Water Resilience Portfolio

January 2020

Table of Contents

Executive Summary

Water is central to nearly everything we value in California. Healthy communities, economies, farms, ecosystems and cultural traditions depend on steady supplies of safe and affordable water.

Those values are increasingly at risk as California confronts more extreme droughts and floods, rising temperatures, depleted groundwater basins, aging infrastructure and other challenges magnified by climate change. For some of California's most vulnerable populations, the risks are particularly acute.

Recognizing the need for action, Governor Gavin Newsom issued an Executive Order in April 2019 directing state agencies to develop recommendations to meet these challenges and enable water security for all Californians.

The Governor emphasized the need to harness the best of science, engineering, and innovation to prepare for what's ahead and support long-term water resilience and ecosystem health.

To that end, state agencies have developed this draft water resilience portfolio to improve California's capacity to prepare for disruptions, withstand and recover from climate-related shocks, and adapt into the future.

Building on state and local initiatives already underway and months of public input, the draft portfolio helps empower local and regional entities to meet their unique challenges, while delivering on the state's responsibility to provide tools and leadership, advance projects of statewide scale and importance, and help address challenges that are beyond the scope of any region.

Because no single solution can fully address the state's water challenges, the draft portfolio embraces a broad, diversified approach. Goals and actions are organized into four categories:

1. **Maintain and diversify water supplies:** State government will continue to help regions reduce reliance on any one water source and diversify supplies to enable flexibility as conditions change. Diversification will look different in each region based on available water resources, but it will strengthen water security and reduce pressure on river systems across the state.

2. **Protect and enhance natural ecosystems:** State leadership is essential to restore the environmental health of many of our river systems in order to sustain fish and wildlife. This entails effective standard setting, continued investments, and more adaptive, holistic environmental management.

3. **Build connections:** The state aims to improve physical infrastructure to store, move, and share water more flexibly and integrate water management through shared use of science, data, and technology.

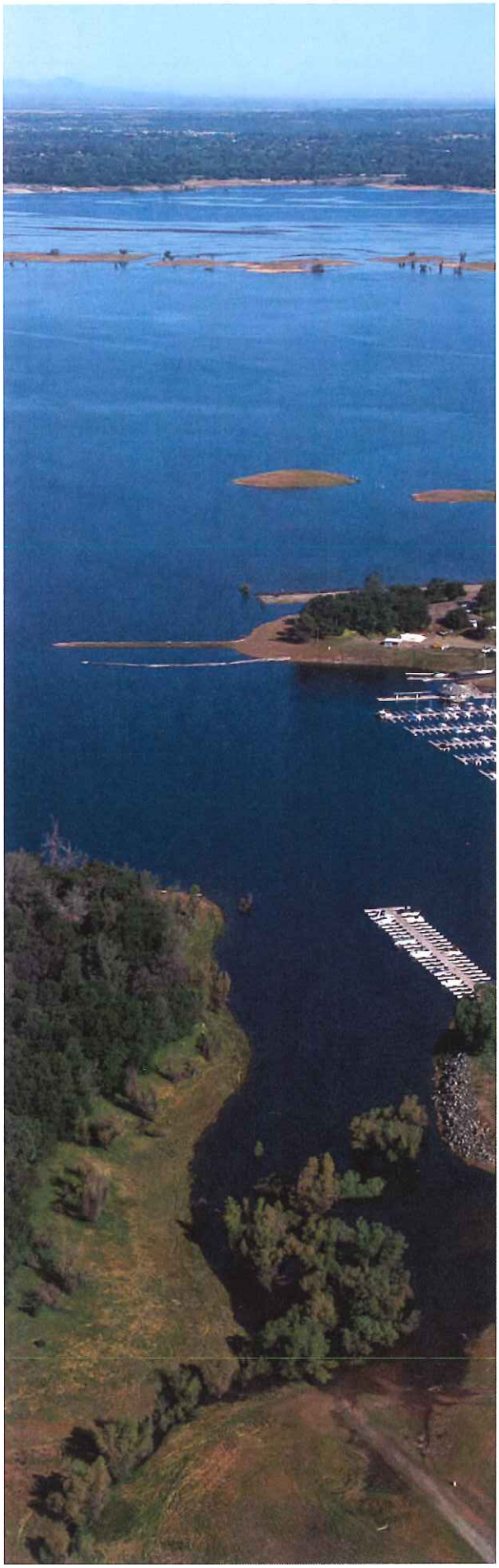
4. **Be prepared:** Each region must prepare for new threats, including flashier floods, deeper droughts, and hotter temperatures. State guidance will enable preparation, protective actions, and adaptive management to weather these stresses.

It will require time, effort, and funding to carry out this portfolio. The pace of implementation will depend upon the feasibility and availability of resources and competing priorities. But this portfolio sets a direction and creates a collective recognition of the ways we can manage water to build climate adaptability in California that works for people, the environment, and the economy.

Water resilience will be achieved region by region based on the unique challenges and opportunities in each area. Local, regional, and tribal leadership is therefore critical. Moving forward, separate agencies and groups must better integrate their water planning and management to steward shared watersheds and aquifers as threats evolve.

State government must focus on enabling regional resilience while continuing to set statewide standards, enable projects of statewide scale and importance, and help address challenges beyond the scope of any region. This portfolio will improve tools to local and regional entities building resilience, encourage collaboration, and support a cohesive, resilient "water system of systems" across California.

Carrying out this portfolio will require a new emphasis on cooperation across state agencies and with regional groups and leaders. Likewise, this portfolio will advance Newsom Administration priorities to build climate resilience across all sectors and make possible opportunity and prosperity for all Californians. This water resilience portfolio will serve as an important step toward achieving these ambitious goals.



Introduction

Water is our lifeblood in California. It has supported Native American cultures for time immemorial and today grows our food, underpins our health and well-being, fuels our economy, and sustains our natural places.

New and unprecedented challenges put that at risk. Our climate is warming and becoming more variable, which reduces mountain snowpack, intensifies drought and wildfire, raises sea level, and drives shorter, more intense wet seasons that worsen flooding. California's growing population--expected to increase to 50 million in coming decades--and our expanding economy place greater pressure on the health of our rivers and aging water infrastructure.

To enable water security for all Californians, we must adapt and retool our water management system to meet these challenges. As Governor Newsom has explained:

"California's water challenges are daunting, from severely depleted groundwater basins to vulnerable infrastructure to unsafe drinking water in far too many communities. Climate change magnifies the risks. To meet these challenges, we need to harness the best in science, engineering and innovation to prepare for what's ahead and ensure long-term water resilience and ecosystem health. We'll need an all-of-the-above approach to get there."

Our imperative is to consider future generations and pursue actions to adapt to a changing climate in a way that supports people, the economy and the environment.

Water Resilience

In April 2019, Governor Newsom directed state agencies through Executive Order N-10-19 to develop a "water resilience portfolio," described as a set of actions to meet California's water needs through the 21st century. The order identified seven principles on which to base this portfolio:

- Prioritize multi-benefit approaches that meet several needs at once
- Utilize natural infrastructure such as forests and floodplains
- Embrace innovation and new technologies
- Encourage regional approaches among water users sharing watersheds
- Incorporate successful approaches from other parts of the world
- Integrate investments, policies, and programs across state government
- Strengthen partnerships with local, federal and tribal governments, water agencies and irrigation districts, and other stakeholders.

In response, state agencies developed an inventory and assessment of key aspects of California water, soliciting broad input from tribes, agencies, individuals, groups, and leaders across the state. An interagency working group considered this assessment and public input and developed a portfolio, which can be defined as the integrated use of a broad range of actions. It is intended to strengthen the resilience of water systems, thereby helping communities prepare for disruptions, to withstand and recover from shocks, and to adapt and grow from these experiences. The pace at which we can carry out this diverse but connected set of actions will depend upon available resources, but taken together, they should allow us to thrive into an uncertain future.

Building on Recent Progress

This water resilience portfolio builds on a strong foundation. Governor Jerry Brown's Water Action Plan, issued in 2014 and updated in 2016, established a comprehensive water strategy for state government. It underscored that no single solution exists to solve our water challenges and prioritized a broad array of state actions.

State policy makers have taken bold action in recent years while managing severe drought and flood emergencies: requiring sustainable use of groundwater; strengthening water efficiency standards for cities, towns and farms; accelerating habitat restoration; planning to modernize conveyance of a critical portion of the state's water supply through the Sacramento-San Joaquin Delta; partnering with tribes and local leaders to remove four dams on the Klamath River; and taking much-needed action to restore the Salton Sea.

Since Governor Newsom took office, he has partnered with the Legislature to tackle California's drinking water crisis, supported development of voluntary agreements to improve environmental conditions in the Sacramento and San Joaquin river systems, and called for smaller, reduced size conveyance through the Delta. These existing efforts complement actions called for in this water resilience portfolio.

