



**STAFF REPORT ON DEVELOPING A  
CLIMATE CHANGE MITIGATION AND ADAPTATION STRATEGY  
FOR THE LAHONTAN REGION**

**May 2017**

**Report to the Lahontan Regional Water Quality Control Board  
Patty Z. Kouyoumdjian  
Executive Officer**



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REGIONAL WATER QUALITY CONTROL BOARDS

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*Patty Z. Kouyoumdjian, Executive Officer*

*2501 Lake Tahoe Blvd., South Lake Tahoe, CA 96150*

*15095 Amargosa Road, Building 2, Suite 210, Victorville CA 92394*

*Internet: <http://www.waterboards.ca.gov/lahontan/>*

Primary authors: Scott Ferguson, Linda Stone, and Mary Fiore-Wagner

Reviewers: Lauri Kemper

Technical Contributors: Staff of the Lahontan Regional Water Board

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## Executive Summary

California has placed itself at the forefront of addressing climate change and its increasing impacts upon people and the environment. The signing of [Assembly Bill 32, the California Warming Solutions Act of 2006](#), clearly established California's global leadership role, and a pathway to reducing greenhouse gas (GHG) emissions in an effort to minimize adverse climate change impacts. California is also taking the lead in establishing and implementing strategies for adapting to climate change impacts. California, through a combination of State laws and Executive Orders, has placed the California Air Resources Board (ARB), Natural Resources Agency (Resources Agency), and California Environmental Protection Agency (CalEPA) as the lead state agencies for developing and implementing the State's climate change laws, policies, and strategies.

The Lahontan Regional Water Quality Control Board (Water Board) also has a role to play in California's extensive and comprehensive response to climate change. Trying to understand what that role is critical in developing the Water Board's Climate Change Mitigation and Adaptation Strategy for the Lahontan Region. It also raises several questions, which include:

- What policies, plans, and general orders will the State Water Board initiate/adopt in response to climate change?
- What role or roles does the Water Board, as a regional state agency responsible for protecting water quality to maintain, restore, and enhance the beneficial uses of the region's waters, play in California's climate change efforts?
- What are the Water Board's current and future responsibilities/obligations, as established by California's climate change laws and policies?
- What can the Water Board do beyond its established responsibilities/obligations with current resources?
- Where should the Water Board direct its limited resources for climate change?

Below, Water Board staff describes the State's climate change framework and requirements for all state agencies, including the Water Board. The framework combined with the Water Board's limited resources, requires thoughtful consideration of key actions that can be achieved by the Water Board within our existing authority and expertise. Given these conditions, the Water Board and its staff will need to continue to incorporate significant collaboration with stakeholders in an effort to effectively respond to climate change.

## Introduction

The State of California is at the forefront of addressing the significant and growing challenges that climate change presents to its citizens, environment, and infrastructure. Climate change is the result of the emission of greenhouse gases (GHGs), primarily: carbon dioxide and methane, which are causing an overall increase in temperatures, reduced snowpack, greater fluctuations in temperature

and precipitation, changes in timing and volume of peak runoff, and more frequent, extreme weather events. All of these climate change effects have impacts on the availability and quality of the state's water. Although California is actively working to reduce GHGs, research shows these impacts will increase in the future even with reduced GHGs emissions. Therefore, it is imperative that California develop climate change mitigation and adaptation strategies, as well as continue to reduce GHGs.

The 2015 Governor's Environmental Goals and Policy Report, which presents a comprehensive approach for climate change, includes the goals of reducing GHGs and providing clean air and water for the state's citizens. It is the Lahontan Regional Water Quality Control Board's (Water Board) responsibility to protect and restore the quality of its water resources and, thus, ensure that clean water is available. The Water Board must develop an effective climate change strategy to mitigate and adapt to the impacts of climate change stresses to meet its mandate to ensure the availability of clean water in the Lahontan Region.

This report will outline the framework for California's climate change efforts; provide a better understanding of how the State Water Board and Water Board can support and implement the State's climate change laws, policies, and strategies within California's framework; summarize the Water Board's climate change efforts and findings to date; and provide a pathway forward for developing an effective strategy to mitigate and adapt to the adverse impacts of climate change on water resources within the Lahontan Region.

## **Framework –Key State Climate Change Laws and Policies**

California's international leadership in climate change mitigation and adaption is based on comprehensive research that has culminated in aggressive goals that are being defined and focused by the following legislation, policies, and strategies.

### **Assembly Bill 32 (AB 32)-The Global Warming Solution Act of 2006**

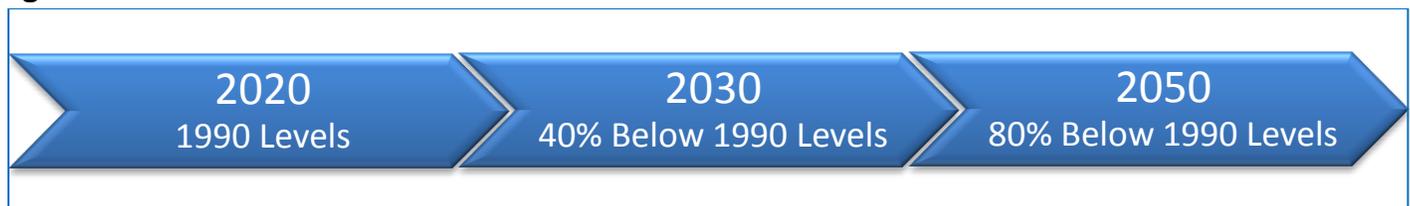
AB 32 charged the California Air Resource Board (ARB) with leading California's efforts to reduce GHGs and was the first program in the country to comprehensively address climate change. AB 32 established the goal of reducing GHGs to 1990 levels by 2020. AB 32 also mandated that the ARB coordinate with state agencies in developing and implementing strategies to reduce GHGs, and has been successful in establishing effective policies that reduce GHGs emissions.

