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California's Draft Water Resilience Portfolio: Improving Public Health and Achieving Long Term Water Resilience Through Investments in California Water Infrastructure

Ian Harris

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(https://gguelj.org/2020/04/27/californias-draft-water-resilience-portfolio-improving-public-health-and-achieving-long-term-water-resilience-through-investments-in-california-water-infrastructure/)

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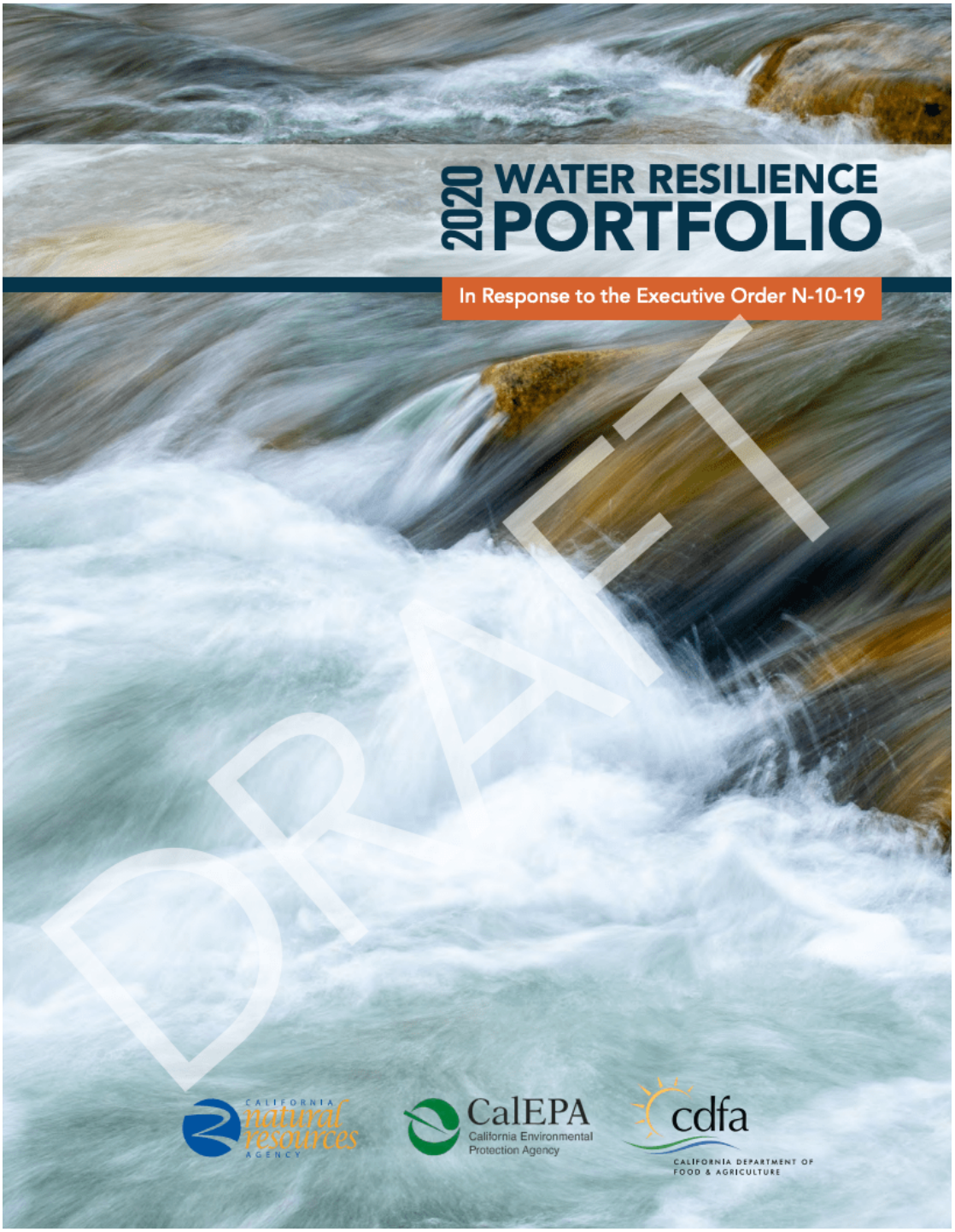
April 27, 2020 by Ian Harris (https://gguelj.org/author/official-iphgmail-com/)

Photo by Heidi Kaden via **Unsplash (https://unsplash.com/photos/8t-OmptdT8A)**.

With public health at the forefront of everyone's mind, refocusing on investing in California's aging water infrastructure presents key opportunities to provide clean, safe drinking water to all and begin to sustainably rebuild state water infrastructure resources. It is no secret that clean safe drinking water is necessary for a healthy life, nor is it a secret that significant portions of California's water infrastructure, including distribution and transmission pipelines, water storage facilities and water treatment facilities, are **well past their expiration dates (https://www.infrastructurereportcard.org/wp-content/uploads/2018/10/FullReport-CA_051019.pdf)**. In the unfortunate wake of COVID-19, it will be critical for local and state level decision makers to keep in mind the direct correlation between clean water and human health.

