Emergency Response

### Light Duty Fleet Vehicles

**Graph 2.3: Composition of Light Duty Vehicle Fleet**

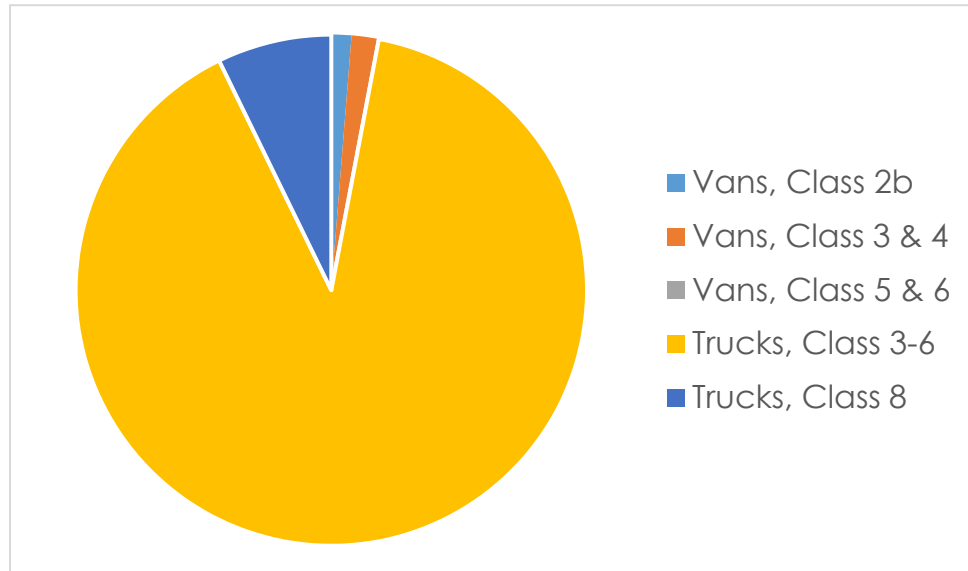


## Medium and Heavy-Duty Fleet Vehicles

**Graph 2.4: Composition of Medium and Heavy-Duty Vehicle Fleet Subject to the ZEV**

Compact Sedan	Mid-Size Sedan	Full-Size Sedan	Compact Pickup	1/2 Ton Pickup	SUV - 5 passenger	SUV - 7 passenger
34	45	4	37	753	101	183

### First Purchasing Mandate



**Table 2.1: Total Fuel Purchased in 2020 (gallons)**

	Diesel	Gasoline	Renewable Diesel
<b>Fuel Amount Gallons</b>	182,179	934,430	594

Table 2.1 shows the breakdown of purchased fuel for CDFW for 2020, due to conservation practices as well as changes in utilization due to the COVID-19 pandemic and resulting emergency telework fuel use has been decreased by over 120,000 gallons of gasoline and 2000 gallons of diesel. Renewable diesel stayed consistent. It is important to note that diesel and renewable diesel are used in farming equipment used to maintain lands that needed to continue regardless of the pandemic, however, gasoline is used in vehicles staff use to travel and this was significantly reduced during the pandemic.

## **Incorporating ZEVs into the State Fleet**

A widespread shift to ZEVs is essential for California to meet its GHG emission goals. State departments are now required to incorporate larger numbers of ZEVs in their vehicle fleets. Starting in FY 17/18 the percentage of new light-duty vehicles that must be ZEVs increases by five percent each year, reaching 25 percent in FY 19/20 and 50 percent in FY 24/25. CDFW has many uses for vehicles within its fleet and incorporating ZEVs is challenging. It is essential that the department reduce GHG emissions from its fleet and is taking steps to do so.

As stated before, CDFW has many uses for vehicles within its fleet and incorporating ZEVs is challenging. However, it is essential that the department reduce GHG emissions from its fleet and is taking steps to do so.

CDFW's fleet typically go off-road, respond to emergencies, and carry heavy equipment. For these types of vehicles, they need the ability to have a 4-wheel drive system, enough torque for hauling, pick-up style for loading, high clearance, and make long distance trips. Work using these types of vehicles include patrolling remote areas, carrying spill response supplies, pulling off-road vehicles, hauling fish hatchery supplies, and various maintenance equipment. Currently there are no Battery Electric Vehicles (BEV) or Plug-in Hybrid Electric Vehicles (PHEV) 4-wheel drive pick-ups that can meet all those needs. CDFW's hatchery fleet transports salmon and trout to many distant cities from the hatchery of origin, and with regard to trout, to remote locations throughout the state.

CDFW is looking for alternatives. When it comes to lighter work that does not require hauling or carrying heavy equipment, CDFW utilizes PHEV all-wheel drive SUVs where possible. PHEV all-wheel drive SUVs are adequate for emergency responses in some locations (not going remotely, off-road), a few land management applications (such as some habitat maintenance, trips to local hardware/feed), and some environmental scientist work in the field (carrying scientific equipment to monitor and survey various activities). PHEV all-wheel drive SUVs are available and CDFW will incorporate those into the fleet whenever it is deemed feasible.

Vehicles used for administrative functions are typically sedans, SUVs, and vans. These vehicles are utilized by administrative staff to travel to CDFW and partner agency offices for meetings, perform contract oversight functions at various sites, deliver mail and packages, and other miscellaneous tasks. These locations are the CDFW's best option for BEVs. For trips that are out of range for the current CDFW ZEVs, hybrid vehicles will be considered as the next best option.

CDFW is also replacing standard gasoline trucks used for fish feeding at hatcheries with electric carts as funding permits. As these trucks stay on the premises, they are good options for ZEVs, however some are limited by terrain and weather conditions. It is the goal the CDFW to eventually replace all feeding trucks with an electric alternative.

Vehicles over mileage and age thresholds are eligible for replacement. Currently, ZEVs are available on statewide commodity contracts in the sub-compact, compact, mid-size sedan, and mini-van vehicle classes. There are currently 27 vehicles in the CDFW fleet that are eligible for replacement in vehicle classes for which ZEVs are available on contract.

### Light-Duty ZEV Adoption

A widespread shift to ZEVs is essential for California to meet its Green House Gas (GHG) emission goals. State departments are now required to incorporate and prioritize a larger number of light-duty ZEVs in their vehicle fleets. Starting in FY 17/18 the percentage of new light duty vehicles that must be ZEVs began increasing by 5% each year, reaching 25% in FY 19/20 and 50% in FY 24/25.

Vehicles that meet specified mileage and age thresholds are eligible for replacement. Currently ZEVs are available on statewide commodity contracts in a range of light duty vehicle categories. While many vehicle classes currently lack a ZEV alternative to purchase due to the purchasing restrictions imposed in State Administrative Manual Section 4121.8, departments are encouraged to complete and review Table 2.2 as if all light duty vehicle classes have a ZEV alternative available for purchase.

**Table 2.2: Light Duty Vehicles in Department Fleet Currently Eligible for Replacement**

	Sub-Compact Sedan	Compact Sedan	Mid-size Sedan	Full-size Sedan	Mini-Van	5 Passenger SUV	Total
# Of vehicles eligible for replacement	0	8	3	1	3	12	27

Table 2.2 shows the vehicles in the fleet that are eligible for replacement based on mileage and age. The figures cited above are subject to change given:

- Availability of funding to replace eligible vehicles
- Replacements of out-of-service vehicles not meeting mileage but approved by OFAM inspectors.

The table below shows the estimated number of ZEVs that have been or are anticipated to be added to the department fleet in coming years. Please consider the impact of the Light Duty ZEV first purchasing policy (SAM Sections 4121.1), the CARB Aligned Vehicle Manufacturer Purchasing Restrictions (SAM Section 4121.8), and the Sedan Purchasing Restrictions (SAM Section 4121.7) when completing this table. Number of ZEV's purchased in prior years is available from [green.ca.gov/fleet](http://green.ca.gov/fleet).

**Table 2.3: Light Duty ZEV Additions to the Department Fleet**

<b>Table Header Format</b>	<b>20/21</b>	<b>21/22</b>	<b>22/23</b>	<b>23/24</b>	<b>24/25</b>
Battery Electric Vehicle	1	2	2		
Plug-in Hybrid Vehicle	4	11	12		
Fuel Cell Vehicle	1	1	1		
<b>Percent of total purchases</b>	3%	6%	7%		
<b>Required ZEV Percentage</b>	30%	35%	40%	50%	50%
<b>Total number of ZEVs in Fleet*</b>	73	87	102		

### **Medium- Heavy-Duty ZEV Adoption**

Similar to the light-duty purchasing policy above, the adoption of MD/HD ZEVs is essential to meet greenhouse gas emission reduction goals. As of July 2020, SAM section 4121.9 requires state agencies to prioritize the purchasing of MD and HD ZEVs vehicles into their fleets. Additionally, beginning December 31<sup>st</sup>, 2025, departments are required, per Assembly Bill (AB) 739, to have 15% of newly purchased vehicles with a gross weight rating of 19,000 pounds or more be ZEVs. This percentage will increase to 30% by December 31<sup>st</sup>, 2030.



**Table 2.4: MD/HD Vehicles in Department Fleet Currently Eligible for Replacement**

	Vans, Class 2b	Vans, Class 3 & 4	Vans, Class 5 & 6	Trucks, Class 3-6	Truck, Class 8	Total
# Of vehicles eligible for replacement	3	4	0	211	17	235

The table below shows the estimated number of MD/HD ZEVs that have been or are anticipated to be added to the department fleet in coming years. The makeup of the CDFW fleet, along with limited market availability for the vehicles needed and the Covid-19 pandemic were the reason that no ZEVs were added in 20/21. Given these challenges still exist, it is difficult for CDFW to predict ZEV additions going forward. CDFW intends continue its purchase of ZEV vehicles, however we are waiting for availability of light duty electric or hybrid trucks to be added to the state contract. CDFW is exhausting its list of available sedans for replacement with ZEV vehicles.

**Table 2.5: ZEV Additions to the Department Fleet**

Table Header Format	21/22	22/23	23/24	24/25	25/26
Battery Electric Vehicle	0	0*			
Plug-in Hybrid Vehicle	0	0			
Fuel Cell Vehicle	0	0			
<b>Percent of total purchases</b>	0				
<b>Total number of ZEVs in Fleet</b>	27				

## Telematics Plan

Telematics is a method for monitoring vehicle use. Using GPS and on-board diagnostics, telematics provides valuable information that often results in fuel savings and improved vehicle utilization. Telematics is especially important for verifying that Plug-in Hybrid Vehicles are maximizing the use of electric fuel rather than gasoline. The rule requiring 50% of ZEVs purchased to be BEVs is not in place for fleets making use of telematics for all ZEVs.

CDFW anticipates a future statewide contract administered through the Department of General Services (DGS) for telematics transponders and applicable software. The ability for the data transmitted by the telematics units to be accessible via cellular, Wi-Fi and satellite will be critical due to the remote areas of operations. Once released CDFW does intend to purchase and use telematics for the entire fleet.

## **Public Safety Exemption**

The composition of CDFW law enforcement and emergency response fleet is comprised of 4-wheel drive pick-ups and SUVs with towing ability. Because there are no immediately available ZEVs offering off-road and towing options, there are no plans to have a CDFW ZEV operated by sworn officers.

Enforcement vehicles are authorized emergency vehicles pursuant to California Vehicle Code § 165. They are equipped with light bars, radios, computers, spotlights, a tow package and various other electronic equipment beyond a normally outfitted vehicle. These vehicles are used often in off-road environments and must have the ability to safely and quickly reach a reported crime in progress or pursue suspicious vehicles.

Emergency response vehicles, pursuant to California Vehicle Code § 21055, are driven in response to emergency calls involving spills of toxic substances. Sites of reported spills must be reached as soon as possible in order to minimize impacts on the public, water supplies and fish and wildlife habitat. Emergency response vehicles are equipped with radios, computers, spotlights a tow package and various other electronic equipment beyond a normally outfitted vehicle.

## **Department of Fish and Wildlife Parking Facilities**

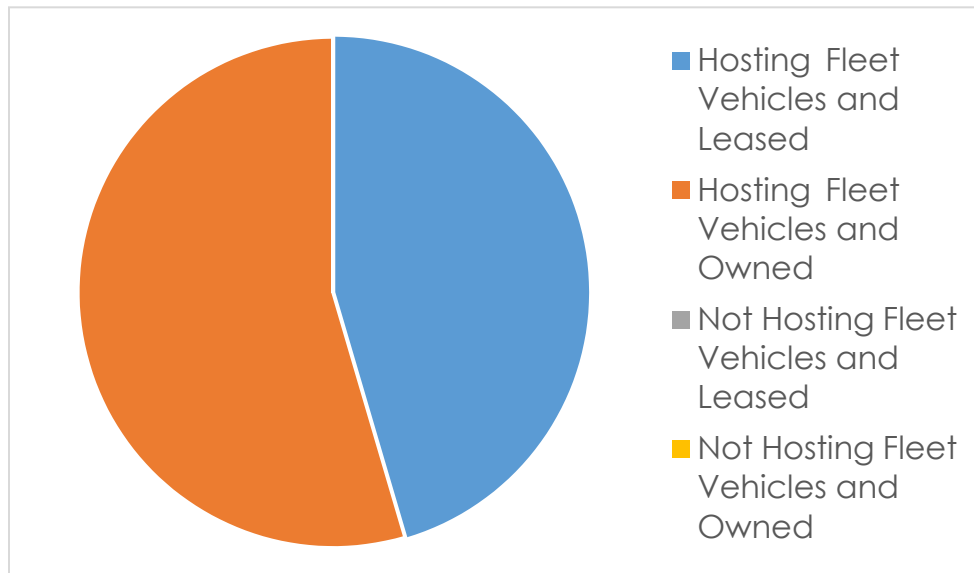
CDFW's facilities consist of three basic types: offices/labs, wildlife areas/ecological reserves, and fish hatcheries. Owned facilities represent 58 percent, whereas leased facilities represent 42 percent, of CDFW locations. The offices and labs are generally mixed use and house scientific, enforcement and administrative staff. Larger main offices have dedicated, secured lots for CDFW fleet and open mixed parking for employees and visitors. Parking at smaller facilities is generally mixed across all parking types. Visitors include those purchasing hunting and fishing licenses, staff attending meetings, public bid openings and various other short-term needs. All office and lab facilities host fleet vehicles.