In 2008, the ARB adopted a Scoping Plan, which was subsequently updated in 2014 (Executive Summary available in Appendix A). The 2008 Scoping Plan and [2014 Updated Scoping Plan](#) focus California's primary GHG reduction efforts on six key economic sectors that include: Energy, Industry, Transportation, Natural and Working Lands Including Agriculture, and Waste Management, and Water. The Scoping Plans identify specific GHG reduction goals, in terms of tons of CO2 equivalents reduced, for each sector. To assist in achieving these goals, roles and responsibilities have already been established for the State and Regional Water Boards for these sectors, where applicable.

## Executive Order B-30-15 and Senate Bill 32 (Chapter 249, Statutes of 2016)

Executive Order B-30-15 (Appendix B) in coordination with SB 32 established an interim goal of reducing GHG levels to 40 percent below 1990 levels by 2030. The intent was to bridge the gap between the short-term 2020 goal (reduce GHGs to 1990 levels) and the long-term 2050 goal (reduce GHGs to 80 percent of 1990 levels). Bridging the gap with the 2030 interim goal is necessary to continue guiding regulatory policy and investment during the 30-year gap, and to continue setting California on cost-effective pathway to achieving long-term GHG reductions.<sup>1</sup> California's short-term (2020), interim (2030), and long-term (2050) GHG reduction goals are currently established as illustrated, below.

**Figure 1- California's Greenhouse Gas Reduction Goals**



## Executive Order S-3-05 and Senate Bill 1107 (Chapter 230, Statutes of 2004)

[Executive Order S-3-05](#) in coordination with SB 1107 (Chapter 230, Statutes of 2004), established that the California Environmental Protection Agency (CalEPA) would be the lead agency for coordinating all GHG emission reduction and climate change activities in state government (Government Code section 12812.6). Executive Order S-3-05 established the Climate Action Team (CAT) to facilitate CalEPA's interagency coordination. Current CAT members include:

**Table 1: Climate Action Team Members**

California Environmental Protection Agency	California Air Resources Board
California State Transportation Agency	California Department of Fish and Wildlife
California Department of Food and Agriculture	Department of Forestry and Fire Protection
CalRecycle	California Department of Transportation
California Department of Water Resources	California Energy Commission
California Health and Human Services Agency	Natural Resources Agency
Office of Planning and Research	California Public Utilities Commission

<sup>1</sup> Executive Order B-30-15

California Government Operations Agency	Business, Consumer Services, and Housing Agency
*State Water Resources Control Board	Strategic Growth Council
California Department of Public Health	Governor's Office of Business and Economic Development
Office of Emergency Services	

Several workgroups have subsequently been created to support the CAT. Those workgroups, and how the State Water Board and Regional Water Boards interact with them, will be discussed later in this report.

## The Short-Lived Pollutants Act

Short-lived climate pollutants (SLCPs), consisting of black carbon (soot), methane, and fluorinated gases, are estimated to be responsible for about 40 percent of current climate change forcings in California. SLCPs are the most potent short-termed GHGs and significant and immediate reductions are needed to minimize the impact of these climate forcings. Senate Bill 605 (Chapter 523, Statutes of 2014) requires that ARB develop a plan to reduce SLCPs emissions. Senate Bill 1383 (Chapter 395, Statutes of 2016) requires plan implementation to begin by January 2018. The ARB adopted the SLCP Reduction Strategy in March 2017 to implement these laws and support the State's GHG reduction goals for 2030 and 2050. Findings and recommendations from [SLCP Reduction Strategy](#) (Executive Summary available in Appendix C) that are relevant to the Water Board include the following:

- **Dairies.** As shown in the figure below, dairies account for 45 percent of methane emissions in California and landfills account for 20 percent. The SLCP Strategy proposes not only reducing the emissions from these sources, but capturing the methane to provide fuel for power and replace the use of fossil fuels. SB 1383 mandates that ARB, CDFG, and State and Regional Water Boards work with the dairy industry to establish a dairy workgroup to identify and address barriers to the collection and utilization of biomethane by first Quarter 2017 and thereafter.
- **Landfills.** Landfills are the second largest contributor of SLCPs in California. The 2017 Scoping Plan Update calls for eliminating the disposal of organic material at landfills, which would potentially eliminate future methane emissions from landfills. Assembly Bill 1045 (Chapter 596, Statutes of 2015) directs CalEPA and CalRecycle to coordinate with ARB and the State and Regional Water Boards to promote composting and use of compost to divert organic waste from landfills.
- **Wastewater.** Methane production from wastewater treatment combined with other miscellaneous sources (industrial operations, rice cultivation, septic tanks) accounts for nine percent of the

state's methane inventory.<sup>2</sup> Wastewater treatment facilities provide an opportunity to reduce organic waste (e.g., biosolids, food wastes, grease) currently going to landfills, and to produce beneficial products such as biofuels, electricity, and soil amendments/fertilizers. The pathway to realizing these benefits is through expanding the use of anaerobic digestion, both in the number of facilities using it and by modifying existing facilities to accept food waste, fats, oils, and greases (FOG) into the co-digestion process. Many of the larger wastewater treatment facilities already incorporate anaerobic digestion into their treatment and produce methane that is using for heating buildings, producing electricity, or is simply burned off (flaring). The 2017 Scoping Plan calls for the ARB to coordinate with CalRecycle and the State and Regional Water Boards to identify and support opportunities for co-digestion of food wastes at existing and new digester facilities, including those located at wastewater treatment facilities; and to develop a program of financial incentives and regulatory actions that ensure that existing and new wastewater treatment facilities have full methane capture and maximize organic waste digestions. The Regional Water Boards are expected to develop permit terms and other regulatory tools that support such efforts.