This Portfolio

We must prepare our water systems to support our growing state in a warmer, more variable climate. Four broad approaches are identified: 1) Maintain and diversify water supplies; 2) protect and enhance natural systems; 3) build connections; and 4) be prepared.

This water portfolio fails if it suggests a one-size-fits all approach to water resilience across our large state. Instead, water resilience will be achieved region by region based on the unique challenges and opportunities in each area. Leadership at the local, regional and tribal levels is essential. This water portfolio is shaped to provide important tools to local and regional entities building resilience and to encourage collaboration within and across these regions.

This portfolio includes more than 100 separate detailed actions to ensure California water systems work for our communities, our economy, and our environment. These actions will be implemented based on priority and to the extent resources are available.

No quick or singular fix will safeguard our communities in coming decades and preserve access to water for all Californians. Rather, advanced planning, thoughtful investments, integrated management, and unprecedented collaboration will prepare us for the future.

California Water Today

Governor Newsom's Executive Order on water resilience directed state agencies to inventory and assess several key components of California's water system and work already underway in state government to improve our water systems. This section summarizes this inventory and assessment, which is presented in the Appendix.

This inventory and assessment are based on available information from state agencies on water supply, demand, quality, climate, instream flows, and water rights. The inventory aggregates information from across the state and characterizes distinct regional conditions using several indicators. California can be subdivided in myriad ways for purposes of analyzing water resources; this inventory uses 10 commonly recognized hydrologic regions. Regional profiles that are developed in this inventory underscore the distinct challenges that different areas of the state face.

California's water sector is truly a "system of systems." Hundreds of distinct rivers and groundwater basins flow across our state. Thousands of separate entities manage water in California depending upon precipitation and ever-changing human and environmental needs. Developing an understandable statewide inventory therefore requires some amount of generalization. Nonetheless, it highlights important needs that can shape state government actions for the benefit of Californians and our economy.

Figure 1 California Hydroregions

Existing Water Supply and Demand

California's statewide annual precipitation is highly variable, from 100 million acre-feet in a dry year to more than 250 million acre-feet during a wet year. Droughts and floods are natural to California's hydrology. Most precipitation comes in the winter from November through March and precipitation greatly varies between regions, resulting in 26 million acre-feet of average annual run-off along the North Coast to just 200,000 acre-feet of average annual runoff in the Mojave Desert.

Not all rain and snow can be used as water supply for human use. Approximately 60 percent of precipitation is naturally lost to evaporation or used by vegetation in places like forested watersheds. Of the remaining water, about 50 percent naturally remains in rivers and streams, where it supports fish and wildlife and protects water quality. Most of this water flows through large rivers on the North Coast that are legally designated as Wild and Scenic Rivers, which new prohibits dams and new diversions on these rivers.

Figure 2 Comparative Variability of California Precipitation

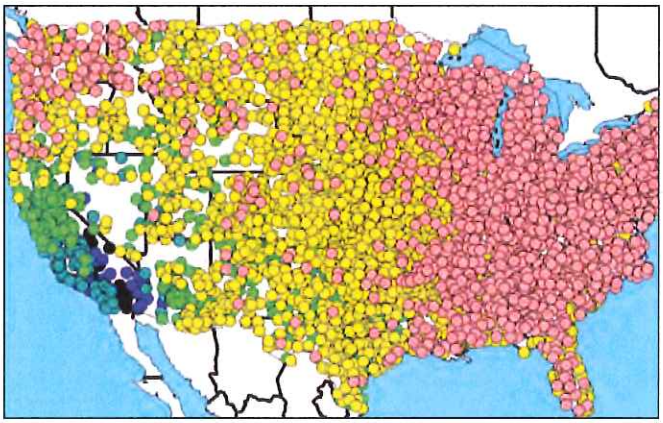


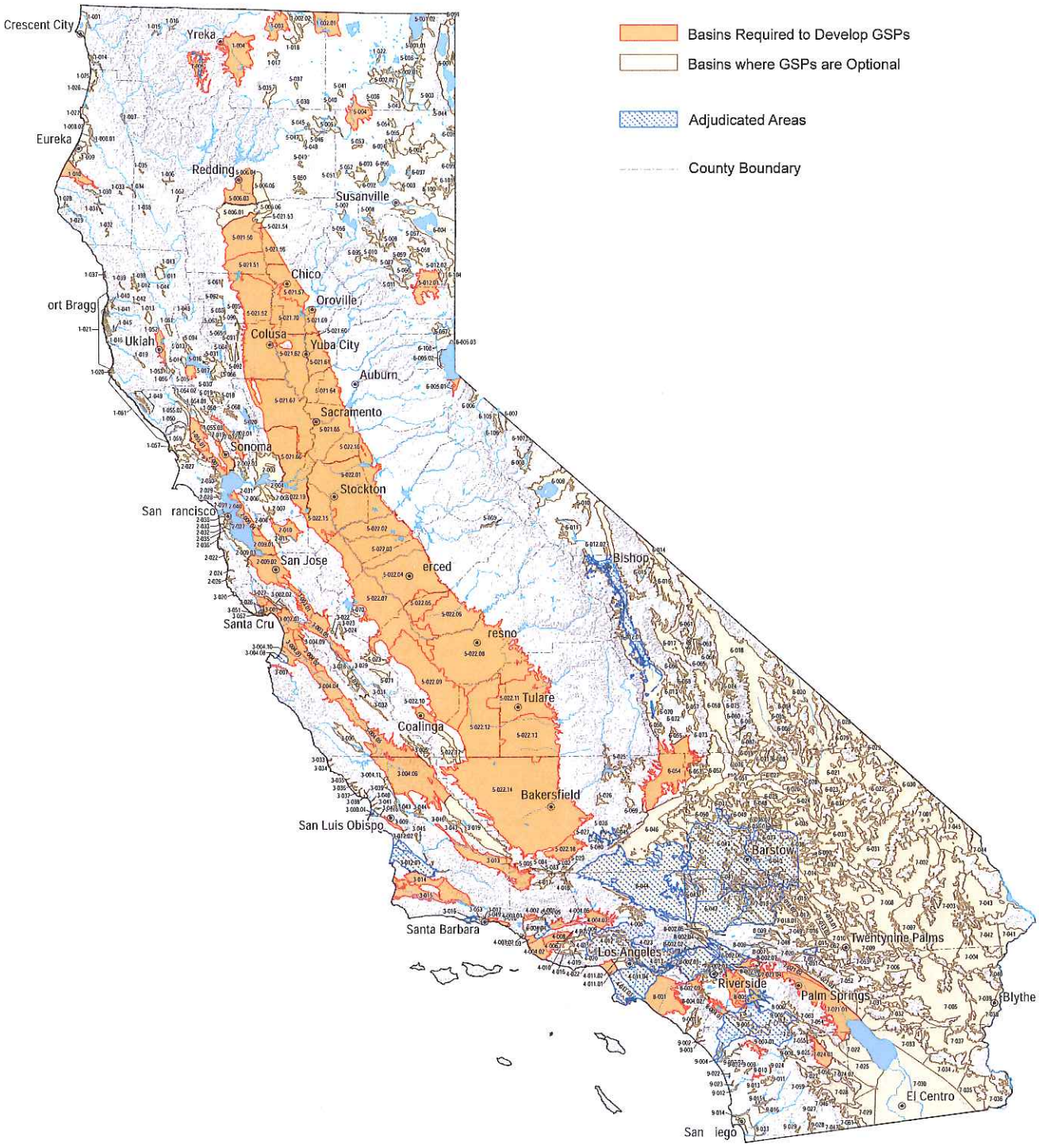
Figure credit: Mike Dettinger, U.S. Geological Survey

California experiences high annual variability in precipitation. Much of this variability stems from the role of a relatively small number of storms in making up the state's water budget.