Wildlife areas and ecological reserves owned by CDFW are managed by lands staff that perform habitat restoration and maintenance projects year-round. These facilities are open to the public for their use and enjoyment, with some requiring a permit. Staffed CDFW lands host fleet vehicles and the parking is mixed use among CDFW fleet, employees, and visitors. Visitors stay anywhere from 30 minutes to all day depending on the use type – hunting, wildlife viewing, studies, meetings, and other miscellaneous recreational activities. Many of the lands do not have paved lots or marked stalls.

Fish hatcheries are operated by staff that breed and rear fish from eggs to fingerlings to be planted in California's lakes and streams. There are 21 fish hatcheries. Fifteen are

owned and operated by CDFW and nine are owned by other entities and operated by CDFW. These facilities are open to the public for viewing and for educational purposes. All hatcheries host fleet vehicles and the parking is generally mixed use among CDFW fleet, employees, and visitors. Visitors stay anywhere from 30 minutes to two hours depending on the time of year.

**Graph 2.2: Parking Facilities**



Hosting Fleet Vehicles and Leased	Hosting Fleet Vehicles and Owned	Not Hosting Fleet Vehicles and Leased	Not Hosting Fleet Vehicles and Owned
60	72	0	0

It is important that the department have adequate EV charging infrastructure to support the ZEV fleet. There are three different levels of electric chargers to consider. Level 1 (L1) EV chargers which have a full charge in 17-25 hours, Level 2 (L2) EV chargers which have a full charge in four to five hours and finally Level 3 (L3) or direct current (DC) fast chargers provide an 80 percent charge in 30 minutes. Given the nature of CDFW's fleet operations and the length of stay for visitors and employees, it has been determined that it is appropriate for L2 chargers to make up majority of chargers used in employee designated parking areas. However, CDFW is considering using a mix of L1 and L2 chargers for fleet parking for a variety of reasons. The use of L3 chargers is being considered for the larger offices, which would potentially reduce the number of

planned L2 chargers and free up more non-dedicated parking stalls, Currently, there is no funding available for the L3 fast chargers which makes installing those less feasible.

Based on estimates of future ZEV fleet purchases and a count of workplace parking spaces determine EV charging ports needed to adequately serve fleet vehicles and employee parking to achieve the goals established in the ZEV Action Plan. Table 2.6 lists the sites that have the most potential for installing chargers, however site assessments will determine the final numbers and locations

The facilities with the most urgent need for EV charging are listed below.

**Table 2.6: High Priority EVSE Projects**

<b>Facility Name</b>	<b>Total Parking Spaces</b>	<b>Existing L1 Charging Ports (2020)</b>	<b>Existing L2 Charging Ports (2020)</b>	<b>Existing L3 Charging Ports (2020)</b>	<b>Total Charging Ports (2020)</b>	<b>EV Charging Ports Needed by 2025</b>
ARCATA - FIELD OFFICE 1	34	1	2	0	3	3
FISH SPRINGS FISH HATCHERY	6	0	0	0	0	6
UPPER BUTTE BASIN WILDLIFE AREA	17	0	0	0	0	6
CRYSTAL LAKE FISH HATCHERY	3	1	0	0	1	1
YOLO BYPASS WILDLIFE AREA AND SCREEN SHOP	80	0	8	0	8	8
EUREKA - FIELD OFFICE	42	1	0	0	1	3
FAIRFIELD - REGIONAL HEADQUARTERS	38	0	4	0	4	4
FILLMORE FISH HATCHERY	16	0	0	0	0	2
FRESNO - REGION HEADQUARTERS	120	3	3	0	6	8
GRAY LODGE WILDLIFE AREA	6	0	2	0	2	2

RANCHO JAMUL ECOLOGICAL RESERVE	33	0	0	0	0	6
LA GRANGE - FIELD OFFICE	11	1	2	0	3	3
SAN JACINTO WILDLIFE AREA	8	0	0	0	0	6
LOS ALAMITOS - FIELD OFFICE	75	0	4	0	4	4
LOS BANOS WILDLIFE AREA	88	0	4	0	4	4
HOT CREEK FISH HATCHERY	127	0	0	0	0	7
MENDOTA WILDLIFE AREA	9	0	2	0	2	2
MOCCASIN CREEK FISH HATCHERY	21	0	0	0	0	4
MONTEREY - REGIONAL HEADQUARTERS	44	2	4	0	6	6
MOUNT SHASTA FISH HATCHERY	19	0	0	0	0	6
NAPA - FIELD OFFICE	74	2	4	0	6	6
UPPER NEWPORT BAY ECOLOGICAL RESERVE	58	0	4	0	4	18
IMPERIAL WILDLIFE AREA	114	0	0	0	0	9
ONTARIO - REGIONAL HEADQUARTERS	20	2	3	0	5	5
OROVILLE WILDLIFE AREA	7	0	0	0	0	6
RANCHO CORDOVA - REGIONAL HEADQUARTERS	113	1	5	0	6	6

AMERICAN RIVER FISH HATCHERY	101	1	5	0	6	6
RED BLUFF - SCREEN SHOP	20	0	0	0	0	6
REDDING - REGIONAL HEADQUARTERS	101	0	4	0	4	4
SACRAMENTO - 1700 9TH ST	6	0	2	0	2	4
SAN DIEGO - REGIONAL HEADQUARTERS	70	2	2	0	4	4
SANTA CRUZ - FIELD OFFICE	13	0	2	0	2	2
SANTA ROSA - FIELD OFFICE 1	55	0	2	0	2	2
STOCKTON - FIELD OFFICE	67	0	4	0	4	8
GRIZZLY ISLAND WILDLIFE AREA	10	0	0	0	0	8
MOJAVE RIVER FISH HATCHERY	19	0	0	0	0	12
ELKHORN SLOUGH ECOLOGICAL RESERVE	35	0	2	0	2	2
WEST SACRAMENTO - FIELD OFFICE 2	150	0	4	0	4	6
WEST SACRAMENTO - FIELD OFFICE 1	50	0	2	0	2	8
YREKA - FIELD OFFICE	12	0	0	0	0	6
EUREKA ANNEX	20	0	0	0	0	2
Total	1912	17	80	0	97	221

\*Estimates based on assumption that if 4-wheel drive tow-package ZEV options for pickup trucks and SUVs are available near future.

## Outside Funding Sources for EV Infrastructure

CDFW has been actively searching for EVSE funding. In 2018, CDFW received monies from a DGS Budget Change Proposal (BCP) to install infrastructure of which has almost been completed. To date, CDFW has 33 EV chargers and 6 solar electric vehicle chargers have been installed with 3 sites remaining. CDFW is currently seeking other funds through Air Quality districts, utility companies as well as government grants to fund further infrastructure programs. In early, 2021 CDFW received a grant from DGS that provided 6 additional solar chargers to the department. CDFW is currently partnering with DGS and Southern California Edison's Charge ready program to provide additional infrastructure to 5 sites in Southern California.

## Hydrogen Fueling Infrastructure

Hydrogen Fuel Cell Electric Vehicles (FCEV) are a type of ZEV that runs on compressed hydrogen fed into a fuel cell "stack" that produces electricity to power the vehicle. A fuel cell can be used in combination with an electric motor to drive a vehicle and tends to have a larger range than most of the electric cars available to the state. Given the remoteness of CDFW locations, FCEV are a good alternative to electric cars. The two major obstacles of these vehicles are the lack of hydrogen fueling stations throughout the state and the price of the vehicles is much higher. CDFW has identified the following sites that potentially serve as hydrogen fueling stations for future FCEVs.

### Sacramento Area:

- 1515 S. River Road, West Sacramento, CA 95691
- 6141 Greenback Lane, Citrus Heights, CA 95621

### Belmont Office Area:

- 248 South Airport Boulevard, South San Francisco, CA 94080

### San Diego Office Area:

- 3060 Carmel Valley Road, San Diego, CA 92130

### Ontario Office Area:

- 1850 Holt Boulevard, Ontario, CA 91761

While there has been active discussion with outside parties to determine the feasibility of installing hydrogen stations at some locations in the Northern Region, there are currently no plans to install hydrogen fueling stations at any CDFW facilities.

## Comprehensive Facility Site and Infrastructure Assessments

Site assessments are performed to establish the cost and feasibility of installing needed EV infrastructure. Table 2.7 below lists priority facilities site assessments.

Initial round of site assessments was completed in 2019, included on the 2019 Roadmap, no assessments were done in 2020. Site assessments resumed at the end of 2021 with the Southern California Edison Charger ready program.

**Table 2.7: Results of Site Assessments**

Facility Name	L1 Chargers with Current Electrical System	L2 Chargers with Current Electrical System	Total cost for Project using Current Electrical System	L1 Chargers with Electrical System Upgrades	L2 Chargers with Electrical System Upgrades

## EVSE Construction Plan

Currently CDFW is working with DGS and the utility companies to fund infrastructure projects. Projects are being assessed on an as needed basis, based on where ZEVs will be housed and used, as well as where funding is available. Standalone solar charger units from BEAM are being utilized as much as possible due to funding as they are great options for our remote and leased locations.

## EVSE Operation

CDFW does not currently charge a fee for charging and about half of the infrastructure is metered. The data collected is used to guide further infrastructure projects. CDFW has completed a department EVSE operation guide for distribution to sites that have EV charging infrastructure.



## CHAPTER 3 - ENERGY

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This Energy Report demonstrates to the Governor and the public the progress the Department has made toward meeting the Governor's sustainability goals related to energy. This report identifies successful accomplishments, ongoing efforts, and outstanding challenges.

### California Department of Fish and Wildlife Built Infrastructure

CDFW's portfolio is large and diverse. The department manages many types of facilities throughout all of California and exist in different climates and terrains.

CDFW is the steward of over 1,000,000 acres of land managed on 722 properties throughout the state, 71 of these properties are owned by the department and include structures of various types and uses.

There are 576 structures located on these 71 sites with an approximate combined square footage of 1,107,416 square feet. CDFW has a variety of types and functions of its structures. More than half of these structures have purchased energy, and many also purchase some form of fuel for heating, which may include natural gas or propane. Roughly 1215 structures, such as pump sheds, restroom facilities and garages have electricity, but are not heated.

Many of the facilities rely on large pumps to pump water for wildlife. These pumps consume a lot of energy. Further, fish hatcheries are 24-hour facilities to keep fish alive and healthy. Finally, CDFW has many labs used for wildlife conservation purposes and oil spill prevention activities that require constant temperatures that may increase energy use. Table 3.1 is a breakdown of total purchased energy for CDFW.

**Table 3.1: Total Purchased Energy 2020**

Purchased Energy	2003 Baseline Quantity	2003 Cost (\$)	2020 Quantity	2020 Cost (\$)	% Qty. Change	% Cost Change
Electricity	25,421,298 kWh	\$ xx	16,563,422 kWh	\$ xx	-35%	\$ xx
Natural gas	44,052 Therms	\$ xx	25,917 Therms	\$ xx	-41%	\$ xx
<b>TOTAL</b>	<b>91,142,669 kBtu Site</b>	<b>% xx</b>	<b>63,350,907 kBtu Site</b>	<b>\$ xx</b>	<b>-30%</b>	<b>% xx</b>

Table 3.2 shows, the department's largest energy users, most of which are fish hatcheries. The reason these locations use so much energy is they are 24-hour facilities, that must use pumps to recirculate the water and/or have larger chillers to keep water the optimal temperature for fish. As funding allows, tank improvements and other energy and water saving upgrades will be made to increase energy efficiency.

**Table 3.2: Properties with Largest Energy Consumption**

Building Name	Floor Area (ft <sup>2</sup> )	Site Energy (kBTU)	Source Energy (kBTU)	Source EUI (kBTU/ft <sup>2</sup> -yr)
CR 4 - MOJAVE FISH HATCHERY	21,508	9,149,163	28,110,018	1,307
NCR 2 – NORTH CENTRAL HQ & AMERICAN RIVER FH	66,667	6,291,222	18,549,417	278
BDR 3 – YOLO BYPASS WA	44,545	5,880,586	2,244,784	50
NR 1 – MAD RIVER FH	50,819	3,510,916	11,059,383	218
IDR 6 – FILLMORE FH	24,423	3,443,475	10,167,299	416
BDR 3 – WARM SPRINGS FH	54,810	3,299,754	10,394,223	190
BDR 3 – GRIZZLY ISLAND WA	29,282	2,309,115	894,934	31
NCR 2 – UPPER BUTTE BASIN WA	13,994	2,291,681	784,602	56
Total for Buildings in This Table	<b>306,048</b>	<b>36,175,910</b>	<b>111,105,309</b>	---
Total for All Department Buildings	<b>1,257,683</b>	<b>63,350,907</b>	<b>193,655,823</b>	---
% Of Totals	24%	57 %	57 %	---

Hatcheries have already been discussed, but CDFW has two other main types of facilities as well, ecological reserves/wildlife areas, and offices/labs. Each has its own challenges. Wildlife areas operate pumps that can consume large amounts of energy, as do facilities that operate 24-hours for wildlife conservation purposes and facilities located in very remote locations.

Funding is also a challenge in implementing the governor's sustainability goals. Scheduled maintenance budgets tend to be prioritized to prevent health and safety issues and compliance with the Americans with Disabilities Act (ADA) over energy efficiency goals. CDFW has relied on grants and utility programs to fund projects and audits.

CDFW does not have the resources for design and construction of major projects and therefore relies on the DGS. The only new or major renovation on the five-year plan is currently under construction. A new fish hatchery that will be used for aquaculture is being built outside Fresno. CDFW is exploring a concept for a second proposed new fish hatchery that will be used to recover Coho Salmon in Santa Cruz County. CDFW relies on DGS to ensure that the building for that project meets all environmental standards

and mandates. The building is less than 50,000 square feet. Since CDFW will not be building new structure in the near future the focus on sustainability will be related to existing buildings.