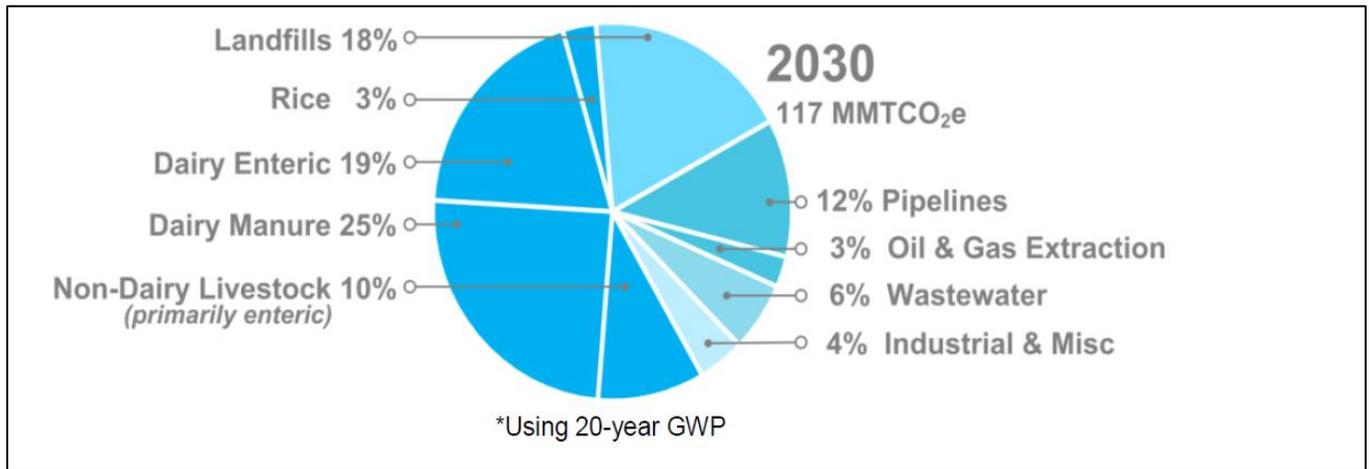
- **Natural and Working Lands.** Wildfire is the largest source of black carbon in California. However, the SLCP legislation only addresses anthropogenic, non-forest sources of black carbon. Under AB 32, the [2017 Climate Change Scoping Plan Update \(Proposed\)](#) does discuss how ARB is working on developing a Natural and Working Lands Inventory that will include an inventory of carbon stocks, stock-change (and by extension GHG flux associated with stock-change) with some attribution by disturbance process for the analysis period 2001-2010. Disturbance processes will include conversion from one land category to a different land category, fire, and harvest.<sup>3</sup> Information from this effort will help identify opportunities to further reduce GHGs, including CO<sub>2</sub> and black carbon emissions. It is likely that high-elevation meadow/wetlands restoration and forestry practices will be identified as presenting opportunities to reduce GHGs and the State and Regional Water Board's regulatory and other programs will likely be involved with making the opportunities realities.

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<sup>2</sup> California Air Resources Board, Short-Lived Pollutant Reduction Strategy, 2017

<sup>3</sup> 2017 Climate Change Scoping Plan Update (Proposed)

**Figure 2: California 2013 Methane Emission Sources (20-Year Global Warming Potential)**



SLCP Reduction Strategy, ARB, 2017  
MMTCO<sub>2</sub>e = Million metric ton of carbon dioxide-equivalent  
GWP = Global Warming Potential

## California Climate Change Adaptation Strategy

Executive Order S-13-08 (Appendix D) signed in 2008, identified the Natural Resources Agency as the lead agency for developing California's climate change adaptation policies and strategy. In 2009, California adopted its Climate Adaptation Strategy, which was subsequently updated in 2014 ([2014 Safeguarding California: Reducing Climate Risk](#)). Both documents recommend adaptation strategies for various sectors including: water, biodiversity and habitat, agriculture, and forestry. Some of the strategies relevant to the Lahontan Region include:

- (1) Fully develop the potential of integrated regional water management, including developing Integrated Regional Water Management (IRWM) Plans that identify strategies to improve coordination of groundwater storage and banking with surface storage, and other water sources, such as recycled water, flood flows, and storm water;
- (2) Practice and promote integrated flood management to reduce flood peaks, reduce sedimentation, store flood waters, recharge aquifers, and restore environmental flows;
- (3) Enhance and sustain ecosystems for species migration, floodplain corridors, and upper watershed forests and meadow functions; and
- (4) Expand water storage and conjunctive management of surface and groundwater resources, including integrated floodplain management, groundwater banking and surface storage, and development of groundwater management plans.

## California Water Action Plan

The 2014 California Water Action Plan puts forth actions to build resiliency and sustainability into California's management of water resources, addressing water supply, water quality, flood protection, and environment. These actions include conservation, integrated management, ecosystem protection, drought planning, expanded water storage, recycled water use, and financing to support

these efforts. Efforts to support sustainability of water supply include promoting the use of recycled water and streamlining the permitting process for reuse and enhancement projects. Stream restoration efforts improve water quality and restore natural system functions, including restoration of key mountain meadows and managing headwaters for multiple benefits. Sustainable groundwater management and groundwater recharge and storage, accelerate cleanup of contaminated groundwater and prevent future contamination. Flood control projects are beginning to be viewed as an opportunity to mitigate climate change impacts by increasing groundwater recharge, restoring and enhancing riparian and wetland habitats, while providing for infrastructure protection. State and Regional Water Board programs are involved at multiple levels with these efforts including technical assistance, financial assistance, and regulatory oversight.