The health and wellbeing of Californian's has always been connected to water. The state has made major strides toward a resilient water future by recognizing **the human right to safe drinking water (http://www.leginfo.ca.gov/pub/11-12/bill/asm/ab_0651-0700/ab_685_bill_20120925_chaptered.pdf)** and creating the **Safe and Affordable Drinking Water Fund (https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201920200SB200)**. And to address water infrastructure issues head on, including drinking water supply, Governor Gavin Newsom signed **Executive Order N-10-19 (https://www.gov.ca.gov/wp-content/uploads/2019/04/4.29.19-EO-N-10-19-Attested.pdf)**, directing state agencies to commission the first Water Resilience Portfolio.



Cover page of the **Draft Water Resilience Portfolio (http://waterresilience.ca.gov/wp-content/uploads/2020/01/California-Water-Resilience-Portfolio-2019-Final2.pdf)**.

Although the State Water Resilience Portfolio is still in draft form (Draft Portfolio), it presents a comprehensive overview of California's current water resources and outlines goals and directives for state agencies to create statewide, local, and regional water infrastructure that is resilient to climate change and other environmental stressors. The Draft Portfolio, as relevant here, hopes to accomplish system resilience by capitalizing on growing trends in California for multi-benefit and distributed infrastructure projects. Distributed infrastructure projects can achieve the state's resilience objectives outlined in the Draft Portfolio by increasing system physical resilience and diversifying the local water supply. **Distributed infrastructure (https://tapin.waternow.org/resources/innovation-in-action-21st-century-water-infrastructure-solutions-overview/)** includes installations, appliances, and technologies located at or near the point of water use and distributed across many properties, that are generally employed in coordination with a water provider's conventional infrastructure.

Although the state's recent actions moving California toward a resilient future are noteworthy, **gradual change may be insufficient (https://www.researchgate.net/publication/326292057_Distributed_Systems_A_design_model_for_sustainable_and_resilient_ir** to make California's water infrastructure truly resilient in time. As many as 1000 communities in California **may be currently living without potable water (https://www.nytimes.com/2019/07/24/us/the-crisis-lurking-in-californians-taps-how-1000-water-systems-may-be-at-risk.html)** in their house, and **one million Californians may are exposed to unsafe drinking water (https://www.politifact.com/factchecks/2019/feb/14/gavin-newsom/true-more-million-californians-dont-have-clean-dri/)** each year. As time goes on, the effects of climate change and a ballooning population will put more strain on an already burdened water supply system. The next significant climactic event that hits the state will hit hard and California's communities must be ready to withstand its impacts. For example, **U.S. Geological Survey has found (https://water.ca.gov/deltaconveyance)** that there is a sixty-six percent probability that a major northern California earthquake will occur in the next thirty years that will disable the current levee-supported water conveyance infrastructure in the Sacramento-San Joaquin Delta. Such an earthquake would threaten the drinking water for over half of all Californians.

What follows is a brief overview of California's water needs and how the Draft Portfolio directs state agencies to address them. This post also explains what distributed infrastructure is and explores how distributed infrastructure investments may reach the level of resiliency that the Draft Portfolio aspires to achieve.

California's Initial Steps Towards Water Resilience & The Draft Portfolio

In 2012, California became the first state to codify **the human right to water (http://www.leginfo.ca.gov/pub/11-12/bill/asm/ab_0651-0700/ab_685_bill_20120925_chaptered.pdf)** when former Gov. Jerry Brown signed A.B. 685 into law. A.B. 685, also known as the Human Right to Water Bill, amended the California Water Code to recognize that every human being has the right to safe, clean, affordable and accessible water adequate for human consumption, to drink and prepare food with. All relevant state agencies must consider the human right to water when creating or revising policies and regulations related to drinking water. The Bill also provides a point of reference for why California has taken, or plans on taking, certain courses of action regarding California's water resources.

One of the most concrete steps towards drinking water resiliency was establishing **the Safe and Affordable Drinking Water Fund (Fund) (https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200SB200)**. The Fund, created by state legislation and signed into law by Gov. Gavin Newsom in 2019, makes up to $130 million a year available to government entities to invest in drinking water infrastructure until 2030. In comparison, over the past ten years, the state of California has **spent a total of $3 billion (http://waterresilience.ca.gov/wp-content/uploads/2020/01/California-Water-Resilience-Portfolio-2019-Final2.pdf)** (*see*, page 145) in assistance to address safe and affordable drinking water needs through capital projects to replace, repair, and improve aging infrastructure and create new treatment systems. The Fund signals a reprioritization of public health by investing in drinking water infrastructure, but even the maximum amount of spending over the next twenty years will only total $2.6 billion, far short of California's long-term needs.

As of 2018, the U.S. Environmental Protection Agency **(EPA) reported (https://www.epa.gov/dwsrf/epas-6th-drinking-water-infrastructure-needs-survey-and-assessment)** that for drinking water alone, California must invest over $51 billion in drinking water infrastructure over the next twenty years to meet the state's needs.