## **Zero Net Energy (ZNE)**

State policies set forth the following milestones for state zero net energy buildings:

- 2017 – 100% of new construction, major renovations and build-to-suit leases beginning design after 10/23/2017 to be ZNE
- 2025 – 50% of total existing building area will be ZNE
- The Governor has set forth the following milestones for state zero net energy buildings:
  - 2020 – 50% of new construction & major renovations will be ZNE
  - 2025 – 100% of new construction & major renovations will be ZNE
  - 2025 – 50% of total existing building area will be ZNE

CDFW does not have any zero net energy facilities. However, some are considered ZNE ready, meaning that their energy efficiency per square footage (Energy use intensity, ECI) meets the thresholds put in place by DGS. The challenge the department faces is with renewable energy. The department is currently planning on renewable energy for larger sites where it is cost feasible to utility Power Purchase Agreements (PPA) as form of payment. To further complicate the situation the department has many sites where the PPA model is not cost effective. For those sites the department must either buy the renewable generation system outright, for which there is no budget for, or purchase solar from community solar vendors. The department has researched community solar and the vendors in the areas that service the department's locations are not currently taken new customer and therefore CDFW is on the wait list. CDFW is always searching for grants and other funding opportunities to buy systems for the smaller sites.

The one site that is currently under construction does not meet the criteria for ZNE, therefore, Table 3.3 does not apply at this time.

**Table 3.3: Zero Net Energy Buildings**

Status of ZNE Buildings	Number of Buildings	Floor Area (ft <sup>2</sup> )	% Of Building Area
Buildings Completed and Verified	W	A	
Building in Design or Under Construction	X	B	
Building Proposed for Before 2025 (but not yet in design)	Y	C	
Addtl. Exist. Bldg. Area within 15% w/ EE projects	Z	D	
Totals for ZNE Buildings by 2025	W+X+Y+Z	A+B+C+D	Blank
Totals for All Department Buildings by 2025	Q	R	Blank
% ZNE by 2025	$(W+X+Y+Z)/Q$ %	$(A+B+C+D)/R$ %	

Of these 14 sites, five pilot sites are in the final contracting stages and construction is anticipated to start in 2022. It is the hope that these pilot sites, once completed, will establish a model for a smoother contracting process and successful outcomes in the future.

Unfortunately, the department has many sites where the PPA model is not cost effective. For those sites the department must either buy the renewable generation systems outright, for which there is limited budget, or purchase solar from community solar vendors. The department has researched community solar and the vendors in the areas that service the department's locations are not currently taking new customers and therefore, CDFW is on the wait list. CDFW is always searching for grants and other funding opportunities to purchase or acquire systems for the smaller sites.

The San Joaquin hatchery site that is currently under construction does not meet the criteria for ZNE, however construction began prior to 2017.

## New Construction Exceeds Title 24 by 15%

All new state buildings and major renovations beginning design after July 1, 2012, must exceed the current California Code of Regulations (CCR) Title 24, energy requirements by 15% or more.

**Table 3.4: New Construction Exceeding Title 24 by 15%**

Buildings Exceeding Title 24 by 15%	Number of Buildings	Floor Area (ft <sup>2</sup> )
Completed Since July 2012	0	0
Under Design or Construction	1	Under 50k
Proposed Before 2025	0	0

The only facility currently under construction is under 50,000 square feet.

### **Reduce Grid-Based Energy Purchased by 20% by 2018**

EO B-18-12 requires state agencies to reduce grid-based energy purchased by 20 percent by 2018, compared with a 2003 baseline.

Thanks to the diligent conservation work of the department, CDFW has already met the 20 percent reduction target. CDFW does not want to stop there and has made additional internal goals to continue to strive to be a leader in conservation both inside the organization and outside. The new goals are related to reducing GHG emissions. In order to achieve the department's goal for GHG emission reduction, the new goal set for reducing grid-based energy purchases is 70 percent by 2030.

Unlike the current goal from EO B-18-12, CDFW is using a 2010 baseline for the new goals and will be switching reporting to the Climate Registry Information System (CRIS), instead of Energy Star Portfolio Manager (ESPM) in order to be more consistent with current GHG reporting standards. CDFW will still report in ESPM as it is linked to the [Green CA](#) website, but internal tracking of goals will be kept now in the CRIS system. This move will streamline things and add more consistency with regard to reporting and goals.

With the new goals the department will have to reduce its current energy usage by 36 million kBtu. Plans to achieve this reduction include lighting retrofits at most locations- several of the large sites have already been completed, pump upgrades or replacements, and the switch to renewable energy at several sites.

### **Energy Efficiency and Employees**

In addition, a list of best practices will be sent around annually to remind locations of the state's energy policy. Employee behavior can also be a huge energy saver and the department will work with employees to ensure they are acting in a sustainable manner. Websites and employee green teams can help spread the word to increase awareness for employee energy conservation.

### **Energy Efficiency in Data Centers and Server Rooms**

The CNRA data center, which hosts the vast majority of CDFW servers is operated within the American Society of Heating, Refrigerating and Air-Conditioning Engineers Technical Committee (ASHRAE-TC) 9.9, Class A1-A4 guidelines. The data center houses servers for many other state departments that are part of CNRA and is 3,800 square feet. The average temperature in the data center is between 68- and 78-degrees

Fahrenheit. In addition, the data center is designed with hot and cold isles to maximize temperature regulation efficiencies. The average power usage effectiveness (PUE) is about 1.48 which exceeds the mandate of 1.5. The PUE is measured based on the rate of consumption by information technology (IT) equipment against the total power of the facility. The agency is constantly improving the environmental footprint in the data center by adjusting and directing cooling where it is most needed by using perforated tiles. Finally, it is standard practice to replace old computer equipment with new, more energy efficient equipment.

As a department CDFW is already over 98 percent virtualized. In addition, CDFW has begun exploring cloud-based virtualization options, which would take on premise services and move them to a hosted data center. This project is currently in the beginning of planning and implementation phase but is expected to expand in the future and significantly reduce energy use.

### CDFW Energy Trends

Total energy use is a good measurement but sometimes can be misleading, if buildings or large square footage was added to the portfolio. EUI is energy use per square footage and can be a more accurate measurement of energy efficiency. Please note that the baseline year is 2003, and from 2013 on is when the department began having reliable data being reported.

**Table 3.5: Department-Wide Energy Trends (if available)**

Year	Floor Area (ft <sup>2</sup> )	Total kBTU Consumption	Department Average EUI
BASELINE YEAR (2003)	1,235,782	91,142,669	278,024,695
2013	1,235,782	69,046,839	212,086,005
2014	1,235,782	67,379,137	207,414,364
2015	1,247,612	71,118,948	216,300,983
2016	1,247,612	72,813,165	222,777,388
2017	1,247,612	63,337,999	193,615,886
2018	1,247,612	63,350,907	193,758,335
2018 GOAL (20% REDUCTION OF BASELINE)	Not Applicable	72,914,135	222,419,756
PERCENT CHANGE 2003 - 2018	Not Applicable	-30%	-30%
2018 GOAL MET?	Not Applicable	Yes	Yes

<b>Year</b>	<b>Floor Area (ft<sup>2</sup>)</b>	<b>Total kBTU Consumption</b>	<b>Department Average EUI</b>
2020 GOAL MET?	Not Applicable	Yes	Yes

A look at department energy trends shows the department is reducing its energy use. To get a better understanding of CDFW's portfolio, the following summary gives a quick look at the makeup of the department's portfolio. CDFW's owned facilities have a total building area of 1,247,612 square feet. Of these facilities, 91 percent of the square footage consists of wildlife areas, ecological reserves, and fish hatcheries, which may be located at remote places. The remaining nine percent are screen shops, offices, labs, and other services mainly located in cities. The total purchased site energy consumption for 2018 is 63.4 million kBtu. The department average source EUI is 137 (kBtu/ft<sup>2</sup>). Since 2003, CDFW has been reducing energy consumption as well as EUI. The lower the EUI, the more efficient the building.

CDFW's leased facilities have a total building area of 683,940 ft<sup>2</sup>. Of the leased square footage, 80 percent are offices, while the remaining facilities are warehouses and other types of buildings. Energy consumption data is currently not available for leased facilities.

Facilities often serve as other functions or multiple functions, which include but are not limited to visitor centers, residential spaces, home offices, and/or educational centers. In 2018, fish hatcheries accounted for 57 percent of the department's total energy consumption, wildlife areas and ecological reserves 38 percent, and other types of facilities, five percent. Average source EUIs (kBtu/ft<sup>2</sup>) for fish hatcheries is 206, wildlife areas and ecological reserves is 34, and others is 91.

Even though the department has met the mandated goals, when comparing to national mediums CDFW is higher on average. CDFW is confirming the accuracy of the data in ESPM as well as looking for opportunities to decrease energy use intensity across the portfolio. The department is putting an emphasis on fish hatcheries as they tend to have higher energy use. No cost data is available, so a cost comparison cannot be made at this time. Since CDFW has met its energy goals, new goals are being established to continue reducing energy usage at the department.

Due to the pandemic fewer energy projects were completed, and energy surveys were paused during 2020 and 2021. It is expected that surveys and projects will resume in late 2021-2022.

**Table 3.6: Summary of Energy Projects Completed or In Progress**

Year Funded	Estimated Energy Savings (kBtu/yr)	Floor Area Retrofit (sq.ft.)	Percent of Department Floor Area
2016	429,895	79,942	8 %
2017	138,828	73,826	7 %
2018	376,594	285,337	23%
2019	10,708	44,544	4%
2020			
2021			

Retrofits in 2020 and 2021 were as needed as items needed to be replaced or updated due to repairs. Most of these retrofits were completed on state owned houses occupied by CDFW staff at our sites. Some of these projects include:

Complete housing retrofit and replacement including addition of energy efficient appliances, windows, and lighting fixture at several houses across multiple CDFW locations.

Upgrade pumps to include variable frequency drives which decrease water use and increase energy efficiency and the addition of six soft start water pumps that save energy in water treatment systems.

Installation of 15 Seasonal Energy Efficiency Ratio (SEER) rated HVAC units over multiple sites, and upgrade for each site from a rated 17 or lower to 19. This constitutes about a 14 percent savings or more per unit depending on the rating of the unit. Some of these units were installed in state owned houses and others in operational buildings with significantly greater square footage.

**Table 3.7: Energy Surveys**

Year	Total Department Floor Area (sq.ft.)	Energy Surveys Under Way (sq.ft.) Level 1	Energy Surveys Under Way (sq.ft.) Level 2	Percent of Department Floor Area Level 1	Percent of Department Floor Area Level 2
2017	64,337	5%	114,089		
2018	436,787	35%	376,594		
2019					
2020					

As of the end of 2018, CDFW has completed over 30 audits. These audits accounts for about half of the properties in the portfolio and over 60 percent of the total square footage of CDFW state-owned properties. Audits were conducted utilizing programs



offered by the larger utilities, PG&E, SCE, SDG&E, and SMUD. CDFW locations are small, and most are not standard offices. The main energy users are pumps and lighting. Due to the size and uniqueness of the sites, ASHRAE Level 2 audits were not necessary. The audits focused on lighting and pumps. The rest of the portfolio is either extremely small and does not qualify for a utility program or falls outside of the larger utility territories and the provider does not have a program. We are evaluating options to complete audits and retrofits for these sites. CDFW continued to research options for audits and retrofits through 2019 but paused during the COVID-19 pandemic due to uncertainty around funding.

## Demand Response

EO B-18-12 directed all state departments are to participate in available demand response programs and to obtain financial incentives for reducing peak electrical loads when called upon, to the maximum extent cost-effective.

CDFW is not participating in automated demand response/demand response at its locations. Due to type and size of locations demand response participation can be challenging. CDFW has spoken with all utilities about possible participation and the utilities are evaluating. One of the more promising programs for the department is the Smart Thermostat program through San Diego Gas and Electric (SDG&E). Audits are currently being scheduled with SDG&E's contractors and to determine eligibility in that program.

**Table 3.8: Demand Response**

Demand Response Participation	Number of Buildings	Estimated Available Energy Reduction (kW)
Number of Buildings Participating in 2020	X	A
Number of Buildings That Will Participate in 2021	Y	B
All Department Buildings (Totals)	Q	R
All Department Buildings (Percent)	$(X+Y)/Q$ %	$(A+B)/R$ %

## Renewable Energy

New or major renovated state buildings over 10,000 square feet must use clean, on-site power generation, and clean back-up power supplies, if economically feasible. Facilities with available open land must consider large scale distributed generation through various financing methods, including, but not limited to, third party power purchase agreements (PPAs).

Although there are no specific kW goals for renewable energy, renewable energy does count towards meeting: (1) Zero Net Energy goal for 2025 and (2) 20% grid-based energy use reduction by 2018.

The department is also pursuing long term clean energy solutions at sites to respond to grid interruptions and potential natural disasters for many of its 24-hour fish hatcheries. CDFW has been researching and working with potential partners to install microgrids at the fish hatcheries using clean energy that could power a facility off grid for up to seven days. As this technology is very new, CDFW is working through multiple channels to set up a contract for the department.

A microgrid has multiple benefits including, reduced GHG emissions due to use of clean energy, monetary savings, and long-term resiliency against grid interruptions. Fish hatcheries are the main priority as they are 24-hour facilities that support life. CDFW has been impacted multiple times in 2019 due to utility companies power safety shutdowns. These shutdowns can last anywhere from 24 hours to multiple days. It is important that CDFW sites have a dependable source of power, with all these power interruptions, in addition to the real threat of wildfire, which resulted in facilities being shut down more often in the past three years. While CDFW is continuing to research this option, at this time it is not cost prohibitive.

**Table 3.9: On-Site Renewable Energy**

Status	Number of Sites	Capacity (kW)	Estimated Annual Power Generation (kWh)
RENEWABLES IN OPERATION OR CONSTRUCTION	2	20	31,540
<b>RENEWABLES PROPOSED</b>	<b>5</b>	<b>1,695</b>	<b>2,758,839</b>
RENEWABLE TOTALS	8	1,715	2,790,379
DEPARTMENTWIDE TOTALS	8	1,715	2,790,379
DEPARTMENTWIDE RENEWABLE PERCENT	11%	17%	17%

Table 3.9 is a breakdown of renewable energy at the department. CDFW is in the final stages of contracting on five pilot sites that will host new solar generation systems. In accordance with DGS, a Power Purchase Agreement (PPA) method will be used to fund the systems. It is the hope of the department that once these systems are completed it will establish a model to follow for future sites. Please see table 3.9 for a breakdown of renewable energy projects. Please note that this is just a pilot project with the goal of expanding to additional sites after the process is completed. Though the

number of sites may only account for 11 percent of the total CDFW state-owned sites, the sites chosen are some of the largest energy users.

## Monitoring Based Commissioning (MBCx)

New and existing state buildings must incorporate Monitoring Based Commissioning (MBCx) to support cost effective and energy efficient building operations, using an Energy Management Control System (EMCS). State agencies managing state-owned buildings must pursue MBCx for all facilities over 5,000 square feet with EUIs exceeding thresholds described in Management Memo 15-04.