### **State Water Resources Control Board's Resolution No. 2007-0059**

State Water Board Resolution No. 2007-0059 (available in Appendix E) specifies that, in partnership with the Department of Water Resources, the State Water Board will work to reduce GHG emissions and demonstrate the effectiveness of climate change adaptation strategies. The Resolution encourages the Regional Water Boards to work with local stakeholders to achieve these goals.

### **State Water Resources Control Board Resolution No. 2017-0012**

State Water Board Resolution No. 2017-0012 (available in Appendix F) lays the ground work for a comprehensive and integrated response to climate change by the State and Regional Water Boards, in coordination with federal, state, and local partners. The Resolution captures and better defines many of the roles and responsibilities that are established through the plans and strategies that have been developed in response to many of the Executive Orders and laws discussed, above. The Resolution aligns many of the State Water Board's and Regional Water Boards' roles and responsibilities with many of the existing programs that the Regional Water Boards routinely work with. These include recycled water use, storm water capture and use, improved ecosystem resilience, groundwater storage, and reporting results. The Resolution also establishes a schedule for completing multiple tasks beginning in 2017, and continuing annually for most. These responsibilities are discussed in greater detail later in this report.

## **Chronology of Water Board Climate Change Strategy**

The Water Board in response to the laws and policies, above, and on its own initiative has made climate change mitigation and adaptation one of its top priorities. In response, Water Board staff has been busy and starting in late 2014, embarked upon a concerted effort to develop a climate change mitigation and adaptation strategy. The Water Board has wanted this to be an inclusive and transparent effort, which is reflected in the activities listed, below. The following table contains a

chronology of the events intended to gather and process information/ideas as part of the Water Board’s effort to develop its climate change strategy.

**Table 2: Water Board Climate Change Strategy Development Activities**

<b>CHRONOLOGY</b>	
<b>November 2014</b>	Water Board hosted first Climate Change Adaptation Public Workshop in Barstow, California. Climate change experts presented the latest research regarding anticipated climate change effects in the Lahontan Region to over 100 attendees. Attendees provided ideas regarding potential Water Board adaptations/responses (regulatory, policy, coordination with stakeholders, education, etc.) to climate change.
<b>January 2015</b>	Water Board hosted its second Climate Change Adaptation Public Workshop in South Lake Tahoe, California, which was similar in format, content, attendance, and participation to November 2014 workshop.
<b>May 2015</b>	Staff presented summary of public ideas generated from the Public Workshops to the Water Board.
<b>July 2015</b>	Staff presented Climate Change Conceptual Model and strategy development approach to the Water Board.
<b>December 2015</b>	Water Board staff create three Climate Change Working Groups to work on outreach and developing a Water Board-specific climate change adaptation strategy. The working groups are Infrastructure, Storm Water and Low Impact Development, and Wetlands and Floodplains. The groups have initially focused on outreach to stakeholders through a Climate Change Adaptation Survey and meetings.
<b>August 2016</b>	The Climate Change Adaptation Survey is distributed to email subscription lists and other interested persons. The survey is posted on the Water Board’s web site.
<b>August – October 2016</b>	Staff attends outreach meetings with a variety of stakeholder groups to encourage stakeholder participation with the Climate Change Adaptation Survey.
<b>November 9, 2016</b>	The Climate Change Survey was presented to the Water Board, in addition to possible criteria for prioritizing potential climate change-related actions, and recommended next steps. Water Board provided direction.

<p><b>January 12, 2017</b></p>	<p>A brief updated overview of survey results and a revised schedule for developing a strategy were presented to the Water Board. The Water Board recognized the schedule was ambitious and may be subject to revision based on the limited resources to address climate change. The Water Board established a subcommittee to work with staff on Climate Change Adaptation.</p>
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The complex and extensive nature of addressing the causes and impacts of climate change is reflected in the Water Board’s pathway towards developing its Climate Change Mitigation and Adaptation Strategy, as depicted in the chronology, above. The impacts of climate change are and will continue to be wide and varied, cutting across political boundaries, socio-economic boundaries, and watershed and ecosystem boundaries. This increases the complexity of responding to climate change, and to most effectively move climate change mitigation and adaptation forward in the Lahontan Region, Water Board staff acknowledges that our efforts will be optimized if and only if we collaborate with others who are also planning for climate change. That is one reason why the Water Board started its strategy development process with two workshops that invited all stakeholders to participate.

**Workshops.** The Water Board’s strategy development process started with two workshops where scientific and technical information based upon the latest research on climate change impacts was presented by Dan Cayan, PhD and Michael Dettinger, PhD. Both are with the Scripps Institute of Oceanography and United States Geological Survey. They shared with workshop participants that the Lahontan Region could expect warmer air and water temperatures, more severe flood events, and a decreasing snowpack in the Sierra Nevada Mountains, all supported with data and analysis. All of these conditions have the ability to adversely affect the quality and quantity of water within the Lahontan Region.

Following the informational portion of the workshop, small working groups were created, and workshop participants were asked to respond to the following:

- List the policies and tools, including changes to organizations and applicable law, the Water Board should have to address climate change by the year 2040. Identify top 3-5 ideas.
- Identify the key steps to get the Water Board from its current state to desired state in 2040.