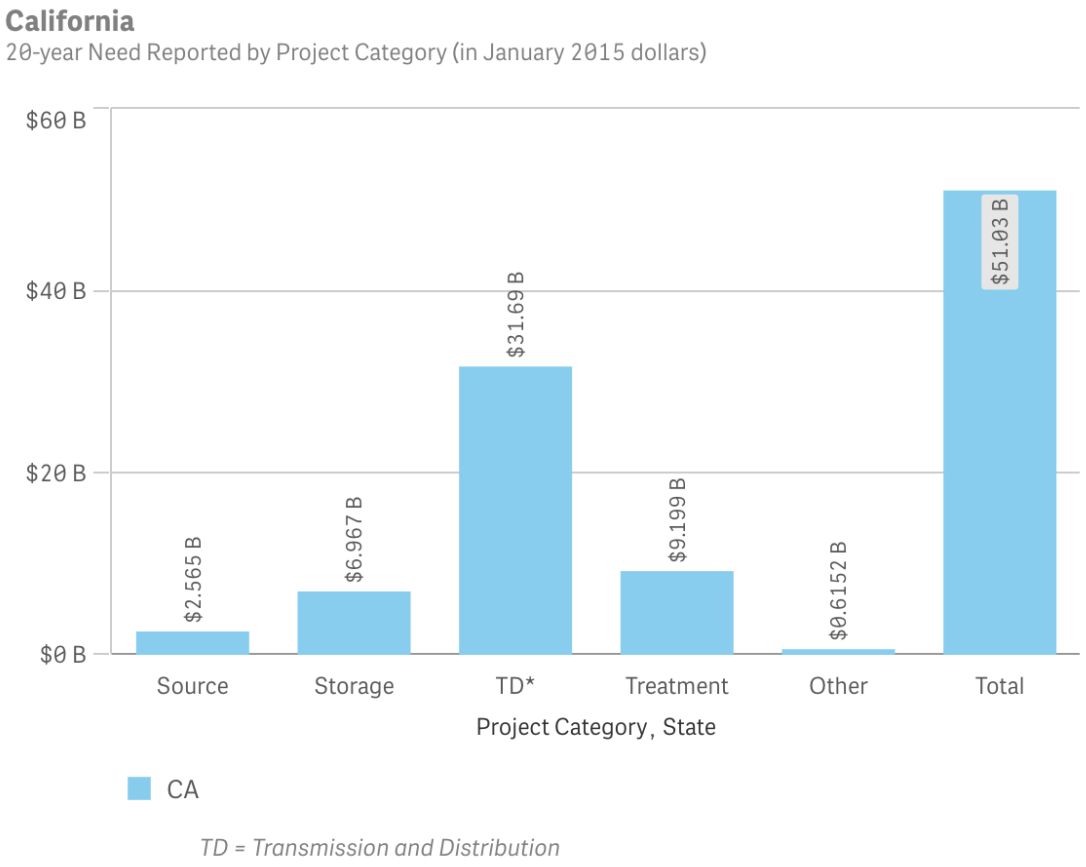
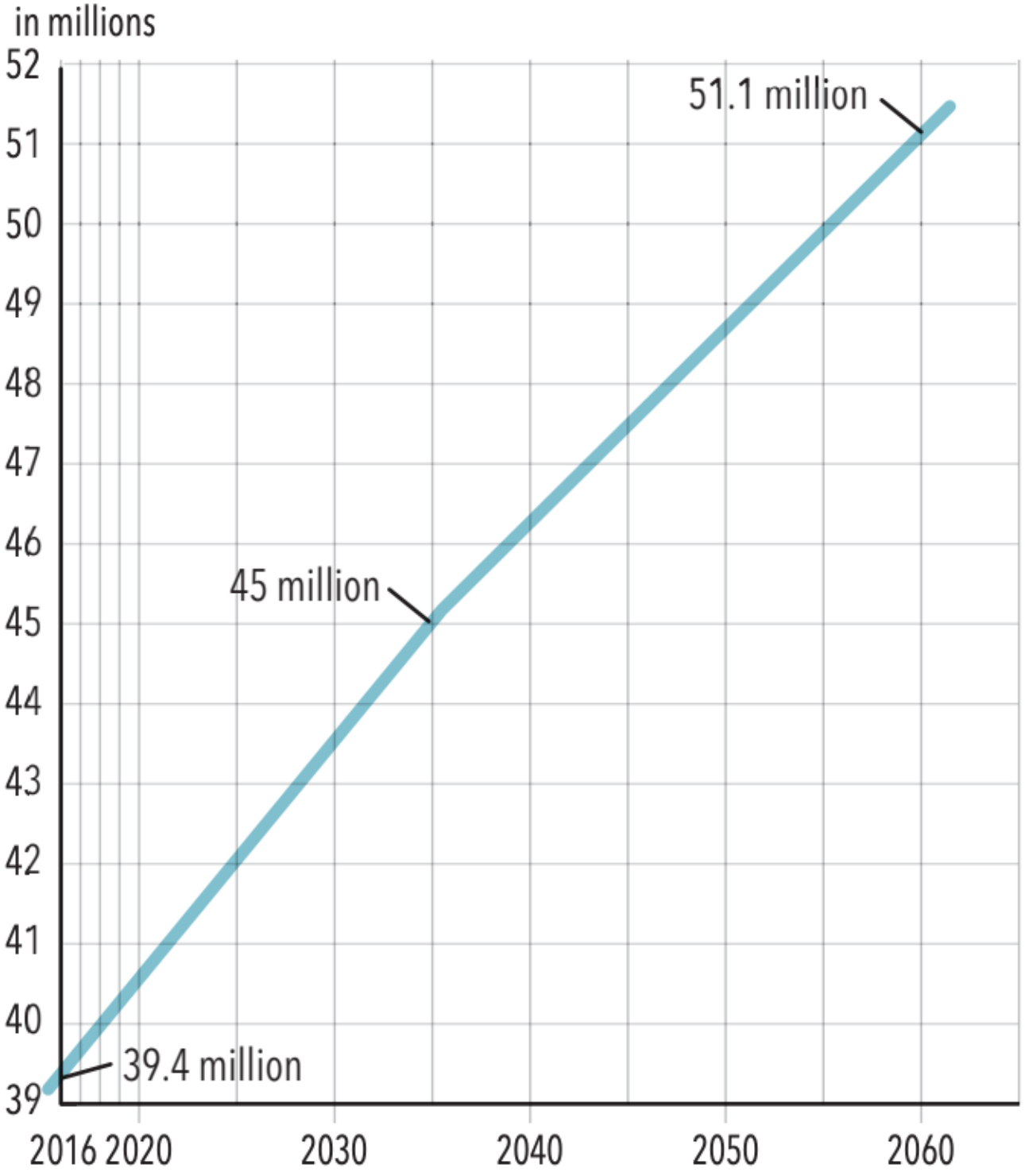