CDFW does not currently have an installed EMCS or current MBCx activities. Many of the locations are smaller buildings that do not have a need for a large energy management system. Per MM15-04, the following facilities meet the criteria for requiring MBCx. CDFW is evaluating these sites to determine feasibility to implement MBCx.

**Table 3.10: Planned MBCx Projects**

Building Name	Location	Floor Area (ft <sup>2</sup> )	EMCS Exists? (MBCx Capable, MBCx Difficult, No EMCS)	MBCx Projected To Start	Projected Cost (\$)
NR 1 - BUTTE VALLEY WILDLIFE AREA	MACDOEL	26,798	No EMCS		
IDR 6 - FILLMORE FH	FILLMORE	24,423	No EMCS		
IDR 6 - FISH SPRINGS FH	BIG PINE	17,189	No EMCS		
NCR 2 - GRAY LODGE WA	GRIDLEY	34,089	No EMCS		
BDR 3 - GRIZZLY ISLAND WA	SUISUN CITY	29,282	No EMCS		
HONEY LAKE WA	WENDEL	35,685	No EMCS		
LOS BANOS WA	LOS BANOS	21,162	No EMCS		
MAD RIVER FH	ARCATA	50,819	No EMCS		
MARINE WILDLIFE VET CARE & RESEARCH CENTER	Santa Cruz	19,400	No EMCS		
MENDOTA WA	MENDOTA	13,111	No EMCS		
MOJAVE FISH HATCHERY	VICTORVILLE	21,508	No EMCS		
NORTH GRASSLANDS WA	GUSTINE	17,433	No EMCS		

R2 - NORTH CENTRAL HQs	RANCHO CORDOVA	66,667	No EMCS		
UPPER BUTTE BASIN WA	BUTTE CITY	13,994	No EMCS		
WARM SPRINGS FH	GEYSERVILLE	54,810	No EMCS		
YOLO BYPASS WA	DAVIS	44,544	No EMCS		
Totals		490,914			

## Financing

State agencies are required to pursue all available financing and project delivery mechanisms to achieve these goals including, but not limited to state revolving loan funds, utility On-Bill Financing (OBF), Power Purchase Agreements (PPAs), GS \$Mart, Energy Service Contractors (ESCOs), or other available programs.

In 2016 and 2017, CDFW coordinated with PG&E to take advantage of their OBF program for four of the higher-energy consumers within PG&E service areas. CDFW has ambitious goals and intends on using all financing available to state departments. In 2018 and 2019, CDFW worked with PG&E and other utilities to have over 30 buildings evaluated for energy savings and is using OBF to complete the energy retrofits. The department is also using SDG&E's direct install for lighting upgrades in San Diego locations. No funding programs or audits were utilized in 2020 due to impacts from the pandemic. Finally, CDFW is committed to identifying and maximizing outside funding to support these efforts, and therefore, has been researching grant opportunities, utility incentives, partnerships with non-governmental organizations (NGOs), and other funding mechanisms.

For renewable energy, the CDFW is utilizing grants, PPAs, and other funding and financing options through outside partners and other state departments such as the California Energy Commission. CDFW is working with DGS and various outside partners to add pilot solar projects at five sites and will be utilizing a PPA to fund the projects. In addition, CDFW was granted 6 solar electric vehicle chargers in 2021 increasing the number solar electric vehicle chargers to 12 for the department.

# CHAPTER 4 - WATER EFFICIENCY AND CONSERVATION

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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. The 2017 water year (October 1, 2016-September 30, 2017) surpassed 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.

The water plan component of the Governor's Sustainability Roadmap will help all agencies and departments maximize water efficiency and conservation while improving their energy savings. Further, the plan helps agencies to gain additional benefits regarding climate adaptation and other ecosystem services. The water efficiency and conservation plan sets priorities, defines tasks, timelines and budgets and designates responsible personnel for each step of the plan.

This water plan has two major components. The first component consists of a quantitative inventory of indoor water use by fixtures, boilers and cooling systems and appliances in state buildings and facilities. The second component focuses on outdoor water use and landscaping and includes a measurement of landscape areas and types as well as an assessment of irrigation equipment. Each water plan component includes a mandatory set of BMPs for ongoing water use efficiency in both buildings and landscapes. Additionally, there are further requirements for large landscape water use tracking, if an agency has a total landscape area greater than 20,000 square feet at a facility. Both components of water use include monitoring, reporting, oversight and

compliance. State agencies shall complete all of the applicable Building and Landscape Inventories and Best Practices assessments found in the workbook sections and report their results in the following tables and sections.

DWR suggests that state agencies contact their water supplier for advice and assistance regarding local water conditions. Water suppliers are a source of expertise and can assist with water conservation and water efficiency efforts in a number of ways including rebates and other incentives, free water audits for both buildings and landscapes, irrigation scheduling assistance, water shortage contingency plans and informational brochures.

## **Best Management Practices**

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.

BMPs can be continuously updated based on need and tailored to fit the facility depending on occupancy and specific operations.

One of the critical practices in effective water management is to designate a water management coordinator to conduct the building walk-through inventory, implement the building BMP's and monitor and report water use. In the beginning of implementation, these BMPs require that staff be able to have enough time and resources to perform the actions required. A certain level of expertise may also be required. It is possible that various skills are needed which may not be found in just one person but require a team approach. Additionally, many of the BMPs are location specific, and it may be that BMP responsibilities are best assigned on that basis.

BMPS are found in the appropriate section. To complete building BMPS, discuss under each section how each BMP has been implemented. If the BMP is a process or inspection, explain how the process is institutionalized by the Department. Give number of repairs and replacements as well as estimated water savings under each BMP inspection.

## **California Department of Fish and Wildlife Water Report and Plan**

Majority of the department's water use is for fish and wildlife in hatcheries, wetlands and other wildlife areas. CDFW reports water for 58 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 not all use is metered, and the amount of recycled water cannot be determined at this time. Many of the hatcheries recirculate the water, use it for fish then put it back into the ground, rivers, etc., when finished. There is very little water consumed at many of these sites, as it is put back when finished. Table 4.1 is a breakout of total water used by CDFW.

**Table 4.1: 2020 Total Purchased Water**

Purchased Water	Quantity	Cost (\$/yr)
Potable	39,849	NA
Recycled Water	0	NA
Total	39,849 Gallons	NA

**Table 4.2: Properties with Largest Water Use Per Capita**

Building Name	Area (ft <sup>2</sup> )	# Of Building Occupants	Total 2020 Gallons	Total 2020 Irrigation in Gallons (if known)	Gallons per Capita
NR 1 – MAD RIVER FH	50,819	3	2,351,400	NA	2,147
NR 1 – TEHAMA WA	6,131	3	1,696,600	NA	1,549
NR 1 - CRYSTAL LAKE FH	27,486	9	4,582,100	NA	1,395
CR 4 – SAN JOAQUIN FH	31,317	7	3,160,800	NA	1,237
SCR 5 – RANCHO JAMUL ER	12,117	9	3,824,800	NA	1,164
Total for Buildings in This Table	127,870		15,554,400		---
Total for All Department Buildings	1,257,683		37,160,700		---
% Of Totals	11%		34%		---

Table 4.2 lists facilities with largest use per capita (per person per square footage). 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 different geographic regions. Some locations also have more visitors during peak fishing or hunting seasons. So, an additional Table 4.3 that was more useful to determine high water users for 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 areas (inland desert, coastal, central valley, etc.)

**Table 4.3: Properties with Highest Percent Increase Since 2013**

<b>Building Name</b>	<b>Address</b>	<b>City</b>	<b>% Change since 2013</b>
CR 4 – MOCCASIN CREEK FISH HATCHERY	Intersection of Hwy 120 and Hwy 49	Moccasin	327%
OSPR – MARINE WILDLIFE VET AND CARE RESEARCH CENTER	151 McAllister Way	Santa Cruz	27%
NR 1 – ASH CREEK WILDLIFE AREA	659695 CA-299	Bieber	9%
CR 4 – CRYSTAL LAKE FISH HATCHERY	40158 Baum Lake Road	Cassel	3%

It should be noted that while the fish hatcheries are the largest users of water per Energy Star Portfolio Manager, it is because the measurement is taken only when water is pumped from the wells or 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.

CDFW's challenges toward meeting the water goals include outdated equipment and 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, a good amount of water use 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 and thus skews the data.

**Table 4.3: Department Wide Water Use Trends**

Year	Total Occupancy /year	Total Amount Used (Gallons/year)	Per capita Gallons per person per day
Baseline Year 2010	552	52,342,600	260
<b>Baseline Year 2013</b>	552	46,067,800	229
2018	552	37,160,700	184
2020 Goal	552	41,465,240	206

For CDFW-owned facilities, the department has met the 20 percent reduction goal from the 2010 baseline by reducing its water use by 29 percent for 2018. Gallons per person per day has also been reduced by 76 gallons per person per day. Water use for 2020 has significantly decreased due to the Pandemic.

In 2013, EO B-29-15 set a special reduction mandate for the timeframe of 2013-2016 for a 25 percent reduction. CDFW took the mandate seriously and significantly reduced water across the department, however some sites 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 from reporting, it cannot always be separated from total water use at these locations, and therefore, was included which skewed the department's reporting for this mandate.

**Table 4.4: Total Water Reductions Achieved**

Total Water Use Compared to Baseline	Goal Met	Reduction Achieved	Total Amount Used (gallons per year)	Annual Gallons Per capita
2010 baseline: 20% Reduction Achieved	Yes	29%	52,342,600	260
2013 baseline: 25% Reduction Achieved	No	12%	40,542,600	201

Most projects completed at CDFW facilities are maintenance repairs or replacements on an as-needed basis. When CDFW completes these repairs, the department replaces 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 DGS

Drought Grant to replace all fixtures with more efficient ones. 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 an estimated water savings total of three million gallons after all fixtures are replaced, annually.

Currently under construction is a new fish hatchery located near Fresno that will be used for aquaculture. The new hatchery will use 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.

CDFW has met the 2010 goal, and so has set a new goal of 40 percent reduction by 2030. The department is committed to conservation and saving water is essential to the mission. New strategies and projects are being assessed for potential water savings. A wish-list of projects is being compiled for when funding becomes available.

Even though the department may not have large landscaped area, there are many sites that have pumps and irrigation controls associated with watering for wildlife. Some of the projects that have been completed in 2018-2019 include fixing water controls at these points that significantly save water and fixing leaking valves. The department's infrastructure is often very old so site manager must be diligent to check and repair leaks when possible. There are also projects in place to reduce spill on wetland ponds. Finally, some sites are looking into rain gutter or capture projects. One project is capturing rain to provide water for a two-acre native nursely to provide plants for restoration purposes.

As mentioned, much of the infrastructure is aging and funding is always a challenge. CDFW is leveraging utility programs and other grant programs to increase pump efficiency and finance pump upgrades.

## **Building Water Management BMPS**

### General Water Management

- Track monthly water use
- Check leak indicator on water meter when water is not in use

Describe how you track your monthly water use and describe your water meter leak indicator check procedure.

### **Leak Detection and Repair**

Perform monthly visual leak detection survey on all water use fixtures:

- Toilets
- Urinals
- Faucets - Check faucets for proper aerators (kitchen faucets 2.2 gpm and lavatory faucets 0.5 gpm) and install aerators or laminar flow devices if necessary.
- Showers - Check showerhead flow rates and install showerheads using no more than 2.0 gpm with trickle flow controls.

### **Kitchens**

- Replace any broken or damaged dishwasher racks, and run dishwasher only when full to maximize capacity
- Check all equipment water temperatures and flow rates against the manufacturer recommendations. Use the recommended minimum temperature and flow to maximize savings.
- Turn off the continuous flow used to wash the drain trays of the coffee/milk/soda beverage island. Clean thoroughly as needed.
- Adjust ice machines to dispense less ice if ice is being wasted.
- Reduce the flow to dipper wells (troughs) for ice cream and butter scoops, and other frequently used utensils.
- Presoak utensils and dishes in basins of water, rather than in running water.
- Do not use running water to melt ice in bar sink strainers.
- Do not use running water to defrost food.
- Do not allow water to flow unnecessarily.

### **Laundry Facilities**

- Run washer only when full to maximize capacity
- Set water level and water temperature appropriate according to the load

### **Leak Detection and Repair**

Perform monthly visual leak detection survey on all water use fixtures:

- Toilets
- Urinals
- Faucets - Check faucets for proper aerators (kitchen faucets 2.2 gpm and lavatory faucets 0.5 gpm) and install aerators or laminar flow devices if necessary.
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- Do not use running water to defrost food.
- Do not allow water to flow unnecessarily.

## Laundry Facilities

- Run washer only when full to maximize capacity
- Set water level and water temperature appropriate according to the load

**Table 4.5: Summary of Indoor Water Efficiency Projects Completed 2014-2020 or In Progress**

<b>Year Completed</b>	<b>Water Saved (Gallons/yr.)</b>	<b>Number of Indoor Water Efficiency Projects Completed</b>	<b>Cost Savings per Year</b>
2015	Work Began		
2016	-		
2017	3 million		
2018	107,654,480		
2019			
2020	N/A*		

Please note that years 2020-2021 very few projects were completed due to the COVID-19 Pandemic. In year 2019, the projects completed were primarily related to repairs and maintenance for state owned housing projects since the majority of other department buildings had been completed in prior years.

**Table 4.6: Summary of Living Landscaping Water Efficiency Projects Completed or In Progress**

<b>Year Funded</b>	<b>Water Saved (Gallons/yr.)</b>	<b>Landscape Area MWELO (ft2)</b>	<b>Climate Appropriate Landscape Area (ft2)</b>
Annually	32,585,100	0	52,272,000
2019	74,945,730	0	4,599,936
2018	3,650	0	2,138,796
2017	100,000	0	217,800
2016	20,000	0	87,120

CDFW has not added new living landscape projects since 2016. However, CDFW has put together potential water savings projects and are currently evaluating funding options. Table 4.8 is a list of these potential projects. CDFW understands that droughts in California are serious, and the department tries to reduce water consumption whenever possible.