Figure 3 California Major Reservoirs and Conveyance Facilities

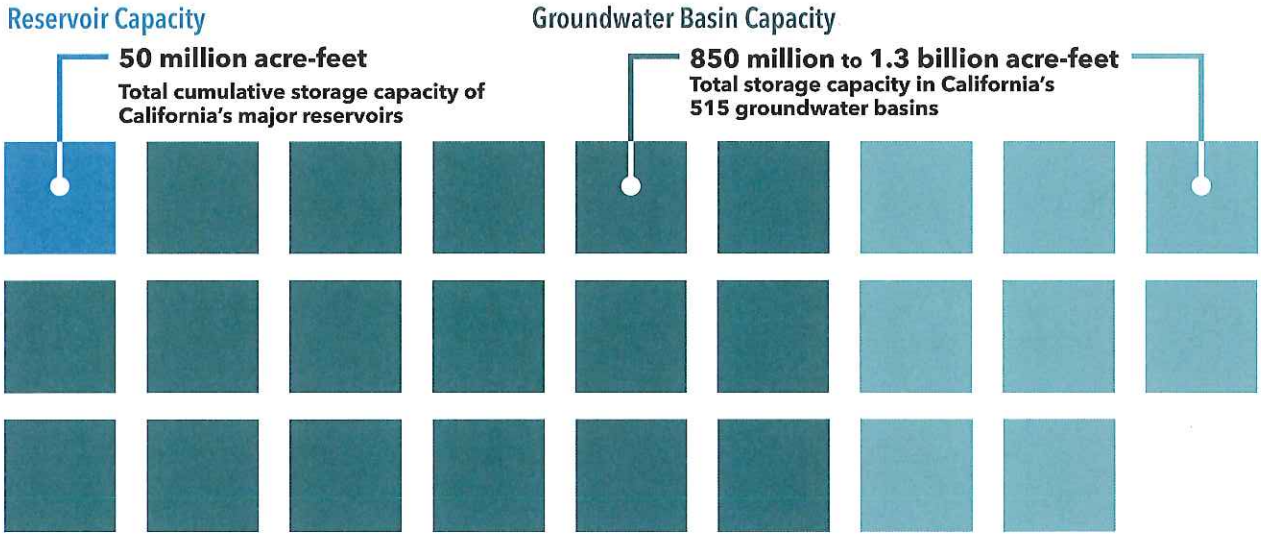
Federal, state, and local governments have built separate systems of dams, reservoirs, and conveyance facilities to move water to cities and farms and provide flood protection. This map shows the largest such facilities.

Figure 4 California Groundwater Basins and Subbasins



Under a historic 2014 law, governments and water agencies using over-drafted groundwater basins must bring those basins into balanced levels of pumping and recharge by 2042 at the latest. The law empowers local agencies to form Groundwater Sustainability Agencies to manage basins sustainably and requires the agencies to adopt Groundwater Sustainability Plans (GSPs). The map also shows adjudicated areas where groundwater pumping is determined by a court ruling.

Figure 5 Reservoir Capacity vs. Groundwater Basin Capacity



California's 515 groundwater basins can store far more water than the state's reservoirs combined. Overall groundwater storage outstrips surface storage even after taking into account that less than half the groundwater is available for use by people because it is either too deep to be pumped economically or of poor quality.

Water that Californians use comes primarily from collecting precipitation in reservoirs and diverting water from rivers—called surface water supply—or pumping groundwater from aquifers. Roughly two-thirds of water supply for human use across the state comes from surface supplies and one-third is pumped from underground aquifers, with some regions almost wholly dependent on groundwater.

Use of surface water is limited by how much rain and snow falls each year and how much water can be safely diverted from rivers. While using water from our rivers has fueled our state's growth and prosperity, taking too much water from river systems degrades ecosystems and water quality, affecting the state's long-term health and economic viability. As a result, some surface water supplies from rivers are limited by standards to protect all beneficial uses of those rivers, including economic activity, environmental protection, drinking water, and recreation.

More than 1,300 reservoirs have been built across the state to manage variable precipitation. The state's largest reservoirs were built decades ago to collect snowmelt from the Cascade and Sierra mountain ranges and convey water to cities and farms. Since most Californians live in the southern portion of the state and along the coast, long conveyance systems were built to bring water from reservoirs to communities and businesses. These systems include the federal Central Valley Project, the State Water Project, and projects built by Los Angeles, San Francisco, and East Bay Area cities. While surface reservoirs are a critical part of California's water system, storing water across seasons and years, they often alter the natural functions of rivers and limit habitat corridors for fish.

Groundwater is pumped from 515 groundwater basins across the state. Decades of over-pumping groundwater has caused subsidence and infrastructure damage in many areas. The Sustainable Groundwater Management Act (SGMA) requires that groundwater use in important groundwater basins be sustainable by 2040-42 to protect this water supply for the future. Implementation of the law will curb overdraft, reducing the amount of groundwater available compared to historical levels. To bring groundwater use in these basins to sustainable levels may require fallowing of farmland, though there are opportunities to minimize total acreage fallowed.

Of the total water supply used directly by people, roughly 80 percent is used to grow food and fiber. Approximately 30 million acre-feet of water are used by farmers and ranchers each year, which enables the largest and most diverse agricultural sector in the nation. While irrigated acreage and the overall amount of water used by farmers has changed little over the last 50 years, the value of California farm output has doubled, thanks to increased productivity and higher-value crops. A shift in recent years toward permanent orchards and vineyards has hardened demand for reliable water supplies, because growers cannot forgo irrigating these crops during drought.

Water supply reliability varies greatly within California's agricultural sector. Some growers depend entirely upon either surface water or groundwater, while others have access to both. Growers with senior water rights for surface water rarely face shortages while those with more junior water rights face cutbacks both during drought and during non-drought conditions to protect water quality and imperiled fish and wildlife. In the recent drought between 2012-16, growers halted production on about 500,000 acres—or 5 percent of the state's irrigated lands—due to lack of water supply.

The remaining 20 percent of water used by people in California supports residential and business use in our communities. This equates to about 7 million acre-feet in a given year, and approximately half of this water use goes to irrigating landscapes. Most metropolitan areas meet water demand through importing water from other parts of the state, besides using and reusing local supplies. Over time, local and state investments and changes to building codes produced increasingly efficient use of water in homes, allowing cities to grow while keeping water use level. During the last drought, average urban water consumption fell nearly 25 percent in response to state and local calls for conservation.

While most communities have benefited from reliable water supplies, water shortages are a persistent problem in many rural areas of the state. Many small water systems that rely on groundwater and homes with private wells lost their water supply during the recent drought. In some places, shortages were caused by intensified groundwater pumping that dropped aquifer levels. This water insecurity continues to plague rural communities.

Key insights from assessing California's current water supply and demand:

- Different areas of the state have very different water supplies and demand profiles. This requires regionally-tailored approaches to providing water supply to address demands.
- More efficient use of water by communities and agriculture has stretched water supplies to meet demands, especially on urban landscapes.
- Diverse water supply sources and reuse of water have helped many communities effectively weather drought.
- Rural communities are particularly vulnerable to water shortages, given their isolation and lack of capacity to develop water supplies.
- California's variable precipitation makes water storage crucial. Aquifers and off-stream reservoirs are the most feasible places to store additional water in the future, given the costs and environmental consequences of building new dams across streams.
- Replenishing aquifers can help the state transition to sustainable groundwater usage but requires capacity to redirect and store water underground when it becomes available.

Current Health of Natural Systems

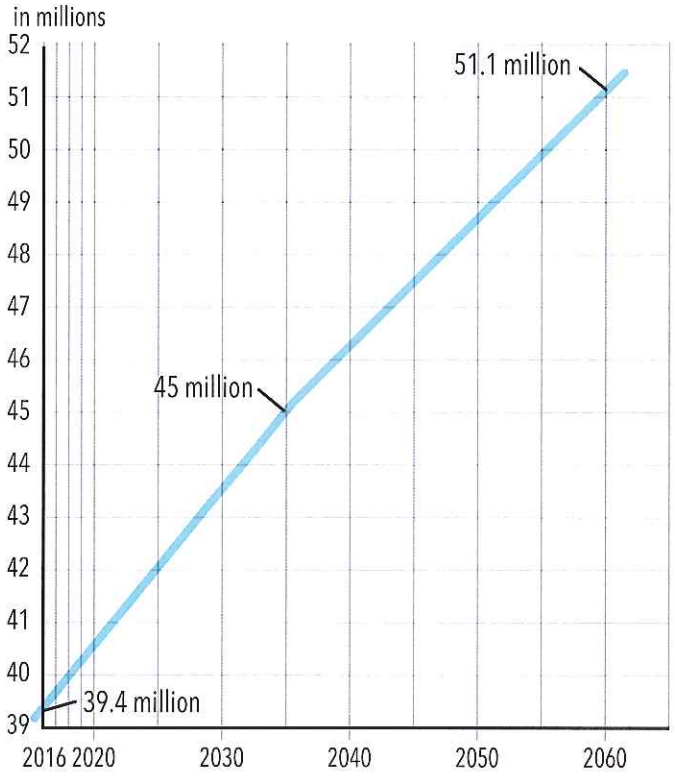
California's world-renowned biodiversity relies on healthy river systems. Our rivers naturally provide habitat for abundant fish and wildlife and have sustained human populations for thousands of years. Over the last 200 years, human engineering to capture and divert flows has altered the natural functions of most major rivers in the state. Reclamation of wetlands has eliminated most of the state's historic wetlands. These changes have impaired our overall resilience as a state and impacted fish and wildlife, threatening the existence of several native fish species including distinct runs of salmon and steelhead.

Reduced stream flows, increased temperatures, lack of habitat, and proliferation of invasive species have impacted many fish species across the state. Native fish and wildlife evolved to cope with drought, but dry periods are increasingly stressful given reduced habitat and river flow in recent decades. During extended drought, many streams already diminished by diversions warm, lessen, or dry up completely. Pollution compounds the stress. Many species are declining, and the number of fish species considered highly vulnerable to extinction rose from nine in 1975 to 31 species today.