Figure from **EPA's 6th Drinking Water Needs Survey and Assessment (https://www.epa.gov/dwsrf/epas-6th-drinking-water-infrastructure-needs-survey-and-assessment)**.

California's drinking water infrastructure needs are the highest of any state at nearly 10.8% of the nation's total $472.6 billion drinking water infrastructure need over the same period.

In addition to this forward looking calculation of water supply need, as mentioned above, approximately **one million Californians currently don't have clean drinking water (https://www.politifact.com/factchecks/2019/feb/14/gavin-newsom/true-more-million-californians-dont-have-clean-dri/)**. Actual amounts are not always known, as many living conditions, including water supply, are not always properly recorded for regulators, or the information is dispersed among different agencies. That said, it is estimated that two million people throughout the U.S. **do not have access to clean running water (http://uswateralliance.org/resources/blog/world-water-day-2020-community-resilience-time-climate-crisis)**, indoor plumbing, or a working toilet.

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

Figure from the **Draft Portfolio (http://waterresilience.ca.gov/wp-content/uploads/2020/01/California-Water-Resilience-Portfolio-2019-Final2.pdf)** (at page 13).

To address these pressing water resource issues, in April 2019, Gov. Newsom signed **Executive Order N-10-19 (https://www.gov.ca.gov/wp-content/uploads/2019/04/4.29.19-EO-N-10-19-Attested.pdf)**, directing the California Department of Food and Agriculture, California Environmental Protection Agency and California Natural Resources Agency to collectively compile potential state actions that will ensure the state's long-term water resilience and ecosystem health. To do this, the three agencies formed an interagency working group and developed the **Draft Water Resilience Portfolio (http://waterresilience.ca.gov/)**.

To develop the Draft Portfolio, the working group conducted an inventory and assessment of key aspects of California water, soliciting broad input from tribes, agencies, individuals, organizations, and leaders across the **state (http://waterresilience.ca.gov/)**. The working group considered assessments and input from more than twenty public listening sessions across the state and more than **100 substantive comment letters (http://waterresilience.ca.gov/)**. The result of the process is the Draft Portfolio, a set of statewide action plans for state agencies to implement, which are meant to support local and regional efforts to ensure water resilience by working for, and with, local and regional water providers.

The **key principles (http://waterresilience.ca.gov/)** guiding the development of the Draft Portfolio include: prioritizing multi-benefit approaches that meet multiple needs at once, utilizing natural infrastructure such as forests and floodplains, embracing innovation and new technologies, encouraging regional approaches among water users sharing watersheds, incorporating successful approaches from other parts of the world, integrating investments, policies and programs across state government, and strengthening partnerships with local, federal and tribal governments, water agencies and irrigation districts, and other stakeholders.