**Table 4.7: List of Submitted Future Water Projects**

<b>Project Description</b>	<b>Estimated Cost \$</b>	<b>Estimated Annual Water Savings (gallons)</b>	<b>Estimated Project Time Length (months)</b>
Install meters on wells.	\$360,000-\$600,000	Estimated 15%-30%	12-24
Fish Springs Hatchery- Upgrade equipment. Project would reduce ground water pumped by approximately 25 percent.	7.0M	200,000,000	24
American River Hatchery- Upgrade equipment. Project would reduce ground water pumped by approximately 25 percent.	3.0M	1,415,435,544 gallons/4343.81 ac/ft per year	18
Mojave River Hatchery- Upgrade equipment. Project would reduce ground water pumped by approximately 25 percent.	7.0M	200,000,000	24
Fillmore Hatchery- Upgrade equipment and install VFD.	7.0M	200,000,000	24

Project would reduce ground water pumped by approximately 25 percent.			
Silverado Fish Base- Upgrade equipment. Project would reduce ground water pumped by approximately 25 percent.	3.0M	236,520,000	24

### **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.

EO 37-16 required DWR to strengthen the requirements for these Plans, including, among other proposed changes, the creation of common standards for each stage in the plan, and extending the drought planning from three to five years. For smaller water suppliers and rural communities not required to maintain a Water Shortage Contingency Plan, DWR works with counties to facilitate improved drought planning.

DWR has finalized these requirements in a Primer that can be found at:

[Making Conservation a CA-Way-of-Life-Primer.](#)

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 required, by June 30, 2017, the formation of locally controlled groundwater sustainability agencies (GSAs) in the State's high- and medium-priority groundwater basins and subbasins (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 CDFW's facilities use well water, CDFW will provide resources to facilities to ensure the guidelines in Management Memo 14-02 are met.

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

**Table 4.8: Number of Buildings with Urban Water Shortage Contingency Plans and in Critical Groundwater Basins**

Number of Buildings with urban water shortage contingency plans.	Number of buildings in critical groundwater basins	Total Amount of water used by buildings in critical groundwater basins (Gallons)
4	7	4,341,600

### **Building Inventories Summary**

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. The project timeframe spanned about two years (starting September 2015 and ending 2017) for all water fixture replacements.

By the end of 2017, CDFW has replaced all fixtures in need of replacement through the 2015 DGS drought 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. Since replacements had just been made to most sites as of 2017, a new summary is not needed at this time. CDFW will assess again in a few years.

### **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. The chillers on most of the sites are too small to qualify for utility optimization programs. Units are replaced with more efficient ones as needed.

### **Irrigation Hardware Inventories Summary**

CDFW's landscaped areas are very small. For the few places with landscapes and 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**

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 GHG 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.

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 or native landscaping, 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.

## **Large landscape Water Use**

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 ft<sup>2</sup> shall be tracked through a water budget program.



CDFW does not have any large landscapes (over 20,000 ft<sup>2</sup>) that would qualify at owned facilities. Leased facility landscapes are managed by the property manager, and CDFW has no authority over those.

## **Best Management Practices**

Building Best Management Practices (BMPs) are ongoing actions that establish and maintain building water use efficiency.

CDFW will put together a best practice 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 investigated the use of utility HVAC optimization programs, to ensure that the equipment is properly maintained and operating as efficiently as possible. However, most of our sites did not qualify as the units were too small. 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 or 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 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.

At several hatcheries, flow meters are being installed to capture the rate of water coming into the hatchery. This is a slow and costly process but the department is expecting to see savings once these meters are installed.

CDFW enters 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.

# CHAPTER 5 - GREEN OPERATIONS

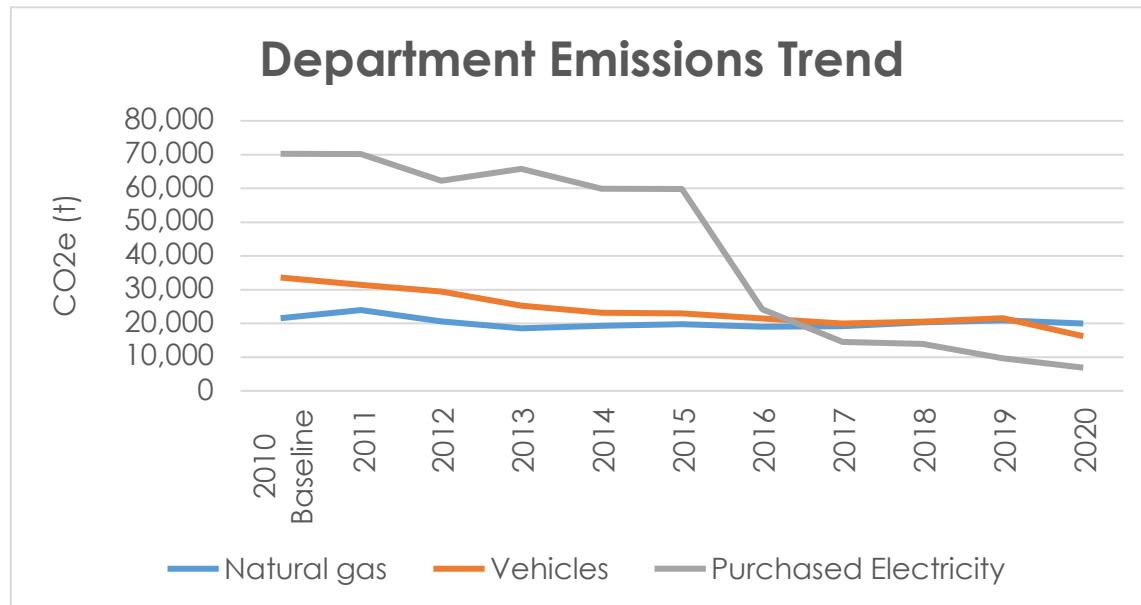
## Greenhouse Gas (GHG) Emissions

State agencies are directed to take actions to reduce department GHG emissions by at least 10 percent by 2015 and 20 percent by 2020, as measured against a 2010 baseline. Through department wide efforts, CDFW has exceeded the mandates goal, table 5.1 show the breakdown of the departments GHG emissions since 2010.

**Table 5.1: GHG Emissions since 2010**

Emissions Source	2010 Baseline	2013	2014	2015	2016	2017	2018	2019	2020	Percent Change since Baseline
Natural gas	1,709	1,105	1,614	1,517	1,508	769	728	20,841	19,906	-8%
Vehicles	11,514	10,955	12,642	12,032	11,266	11,400	12,129	21,533	16,214	-52%
Purchased Electricity	10,726	7,993	7,146	7,553	7,217	5,648	5,125	9,717	6,938	-90%
<b>Total</b>	<b>125,416</b>	<b>109,545</b>	<b>102,354</b>	<b>102,565</b>	<b>64,690</b>	<b>53,681</b>	<b>54,850</b>	<b>52,091</b>	<b>43,058</b>	<b>-66%</b>

**Graph 5.1: GHG Emissions since 2010**



Graph 5.1 shows a breakdown of department GHG emissions. Natural gas is staying relatively the same but there have been decreases in both vehicle and purchased electricity emissions for 2020. Please note that 2020 emissions data is in part impacted due to the change in utilization resulting from the pandemic and Emergency Telework. It is anticipated future utilization will differ from pre-pandemic utilization, and CDFW plans to continue to evaluate this change and how to continue to reduce GHG.

Though CDFW has exceeded its goal, the department understands how important it is to reduce GHG emissions, and therefore has set new internal goals.

The department has set a 50 percent reduction in GHG emissions by 2030, using the 2010 baseline tracked in the Climate Registry Information System (CRIS). To meet the ambitious goal, the department set new goals for energy and fleet reduction as well. CDFW's new goals are:

- ▶ **Reduce GHG emissions by 50 percent.**
  - ▶ Reduce energy use by 70 percent.
  - ▶ Reduce fleet emissions by 30 percent.

The department currently needs to reduce emissions by 6007.5 metric tons in order to achieve the 50 percent goal. GHG emissions are broken out by three categories in the CRIS database, vehicles, electricity, and heating fuel. Table 5.1a shows the department's status as of 2020.

**Table 5.1a: Progress Toward CDFW GHG Emission Goal**

<b>Emission Source</b>	<b>2020 Emissions Reported (MT CO2)</b>	<b>CDFW Goal</b>	<b>2020 Progress</b>
NATURAL GAS	19,906	70%	-8%
VEHICLE	16,214	30%	-52%
ELECTRICITY	6,938	70%	-90%

## Low Emitting Landscaping Equipment

State agencies are to use manual landscape and hardscape maintenance as much as possible to reduce air pollution, dust, and noise. These measures are addressed in SAM Section 1821.6. CDFW plans to pilot a facility to switch to electric battery or battery-powered landscape equipment. Because CDFW's facilities are in remote places and at times can get quite cold or hot, the equipment must be durable enough to withstand such conditions. If the pilot goes well, CDFW will start switching its landscape equipment to electric.

## Building Design and Construction

Executive Order B-18-12 requires that all new buildings, major renovation projects and build-to-suit leases over 10,000 square feet shall obtain LEED Silver certification or higher. All new buildings under 10,000 square feet shall meet applicable CALGreen Tier 1 Measures. New buildings and major renovations greater than 5,000 square feet are also required to be commissioned after construction.

Since 2012, CDFW has only had one new building that is currently under construction and one leased space with major renovation. The leased space received a Gold, LEED certification for the interior. There are no other buildings planned, but CDFW will adhere to all mandates should the need arise again.

**Table 5. 2: New Construction since July 1, 2012**

Facility Name	LEED Certification Type & Level Achieved	Commissioning Performed (Y/N)
CA DEPT. OF FISH AND WILDLIFE OFFICE-LAB	Gold	?
FISH HATCHERY	N/A	Still under Construction

State agencies shall implement mandatory measures and relevant and feasible voluntary measures of the California Green Building Standards Code (CALGreen), Part 11, related to indoor environmental quality (IEQ) that are in effect at the time of new construction or alteration and shall use adhesives, sealants, caulks, paints, coatings, and aerosol paints and coatings that meet the volatile organic chemical (VOC) content limits specified in CALGreen.

Due to the size and limitations of the lands/maintenance section, the department relies on DGS for all major renovations and new construction, and therefore, expects that they follow proper protocol on these matters.

## LEED for Existing Buildings Operations and Maintenance

All State buildings over 50,000 square feet were required to complete LEED-EBOM certification by December 31, 2015 and meet an Energy Star rating of 75 to the maximum extent cost effective.

CDFW does not have any LEED-EBOM certified buildings as all owned buildings are under 50,000 ft<sup>2</sup>. However, a few of the leased sites have obtained or are in the process of obtaining LEED certification. CDFW's West Sacramento leased location is expecting gold certification.

**Table 5.3: LEED for Existing Buildings and Operations**

<b>Number of Buildings over 50,000 sq. ft. and eligible for LEED EBOM</b>	<b>Number of Building over 50,000 sq. ft. that have achieved LEED EBOM</b>	<b>Percentage of buildings over 50,000 sq. ft. required to achieve LEED EBOM that have achieved it</b>
0	0	0

## Indoor Environmental Quality

When accomplishing Alterations, Modifications, and Maintenance Repairs and when relevant and feasible, state agencies shall implement the mandatory and voluntary measures of the California Green Building Standards Code (CALGreen), Part 11, related to indoor environmental quality. Indoor Environmental Quality must also be maintained through the use of low emitting furnishings, cleaning products and cleaning procedures.

CDFW knows the value of indoor air quality, it impacts the environment, employees, and all who enter the buildings. The department is committed to meeting and where possible exceeding the standards set forth in Management Memo 14.05 and the CALGreen code. Below are some of the areas that CDFW is making progress.

### **New Construction and Renovation**

Due to the size and limitations of the lands/maintenance section, the department relies on DGS for all major renovations and new construction, and therefore, expects that they follow proper protocol on these matters.

## **Furnishings**

CDFW is currently developing a BMPs guide that will help increase and ensure environmentally preferred purchasing (EPP) in all procurement, when feasible. As the programs ramps up, EPP will be part of the internal trainings offered by the department.

## **Cleaning Products and Cleaning Procedures**

CDFW is currently writing language that will be included in all new janitorial contracts that will require vendors to use products and procedures that are Green Seal certified. The department is also drafting a policy that covers locations where cleaning is done in-house.

## **HVAC Operation**

Locations will be sent a BMPS guide annually and asked to review it no less than quarterly. As equipment needs to be replaced it is upgraded to more efficient units. Because most of the owned locations are small, the department does not have many large HVAC units.

## **Integrated Pest Management**

Department staff and contracted pest management companies will follow an integrated pest management (IPM) strategy that focuses on long-term prevention of pest problems through monitoring for pest presence, improving sanitation, and using physical barriers and other nonchemical practices. If nonchemical practices are ineffective, Tier 3 pesticides may be used, progressing to Tier 2 and then Tier 1 if necessary.

CDFW does not have a formal policy or integrated pest management plan in effect for the department or as part of the pest control contracts. The different regions and locations have their own contracts and deal with a variety of challenges that may not quite fit into the guidance put forth in the DGS California Best Practices Manual for offices. Most of the facilities are located on areas reserved for wildlife and therefore, critters and insects are present. CDFW tries where possible not to use spray pesticides, especially because it could harm wildlife and other sensitive nature areas present.

With the addition of the sustainability unit, CDFW will develop a BMPs guide more suited for the department's facilities that will be distributed to all facilities and is currently working on language that will be written into all new pest control contracts drawing upon resources from the California Best Practices Manual and Management Memo 15-06, where feasible.

**Table 5.4: Pest Control Contracts**

Pest Control Contractor	IPM Specified (Y/N)
HUNTER SERVICES INC.	N
TERMINIX INTERNATIONAL CO.	Y
BIG TIME PEST CONTROL	N

## Waste and Recycling Programs

The California Integrated Waste Management Act (Assembly Bill 939, Sher, Chapter 1095, Statutes of 1989 as amended) established the solid waste management hierarchy. Source reduction is at the top of the state's waste management hierarchy; recycling and composting is next, followed last by environmentally safe disposal. California's Department of Resources Recycling and Recovery (CalRecycle) administers the state's recycling and waste management programs. State agencies must report their waste and recycling efforts by May 1 of each year covering activities conducted during the prior calendar year in the annual report (State Agency Reporting Center (SARC) Report).

Pursuant to SB 1106 each state agency shall have at least one designated waste and recycle coordinator. The coordinator shall perform the duties imposed pursuant to this chapter using existing resources. The coordinator shall be responsible for implementing the integrated waste management plan and shall serve as a liaison to other state agencies and coordinators. In addition, each state agency is required to provide adequate receptacles, signage, and education and outreach to staff.