This was a valuable event as over 400 ideas/responses were generated by more than 100 workshop participants during the two workshops. The participants represented a broad spectrum of different backgrounds, experiences, opinion, and interests, but all had in common, an interest in climate change, its impacts, and how the Water Board and others should respond. Water Board staff analyzed the results and observed that many of the ideas initially trended towards four primary themes that were then further consolidated into the following three primary themes:

- Protect surface and groundwater quality and quantity by ensuring protection of floodplains, wetlands, and critical recharge areas, as well as maintaining/improving vital infrastructure and improving storm water management.
- Improve water quality and supply by requiring low impact development (LID) best management practices (BMPs).
- Increase communication with the public, continue collaboration with partner agencies, and continue streamlining regulatory process to help implementers on climate change adaptation projects.

Staff continued to analyze the responses and created a conceptual model for moving forward in mitigating and adapting to climate change impacts. Staff presented this information to the Water Board during two different Board meetings in 2015, and received input and direction from Water Board members, who strongly supported the idea of developing a strategy that identified specifically how the Water Board should proceed in this field. The Water Board also continued to express its strong support for including stakeholders in the process, recognizing that the Water Board and its staff would be working with and relying upon many of the stakeholders to effectively implement its Climate Change Mitigation and Adaptation Strategy.

To continue making progress in strategy development, Water Board staff created three Climate Change Working Groups: Infrastructure, Storm Water and Low Impact Development, and Wetlands and Floodplains. These three working groups were significantly based upon the three themes that came out of the 400-plus ideas that were shared at the workshops. The working groups and other Water Board staff recognized that under the three themes, above, there was further coalescing of ideas regarding more specific concepts and actions that the Water Board could pursue, totaling approximately 25. This observation was the beginning of the process of starting to focus in on a limited number of actions the Water Board could implement either on its own, or in coordination with others.

**Climate Change Adaptation Survey** .The staff working groups believed that additional information was still needed before it could begin the process of identifying a more limited number of actions to pursue. The working groups thought using a survey would be an effective method to learn what others were doing to adapt to and prepare for climate change, and the challenges or obstacles others were encountering in doing so, and their level of support for and ideas regarding the approximately 25 concepts/actions the Water Board could take in response to climate change. Staff publicized and released its online Climate Change Adaptation Survey in August 2016, and accepted responses through the end of December 2016.

Water Board staff received over 150 responses from a wide variety of stakeholders within and outside the Lahontan Region. Staff recognizes that this was not a scientific survey that provided results fully representing those living and working within the Lahontan Region. However, the survey was in staff's opinion successful in reaching out and keeping a substantial group of the region's stakeholders

involved. Staff also sees a few trends in the results that may be helpful in guiding the Water Board's future actions.

A more in depth review and analysis of the survey results is provided in Appendix G. Below is a summary of staff's analysis that is divided into four categories.

Ongoing and Planned Efforts – The primary activities that survey respondents in the Lahontan Region are currently doing or are planning to do center on water conservation, and education and outreach. To a lesser, but still significant level, others are also working on groundwater monitoring, requiring low impact development design and BMPS, developing aquatic habitat protection programs and conducting infrastructure risk analysis.

Challenges/Obstacles – Economics/costs was the most frequently selected challenge respondents selected. Water rights and state regulations to a lesser, but still significant level (greater than 40 percent of respondents), were also identified as key obstacles.

Level of Support for the Range of Options – This was the portion of the survey that received the most attention. The number of respondents that indicated their level of support, in addition to submitting comments was the highest for this survey section. Overall, there is strong support for the concepts of protecting water quality, water supplies, aquatic habitat, etc. However, the support decreases when a regulatory approach is proposed. This is not surprising and further supports working collaboratively with others, especially when it involves a regulatory response.

Partners – The Water Board's and its staff's research and outreach regarding climate change mitigation and adaptation, current and future responsibilities, and available resources, continues to strengthen the role that partnering will play in Water Board's strategy. Fortunately, the survey results identify a significant number (greater than 50) of stakeholders that express their willingness to more actively participate in developing and implementing the Water Board's Climate Change Mitigation and Adaptation Strategy.

Overall Utility of the Survey – Upon reflection, Water Board staff acknowledges the survey was limited value given the limited response, and nature of some of the questions. Staff acknowledges that the survey may not have been the best tool to gather information representative of stakeholders throughout the Lahontan Region. It is likely that staff will receive more poignant input upon proposing direct, specific actions to stakeholders during upcoming stakeholder workshops.

Water Board staff do believe the survey provided the public, stakeholders, and dischargers throughout the Lahontan Region an opportunity to comment and provide input on actions that the Water Board may pursue in responding to climate change. Staff believes that the survey was effective at keeping stakeholders and others engaged, providing view into and another opportunity to participate in the Water Board's strategy development process. It is likely that some, possibly many, of the respondents will be our future partners in responding to climate change in the Lahontan Region.

## Water Board’s Role in California’s Climate Change Efforts

Through state law and Executive Orders, the California Air Resources Board (ARB), CalEPA, and the Natural Resources Agency (Resources Agency) have been identified as the leads for developing and overseeing implementation of California’s policies and strategies responding to climate change. Executive Order S-3-05 established the Climate Action Team (CAT), under the leadership of CalEPA, to facilitate this interagency coordination, which includes the State Water Board. The current CAT working groups include:

**Table 3: Climate Action Team Working Groups**

Agriculture (Ag-CAT) *	Biodiversity	Coastal and Ocean Climate Adaptation (CO-CAT) *
Interagency Forestry	Intergovernmental	Land Use and Infrastructure
Public Health	Research *	State Government *
Water Energy (WET-CAT) *		

\*State Water Board is a member.