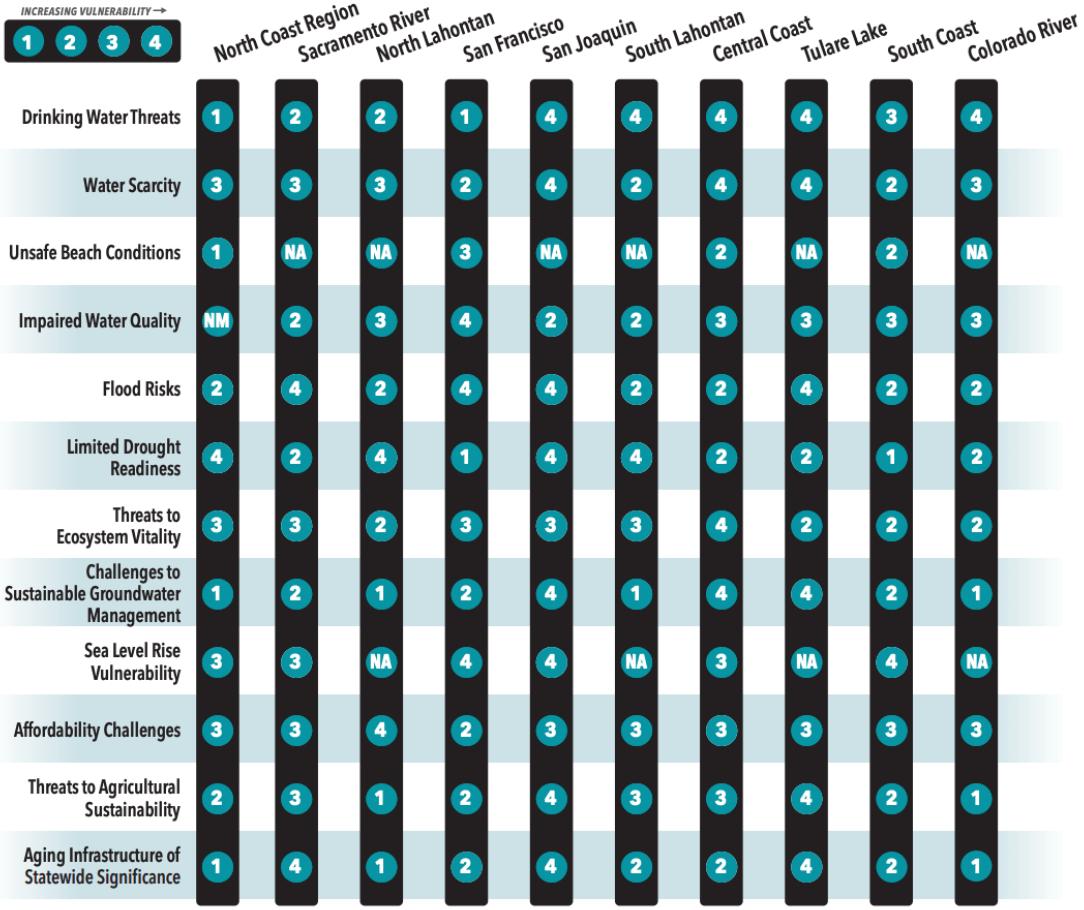
The Draft Portfolio is still a draft, which means that some changes may happen before the publication of the final Portfolio. The draft was published on January 3, 2020 and the interagency working group solicited further public comments and community input, which will likely help guide the next version of the Draft Portfolio. The **period for comment (http://waterresilience.ca.gov/)** on the draft closed on February 7, 2020. Once finalized, the Portfolio will represent the state's unified plans at the state level for ensuring water resilience in the coming decades and will clearly delineate the state's role in relation to local and regional water authorities.

Threats to Drinking Water and Aging Traditional Infrastructure Are Pushing California To Explore New and Different Solutions

The Draft Portfolio identified several factors pushing California to finally make system-wide changes in water infrastructure. Two significant drivers for action are future threats to water supplies and large aging infrastructure installations.

Comparing Regional Vulnerability Indicators

The chart below is a broad snapshot of regional water challenges, presented solely to differentiate water needs across the state. The sources of information used in these assessments are listed on the following page. These regional summaries are presented not to suggest a governance structure or to guide state funding, but rather as a method to differentiate water needs across the state. Projects and initiatives to strengthen water resilience may be achieved best in smaller geographies or even across these regions. These summaries are offered to stimulate a deeper conversation about defining and achieving water resilience on a regional scale. Climate change will impact the severity of these vulnerabilities.



The Central Coast Region Vulnerability Indicators graphic is provided as an example of the conditions analyzed for each region by the Draft Portfolio. (*see*, the **Draft Portfolio (http://waterresilience.ca.gov/wp-content/uploads/2020/01/California-Water-Resilience-Portfolio-2019-Final2.pdf)** at 108).

Data from the Resilience Portfolio shows that "drinking water threats"[1] is a top vulnerability for half of all of California's hydrologic regions, and affects more hydrologic regions than any other vulnerability condition analyzed in the **Draft Portfolio (http://waterresilience.ca.gov/wp-content/uploads/2020/01/California-Water-Resilience-Portfolio-2019-Final2.pdf)** (*see*, page 108).

The five affected regions (http://waterresilience.ca.gov/wp-content/uploads/2020/01/California-Water-Resilience-Portfolio-2019-Final2.pdf) (*see*, page 108) include the Central Coast Region, Colorado River Region, San Joaquin Delta region, South Lahontan Region, and Tulare Lake Region.

Figure 10 California Hydrologic Regions

Map of California's Hydrologic Regions (*see*, the **Draft Portfolio (http://waterresilience.ca.gov/wp-content/uploads/2020/01/California-Water-Resilience-Portfolio-2019-Final2.pdf)** at 67).