**Table 5.5: State Agency Reporting Center (SARC) Report on Total Waste per Capita**

Per Capita Baseline	2019	2020	Total Waste 2019	Total Waste 2020	% Change from 2019/2020
2.10	1.85	2.06	824	736.24	-11%

Table 5.5 shows CDFW's SARC reporting, and that it has met its per capita goal again.

## Recycling

Recycling is the practice of collecting and diverting materials from the waste stream for remanufacturing into new products, such as recycled-content paper. Stewardship programs help collect and recycle carpet, paint, pharmaceutical and sharps, and mattresses. AB 341, Mandatory Commercial Recycling (Chesbro, Chapter 476, Statutes of 2011) requires businesses and public entities that generate four cubic yards or more



of commercial solid waste per week to arrange for recycling services under the goal of source reducing, recycling or composting 75% of solid waste generated statewide.

## **Organics Recycling**

State agencies must implement AB 1826 (Chesbro, Chapter 727, Statutes of 2014). State agencies that generate 2 cubic yards or more of commercial solid waste (total trash, recyclables, and organics) per week shall arrange for organic waste recycling services.

Organic waste includes:

- Food waste
- Green waste
- Landscape and pruning waste
- Nonhazardous wood waste
- Food-soiled paper

The exemption under 42649.82 (e)(3)(E) related to businesses that generate one cubic yard or less of organic waste is no longer in effect. Furthermore, CalRecycle has extended the current AB 1826 rural exemption until December 31, 2026.

Effective January 1, 2022, state agencies must implement SB 1383 (Lara, Chapter 395, Statutes of 2016). State agencies are currently required to maintain mandatory commercial recycling and organic recycling programs, including ensuring that properly labeled recycling containers are available to collect bottles, cans, paper, cardboard, food waste, and other recyclable materials. SB 1383 builds upon these efforts by identifying non-local entities and expanding the definition of organic waste to include food scraps, landscape and pruning waste, organic textiles and carpets, lumber, wood, manure, biosolids, digestate, and sludges.

Under SB 1383, non-local entities include:

- Special districts
- Federal facilities
- Prisons
- State Park facilities
- Public universities and community colleges
- County fairgrounds
- State agencies

### Edible Food Recovery Program

Commercial edible food recovery begins January 1, 2024, for Tier 2 generators which most state agencies would fall under. SB 1383 requires that by 2025 California will recover 20 percent of edible food that would otherwise be sent to landfills, to feed

people in need.

Click [here for What is edible food?](#)

Click [here for Commercial edible food generator requirements](#)

## **Material Exchange**

These programs promote the exchange and reuse of unwanted or surplus materials from your agency. The exchange of surplus materials reduces the cost of materials/products for the receiving agency and results in the conservation of energy, raw resources, landfill space, including the reduction of greenhouse gas emissions, purchasing and disposal costs. CDFW gives dead fish from some of the hatcheries to local Native American tribes and communities.

## **Waste Prevention/Reuse**

Programs in this section support (a) waste prevention: actions or choices that reduce waste and prevent the generation of waste in the first place; and (b) reuse: using an object or material again, either for its original purpose or for a similar purpose, without significantly altering the physical form of the object or material.

## **Training and Education**

Pursuant to [AB 2812 \(Gordon, Chapter 530, Statutes of 2016\)](#), each state agency is required to provide adequate receptacles, signage, education, and staffing, and arrange for recycling services consistent with existing recycling requirements for each office building of the state agency or large state facility. The bill requires, at least once per year, each covered state agency and large state facility to review the adequacy and condition of receptacles for recyclable material and of associated signage, education, and staffing. Additionally, the bill requires each state agency to include in its existing Report to CalRecycle a summary of the state agency's compliance with the act.

## **Environmentally Preferable Purchasing**

State agencies are required to purchase and use environmentally preferable products (EPP) that have a reduced effect on human health and the environment when compared with competing goods that serve the same purpose.

Additionally, the State Agency Buy Recycled Campaign (SABRC) is a joint effort between CalRecycle and the Department of General Services (DGS) to implement state laws requiring state agencies and the Legislature to purchase recycled-content products (RCP) and track those purchases. Both state agency and its contractors must be track purchases that fall under eleven product categories. Click [here for the](#)

current product categories. It complements the intent of the Integrated Waste Management Act (AB 939, Sher, Chapter 1095, Statutes of 1989 and Public Resources Code 4000 et al), which was enacted to reduce the amount of waste going to California's landfills. An annual report detailing state agencies' annual RCP purchase is due to CalRecycle by October 31 of each year.

Pursuant to Public Contract Code Sections 12203 and 12211 (AB 2675, Lowenthal. State agency: public contracts), effective January 1, 2020, this bill requires each state agency to ensure that at least 75 percent of the total purchases under the reportable categories contain recycled-content products meeting the minimum percentage content, except for paint, antifreeze, and tires which would remain at the 50 percent requirement. Click [here for current SABRC compliance percentages](#)

## **Reducing Impacts**

The environmental impact of the goods we buy is often larger than the impact of our own department operations. Our department is committed to reducing the environmental impact of our goods and services we purchase. The areas of the SABRC report are listed below.

- Paint (i.e., master painter's institute certified paint and recycled paint)
- IT goods (energy star rated: computers, monitors and televisions DGS-52161505 Purchasing Standard or meet current specifications of statewide contracts)
- Janitorial supplies and cleaners (EcoLogo, Greenseal certified cleaners, DGS\_471318A Purchasing Standard compliant)
- Janitorial supplies, paper products (i.e., SABRC compliant and DGS\_141117A Purchasing Standard Compliant)
- Desk Lamps (DGS-391115-A Purchasing Standard compliant)
- Office equipment (i.e., EPEAT compliant and EnergyStar rated printers, copiers and DGS\_432121A Purchasing Standard compliant for high-end multifunctional devices) and
- Paper products (i.e., Forest Stewardship Council certified, SABRC compliant copy paper, DGS-441200-A Purchasing Standard compliant)
- Remanufactured toner cartridges (available from PIA and statewide contract ID/Number: 1-15-75-61)

**Table 5.6: State Agency Buy Recycled Campaign FY 20/21 Performance**

<b>Product Category</b>	<b>SABRC Reportable Dollars</b>	<b>SABRC Compliant Dollars</b>	<b>% SABRC Compliant</b>
Antifreeze	149.58	104.11	70
Compost and Mulch	2,302.12	2,302.12	100
Glass Products	9,548.68	5,895.34	62
Lubricating Oils	12,541.04	6,003.23	48
Paint	4,370.82	1,795.66	41
Paper Products	54,614.59	30,356.58	56
Plastic Products	436,388.58	299,903.88	69
Printing and Writing Paper	166,941.31	69,247.68	41
Metal Products	569,102.31	419,170.83	74
Tire Derived Products	11,805.87	7,746.25	66
Tires	94,106.24	0	0

There are four categories that the department has not yet met the target for: lubricating oils, paint, printing and writing paper, and tires. There are safety concerns within the department about using retreaded tires as well as the tires do not meet the necessary requirements for the department's Law Enforcement Vehicles. CDFW is looking into ways to increase the use of retreaded tires and/or looking for alternatives that meet the EPP standards while not compromising functionality or safety for department use. CDFW is slowly increasing the use of re-refined oil products and is looking at ways to incorporate this use more within the fleet.

For paint, printing, and writing paper, there have been some inaccuracies in the data due to the coding of items in the accounting system, Fi\$Cal, so the department is verifying the numbers to confirm the low percentage is due to an error.

As it relates to the compliance rate for glass products, due to the nature of the scientific research and other work being conducted by CDFW, often virgin glass is required, and recycled glass is unable to be used due to the impurities. This makes it very difficult to meet the mandate. Further, with regard to tire utilization, CDFW tends to defer to California Highway Patrol, especially for our emergency response staff. At this time, CHP is not using recycled tires and we are following their lead.

The Green Buyer website tracks and offers transparency in agencies performance for buying EPP goods. EPP goods are those identified as EPP when entered into SCPRS. These goods are available from statewide contracts or complaint with DGS Purchasing Standards or SABRC. EPP goods are categorized by UNSPSC and compared with goods of the same category to establish the percent EPP spend as reported in SCPRS. EPP goods are found on [DGS Buying Green website](#).

**Table 5.7: Commodities categories with the greatest Potential to Green**

Commodity	2020 Total Spend (\$)	2020 Percent EPP Spend (%)	EPP Target (%)
LUBRICATING OILS	12,541.04	48	75
PAINT	4,370.82	41	50
PRINTING AND WRITING PAPER	166,941.31	41	75
TIRES	94,106.24	0	50

### Sustainability Development and Education

CDFW will incorporate language in all solicitations and statements of work, to address EPP and the importance of the environment. In addition, the department will include the importance of purchasing of EPP products in future CDFW internal trainings. Finally, a dedicated staff person has been identified to increase and formalize an EPP program. CDFW is researching and creating a formal plan to identify opportunities to communicate with bidders and vendors on all items including EPP. Due to the COVID-19 pandemic training was ceased in years 2020/21. It is the hope of CDFW to resume training in 2022.

**Table 5.8: Buyers who have completed EPP Training**

CalHR Classification	Total Number of Buyers	Percent Completing EPP Training	Commitment to have buyers complete EPP training (%)

CDFW has not done any formal training in regard to EPP in the last few years. However, updates on the SABRC report and as well as informal question and answer sessions with the department sustainability manager have taken place on an as needed basis. The sustainability and procurement offices will work together to create a more formal process going forward.

### Location Efficiency

Location efficiency refers to the effect of a facility's location on travel behavior and the environmental, health and community impacts of that travel behavior including

emissions from vehicles. Locating department facilities in location efficient areas reduces air emissions from state employees and users of the facilities, contributes to the revitalization of California's downtowns and town centers, helps the department compete for a future workforce that prefers walkable, bikeable and transit-accessible worksites and aligns department operations with California's planning priorities.

CDFW's goal is that the average location efficiency score for all new leases be 10 percent higher than our 2016 average on or after Jan 1, 2017. The baseline score is currently 67 Smart Location Calculator (SLC), and the department target is 73 SLC.

Table 5.9 lists leases that began after January 2017, many other leases are currently in negotiation. CDFW works with DGS to try and meet the goal of 73 SLC or better on all new leases, however due to the nature of the department's locations, it can be hard to meet the goals for location efficiency. Nonetheless, the department will continue to encourage DGS to look for locations that exceed the baseline.

**Table 5.9: Smart Location Score for new Leases**

<b>Facility name</b>	<b>Smart Location Calculator Score</b>
OSPR – Bakersfield Office	93
BDR 3 – Fairfield Office HQ	23
CR 4 – Fresno Annex Conservation Office	87
West Sacramento 980	30
LED – Sacramento Forensic Lab	53
IDR 6 – Murrieta Office	53
BDR 3 – Santa Rosa Field Office	43
Average	55
Baseline	67
% Change from Baseline	-19%

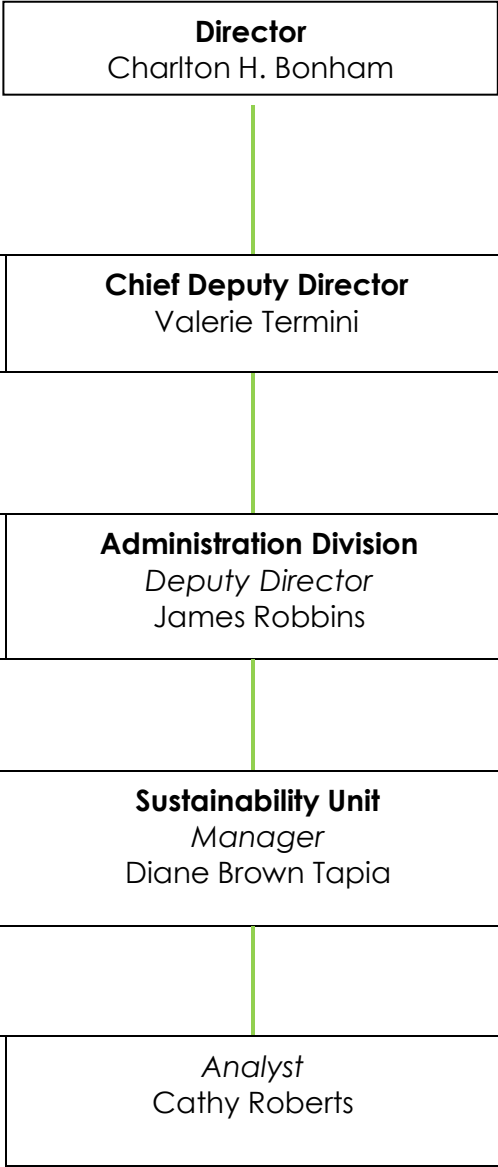
Table 5.9 lists the department's lowest scoring leases. This list was narrowed to only include shop, storage, and office types. All other sites (types) need to be located where they are because of their relation to the wildlife area, etc. The property management staff will look at locations to see where improvements in scores can be made as leases renew. Unfortunately, many locations need to be close to the wildlife they serve which often means remote locations. However, if there is a way to improve efficiency, the department will. It is important to look at all low scoring leases, not just the bottom 10. CDFW will also ensure that DGS knows the department's baseline and goals.