The Water Board has two primary pathways to participate in California’s climate change efforts. The first is working through the State Water Board, the Water Board’s conduit into the CAT and CAT working groups. Working with the State Water Board, the Water Board can develop proposals/requests for action that the State Water Board would then carry up and through the CAT Coordination System. It is also through this pathway that task associated with California’s climate change policies and strategies are delegated or distributed to CAT members and their boards, departments, and agencies.

The second pathway is to effect change through the Water Board’s planning and regulatory programs. Such efforts could include requiring permittees vulnerable to climate change impacts, such as flooding, to conduct infrastructure risk assessments and develop and implement risk abatement programs. Doing so would likely result in better protecting vital infrastructure, such as sewer collection systems, from flooding, thus better protecting water quality by reducing the number and severity of sewage spills that typically increase with flooding events. Another example involves the permitting process for renewable energy projects (wind and solar). The Water Board modified its permitting process, so that it could be incorporated into the state-wide permitting program for such projects overseen by the California Energy Commission. Water Board staff has further refined its project review/permitting process for such projects, to decrease the time it takes to get such projects operational and reducing California’s reliance upon other energy sources that contribute GHGs. Such actions assist in reducing GHGs and achieving compliance with the State’s Renewable Energy Portfolio Standard and the California’s GHG reduction goals.

## Current and Near-Future Water Board Responsibilities

There has been a lot of effort and results in developing California's response to climate change since the mid-2000's. The Governor's Office, State Legislature, CalEPA and the Resources Agency and their boards, departments, and agencies have all been very busy developing and implementing California's laws, policies, and strategies targeting climate change. Implementing California's climate change policies and strategies is largely being carried out by CalEPA's and Natural Resource's boards, departments, and agencies, and the State and Regional Water Boards have been receiving their assignments. State Water Board Resolution No. 2017-0012 brings together in a single document the State and Regional Water Boards' responsibilities regarding climate changes as they currently stand. The Resolution draws upon the multiple plans (e.g., ARB 2014 Updated Scoping Plan, ARB 2017 Short-Lived Climate Pollutant Reduction Strategy) and identifies the State and Regional Water Board's current responsibilities, as established by the State's climate change laws, policies, and strategies. Below is a listing of key Regional Water Board responsibilities and directives that could affect Regional Water Board workload, as identified in State Water Board Resolution No. 2017-0012.

1. Reduce GHG Emissions
  - a. Short-Lived Climate Pollutants
    - i. State Water Board Division of Water Quality (DWQ) shall collaborate with Regional Water Boards, ARB, CalRecycle, and California Department of Food and Agriculture to reduce methane emissions from landfills through organic waste diversion, and co-digestion with existing or new anaerobic digesters at wastewater treatment facilities, or through composting, while achieving water quality objectives. **(Direct effect on WB workload)**
    - ii. Identify opportunities to reduce methane emissions from dairies and concentrated animal feeding operations while achieving water quality objectives. **(Direct effect on WB workload)**
    - iii. Regional Water Boards should provide information on their activities to reduce methane emissions in the Water Boards' 2017-18 Annual Performance Report. **(Direct effect on WB workload)**
  - b. Recycled Water
    - i. DWQ shall coordinate with the Regional Water Boards to make annual reporting of recycled water data a requirement of waste discharge permits and water reclamation requirements. Starting with the 2017-18 Annual Performance Report, begin reporting information regarding volume of recycled water used, and types of uses. **(Potential effect on WB workload)**
  - c. Storm Water
    - i. DWQ shall collaborate with the Department of Water Resources, and other State and local land use agencies to prioritize storm water detention and infiltration. **(Potential effect on WB workload)**
  - d. Energy Efficiency and Renewable Energy

- i. Division of Financial Assistance and Division of Drinking Water, as part of existing technical assistance programs for disadvantaged communities, shall include assistance to finance, construct, upgrade, and operate energy-efficient drinking water and wastewater treatment systems, and to power those systems with zero-carbon and low-carbon renewable energy technologies. **(Direct effect on WB workload)**
2. Improve Ecosystem Resilience
    - a. Regional Water Boards update plans, permits, and policies, and coordinate with other agencies to enhance ecosystem resilience to the impacts of climate change, including but not limited to actions that protect headwaters, facilitate restoration, enhance carbon sequestration, build and enhance healthy soils, and reduce vulnerability to and impacts from fires. **(Direct effect on WB workload)**
    - b. Document climate resilience benefits of ecosystem protection and restoration actions. **(Direct effect of WB workload)**
    - c. State Water Board to work with USEPA to address climate change impacts that contribute to or exacerbate degradation of water quality, including but not limited to increased surface water temperatures, decreased surface water flows, changes in water chemistry (such as increases in salinity, bacteria, and nutrient concentrations), hydrology, and ecology. **(Potential effect on WB workload)**
3. Respond to Climate Change Impacts
    - a. Office of Information Management and Analysis (OIMA), shall by July 1, 2018 evaluate criteria for siting of new drinking water systems using climate change projections, and shall recommend adjustments to siting criteria and standards as needed.
      - i. Work with Division of Drinking Water to evaluate water quality in public water supplies, including investigating sources of pollution. **(Direct effect on WB workload)**
    - b. State Water Board to coordinate with Regional Water Board to identify actions for effective permitting of projects to develop new and underutilized water resources, and expand surface water and groundwater storage, where appropriate. **(Direct effect on WB workload)**
    - c. State and Regional Water Boards will work with California Department of Forestry and Fire Protection, federal land management, and other agencies to restore and maintain healthy watersheds, reduce vulnerability to catastrophic fires, and support resilience in recovery efforts. **(Direct effect on WB workload)**
    - d. DWQ works with Regional Water Boards to evaluate and by July 1, 2018 make recommendations to the State Water Board on the need to modify permits and other regulatory requirements to reduce water and wastewater treatment infrastructure vulnerability to flooding, storm surge, and sea level rise. **(Direct effect on WB workload)**
4. Rely on Sound Modeling and Analyses
    - a. Office of Information Management and Analysis (OIMA) shall work with the State and Regional Water Boards in selecting and using climate change data, model outputs and data evaluation

services, as needed to account for and address impacts of climate change in permits, plans, policies, and decisions. **(Direct effect on WB workload)**