This vulnerability is heightened for California's large water projects, with concerns about future resiliency and environmental impacts. Just recently, the Anderson Dam near San Jose was **ordered to be drained (https://abcnews.go.com/US/wireStory/earthquake-risk-prompts-order-drain-california-dam-69207532)** by the Federal Energy Regulatory Commission (FERC). Anderson Dam, built in 1950, was classified in 2017 as posing an extremely high downstream hazard in the event of an earthquake. **FERC called the risk (https://www.sanjoseinside.com/2020/02/25/feds-order-draining-of-anderson-reservoir/)** the Anderson Dam posed "unacceptably high," and therefore recommended that the reservoir be drained until seismic retrofitting is completed. The Oroville Dam spillway, also built in the 1950's, required over one billion dollars in repairs after **the spillway cracked (https://www.americanrivers.org/2020/03/dam-safety-for-downstream-safety-revisiting-the-oroville-dam-spillway-failure/)** in February, 2017, and almost 200,000 people were forced to evacuate the surrounding area in northern California during the incident.

Image via **Twitter (https://twitter.com/CANGJ3OPS/status/829769462077284352?ref_src=twsrc%5Etfw%7Ctwcamp%5Etweetembed%7Ctwterm%5E829769462077284352&ref_url=https%3A%2oroville-dam-failure%2Findex.html)**.

Vulnerability and uncertainty also surround one of the most debated water projects in California history, **the Delta tunnels project (https://www.restorethedelta.org/101-save-the-delta-stop-the-tunnels/)**, which has recently been reduced from the previously proposed two tunnels, to one tunnel. Now officially titled the **Delta Conveyance Project (https://www.enr.com/articles/48538-california-moves-forward-with-delta-tunnel)** (Project), the Project is the state's plan to construct large underground tunnels in the Sacramento-San Joaquin Delta, in order to transport more water to the Central Valley and southern California. The proposed Project faces significant **opposition (https://www.sacbee.com/news/california/water-and-drought/delta/article97468367.html)** based on the project's

potentially devastating environmental impacts and overestimated economic value. The change to only include **one tunnel (https://water.ca.gov/deltaconveyance)** in the Project, deviating from the original plan, requires the Department of Water Resources to return to the drawing board to pursue new environmental reviews and restart the planning process to construct a single tunnel.

With growing uncertainty about the future of larger, traditional water resources, there are effective localized solutions that can help secure California's water resilience. Distributed infrastructure projects throughout California could alleviate strains on the state's aging large water infrastructure resources and address specific concerns described in the Draft Portfolio. The degree to which the state allocates technical and financial resources to local and regional water solutions are still uncertain, given the current state of the Draft Portfolio.

Public Reception of The Draft Portfolio and The State's Next Steps

As with many significant government actions, when the Draft Portfolio was released in January, it was met with mixed reviews. Individuals and organizations, eager to contribute to the conversation and development of the next iteration of the Draft Portfolio, provided a wide range of comments. While there were some responses of praise for the Draft Portfolio, such as **comments made by the Regional Water Authority (https://rwah2o.org/media-statement-resiliency-portfolio-underscores-benefits-of-regional-collaboration/)**, a larger portion were critical of the Draft in some way.

Some commenters were critical of the interagency working group for, **as one put it (http://blogs.edf.org/growingreturns/2020/01/15/newsom-water-resilience-portfolio-california/)**, ignoring "good science," which they believed should have been included or relied upon in the Draft Portfolio. **Another commenter (https://www.restorethedelta.org/wp-content/uploads/20200205-RTD-Comments-Water-Resilience-Portfolio.pdf)** thought that the Draft Portfolio was only "rehashing" old rhetoric about California's water needs instead of contributing new comments to the conversation, and thought that the interagency working group ignored recommendations made by those outside "the water agency industry."

Further still were those commenters who acknowledged the effort and thoroughness of the draft, but were in some way left wanting more or otherwise unsatisfied. One of the biggest concerns for these individuals and organizations was that the Draft Portfolio is a set of recommendations and does not compel or mandate state agencies take action. For instance, a Senior Fellow at the Public Policy Institute of California described the Draft Portfolio as a "herculean effort" that is **"a plan to plan." (https://calmatters.org/explainers/water-policy-explained-california-delta-reservoir-water-conservation/)** Similarly, the Natural Resource Defense Council submitted **public comments (https://www.nrdc.org/sites/default/files/nrdc-comment-letter-water-resilience-portfolio.pdf)** calling for, among other things, specific metrics and related legal obligations to be attached to state action executed pursuant to the Draft Portfolio.

It is clear that changes to the Draft Portfolio will be welcomed by many interested parties. Unfortunately, just weeks after the comment deadline in February, Gov. Newsom **proclaimed a state of emergency (https://www.gov.ca.gov/2020/03/04/governor-newsom-declares-state-of-emergency-to-help-state-prepare-for-broader-**

spread-of-covid-19/) in California and shortly thereafter, Gov. Newsom issued **Executive Order N-33-20 (https://www.gov.ca.gov/wp-content/uploads/2020/03/3.19.20-attested-EO-N-33-20-COVID-19-HEALTH-ORDER.pdf)**, the statewide stay-at-home order, as the number of COVID-19 cases grew rapidly. Understandably, there has been no news from the state regarding the current status of the Draft Portfolio.