State and federal laws enacted to protect against reduced river flows and loss of habitat have been unevenly applied and only partially successful. Instream flow requirements, for example, have been set on a limited number of rivers in the state. Many environmental regulatory laws focus on protecting single species rather than the ecological functions that allow many species to thrive. As ecological stressors mount, existing approaches to protecting fish and wildlife must be modernized to protect and restore natural systems that support our state's celebrated biodiversity.

State and federal natural areas, refuges, and hatcheries play an important role in the resilience of native species. Maintenance of these wildlife-oriented assets is important to preserving the state's biodiversity and will become crucial as climate-driven changes further stress fish and wildlife.

Figure 6 California's Population from 1900 to Today–and into The Future



State demographers expect California's population to add at least 10 million more residents over the next three decades.
Source: California Department of Finance

Key insights from assessing the current health of California's natural systems:

- Improved understanding is needed about the amount of water that must stay in rivers and streams to protect fish, wildlife, habitat, and water quality, and further actions are needed to support the availability of water for these needs.
- Drastic loss of fish and wildlife habitat makes it important to restore and connect habitat where feasible.
- Hatcheries may be necessary to maintain viability of some fish species.
- Approaches to protecting fish and wildlife that focus on developing a static management plan for a single species are increasingly outdated as ecosystem-wide threats mount.

Water Quality

The quality of water in our state varies greatly by region. While the vast majority of Californians are fortunate enough to take clean drinking water for granted, upwards of one million residents lack access to safe drinking water. Pollution from diffuse sources, such as pesticides, sediment, and pathogens, are the source of many regional-scale water quality issues and difficult to address through a single cleanup action.

Surface water quality in rivers and at beaches ranges from pristine to heavily polluted. In urban areas, stormwater can pick up contaminants from city streets before discharging to lakes, rivers, or the ocean--leading to beach closures up and down the state. Surface water quality also can be affected by sediment, pesticides, temperature, nutrients, metals, pathogens, and more, discharging into rivers, streams, and the ocean. A warmer climate provides optimal conditions for worsening harmful algal blooms, which can force the closure of beaches, rivers, and lakes due to health risks for people and pets.

Groundwater quality can be affected by both naturally-occurring and man-made chemicals. Arsenic and uranium can affect groundwater quality in aquifers where those elements are abundant due to underlying geology. In other basins, compounds such as nitrate from synthetic fertilizers, manure, and septic systems–can pose water quality risks to both public water systems and private domestic well users. These threats are particularly acute across the San Joaquin Valley and portions of the Central Coast.

Key insights from assessing California's water quality:

- Many Californians who depend upon small water systems or private wells are vulnerable to groundwater contamination. Larger suppliers must balance the potential threat of contaminants of emerging concern against the ability to supply water.
- California's major water pollution problems are from diffuse, difficult-to-control sources, such as urban and farm runoff, fertilizers, pesticides, and soil erosion.
- Waterways are becoming increasingly prone to harmful algal blooms and low dissolved oxygen levels.

Flood Risk

Flooding is a natural occurrence in California. It takes many forms, from slow-rise riverine flooding to explosive mud slides. Each of the state's 58 counties

have experienced at least one significant flood event in the last 25 years, and over one quarter of the state's population and a half-trillion dollars in assets are exposed to flood risk.

California gets most of its annual precipitation from a handful of major winter storms. Levees and reservoirs have played an important role in limiting flood risks from these storms. Intensifying winter storms increase pressure on our levees and complicate reservoir operations, which must balance flood risk with the need to store water supply.

Federal agencies play an important role in flood management. They set levee standards, ensure capacity in reservoirs during storm season, and manage a national flood insurance program. They also help to fund disaster preparedness, response, and recovery.

Investments in recent decades have reduced flood risks to protect the safety of California families and prevent disruptions to our economy, but more is needed.

While flood protection has traditionally relied on strengthening and maintaining levees, recently many communities have reduced flood risk significantly by widening channels and allowing rivers to spread out across natural floodplains. This approach also helps recharge groundwater, creates wildlife habitat, and can reduce maintenance costs.

Key insights from assessing flood risks:

- Given the number of Californians exposed to flood, public awareness and preparedness are crucial to minimizing risk.
- Federal coordination is important to successful flood management in California.
- Better forecasting of weather and fuller monitoring of snowpack and river conditions would allow reservoir operators to assess risks more carefully.
- Avoiding floodplain development and allowing rivers to regain access to floodplains can help manage floods while benefiting water supplies and fish and wildlife habitat.

Climate Change Impacts

Global climate change, already altering our water resources in alarming ways, likely will escalate over time. California's climate is warming and becoming even more variable, which reduces winter snowpack, intensifies drought and wildfire, and drives more intense storms that worsen flooding. Exactly how these impacts will play out across regions in coming decades depends on countless factors, including global efforts to reduce carbon emissions.

Each region of California will be affected differently. Rising winter temperatures will reduce mountain snowpack in the Sierra Nevada and Cascade ranges by 65 percent on average by the end of the century, increasing flashy winter runoff and flood risks while reducing spring and summer stream flow. Increasingly warm temperatures will mean higher risk of wildfire to fire-prone areas. Warming temperatures increase the severity of our natural drought cycle, which most greatly impacts areas that depend on surface water flows. Coastal communities are vulnerable to flooding with rising sea levels and storm surges while agricultural communities will have to adjust to new growing conditions driven by changing temperatures. Native species will migrate, seeking optimal conditions. Estuaries face degraded water quality during droughts. San Francisco Bay and the Sacramento-San Joaquin Delta will face salinity intrusion as sea level rises.

Historical hydrological patterns can no longer serve water managers as a trustworthy guide around which to plan, so climate science and projections have become increasingly important. Future conditions will continue to change and require ongoing adjustment and adaptation of water management.

Key insights from assessing likely climate change impacts include:

- Climate change will impact each area of our state in distinct ways, so building climate resilience must be customized by region.
- Water infrastructure and management must be updated to allow capture of water when it is available in increasingly intense bursts and to provide water supplies and protect the environment during prolonged dry periods.
- Water managers must address how a heightened risk of catastrophic wildfire will affect water supply and quality.
- It will become increasingly important to enable habitat connections and corridors to allow native species to migrate based on changing climate conditions such as rising temperatures.
- Improved physical connections between water users and more groundwater storage would help managers redirect and store water when it is available.
- In many circumstances, forests, soils, wetlands, floodplains, and other natural assets can help

California water systems adapt to climate change in more beneficial and durable ways than human engineering.

Future Water Needs

In coming decades, as our state confronts climate-driven impacts to our water systems, demand for water will likely rise alongside population and economic growth.

California is projected to add another 10 million residents by 2050. This growth could increase water demand in communities in that period by one to six million acre-feet, according to state estimates. Residential water use will become increasingly efficient, given new state standards and local investments to recycle water, capture stormwater, and desalt ocean and brackish water.

Agricultural water demand will likely continue to outpace available water supplies into the future. Simply put, California agricultural production will be shaped by limits on available water supply. The amount of groundwater available for use will be determined by the annual sustainable yield that each groundwater basin can provide under the Sustainable Groundwater Management Act (SGMA), and it will be lower than historical pumping levels that depleted aquifers. Groundwater recharge is important to maximize the amount of groundwater that can be pumped on a sustainable basis.

Surface water supplies will be limited by the timing and volume of flows that must stay in rivers for other beneficial uses. Over time, as understanding of environmental needs improves, more reliable projections can be made about surface water supplies available for agriculture.

The projected statewide water needs of California fish, wildlife, and natural ecosystems have not been quantified, given the diversity of the state's river systems and evolving understanding of both the biological needs of species and future climate-driven conditions. However, it is clear that each river system requires adequate season-by-season water flow to protect the natural functions fish and wildlife need. Such flows also support healthy water quality and temperatures and should be complemented by adequate habitat and removal of invasive species to enable fish and wildlife to thrive.

Key insights from assessing future water needs:

- Given natural limits on precipitation and the need to provide water for a broad range of beneficial uses, water efficiency, conservation, and reuse should be prioritized to stretch existing water supplies to meet increased future demands.
- Capturing precipitation when it comes in increasingly short and intense periods is crucial. This requires finding ways to redirect and store flood flows into aquifers.
- Water districts must prepare to serve additional customers at the same time climate change affects the reliability of surface supplies imported from long distances.
- Many users of groundwater must reduce their demand, recharge aquifers, or both in order to bring groundwater basins into sustainable conditions, even as climate change affects the reliability of local and imported surface supplies.