**Table 5.10: Lowest Smart Location Score Leases**

<b>Facility name</b>	<b>Smart Location Calculator Score</b>
IDR 6 - BLYTHE FIELD OFFICE (leased)	9
BDR 3 - Fairfield Field Office HQ (leased)	23
West Sacramento 1010 Riverside (leased)	27
West Sacramento 980 Riverside Parkway (leased)	30
CR 4 - KERN DFW Check Station (Leased)	36
NR 1 - Yreka Pacific Mobile Structures (leased)	40
BDR 3 - SANTA ROSA Field Office 2 (Lease)	43
MR 7 - Santa Rosa Office (and Warehouse) (Lease)	43
LED - WEST SACRAMENTO WAREHOUSE (leased)	46
BDR 3 - STOCKTON LICENSE OFFICE (LEASE)	47

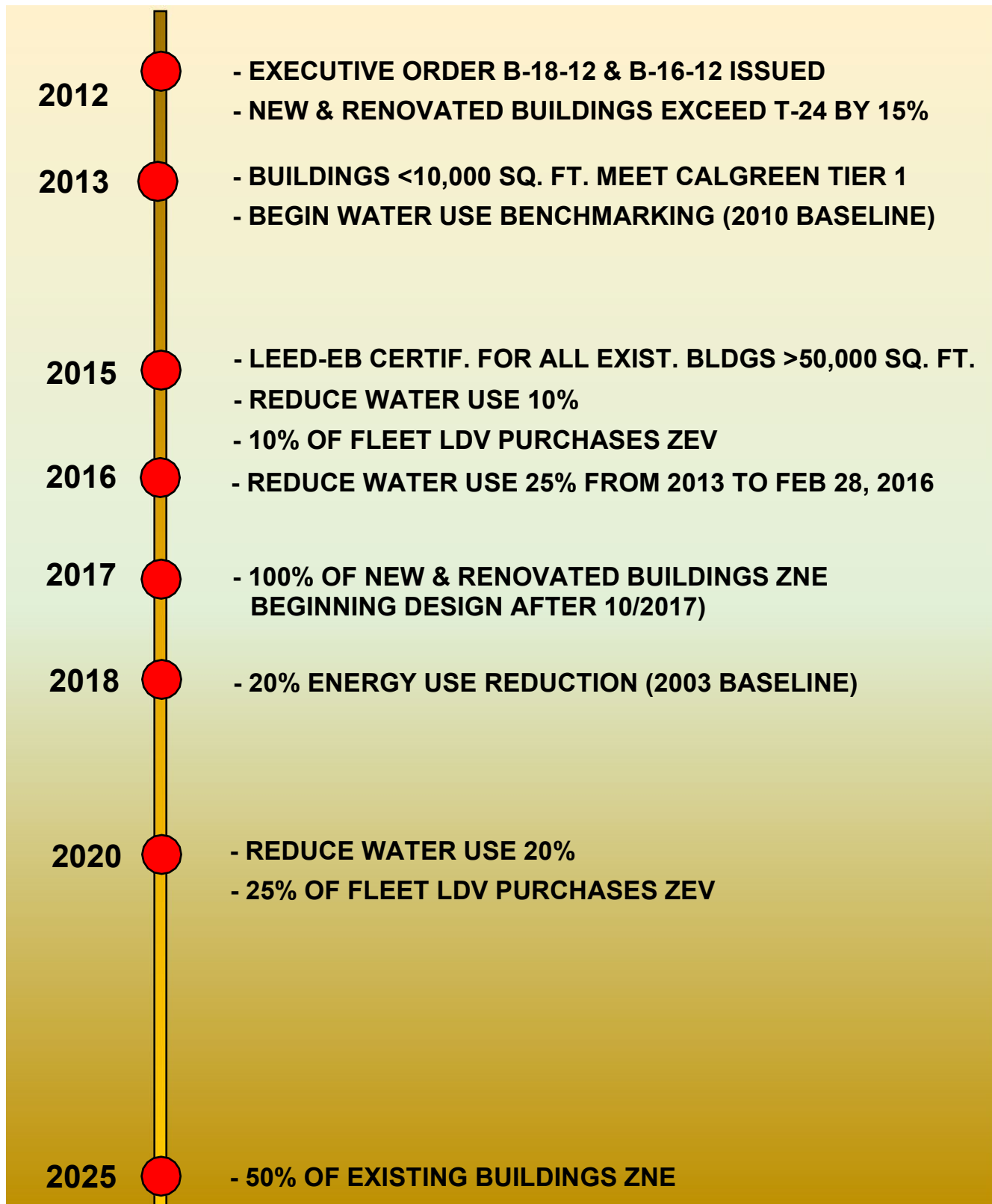
# Appendix A – Sustainability Leadership

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## Appendix B - Sustainability Milestones & Timeline



# Appendix C – Roadmap Checklists

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## 1 - Climate Adaptation Roadmap Checklist

Policy References: Executive Order B-30-15

### Executive Summary:

- Summary of status and actions underway to meet sustainability objectives related to climate adaptation.
- Include summary of changes from previous roadmap.

(This executive summary can be a paragraph in a single, comprehensive executive summary including all roadmap chapters if combined into one document.)

### Past Performance:

- Describe how screening process will integrate facility operations and planning processes
- Describe approach and steps taken to integrate climate considerations in planning and investment, and how this will address changes
- Use Cal-Adapt to collect data and characterize anticipated climate change
- Report Top 5 facilities most affected by changing temperature in Table 1.2a
- Discuss how temperature and extreme heat events affect your facilities and operations, and what facilities and regions are most affected
- Describe strategies to reduce impacts of changing temperatures
- Describe ways you could employ natural infrastructure to reduce risks of climate change
- Report facilities located in disadvantaged communities in Table 1.5 and discuss how these facilities can interact with the community or serve as a resource
- Report facilities located in urban heat islands in Table 1.4
- Describe whether these facilities have large parking lots or impervious surface

- Describe actions that can be or are being taken to reduce urban heat island affect at these facilities

**Future Planning:**

- Report five facilities that will experience the largest increase in extreme heat events in Table 1.1
- List facilities most impacted by projected changes in precipitation in Table 1.5, and describe strategies to reduce these impacts
- Identify facilities at risk from rising sea levels in Table 1.6
- Discuss actions that can be taken to minimize risks of sea level rise
- List facility climate risks in Table 1.10
- Identify new facilities anticipating future extreme heat events in Table 1.10
- Discuss how new facilities siting, design, construction and operation are accounting for these changing conditions
- Report new facilities and disadvantaged communities and urban heat islands in Table 1.11
- Describe how climate change will affect useful life of each planned facility
- Verify the integration of a Climate Change Plan into department planning in Table 1.12
- Verify the engagement and planning processes in Table 1.13
- Report if climate change is integrated into funding programs in Table 1.14
- Describe what climate impacts are of most concern to your facilities and plans, and how department will track how they are changing
- Describe which office or branch will develop a policy to integrate climate change into infrastructure, how it will prioritize, and when the policy will be completed

## 2 - Zero-Emission Vehicle Roadmap Checklist

**Policy References:** EO B-18-12, EO B-16-12, 2016 ZEV Action Plan

### **Executive Summary:**

- Summary of status and actions underway to meet sustainability objectives related to fleet operations and Zero Emission Vehicles.
- Include summary of changes from previous roadmap.

(This executive summary can be a paragraph in a single, comprehensive executive summary including all roadmap chapters if combined into one document, signed by the department executive director.)

### **Department Fleet Status:**

- Describe fleet composition and uses
- Edit Graph 2.1 to reflect Department fleet vehicle composition
- Edit Graph 2.2 to reflect Department light duty vehicle fleet composition
- Edit Graph 2.3 to reflect Department medium and heavy-duty vehicle fleet composition

### **Past Performance:**

- Report all prior year Total Purchased Fuel in Table 2.1
- Describe any successes or challenges encountered by your department as it seeks to incorporate ZEVs into its portfolio
- Report on department light duty fleet eligible for replacement in Table 2.2
- Report recent and planned light duty ZEV fleet additions in Table 2.3
- Report on facilities with parking and whether hosting fleet vehicles & modify Graph 2.2 to reflect this

### **Future Planning:**

- Identify facilities with the most urgent need for EV charging in Table 2.4

- Describe department's engagement with utility and other funding programs for EVSE's and infrastructure
- List any hydrogen fueling stations that could serve as any primary refueling stations for fleet vehicles, and any plans to install hydrogen refueling infrastructure at department facilities
- List site and infrastructure assessment results for ZEV parking in Table 2.5
- Describe plan to design, bid, construct and activate EVSE infrastructure
- Describe department's operation plan for EVSE infrastructure and how it will collect and report EVSE use data and maintain equipment
- Identify department stakeholders for ZEVs and EVSE efforts in Appendix

### 3 - Energy Efficiency Roadmap Checklist

**Policy References:** EO B-18-12, MM 14-07, MM 14-09, MM 15-04, MM 15-06, MM 17-04

#### **Executive Summary:**

- Summary of status and actions underway to meet sustainability objectives related to energy use and efficiency.
- Include summary of changes from previous roadmap.

(This executive summary can be a paragraph in a single, comprehensive executive summary including all roadmap chapters if combined into one document, signed by the department executive director.)

#### **Department Energy Status:**

- Describe mission of your department
- Describe built infrastructure supporting department mission that consumes energy (electricity, natural gas, propane, etc.). Include number and total square footage of department facilities.
- Complete summary of actions and timeframes to meet requirements (can be bullet points)

#### **Past Performance:**

- Report 2020 Total Purchased Energy in Table 3.1
- List department properties with largest energy consumption in Table 3.2
- Describe any successes or challenges encountered by your department and solutions as it seeks to achieve energy efficiency
- Identify specific challenges to achieving ZNE, T-24+15%, reducing grid-based energy, demand response, renewable energy or monitoring-based commissioning
- Describe department's 5-year capital improvement program
- List department zero net energy buildings in Table 3.3 and department's plans to achieve ZNE at 50% of building portfolio area

- Report department wide energy trends in Table 3.5
- Report yearly energy surveys in Table 3.7
- Discuss energy survey status and efforts over past 5 years

**Future Planning:**

- Describe efforts to reduce plug loads and comply with energy standard operating procedures
- List status of new buildings exceeding Title 24 by 15% in Table 3.4, and describe strategy for ensuring this minimum level of efficiency in future
- Identify department energy projects in Table 3.6
- Identify department demand response in Table 3.8
- Describe demand response programs available, and positive or negative experiences or lessons learned, and department benefits for participation
- Discuss steps department is taking to implement DR in more buildings
- Identify department on-site renewable energy in Table 3.9
- Discuss proposed increases in on-site renewable energy
- Report department planned Monitoring-Based Commissioning (MBCx) projects in Table 3.10
- Summarize department's MBCx experience, challenges, successes, and whether MBCx is incorporated as required, or plans to implement
- Discuss how energy efficiency Best Management Practices have been implemented, how they were institutionalized, and quantify repairs and replacements with estimated energy savings, if possible.
- Describe department steps to finance energy goals and requirements, and what programs it is using

## 4 - Water Efficiency and Conservation Roadmap Checklist

**Policy References:** Executive Order B-37-16

### **Executive Summary:**

- Summary of status and actions underway to meet sustainability objectives related to water efficiency and conversation.
- Include summary of changes from previous roadmap.

(This executive summary can be a paragraph in a single, comprehensive executive summary including all roadmap chapters if combined into one document.)

### **Past Performance:**

- Describe built infrastructure supporting department mission that consumes purchased water. Include number and total square footage of department facilities.
- Report all 2020 Total Purchased Water in Table 4.1
- List department properties with largest water use per capita in Table 4.2
- List facilities with largest landscape areas in Table 4.3
- Describe any successes or challenges encountered by your department, and solutions as it seeks to achieve water efficiency and conservation
- Report department wide water use trends in Table 4.4
- Report total water reductions achieved in Table 4.5
- Describe major water efficiency project over past five years or underway
- Identify indoor water efficiency projects in Table 4.6
- Identify boilers and cooling systems projects in Table 4.7
- Identify landscaping hardware water efficiency projects in Table 4.8
- Identify living landscaping water efficiency projects in Table 4.9



**Future Planning:**

- Report the number of buildings with urban water shortage contingency plans and in critical groundwater basins in Table 4.10, and discuss steps to reduce water use in those facilities
- Identify building inventory interior fixture needs in Table 4.11
- Summarize water using boilers and cooling systems inventory in Table 4.12
- Identify irrigation hardware inventory in Table 4.13 and discuss how replacements will occur
- Identify living landscape inventory in Table 4.14 and discuss results
- Identify large landscape inventory and water budget, as well as certified staff in Table 4.15
- Discuss how water conservation Best Management Practices have been implemented, how they were institutionalized, and quantify repairs and replacements with estimated water savings, if possible.

## 5 - Green Operations Roadmap Checklist

**Policy References:** Executive Order B-18-12

### **Executive Summary:**

- Summary of status and actions underway to meet sustainability objectives related to green operations
- Include summary of changes from previous roadmap.

(This executive summary can be a paragraph in a single, comprehensive executive summary including all roadmap chapters if combined into one document.)

### **Past Performance:**

- Report GHG Emissions since 2010 in Table 5.1 and update Graph 5.1 to reflect department emissions trend
- Describe any successes or challenges encountered by your department as it seeks to achieve GHG Emission reductions, and how various strategies contribute
- Explain which actions your department has taken that had the largest impact on GHGe
- Identify newly constructed buildings since July 1, 2012, and LEED level achievement in Table 5.2 and list number of buildings eligible as well as have achieved LEED for Existing Buildings and Operations in Table 5.3.
- Report state agency buy recycled campaign 2016 performance in Table 5.5 and describe your department's efforts to increase green commodities
- Report the lowest smart location score leases in Table 5.9 and describe the department's measures to improve location efficiency scores

### **Future Commitment:**

- Discuss how your department implements efficiency measures to meet Energy Star targets and to achieve LEED EBOM for buildings >50,000 sq. ft. Describe steps to achieve these and goal dates.