Regardless of whether comments from the public are substantively incorporated into the Final Portfolio, the state has made it clear that local and regional multi-benefit projects will be central to realizing a resilient water future. In many cases, distributed infrastructure projects are the preferred infrastructure choice for communities due to multiple benefits associated with any given project.

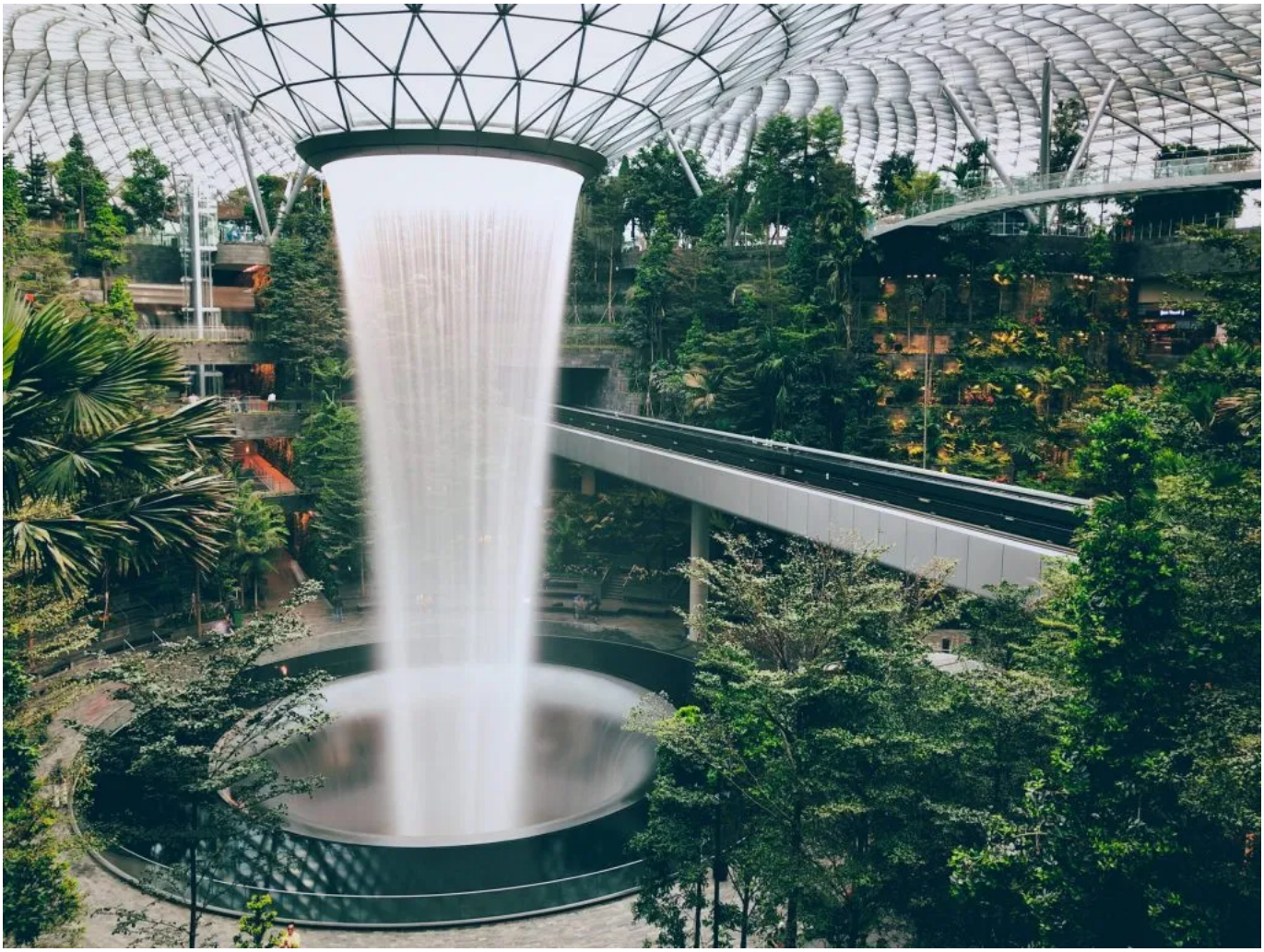
Distributed Infrastructure May Be the Key to A Resilient California By Diversifying Water Supplies and Increasing Physical Resilience

To meet future water needs (http://waterresilience.ca.gov/wp-content/uploads/2020/01/California-Water-Resilience-Portfolio-2019-Final2.pdf) (*see,* page 15). among other things, California communities need to prioritize water efficiency, conservation, reuse, and improve rainfall capture to recharge aquifers. To cope with a future of **reduced snowpack (https://mavensnotebook.com/2020/04/01/this-just-in-march-precipitation-not-enough-to-offset-dry-winter/)** and more punishing droughts, local and regional entities "must reduce reliance on any one source and **diversify supplies (http://waterresilience.ca.gov/wp-content/uploads/2020/01/California-Water-Resilience-Portfolio-2019-Final2.pdf)** to enable flexibility as conditions change" in order to meet future water needs.