State Government's Current Role in Water

While most water is managed locally in California, several state agencies lead important water-related functions:

- The Department of Water Resources (DWR) manages the State Water Project, oversees implementation of SGMA, and leads statewide water resource planning, and serves as the statewide flood control agency.
- The State Water Resources Control Board regulates water rights and sets water quality standards.
- The California Department of Fish and Wildlife protects fish and wildlife resources affected by water management.
- The California Department of Food and Agriculture supports the ongoing vitality of the state's agricultural industry.
- The California Public Utilities Commission regulates investor-owned water sellers.
- The Delta Stewardship Council oversees a management plan for the Sacramento-San Joaquin Delta.
- The Central Valley Flood Protection Board serves as a partner to the U.S. Army Corps of Engineers and oversees the flood management system for the Sacramento and San Joaquin rivers.

Dozens of water-related programs, policies and investments are implemented across these agencies. These programs involve a wide range of functions, including funding, regulation, analysis and planning, local assistance, data gathering and dissemination, infrastructure maintenance, and emergency response.

A detailed breakdown of these state programs is contained in the Appendix.

The Governor and Legislature lead water policy in the state and enable state funding for water improvements. Since 1970, a total of $34 billion in water-related bond funding has been approved through 23 separate measures; two other measures were rejected. Many state programs involve the disbursement of these bond funds to local agencies, tribes, and non-profit groups.

An assessment of state government's role on water finds:

- The state's water management duties are dispersed across many agencies and programs and often siloed from one another in ways that limit overall effectiveness.
- State agencies collect vast amounts of information that could support improved local and regional resilience but do not always synthesize and disseminate it in helpful, actionable ways.

Current Water Priorities

The Newsom Administration has actively advanced several water priorities, which complement those of this water portfolio.

To support access to **clean and safe drinking** water for all Californians, the Governor and Legislature partnered to establish an ongoing, stable funding source to help enable delivery of safe and affordable drinking water. The Safe and Affordable Drinking Water Fund (SB 200) provides up to $130 million annually until 2030 to address the drinking water crisis.

The Water Board is now developing a plan to rapidly deploy this ongoing funding in a way that complements and leverages existing work using federal State Revolving Fund dollars and one-time bond funds. During this first year of implementation, most of the funding will be used to address immediate drinking water and public health needs, while planning gets underway for long-term solutions in hundreds of communities around the state.

Governor Newsom also directed state agencies to work with a broad range of water agencies and environmental conservation groups to develop **voluntary agreements** to implement the State Water Resources Control Board's Bay-Delta Water Quality Control Plan. The Water Board is legally required to update this plan to protect fish and wildlife, water quality, and other beneficial uses of water in the Delta and its key watersheds.

Successful voluntary agreements hold the promise to adaptively manage enhanced flows and habitat to improve conditions for fish and wildlife. Voluntary agreements must be adequate to meet the Water Board's standards. These agreements must undergo scientific peer review and environmental review under the California Environmental Quality Act. Voluntary agreements reflect a collaborative approach to water resources management and native fish and wildlife protection.

At the same time, California's main system of **water conveyance**, which moves a large portion of the state's surface water supply, continues to be under threat from flood, subsidence, earthquake, and climate change. Our state-led water system that captures precipitation from the Sierra Nevada mountains and the Sacramento and San Joaquin rivers to provide drinking water to 27 million Californians faces major vulnerabilities as it travels through the Sacramento-San Joaquin Delta.

Most notably, the U.S. Geological Survey indicates that there is a 66 percent probability in the next 30 years that a major northern California earthquake will occur that can disable the current levee-supported conveyance infrastructure in the Delta, threatening the drinking water for over half of all Californians. Besides protecting statewide water supplies, modernized Delta conveyance for these water projects will facilitate water transfers and groundwater recharge in overdrawn basins.

The Administration is advancing a single-tunnel conveyance project under the Delta to protect this statewide source from levee collapse caused by flood or earthquake risk and saltwater intrusion as sea level rises. This project will be funded by water agencies that will benefit from improved supply reliability. The project is undergoing environmental review and includes significant public engagement to design a project to limit Delta impacts and provide local benefits.

Moving Forward: Regional Networks, State Support

Water resources vary greatly across California. Different areas have unique water supplies, environmental conditions, user needs, and vulnerabilities. Given these differences, a one-size-fits-all approach to building water resilience does not work in California. Rather, effective water management and preparing for the future are best achieved at a regional scale.

Local and regional water agencies are well positioned to deliver needed improvements to water systems. Already, these thousands of local and regional entities account for approximately 85 percent of water system

investments. They work together to secure water, steward natural river systems, reduce flood, drought, and fire risks, and prepare for the future. Effectively managing water resources requires collaboration beyond water agencies, including tribes, local governments, and industries. Every Californian has an opportunity to help make California more water resilient.

At the same time, state government plays an important role in water management. Many areas of the state depend on water captured and moved hundreds of miles by state and federal infrastructure. Policymakers establish important water laws, policies, and standards. State agencies allocate billions of dollars for water supply, safe drinking water, flood protection, environmental restoration, and pollution control.

State government must focus on enabling regional resilience while continuing to set statewide standards, invest in projects of statewide scale and importance, and address challenges beyond the scope of any region.

While a regionalized approach will build our water resilience, regional approaches cannot cause further fragmentation. Local actions must be coordinated with neighboring entities that share common water resources, often in the same watershed or aquifer. In some areas, the state's Integrated Regional Water Management Program has advanced this coordination. In other places, flood control, groundwater management, forest health, and other issues provide an impetus for coordination.

Partnerships between state agencies and regional and local entities have evolved in recent years. State funding programs, for example, have encouraged watershed-scale collaboration and state agencies have worked to support large multi-benefit projects such as floodplain restoration. Moving forward, state-regional partnerships that advance broad, multi-benefit projects are critical to achieving water resilience.

A broad range of state government actions are needed to advance these partnerships. These partnerships may already exist in some regions and others may require new alignments across a region. Either way, the partnerships should be built on what is already working in each region.

The sections that follow detail the actions that the Newsom Administration will take, as resources allow, to help California move toward regional water resilience.

Maintain and Diversify Water Supplies

California's people and economy depend upon reliable supplies of water. Reliability is challenged by population and economic growth and climate-driven variability. We must prioritize securing adequate water supplies for an uncertain future—and start fulfilling the human right to water for the more than one million Californians who currently lack safe drinking water supplies.

To cope with a future of reduced snowpack and more punishing droughts, local and regional entities must reduce reliance on any one source and diversify supplies to enable flexibility as conditions change. Supply diversification will look different in each region, depending upon available resources.

The state should prioritize regional supply diversification that achieves multiple benefits. Diversification takes many forms. The most cost-effective, environmentally beneficial way to stretch water supplies is through better water use efficiency and eliminating water waste. Many California communities have made great progress in reducing per capita water use in recent decades. More can be done, especially to reduce water used on ornamental turf and landscaping. Managed well, California's groundwater basins can provide a crucial buffer against drought and climate change. Recycled water is a sustainable, nearly drought-proof supply when used efficiently, and the total volume of water California recycles today could triple in the next decade. Captured rain and storm runoff can be used to recharge aquifers, refill reservoirs, reduce urban heat island effects, provide landscape irrigation, and reduce the pollution that flows to rivers and beaches. Depending upon local circumstances, desalination can be a viable supply source, and desalting brackish groundwater can provide a safe supply and capacity for additional groundwater storage.

As average water temperatures warm, more precipitation will fall as rain and less as snow, and we will need more places to store peak runoff for dry times. California's groundwater aquifers have many times the total storage capacity of existing surface water reservoirs combined. Another way to safeguard water supplies is to protect it from contamination, which benefits people and the environment.

The following proposals detail how state agencies can support supply diversification:

1. **Help local water agencies achieve reliable access to safe and affordable water.**

    1.1 Implement the Safe and Affordable Drinking Water Act of 2019, with provision of interim water to 75 drinking water systems or schools, planning assistance for 100 systems, and permanent solutions for 100 systems by the end of 2020. Map drinking water-source aquifers at high risk of contamination and

shortages and identify water systems and private wells that consistently fail to provide safe drinking water.

1.2 Increase financial capacity to support drinking water projects through the Drinking Water State Revolving Fund and other state and local funding mechanisms.

1.3 As required by AB 401 of 2016, deliver to the Legislature a report detailing options for implementation of a low-income water rate assistance program.

1.4 Evaluate the feasibility of requiring a water quality test at the point of sale when selling a property supplied by a private well and disclosure of the test results to prospective buyers.

2. Drive greater efficiency of water use in all sectors.

2.1 Implement existing "Make Conservation A Way of Life" laws (SB 606 and AB 1668, 2018), which create new efficiency standards for residential use and reporting requirements for agricultural use.

2.2 Simplify the Model Water Efficient Landscape Ordinance, which sets efficiency standards for landscaping of new and retrofitted developments. Support training for local government planners to ensure compliance with this law.