5. Outreach

- a. Office of Public Participation (OPP) shall work with Regional Water Boards, and the USEPA to offer consultation to Tribes and solicit feedback on Tribal needs for addressing climate change and related impacts pertaining to the Water Boards' core functions. Reporting on these efforts shall begin with the 2017-18 Annual Performance Report **(Direct effect on WB workload)**

The State Water Board's Resolution presents a significant workload for all the Regional Water Board's, including the Water Board. In some instances, the Water Board was already engaged in climate change activities prior to the Resolution being adopted (e.g., coordinating with other agencies on forest and watershed health). However, many of the tasks noted, above, represent new assignments and that do not come with new resources.

## Overall Picture for the Lahontan Region

It is clear from the information provided, that California is fully engaged in its response to climate change, on both the GHG reduction and mitigation/adaptation fronts. These efforts have already produced an extensive list of responsibilities and actions for state agencies, including the State and Regional Water Boards. The ARB, Resources Agency, and CalEPA are the state agencies that have been charged with coordination, development, and implementation of California's climate change efforts. The actions of these agencies are largely driving the majority of State Water Board and Water Board responsibilities and actions. Additionally, the Water Board is in the process of identifying specific climate change mitigation/adaptation actions targeting conditions in the Lahontan Region. Water Board staff in coordination with the Water Board and its Climate Change Subcommittee has been soliciting information and input from the scientific community and stakeholders across the region. The overall process is illustrated in the figure, below.

**Figure 3: Water Board Climate Change Inputs**



As stated earlier, the Water Board initially received approximately 400 stakeholder ideas/recommendations regarding how the Water Board should respond to climate change. Staff subsequently observed that the 400 ideas generally fell into three themes (water quality/quantity protection, low impact development, and collaboration), under which, were approximately 25 specific concepts/actions. Water Board staff, following the Climate Change Adaptation Survey, continued to analyze potential outcomes in light of available resources and existing and future responsibilities established through State law, policies, and strategies. Staff began to further refine the list of potential actions into the following list:

**Table 4: Focused List of Potential Climate Change Actions for the Lahontan Region**

Increase Storm Water Collection and Reuse	Increase Low Impact Development Implementation
Increase Wetland and Floodplain Protection and Restoration	Increase Headwaters and Riparian Corridor Protection
Update Regulation and Protection for Waters of the State not Subject to Federal Clean Water Act	Adopt Policies to Protect Critical Groundwater Recharge Areas
Improve Protection of Infrastructure to Reduce Threat to Water Resources	Assess Infrastructure Vulnerability
Increase Recycled Water Reuse	Expand and Improve Partnering/Collaboration

Water Board staff is continuing to assess what specific activities would fall under these general activities. Staff also continues to explore if there are other areas, outside of the 400 stakeholder ideas, that should receive the Water Board’s attention and resources. Finally, staff continues to evaluate what the Water Board can do within our limited resources and authority in response to

climate change. Below is a table that presents the actions currently being implemented or to be implemented, as required by law, the State Water Board, or through the Water Board, with respect to Water Board programs and activities (e.g., permitting). The table also identifies in the last column some potential activities that the Water Board could do, provided there are available resources to dedicate to such activities.

**Table 5: Climate Change Responsibilities/Responses for the Lahontan Region**

	Law	SWRCB	Lahontan RWQCB Pre-Existing Activity	Lahontan RWQCB Potential Activity
Permitting and Basin Planning	Global Warming Solutions Act of 2006	<ul style="list-style-type: none"> <li>• Coordination through CAT and CAT Working Groups</li> <li>• Recycled Water Policy</li> <li>• Recycle Water General Permit (GPs)</li> </ul>	<ul style="list-style-type: none"> <li>• Revised permitting process for renewable energy projects</li> <li>• Revised Basin Plan Truckee prohibitions to facilitate water quality improvement projects</li> <li>• Lahontan Supplemental Environmental Project Program</li> <li>• Federal Agency GP</li> <li>• LADWP Owens Valley Operations GP</li> </ul>	<ul style="list-style-type: none"> <li>• Streamline habitat restoration permit process</li> <li>• Develop Riparian Protection Policy</li> <li>• Increase aquatic habitat protections/ reduce hydromodification</li> <li>• Require infrastructure risk assessment and risk abatement programs</li> <li>• Increase storm water collection and reuse</li> </ul>
	Short-Lived Climate Pollutant Act	<ul style="list-style-type: none"> <li>• Compost Facilities GP</li> </ul>	<ul style="list-style-type: none"> <li>• Dairy GP</li> <li>• Timber Waiver</li> <li>• Federal Agency GP</li> </ul>	<ul style="list-style-type: none"> <li>• Provide technical assistance to wastewater facilities for co-digestion facilities</li> </ul>
Monitoring		<ul style="list-style-type: none"> <li>• Surface Water Ambient Monitoring Program (SWAMP)</li> <li>• Groundwater Ambient Monitoring and Assessment</li> <li>• California Environmental Data Exchange Network</li> </ul>	<ul style="list-style-type: none"> <li>• Surface water sample collection across the region</li> <li>• Lake Tahoe Nearshore Study</li> <li>• Bishop Creek Bacteria Study</li> </ul>	<ul style="list-style-type: none"> <li>• Modify program to increase support of climate change activities</li> </ul>