The Draft Portfolio identifies **"multi-benefit" projects (http://waterresilience.ca.gov/wp-content/uploads/2020/01/California-Water-Resilience-Portfolio-2019-Final2.pdf)** (*see,* page 6) as a priority for diversifying water supplies to meet future water needs. Multi-benefit water projects are those which, because of water's link to economic, environmental, and community wellbeing, **provide benefits (https://pacinst.org/wp-content/uploads/2019/04/moving-toward-multi-benefit-approach.pdf)** such as reducing energy use and greenhouse gas emissions, creating wildlife habitat, and enhancing community livability. For example, one portfolio-directive is to "**simplify permitting (http://waterresilience.ca.gov/wp-content/uploads/2020/01/California-Water-Resilience-Portfolio-2019-Final2.pdf)** (*see*, page 21) to help launch more multi-benefit, multi-partner projects." Another directive is to "establish an interagency team to develop **multi-benefit funding programs (http://waterresilience.ca.gov/wp-content/uploads/2020/01/California-Water-Resilience-Portfolio-2019-Final2.pdf)** (*see*, page 24) by utilizing resources in existing programs."

Distributed infrastructure includes the installations, appliances, and technologies located at or near the point of water use and distributed across many properties. **These solutions (https://tapin.waternow.org/resources/innovation-in-action-21st-century-water-infrastructure-solutions-overview/)** are also generally employed in coordination with a water provider's conventional infrastructure and can provide safe and reliable water supplies along with significant co-benefits. Distributed infrastructure water installations can take on various forms in a community, including, permeable pavements (roads, parking lots,

jogging paths, etc.), rainwater cisterns and catchment systems, **bioswales (https://nacto.org/publication/urban-street-design-guide/street-design-elements/stormwater-management/bioswales/)**, and green roofs, with each project addressing different community needs.



Seven stories tall, the Changdi Airport Waterfall in Singapore is the world's largest indoor waterfall and is supplied by captured rainwater. Photo by Joe Green via **Unsplash (https://unsplash.com/photos/9yoPzIns9G4)**.

Communities throughout the U.S. have already **decided to "go-green," (https://tapin.waternow.org/resources/innovation-in-action-21st-century-water-infrastructure-solutions-overview/)** implementing some form of distributed infrastructure project for more than just environmental purposes. **Particular community benefits (https://tapin.waternow.org/resources/innovation-in-action-21st-century-water-infrastructure-solutions-overview/)** associated with established projects include urban revitalization, energy savings, increased local economic development, and improvements in public health.

Beyond community benefits, distributed infrastructure models are **more resilient (https://www.researchgate.net/publication/326292057_Distributed_Systems_A_design_model_for_sustainable_and_resilient_ir** to adverse climate change conditions because they provide the system with diversity, redundancy, and modularity. **Distributed**

models inherently have the potential (https://www.researchgate.net/publication/326292057_Distributed_Systems_A_design_model_for_sustainable_and_resilient_ir to: (1) increase the physical resilience of infrastructure; (2) foster social and institutional flexibility and innovation; and (3) reduce the environmental footprint of production and consumption. **The Draft Portfolio (http://waterresilience.ca.gov/wp-content/uploads/2020/01/California-Water-Resilience-Portfolio-2019-Final2.pdf)** (*see,* page 7) also makes plain California's necessary path toward a resilient water future, stating that the "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." (*see,* page 7).

With these tangible benefits, communities throughout California can diversify their water supplies at the local or regional level, thus making more local or regional water systems more resilient to disruptive forces such as drought, earthquakes, and wildfire.

Continued Drinking Water Investments and Implementing the Water Resilience Portfolio Are the Start of a Safe and Resilient Water Supply for California

It appears that the state understands its role in creating a resilient future because the Draft Portfolio is a collaboration of multiple agencies, and directs state agencies to work for, and alongside with, local and regional water providers to achieve the goals outlined in the Draft Portfolio. While the majority of the heavy lifting, both physically and financially, will be borne by local and regional agencies, the state must facilitate the transition between traditional and aging infrastructure to multi-benefit, distributed, resilient infrastructure.

California is addressing the majority of state water issues, including drinking water supply issues, in a holistic manner through the Draft Portfolio. Through this process, along with California's creation of the Safe and Affordable Drinking Water Fund and recognition of the human right to water, the state is making considerable efforts toward future drinking water resiliency. If California is to ensure the complete and resilient water infrastructure that it envisions, new technologies, financing options, and bureaucratic cooperation must be utilized to their fullest extent to meet California's drinking water needs in the near and long term. Some of these opportunities may be utilized by following through on significant portions of the Final Resilience Portfolio, once it is released.

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1. The "drinking water threat" condition "considers the proportion of people in each hydrologic region served by public water systems with at least 15 service connections, which are not in compliance with federal and state primary drinking water standards." (*see*, **Draft Portfolio (http://waterresilience.ca.gov/wp-content/uploads/2020/01/California-Water-Resilience-Portfolio-2019-Final2.pdf)** at 100).

‹ California's Fight for Clean Air (https://gguelj.org/2020/03/29/californias-fight-for-clean-air/)

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