2.3 Fund the State Water Efficiency and Enhancement Program and prioritize grants for water-saving irrigation system improvements to disadvantaged farmers and ranchers in basins considered high priority under the Sustainable Groundwater Management Act (SGMA).

2.4 With public and stakeholder input, update the assumptions and methodologies of the Water Energy Cost Effectiveness Calculator, which helps investor-owned utilities determine the energy savings associated with water conservation.

2.5 Promote consistent and effective conservation messaging in partnership with local water districts.

3. Help regions secure groundwater supplies by supporting the transition to sustainable use.

3.1 Continue implementation of SGMA, including reviewing Groundwater Sustainability Plans submitted in January 2020 and 2022 and assuring basin-wide alignment across the state's 260 new groundwater sustainability agencies. Support local implementation however possible, and where basin managers are unable or unwilling to implement the law, exercise appropriate enforcement.

3.2 Create a state interagency team to work with stakeholders to identify tools and strategies to address the economic, environmental, and social effects of changing land use and agricultural production as local water managers implement sustainable groundwater management.

3.3 Provide targeted support to local planning efforts to address potential land-use changes in regions implementing SGMA.

3.4 Explore ways to further streamline groundwater recharge and banking efforts and provide technical assistance to facilitate the redirection of water during periods of extended high flows to allow water to sink into aquifers, including on agricultural land.

3.5 Make funding available for groundwater recharge projects with multiple benefits.

3.6 Create flexibility for groundwater sustainability agencies to trade water within basins by enabling and incentivizing transactional approaches, including groundwater markets, with rules that safeguard natural resources, small farmers, and disadvantaged communities.

3.7 Support use of aerial electromagnetic surveys, groundwater quality conditions, and well completion reports to identify optimal areas for enhanced recharge and critical connections in aquifer systems so that local governments may protect those lands from development and utilize for managed aquifer recharge.

3.8 Explore streamlined permitting for low-hazard dams that are not across a stream channel or watercourse and are used principally for agricultural and groundwater recharge purposes.

3.9 Help regions prevent contamination of groundwater basins, including through seawater intrusion, and remediate contaminated groundwater basins that will enable large-scale water recycling and conjunctive use.

4. **Support local and regional agencies to recycle or reuse at least 2.5 million acre-feet a year in the next decade.**

   4.1 Increase financial capacity to support recycling, reuse, and wastewater projects through the Clean Water State Revolving Fund and other state and local funding mechanisms.

   4.2 Complete raw water augmentation regulations and treated drinking water augmentation regulations, as required by AB 574 of 2017, to allow purified recycled water to be moved directly into distribution systems.

   4.3 Implement 2018 legislation (SB 966) that requires creation of risk-based water quality standards for onsite collection and non-potable reuse of water in apartment, commercial, and mixed-use buildings.

   4.4 Update 20-year-old "purple pipe" regulations to eliminate outdated and overly prescriptive requirements in order to expand use of non-potable recycled water while protecting food safety and the environment.

5. **Support cities and towns to make stormwater capture a growing share of their supply.**

   5.1 To address inconsistent approaches in how municipalities estimate the cost of stormwater programs, develop a framework to identify cost of compliance with stormwater permit requirements.

   5.2 Pilot stormwater capture and use projects through the Drinking Water State Revolving Fund to identify impediments to address and to provide a framework for additional future projects.

   5.3 Develop best management practices and standards for the design and construction of recharge wells used to capture urban stormwater.

6. **Enable use of desalination technology where it is cost-effective and environmentally appropriate.**

   6.1 Consider new desalination projects according to existing state criteria including the Water Board's Ocean Plan and the Coastal Act.

   6.2 Team with federal and academic partners to develop desalination technologies that treat a variety of water types for various uses, with a goal of enabling manufacturing of energy-efficient desalination technologies in the U.S. at a lower cost, same or better quality, and reduced environmental impact than non-traditional water sources.

7. **Expand smart surface water storage where it can benefit water supply and the environment.**

   7.1 Accelerate state permitting and approvals of projects selected under the Water Storage Investment Program (Proposition 1) so that they are ready to go; for example, advance the largest off-stream reservoir in the suite of projects - Sites Reservoir - in a manner that protects and enhances fish and wildlife and water reliability.

   7.2 Acquire through contract a portion of storage, dedicated for environmental purposes, for the life of the water storage projects the Water Commission selected under the Water Storage Investment Program funded by Proposition 1.

8. **Protect and restore water quality by driving pollution reduction from a range of sources.**

   8.1 Implement AB 834, the 2019 legislation that requires the Water Board to establish and maintain a comprehensive harmful algal bloom program that includes incident response, monitoring, and website postings.

   8.2 Support statewide source control programs that include public education for emerging contaminants that are hardest to treat.

   8.3 Support statewide non-point source control programs that focus on erosion and sediment discharge.

   8.4 Support mercury control programs to reduce human and wildlife exposure to mercury-contaminated fish.

   8.5 Develop and implement statewide water quality objectives for aquatic toxicity to enhance protections for aquatic life. Assess biological communities to determine stream health and condition future projects to protect high-quality, high-functioning systems.

   8.6 Support technical assistance and grower training within the Fertilizer Research and Education Program to better manage fertilizer application and irrigation practices to protect water quality.

   8.7 Enhance dairy and livestock manure management programs to protect water quality.

Protect and Enhance Natural Systems

Many river systems across California have been highly altered by water development and these changes have impacted natural ecosystems on which fish and wildlife depend. Climate change further threatens these ecosystems as air and water temperatures increase and dry periods become more punishing.

Environmental conditions cannot be treated as something that simply needs to be "mitigated" as a result of water development. Fuller, more dynamic integration of environmental protection and enhancement into water management first requires assessment of fish and wildlife needs. Understanding the level of flow needed to support aquatic and riparian habitat on major streams would enable local agencies to better balance competing demands for water and encourage water users to voluntarily improve environmental conditions in diverse ways under durable, legal agreements.

As average temperatures warm, salmon, steelhead, and other native species need access to cooler habitat. Removal or modification of obsolete or malfunctioning dams and culverts can help fish endure drought while replenishing sediment-starved beaches and wetlands in ways that help people and wildlife. The green infrastructure of wetlands, upper watersheds, soils, and floodplains support prodigious biodiversity, dampen floods, filter water, and recharge groundwater, among other valuable services. These natural assets lend themselves to multi-benefit water projects and large-scale habitat restoration that can build community and economic resilience. Such broad-benefit projects should be less difficult to plan, permit, and pay for than is the case now.

State agencies can protect and enhance natural ecosystems in several important ways:

9. Help regions better protect fish and wildlife by quantifying the timing, quality, and volume of flows they need.

- **9.1** Develop rapid methodologies to establish regional instream flow metrics through the multi-partner California Environmental Flow Framework. Provide regional training on the environmental flow methods and tools to support local and statewide resource managers. Develop a series of case studies around the state to refine the tools.
- **9.2** Conduct and utilize instream flow analyses to further develop instream flow recommendations for ecologically important streams to protect public trust values.
- **9.3** Bring together regulators, water users, and other stakeholders to develop innovative, voluntary solutions to water supply and ecosystem protection.
- **9.4** Work with universities, tribes, and non-governmental groups to develop new tools for identifying functional ecosystem flows.
- **9.5** Develop analytical modeling tools that can be used to rapidly assess streamflow depletion tied to groundwater pumping.

10. Reconnect aquatic habitat to help fish and wildlife endure drought and adapt to climate change.

- **10.1** Support the revival of salmon, steelhead, lamprey, and other native fisheries and ecosystems central to several Native American tribes on California's second-largest river through the bi-state effort to remove four Klamath River hydroelectric dams and related river restoration activities.
- **10.2** Support a comprehensive culvert and fish passage improvement program along transportation corridors, using the strategy generated by the public-private California Fish Passage Forum and coordinated with the six regional California Fish Passage Advisory Committees.
- **10.3** Develop priorities for removal of aging and obsolete dams with collaborative partners.
- **10.4** Evaluate, plan for, and respond to environmental stressors due to climate change, including development of regional contingency plans for fish and wildlife and ecosystems.

11. Support the expansion of wetlands to create habitat, filter runoff, buffer floods, and recharge groundwater.

- **11.1** Work with federal agencies to meet the water needs of national wildlife refuges, which function together as a vital network for migratory shorebirds and waterfowl, with priority given to the Lower Klamath Basin National Wildlife Refuge on the California-Oregon border.
- **11.2** Implement the newly adopted State Wetlands Policy to make regulation of wetlands more protective, predictable, and consistent, and provide training to state and local water managers on those regulations.

11.3 Support expansion of multi-benefit floodplain projects across the Central Valley and coastal regions, including projects that restore or mimic historical river and floodplain processes, such as the Yolo Bypass and Cache Slough Partnership program.