	Law	SWRCB	Lahontan RWQCB Pre-Existing Activity	Lahontan RWQCB Potential Activity
Emergency Preparedness			<ul style="list-style-type: none"> <li>• Waiver for Debris Disposal due to Emergencies</li> <li>• Aquatic Pesticide Exemption for Emergency Situations</li> </ul>	<ul style="list-style-type: none"> <li>• Participate in Emergency Preparedness Activities (e.g., Inyo County 2017 Spring Runoff Operations)</li> <li>• Threat analysis permit requirement</li> </ul>
Groundwater Basin Protection	California Water Code	<ul style="list-style-type: none"> <li>• Recycled Water Policy</li> <li>• Anti-Degradation Policy</li> </ul>	<ul style="list-style-type: none"> <li>• Salt and Nutrient Management Plans</li> <li>• Mojave water quality objectives</li> <li>• Establish in-stream flow requirements for Squaw Creek</li> <li>• Monitored Natural Attenuation Report and Guidance</li> </ul>	<ul style="list-style-type: none"> <li>• Establish in-stream flow requirements for other streams subject to impacts from groundwater withdrawals</li> <li>• Increase protection for critical groundwater recharge areas</li> </ul>
	Sustainable Groundwater Management Act	Intervention		<ul style="list-style-type: none"> <li>• Develop objectives for ground water basins</li> </ul>

RBs – Regional Boards

LADWP – Los Angeles Department of Water and Power

GP – General Permit

LID – Low Impact Development

The information in Table 5 combined with the discussion of the Water Board’s current and future responsibilities, as established by State law, policies, and strategies, shows that the Water Board has already completed or is scheduled to complete a significant number of climate change activities under its own initiative. Additionally, it also shows that the Water Board’s plate is nearly full with future obligations. The Water Board will need to be very strategic in identifying a few select actions for the near future (3 – 5 year horizon), given that additional resources do not appear to be forthcoming. This situation also supports staff improving its existing partnerships and developing new partnerships to promote and support the work of others and to be able to work in priority areas that currently are receiving little attention.

## Recommended Pathway Forward

At the Water Board’s May 2017 meeting, Water Board staff will be looking for Board direction regarding where to focus the Water Board’s limited resources and narrow authority to best mitigate and adapt to climate change impacts in the Lahontan Region. The potential actions continue to fall

under two distinct categories: 1) actions directly under Water Board authority (e.g., permitting, Basin Plan amendments to expand prohibitions, establish water quality objectives, etc.), and 2) actions other agencies or organizations could implement.

Water Board staff will also be looking for direction regarding the next steps staff is proposing to take following the May 2017 Board meeting. Staff is proposing taking the direction the Water Board provides, and in coordination with the Water Board's Climate Change Subcommittee, identifying a limited number of specific actions for consideration by stakeholders, primarily those that would be directly affected by such actions. In addition, staff will work with the Subcommittee to identify partnership opportunities with local governments and organizations to develop a Climate Change Mitigation and Adaptation Strategy.

Staff is anticipating scheduling three workshops (north, central, and south) during the late summer months. Staff proposes providing pre-workshop materials that will include a limited number of specific actions, and questions staff would like stakeholders to answer regarding these specific actions. For example, staff may proposed developing permit requirements for expanding use of low impact development design principles for future development and redevelopment projects. Staff would also provide questions intended to evaluate how much cooperation/acceptance there may be for such requirements, the ability to comply with such requirements, and other options for achieving the requirements' objectives. Taking this approach will allow participants to be prepared for focused workshop discussions and clear feedback. Staff also anticipates providing breakout sessions, likely based upon the three general themes (water quality/quantity protection, low impact development, and collaboration), discussed, above. Staff believes these workshops will provide specific and focused information that will play a significant role in establishing effective partnerships, and identifying the limited actions the Water Board should pursue as part of its Climate Change Mitigation and Adaptation Strategy.

Following the workshops, Water Board staff would develop a Draft Strategy Report that incorporates much of the information and input that has been received over the past two-plus years, and presents a specific strategy of actions for Water Board consideration. Staff is tentatively scheduling the Draft Strategy Report for Water Board review at the Water Board's November 2017 meeting. Following the November 2017 meeting, staff anticipates conducting two technical workshops that would be the venues for discussing potential action items with the regulated community and stakeholders. Again, this additional interaction is intended to strengthen partnerships that the Water Board will be relying upon to successfully implement its Climate Change Mitigation and Adaptation Strategy. Staff is considering scheduling the two workshops in January 2018, which would then be followed by developing the draft strategy for the Water Board's consideration and adoption at a spring 2018 Board meeting.

## Closing Ideas

The Water Board is facing another challenge in climate change without any additional resources and limited sphere of influence compared to the extensive nature of climate change. Even under these conditions, Water Board staff sees that the Water Board has an opportunity to determine how to best use its limited resources to implement California's requirements within our existing authority and expertise. Staff sees some flexibility in meeting its responsibilities, as identified in State Water Board Resolution No. 2017-0012, that can be used to address conditions unique to the Lahontan Region. The flexibility also potentially could allow the Water Board to respond in a way that supports and promotes the efforts of its stakeholders, as they respond to climate change. However, the reality is that the flexibility combined with continuing collaboration with our stakeholders will only improve the efficiency of implementing a few select actions beyond what has already been assigned to us.