- Discuss the steps taken to ensure new construction incorporates the IEQ provisions of CALGreen, and ensures IEQ is considered and incorporated into products, cleaning, and HVAC operation
- Identify pest control contracts in Table 5.4 and discuss the steps taken to incorporate IPM into all contracts and practices
- Describe department efforts to reduce waste and recycle
- Describe department efforts to reduce environmental impacts through purchases of goods and services
- Identify commodities categories with the greatest potential to green in Table 5.6 and describe your department's efforts to increase green commodities
- List buyers who have completed EPP Training in Table 5.7 and discuss available training and certifications buyers may have beyond the basic training courses
- List new leases and their smart location scores in Table 5.8 and describe the department's measures to improve location efficiency scores
- Describe how you will achieve greener operations and how many GHGe reductions your department will need to achieve its goal

## Appendix D – Acronyms

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Customize to include organizations and acronyms within your specific department

AB	Assembly Bill
ADR	Automated Demand Response
AMB	Asset Management Branch (at DGS)
BMP	Best management practices
CA	California
CALGREEN	California Green Building Code (Title 24, Part 11)
CEC	California Energy Commission
DGS	Department of General Services
DWR	Department of Water Resources
EHT	Extreme heat threshold
EMS	Energy management system (aka EMCS)
EMCS	Energy management control system (aka EMS)
EO	Executive Order
EPP	Environmentally preferable purchasing
ESCO	Energy service company

ESPM	Energy Star Portfolio Manager
ETS	Enterprise Technology Solutions (a division at DGS)
EUI	Energy use intensity (source kBTU/sq. ft.)
EVSE	Electric vehicle supply equipment (charging equipment)
FMD	Facilities Management Division (a division at DGS)
GCM	Global circulation model
GHG	Greenhouse gas
GHGe	Greenhouse gas emissions
GSP	Groundwater Sustainability Plan
IEQ	Indoor environmental quality
kBTU	Thousand British thermal units (unit of energy)
LCM	The Landscape Coefficient Method
LEED	Leadership in Energy and Environmental Design
MAWA	Maximum applied water allowance
MM	Management Memo
MWELO	Model Water Efficient Landscape Ordinance
OBAS	Office of Business and Acquisition Services (at DGS)

OBF	On-bill financing
OFAM	Office of Fleet and Asset Management (at DGS)
OS	Office of Sustainability (at DGS)
PMDB	Project Management and Development Branch (at DGS)
PPA	Power purchase agreement
PUE	Power usage effectiveness
RCP	Representative Concentration Pathway
SABRC	State Agency Buy Recycled Campaign
SAM	State Administrative Manual
SB	Senate Bill
SCM	State Contracting Manual
SGA	Sustainable groundwater agency
SGMA	Sustainable Groundwater Management Act
WMC	Water management coordinator
WUCOLS	Water Use Classifications of Landscape Species
ZEV	Zero-emission vehicle
ZNE	Zero net energy



## Appendix E - Glossary

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**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.

**Grass cycling** -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% or more), contains little lignin and has high nitrogen content, grass clippings easily break down during an aerobic process. Grass cycling 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. Grass cycling can provide 15 to 20% 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% for droughts lasting up to three years.

## Appendix F – Department Stakeholders

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List individuals, offices, and divisions responsible for leading efforts related to each initiative identified in this report. Include their respective titles, roles, responsibilities.

### Climate Change Adaptation

<b>Understanding Climate Risk at Existing Facilities</b>	
AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director

<b>Understanding Climate Risk at Planned Facilities</b>	
AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director

<b>Integrating Climate Change into Department Planning and Funding Programs</b>	
AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director

<b>Measuring and Tracking Progress</b>	
AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director

### Zero Emission Vehicles

<b>Incorporating ZEVs Into the Department Fleet</b>	
AD/BMB	Michael Boll, Fleet and Asset Manager Don Renalter, Assistant Section Chief Valinda Roberts, Section Chief

<b>Telematics</b>	
AD/BMB	Michael Boll, Fleet and Asset Manager Don Renalter, Assistant Section Chief

	Valinda Roberts, Section Chief
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<b>Public Safety Exemption</b>	
AD/BMB	Michael Boll, Fleet and Asset Manager Valinda Roberts, Section Chief
LED	David Bess, Deputy Director
OSPR	Thomas Cullen, OSPR Administrator

<b>Outside Funding Sources for ZEV Infrastructure</b>	
AD/BMB	Michael Boll, Fleet and Asset Manager Don Renalter, Assistant Section Chief Valinda Roberts, Section Chief

<b>Hydrogen Fueling Infrastructure</b>	
AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director

<b>Comprehensive Facility Site and Infrastructure Assessments</b>	
AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director

<b>EVSE Construction Plan</b>	
AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director

<b>EVSE Operation</b>	
AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director

## Energy

<b>Zero Net Energy (ZNE)</b>	
AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director

**New Construction Exceeds Title 24 by 15%**

AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director
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**Reduce Grid-Based Energy Purchased by 20% by 2018**

AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director
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**Server Room Energy Use**

AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director
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**Demand Response**

AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director
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**Renewable Energy**

AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director
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**Monitoring Based Commissioning (MBCx)**

AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director
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**Financing**

AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director
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**Water Efficiency and Conservation**

<b>Indoor Water Efficiency Projects in Progress First initiative</b>	
AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director

<b>Boilers and Cooling Systems Projects in Progress</b>	
AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director

<b>Landscaping Hardware Water Efficiency Projects in Progress</b>	
AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director

<b>Living Landscaping Water Efficiency Projects in Progress</b>	
AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director

<b>Buildings with Urban Water Shortage Contingency Plans in Progress</b>	
AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director

## **Green Operations**

<b>Greenhouse Gas Emissions</b>	
AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director

<b>Building Design and Construction</b>	
AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director

<b>LEED for Existing Buildings Operations and Maintenance</b>	
AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director

**Indoor Environmental Quality**

AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director
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**Integrated Pest Management**

AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director
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**Waste Management and Recycling**

AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director
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**Environmentally Preferable Purchasing**

AD/BMB	Don Renalter, Manager Melinda Peacock, Section Chief
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**Location Efficiency**

AD	Diane Brown-Tapia, Manager James Robbins, Deputy Director
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# Appendix G – Sustainability Requirements & Goals

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Governor Edmund G. Brown Jr. directed California state agencies to demonstrate sustainable operations and to lead the way by implementing sustainability policies set by the state. Additionally, enacted legislation includes sustainability-related requirements of state facilities and operations. Specific references and background on executive orders, legislation, management memos and other requirements or actions are included in five general chapters within this roadmap, as follows:

- Climate change adaptation
- Zero-emission vehicles
- Energy
- Water efficiency and conservation
- Green operations

These general sustainability initiatives include the following:

- GHG emissions reductions
- Climate change adaptation
- 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
- Zero Net Energy (ZNE)

# Appendix H – Sustainability Background

## References

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The following executive orders, Management Memos, legislative actions, resources and guidance documents provide the sustainability criteria, requirements, and targets tracked and reported herein.

### Executive Orders

The governor issued the following executive order relevant to chapters of this roadmap:

- **Executive Order B-16-12**

EO B-16-12 directs state agencies to integrate zero-emission vehicles (ZEVs) into the state vehicle fleet. It also directs state agencies to develop the infrastructure to support increased public and private sector use of ZEVs. Specifically, it directs state agencies replacing fleet vehicles to replace at least 10 percent with ZEVs, and by 2020 to ensure at least 25 percent of replacement fleet vehicles are ZEVs.

- **Executive Order B-18-12**

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 on-site 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 staff-level Sustainability Working Group and the executive-level Sustainability Task Force – to ensure these measures are met. Agencies annually report current energy and water use into the Energy Star Portfolio Manager (ESPM).

- **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. Governor Brown directed numerous state agencies to develop new programs and regulations to mitigate the effects of the drought and required increased enforcement

of water waste statewide. Agencies were instructed to reduce potable urban water use by 25 percent between 2013 and February 28, 2016.

- **Executive Order B-30-15**

In 2015, the governor issued EO B-30-15, which 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 GHG emission reduction target of 40 percent below 1990 levels by 2030 and reaffirms California’s intent to reduce GHG emissions to 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. It also directs state agencies to take climate change into account in their planning and investment decisions and employ life-cycle cost accounting to evaluate and compare infrastructure investments and alternatives. State agencies are directed to prioritize investments that both build climate preparedness and reduce GHG emissions; prioritize natural infrastructure; and protect the state’s most vulnerable populations.

- **Executive Order B-37-16**

EO B-37-16 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. The California Department of Water Resources (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 section of the State Administrative Manual (SAM), and associated Management Memos (MMs) currently impose sustainability requirements on the department under the governor's executive authority:

- **SAM Chapter 1800**: Energy and Sustainability
- **MM 14-02**: Water Efficiency and Conservation
- **MM 14-05**: Indoor Environmental Quality: New, Renovated, And Existing Buildings
- **MM 14-07**: Standard Operating Procedures for Energy Management in State Buildings
- **MM 14-09**: Energy Efficiency in Data Centers and Server Rooms
- **MM 15-03**: Minimum Fuel Economy Standards Policy
- **MM 15-04**: Energy Use Reduction for New, Existing, and Leased Buildings
- **MM 15-06**: State Buildings and Grounds Maintenance and Operation
- **MM 15-07**: Diesel, Biodiesel, and Renewable Hydrocarbon Diesel Bulk Fuel Purchases
- **MM 16-07**: Zero-Emission Vehicle Purchasing and EVSE Infrastructure Requirements
- **MM 17-04**: Zero Net Energy for New and Existing State Buildings

## Legislative Actions

Several pieces of legislation were signed in 2015-16 that codified several elements of the executive orders, or provided further requirements included in the policies. These include the following:

- **Assembly Bill (AB) 1482 (Gordon, 2015)**: Requires that the California Natural Resources Agency (CNRA) update the state's adaptation strategy safeguarding California every three years. Directs state agencies to promote climate adaptation in planning decisions and ensure that state investments consider climate change impacts, as well as the use of natural systems and natural infrastructure. (Public Resources Code Section 71153)
- **Senate Bill (SB) 246 (Wieckowski, 2015)**: Established the Integrated Climate Adaptation and Resiliency Program within the Governor's Office of Planning and Research to coordinate regional and local efforts with state climate adaptation strategies to adapt to the impacts of climate change. (Public Resources Code Section 71354)
- **AB 2800 (Quirk, 2016)**: Requires state agencies to take the current and future impacts of climate change into planning, designing, building, operating, maintaining and investing in state infrastructure. CNRA will establish a Climate-Safe Infrastructure Working Group to determine how to integrate climate change impacts into state infrastructure engineering. (Public Resources Code Section 71155)
- **Assembly Bill (AB) 4**: Passed in 1989. The State Agency Buy Recycled Campaign (SABRC) statutes are in Public Contract Code Section 12153-12217. The intent of SABRC is to stimulate markets for materials diverted by California local government and agencies. It requires state agencies to purchase enough recycled-content products to meet annual targets, report on purchases of recycled and nonrecycled products, and submit plans for meeting the annual goals for purchasing recycled-content products.
- **AB 32 Scoping Plan**: The scoping plan assumes widespread electrification of the transportation sector as a critical component of every scenario that leads to the mandated 40 percent reduction in GHG by 2030 and 80 percent reduction by 2015.
- **AB 2583 (Blumenfield 2012) Public Resources Code §25722.8**: Statute requires reducing consumption of petroleum products by the state fleet

compared to a 2003 baseline. Mandates a 10 percent reduction or displacement by Jan. 1, 2012, and a 20 percent reduction or displacement by Jan. 1, 2020.

- **AB 75** – Implement an integrated waste management program and achieve 50 percent disposal reduction target. State Agencies report annually on waste management program
- **SB 1106** – Have at least one designated waste management coordinator. Report annually on how your designated waste and recycling coordinator meets the requirement.
- **AB 2812** - Provide adequate receptacles, signage, education, staffing, and arrange for recycling services. Report annually on how each of these is being implemented
- **AB 341** – Implement mandatory commercial recycling program (if meet threshold). Report annually on recycling program
- **AB 1826** – Implement mandatory commercial organics recycling program (if meet threshold). Report annually on organics recycling program
- **SB 1383** - 50 percent reduction in the level of the statewide disposal of organic waste from the 2014 level by 2020, a 75 percent reduction by 2025, and 20 percent of currently disposed edible food is recovered for human consumption by 2025.
  - Agencies already in compliance with AB 1826 may need to further expand their organic waste recycling service to comply with the new requirements
  - Jan. 1, 2024, Tier 2 Commercial Edible food Generators will be required to donate edible food to a recovery organization.
- **SB 1335** - requires food service facilities located in a state-owned facility, a concessionaire on state-owned property, or under contract to dispense prepared food using reusable, recyclable, or compostable. food service packaging

## **Action Plan**

- **2016 Zero-Emission Vehicle Action Plan**

The plan establishes a goal to provide electric vehicle charging to 5 percent of state-owned parking spaces by 2022. It also advances the ZEV procurement target to 50 percent of light-duty vehicles by 2025.

## State Resources and Guidance Documents

California has invested significant resources in understanding the risks of climate change, water efficiency, strategic growth, and state actions available to respond to and reduce these risks. These include the following:

- **Safeguarding California**: The state's climate adaptation strategy organized by sector. Each sector identifies risks from climate change and actions to reduce those risks.
- **Safeguarding California Implementation Action Plans**: Directed under EO B-30-15, the Implementation Action Plans outline the steps that will be taken in each sector to reduce risks from climate change.
- **Planning and Investing for a Resilient California**: Prepared under direction of EO B-30-15, this document provides a framework for state agencies to integrate climate change into planning and investment, including guidance on data selection and analytical approach.
- **California's Climate Change Assessments**: California has completed three comprehensive assessments of climate change impacts on California. Each assessment has included development of projections of climate impacts on a scale that is relevant to state planning (i.e., downscaled climate projections). These data are available through **Cal-Adapt**, an online data visualization and access tool.
- **Water Use Reduction Guidelines and Criteria**: Issued by the California Department of Water Resources February 28, 2013, 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 owned, funded or leased facilities. 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.
- **Strategic Growth Council (SGC) Resolution on Location Efficiency**: Location efficiency refers to the greenhouse gas emissions arising from the

transportation choices of employees and visitors to a building as determined by the Smart Location Calculator. Adopted on December 6, 2016, the resolution directs members of the SGC to achieve a 10 percent improvement in the Smart Location Score of new leases compared to the average score of leased facilities in 2016.



**Table G-1: Background References and Applicable Roadmap Chapters**

	Climate Adaptation	ZEV	Energy	Water	Green Operation
<b>Executive Orders:</b>					
EO B-16-12		X			X
EO B-18-12		X	X	X	X
EO B-29-15				X	
EO B-30-15	X	X	X		X
EO B-37-16				X	
<b>Management Memos</b>					
MM 14-02				X	
MM 14-05			X		X
MM 14-07			X		X
MM 14-09			X		
MM 15-03		X	X		
MM 15-04			X		X
MM 15-06			X	X	X
MM 15-07		X			
MM 16-07		X			
MM 17-04			X		
<b>Legislative Actions</b>					

SB 246	X				
SB 2800	X				
SB 1106					X
SB 1383					X
AB 4					X
AB 32		X			X
AB 75					X
AB 341					X
AB 1826					X
AB 2812					X
AB 1482	X				
<b>Action Plans</b>					
2016 ZEV Action Plan		X			
<b>State Resources and Guidance Documents</b>					
Cal-Adapt	X				
California's Climate Change Assessments	X				
Public Resources Code §25722.8		X			
Planning and Investing for a Resilient California	X				
Safeguarding California	X				

Safeguarding CA Implementation Action Plan	X				
Sustainable Groundwater Management Act of 2014				X	

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