12. Curb invasive species altering California waterways.

12.1 Work to eradicate nutria, large rodents introduced to the Central Valley from South America, which jeopardize wetlands and levees by eating aquatic plants and burrowing.

12.2 Support programs that prevent, detect, and manage invasive species and pests; develop California-specific invasive species risk assessments; support early detection programs, and evaluate and improve weed management efforts.

13. Simplify permitting to help launch more multi-benefit, multi-partner projects.

13.1 Coordinate grant and loan programs across state agencies to make funding for multi-benefit projects easier to arrange and leverage.

13.2 Support the development of expedited and cost-effective permitting mechanisms for common types of restoration and enhancement projects.

13.3 Expand use of the Regional Conservation Investment Strategies approach established in 2017 under AB 2087 to guide mitigation needs for water-related projects.

13.4 Incorporate strategically designed conservation planning (e.g., Natural Community Conservation Planning, Habitat Conservation Plans, Regional Conservation Investment Strategies) and other resource protection and recovery plans into mitigation approaches for levee modifications, operations, and maintenance.

13.5 Support the alignment of state permitting fees with level needed to properly fund state permitting agencies to deliver timely projects.

13.6 Pilot a project to evaluate the effectiveness of simplified environmental permitting processes and monitor whether such processes are achieving desired environmental outcomes.

13.7 Identify opportunities to meet legal standards in creative, collaborative ways, such as through voluntary agreements that enhance flows and habitat.

14. Upgrade and maintain state wildlife refuges, hatcheries, and restoration areas.

14.1 Support research, monitoring, maintenance, and management of state habitat restoration projects, hatcheries, and wildlife refuges.

14.2 Upgrade water and energy delivery systems on state-owned and managed land and in state hatcheries.

14.3 Develop and implement scientifically sound hatchery and genetic management plans in coordination with tribal governments to reduce risks to listed fish species.

15. Encourage investment in upper watersheds to protect water quality and supply.

15.1 Encourage enhancement of both forest and water management through watershed coordinator programs, resource conservation districts, and other groups coordinating regionally.

15.2 Complete plans for watershed restoration investments in the drainages that supply the Oroville, Shasta, and Trinity reservoirs, as required by 2018 legislation (AB 2551).

15.3 Utilize the Governor's Forest Management Task Force to explore how investments and programs in forest resilience may improve watershed natural functions, including water quantity and quality benefits, and how water management can enhance forest health.

16. Improve soil health and conservation practices on California farms and ranches.

16.1 Fund the Healthy Soils program, which supports on-farm practices that enhance water retention and provide other environmental benefits, through incentives, demonstrations, and technical assistance.

16.2 Enhance agricultural lands for biodiversity, resilience, and habitat benefits through incentives for on-farm conservation practices and innovative partnerships.

16.3 Support technical assistance, such as through the UC Cooperative Extension Climate Smart Agriculture Advisors program and Resource Conservation Districts, to support farmers and ranchers with education about healthy soils, manure management, water and nutrient efficiency practices, drought adaptation, and land management changes.

17. Minimize air pollution and restore habitat at the Salton Sea.

17.1 Support achievement of milestones within the 10-year Salton Sea Management Plan to minimize air pollution and preserve fish and wildlife habitat.

17.2 Develop criteria and a monitoring plan to evaluate Salton Sea improvements to local air quality and environmental habitat.

17.3 Complete an independent feasibility analysis of water importation options for the Salton Sea.

18. Help protect the economic and ecological vitality of the Sacramento-San Joaquin Delta.

18.1 Complete the update to the Bay-Delta Water Quality Control Plan for San Francisco Bay and the Delta, as required by law, and implement the Plan, potentially through voluntary agreements.

18.2 Complete a climate change vulnerability assessment and adaptation strategy to protect people, with a particular focus on disadvantaged communities, habitat, water quality, and supply.

18.3 Add a requirement to the water management plans which urban and agricultural suppliers submit to the state every five years that mandates districts that receive water from Delta-based projects to demonstrate how they are reducing reliance on those supplies.

18.4 Provide incentives and technical advice to Delta landowners for creating managed wetlands or cultivating rice to reverse land subsidence and reduce carbon emissions. Eliminate subsidence-inducing practices on state-owned lands and pursue alternative sources of revenue to support long-term land management.

Build Connections

Our decentralized water management system, with thousands of entities managing water in California, can hinder our ability to steward shared water resources. Lack of coordination among water agencies in the same watershed, for example, limits preparedness for floods and droughts and the ability to quickly adapt when crises come. Overlap and gaps in jurisdictional boundaries can leave Californians out of the discussion and underserved. Connectivity must begin with identifying those most vulnerable around us, building their capacity to engage, and assuring that their needs are prioritized. A region, after all, is only as strong as its most vulnerable communities.

Our water systems are also challenged with aging, damaged, or increasingly risk-prone infrastructure that transports water between different areas of the state. Regions need physical connections–new pipelines and aqueducts and storage places to help move water from places of surplus to places of scarcity. We need other kinds of connections, too. A common, readily available set of facts about water supply and use can make balancing competing needs less contentious and more efficient. Integrated use of science and monitoring, data, and technology, coupled with human coordination, can help water managers match assets to challenges and share costs and benefits. Finally, state government must integrate itself to minimize regulatory and reporting burdens on local water managers and track outcomes toward regional resilience.

State agencies can help regions build connections in several important ways:

19. Modernize inter-regional conveyance to help regions capture, store, and move water.

19.1 Plan, permit, and build a resilient tunnel under the Sacramento-San Joaquin Delta to safeguard State Water Project and Central Valley Project supplies drawn from the Sacramento and San Joaquin river systems. New conveyance should complement existing and improved through-Delta conveyance to promote operational flexibility, protect water quality, and support ecosystem restoration, as well as limit local impacts.

19.2 Conduct a feasibility analysis for improved and expanded capacity of federal, state, and local conveyance facilities to enhance water transfers and water markets. The analysis must incorporate climate change projections of hydrologic conditions.

19.3 Continue studies of subsidence effects on water infrastructure and support strategies to minimize damage from ongoing subsidence, halt subsidence, and rehabilitate infrastructure.

19.4 Direct the Water Commission to assess a state role in financing regional conveyance projects that could help meet needs in a changing climate.

19.5 Ensure effective long-term State Water Project management by completing risk-informed asset management plans for critical infrastructure.

20. Support groups and leaders in each of the state's regions to develop and execute integrated water resilience strategies.

20.1 Build on the Integrated Regional Water Management Program and other regional efforts to align climate scenarios and expand watershed-scale coordination and investments that contribute to water resilience. Emphasize outcome-based management that builds on integrated planning, action, and monitoring across sectors, including groundwater sustainability, upper watershed land management, and climate resilience.

20.2 Structure funding sources to reduce the hurdles for water projects that reflect integrated solutions, produce multiple benefits, and improve watershed function.

20.3 Support the capacity, participation, and full integration of tribal governments and under-represented communities in regional planning processes.

21. Ease movement of water across the state by simplifying water transfers.

21.1 Substantially reduce approval time for transfers.

21.2 Develop an open and transparent ledger system to allow for improved local and regional participation in the water transfer market.

21.3 Develop best practices for inter-and intra-basin groundwater trading programs that protect communities, economies, and the environment, including standards for measuring, reporting, accounting, and monitoring groundwater use and trading.

21.4 Explore an expedited process to facilitate transfers between the Central Valley Project and State Water Project.

22. Modernize water data systems to inform real-time water management decisions and long-term planning.

22.1 Develop data management training for state agencies that aligns protocols for water data access and management under the Open and Transparent Water Data Act of 2016 (AB 1755).

22.2 Support state water data compliance with AB 1755.

22.3 Streamline data submission and reporting to the state.

22.4 Align water diversion reporting by water users to a single date to simplify reporting.

22.5 Assess and integrate state and federal surface and groundwater models. Using an agreed-upon approach, establish the assumptions, data inputs, modeling parameters, and other requirements to develop water mass balances that may be used by regions.

22.6 Build upon implementation of SB 19 of 2019, which requires an assessment of the state's stream gage network. Convene state, local, and federal agencies and assess and prioritize the monitoring instrumentation needed (flow meters, remote sensing, weather stations, etc.) to support regional resilience.

22.7 Explore ways to make water rights information easily available to the public by rebuilding the state's water right data base to include digital place of use, diversion, and case history information, made available on an easy-to-use geospatial platform.

22.8 Phase in requirements for telemetered diversion data (real-time water use) to diversions of 500 acre-feet or more per year, down from diversions of 10,000 acre-feet a year, to help water users coordinate projects, transfers, environmental protection, and other management activities.

22.9 Enable the use of OpenET–a public and easily accessible platform for measuring the amount of water used to grow food.

23. Coordinate science crucial to water management.

- **23.1** Establish an inter-agency and public-private task force that includes diverse stakeholders to prioritize key scientific questions statewide that must be answered to better inform water managers about how to best manage water supplies and flood risk for all of California's needs.
- **23.2** Improve Delta monitoring efforts based upon Delta Independent Science Board recommendations.

24. Foster innovation and technology adoption across all water sectors.

- **24.1** Promote broadband deployment in unserved and underserved areas of the state to enable farmers and irrigation districts to use the latest water management technologies, including irrigation control.
- **24.2** In order to enable application of promising new technologies, where needed, consider amending laws and regulations that restrict programs to certain technologies.
- **24.3** Establish a state-managed "water innovators" clearinghouse where new approaches and technologies can be posted online.
- **24.4** Establish Secretaries' Awards for early, ambitious, or successful adoption of innovation, given by the Secretaries for the Natural Resources Agency, California Environmental Protection Agency, and Department of Food and Agriculture.

Be Prepared

Water management is essentially risk management. As the concentration of greenhouse gases in the atmosphere increases and the planet warms, the risks water managers face evolve. The future threatens flashier floods, deeper droughts, and hotter temperatures. At the same time, major water infrastructure components age. The average age of a state-regulated dam is 70 years. Some should be upgraded to handle changing precipitation patterns. Most Central Valley levees have not been maintained to meet federal standards.

Given that we will experience changes in the future that we cannot anticipate now, we must also adapt our institutions to be able to modify policies, investments and programs as conditions change. Science and monitoring can help us anticipate these changes as they occur. Better understanding and tracking of snowpack, storms, stream flow, and potential climate effects at a fine-grain, local level would help all water managers.

State agencies can support regional preparedness in several important ways:

25. Help regions prepare for new flood patterns.

- **25.1** Review state, federal, and local permits for flood management projects and operations and maintenance and recommend ways to simplify the permitting process.
- **25.2** Research and explore ways to provide flood insurance beyond the national program.
- **25.3** Develop a flood management strategy for the San Joaquin River and its tributaries.
- **25.4** Facilitate inter-agency annual dam, flood, debris flow, and wildfire emergency table-top exercises with emergency responders and local communities, focusing on testing emergency notification protocols, sirens and warning systems, and evacuation route planning.
- **25.5** Augment financial assistance and expand state technical assistance for communities to update their local hazard mitigation plans and general plans to meet state adaptation requirements at least once every five years by prioritizing disadvantaged and flood-vulnerable communities. Updates should account for climate change and forecasted population growth.
- **25.6** Provide hydraulic and economic modeling assistance to update the flood hazards within the California State Hazard Mitigation Plan, review the floodplain management elements of local hazard mitigation plans, and support flood loss avoidance studies following federally-declared disasters. These actions will maximize eligibility for federal financial assistance before and after disasters.
- **25.7** Partner with urban communities to improve existing and identify new flood risk reduction projects to meet or exceed state and federal standards.
- **25.8** Partner with federal, tribal, and local agencies to support small community flood risk-reduction projects in vulnerable communities in the Central Valley and elsewhere.

25.9 Make available to the public regularly-updated bathymetric analyses of channels in the Delta to help local flood control agencies, landowners, and habitat managers better understand levee condition, habitat types, and channel siltation.

26. Help regions prepare for inevitable drought.

26.1 Submit recommendations to the Governor and Legislature on how to improve drought planning for small suppliers and rural communities identified as vulnerable to drought, as required by AB 1668, the 2018 legislation.

26.2 Review state actions during the 2012-16 drought and use that response as the basis for planning water right inspections, emergency regulations, emergency staffing, improved forecasting, and other necessary responses for future droughts.

26.3 Support the development of a drought operations strategy for the State Water Project and Central Valley Project to meet Water Board-required flow and water quality criteria and respond to fish and wildlife needs during extended drought conditions lasting up to six years.

26.4 Provide financial and technical assistance and training to reduce drought risk to tribal and under-represented communities with small water systems and households on private wells.

27. Sharpen the ability of regions to anticipate weather and climate changes.

27.1 Support regional decision making with watershed-scale climate vulnerability and adaptation assessments that include strategies to address risks to water supply, ecosystems, and water quality.

27.2 Support California Water Plan planning-area scale analysis of future flood risk, water demand, supply reliability, and water for the environment for a range of climate and growth scenarios. Integrate future water supply and demand analyses into the water right priority system and incorporate climate change forecasts into permitting processes.

27.3 In cooperation with the U.S. Army Corps of Engineers and reservoir owners, evaluate the potential for implementing forecast-informed reservoir operations in coastal and inland watersheds where improved weather forecasting capabilities would allow reservoir operators to improve flood control and water supply storage.

27.4 Support utilization of emerging technologies and partnerships to better estimate severity of future flood and drought conditions, including seasonal snowpack and runoff that generate most of California's water supply.

Executing This Portfolio

Carrying out the actions of this water portfolio will require sustained leadership and oversight, funding, and cooperation. Given limited resources, not all actions can be implemented with equal priority, but taken together, this suite of actions outlines a vision.

State agencies must serve as a crucial hub of collaboration across regions and all levels of government. This will require both focus and new emphasis on cooperation across state agencies and with regional groups and leaders.

Our work moving forward must also enable a faster pace of adaptation and coordination. Addressing new challenges as climate change advances requires stronger capacity to reflect, innovate, communicate, and coordinate. This cannot take place in silos but must be integrated within and across regions. State agencies can help facilitate this shared learning and innovation.

This water resilience portfolio is part of a broader state government effort to adapt to climate change. Currently, all state agencies are aligning investments, programs, and policies to protect communities and natural places from a wide range of climate-driven impacts. Water resilience actions must be integrated with other climate adaptation efforts, such as improving forest health and protecting coastal communities.

This water resilience portfolio is also part of enabling opportunity for all Californians, which is a critical priority for the Newsom administration. Actions within this portfolio have been tailored to strengthen the economic and environmental vitality of all regions.

Finally, state agencies need to hold themselves accountable for achieving actions in this water resilience portfolio. This includes monitoring progress toward achieving these actions and modifying actions and strategies over time as needs and opportunities change.

To implement this resilience portfolio, state agencies will:

28. Institutionalize better coordination across state agencies.

- **28.1** Regularly convene the leaders of state agencies with water-related responsibilities to implement the portfolio actions and coordinate programs and expenditures.
- **28.2** Broaden the impact of the California Water Plan, required every five years by law, by increasing alignment and coordination between contributing state agencies. Assess progress toward regional water resilience in Water Plan updates. Inventory recurring state-published water-related plans and assess whether each should be continued, modified, consolidated, or discontinued.
- **28.3** Establish an interagency team to develop multi-benefit funding programs by utilizing resources in existing programs.
- **28.4** Create a water financing work group to identify innovative funding mechanisms and new approaches to enable greater funding for water management needs.

29. Partner with key non-state partners to improve coordination and alignment.

- **29.1** Establish regular dialogue with local and regional water leaders to improve how state and regions work together to improve water resilience.
- **29.2** Work with local and regional leaders to explore organizing specific water resilience portfolios in each region and pilot innovations, such as development of regional water budgets to improve drought resilience and water transfers.
- **29.3** Consult and coordinate with California Native American tribes as directed under Executive Orders B-10-11 and N-15-19, which establish government-to-government consultation between the Administration and tribes.

30. Unify to pursue federal funding and cooperation.

- **30.1** Coordinate water resources priorities across state agencies and with local agencies and communities, as appropriate, to strengthen Congressional and federal agency support for California's water future.
- **30.2** Pursue federal funding for priority multi-benefit projects that may include flood risk reduction and ecosystem benefits and that are of inter-regional value.
- **30.3** Advocate to secure federal research that advances or improves California water management–for example, to meet California-specific forecasting needs.
- **30.4** Pursue reforms of federal hazard-related programs to ensure adequate federal funding for California water infrastructure repair, maintenance, and improvements.

31. Actively integrate water resilience portfolio actions into other Administration efforts to build climate resilience.

- **31.1** Include water portfolio priorities in the discussion of a potential climate resilience general obligation bond.
- **31.2** Integrate the Water Resilience Portfolio into the State Climate Action Plan that must be produced every three years.
- **31.3** Include water actions that build economic resilience into the Administration's Regions Rise Together Initiative.

32. Track and report publicly on progress toward implementing this Water Resilience Portfolio.

- **32.1** Issue an annual status report regarding implementation of this Water Resilience Portfolio.
- **32.2** Gather stakeholders from across the state each year to discuss progress implementing this portfolio and more broadly achieving water resilience across the state.

What can our water future look like if we succeed? All Californians have safe and clean drinking water. Our native fish populations recover. Reliable water helps tribal governments, rural communities and agriculture thrive. Cities and towns grow while using water efficiently. We capture, use and share water supplies to weather droughts. Our communities are safe from flood risks. And we adapt together to changes through collaborative, science-based management and strong partnerships.

With shared commitment and resources, this future is within reach.