

California Air Resources Board

Climate Adaptation and Resilience Guidance

**State Water Resources Control Board
Safe and Affordable Drinking Water (SADW) Fund**

California Climate Investments



FINAL

May 12, 2021

CLIMATE ADAPTATION AND RESILIENCE GUIDANCE



The California Air Resources Board (CARB) developed this guidance for the State Water Resources Control Board (State Water Board) Safe and Affordable Drinking Water (SADW) Fund, part of the Safe and Affordable Funding for Equity and Resilience (SAFER) Drinking Water Program. This guidance will assist in the development of SADW projects that increase climate adaptation and build resilience to the impacts of climate change in SADW project communities over each project’s lifetime. The project lifetime is the useful life of the project (quantification period).¹

Health and Safety Code section 39719, subdivision (b)(3)(B) requires that the Greenhouse Gas Reduction Fund (GGRF) be used to facilitate reductions of greenhouse gas emissions or to improve climate change adaptation and resiliency of GGRF Disadvantaged Communities (DACs) or GGRF Low-Income Households or GGRF Low-Income Communities (collectively known as “priority populations”). SADW projects should build community resilience in preparation for both the direct and indirect impacts of climate change.

Definitions:

Adaptation: Adjustment in natural or human systems to a new or changing environment. Adaptation to climate change refers to adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.²

Resiliency: The capacity of any entity—an individual, a community, an organization, or a natural system—to prepare for disruptions, to recover from shocks and stresses, and to adapt and grow from a disruptive experience.²

Community Resilience: The ability of a community to mitigate harm and maintain an acceptable quality of life in the face of climate-induced stresses, which take different forms depending on that community’s circumstances and location. An example of a direct impact of climate change is higher numbers of extreme heat days. An example of an indirect impact is increased risk of heat-related illness and mortality for vulnerable populations. Community resilience can include but is not limited to the physical and psychological health of the population, social and economic equity and well-being of the community, effective risk communication, integration of organizations (governmental and nongovernmental) in planning, response, and recovery, and social connectedness for resource exchange, cohesion, response, and recovery.²

¹ CARB provides default values for quantifiable project types in CARB Quantification Methodologies.

² California Natural Resources Agency (2018). California's Climate Adaptation Strategy <http://resources.ca.gov/docs/climate/safeguarding/update2018/safeguarding-california-plan-2018-update.pdf>

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Climate change risks and anticipated impacts of climate change include:

- Climate change risks and exposures within the SADW project community, such as the direct public safety risks and public health impacts from exposures to extreme heat, drought, food insecurity, wildfire, reduced air quality, flooding, extreme precipitation, or sea level rise.
- Anticipated impacts of climate change risks and exposures to the built environment, economy, and surrounding natural environment, such as increased physical risk to public infrastructure, increased private insurance costs, and impaired quality and/or decreased availability of surface or ground water.
- Disproportionate impacts on vulnerable communities and populations, such as environmental justice communities, low-income communities, Native American Tribes and communities, communities of color, immigrant communities, the elderly, pregnant women, children, and people with disabilities, among others.³

Based on the climate change risks and anticipated impacts, SADW projects that support climate adaptation and resilience are those that:

- Lead to increased community resilience in the face of climate change;
- Are designed to meet the future climate-impacted needs of community residents; or
- Increase the resiliency of investments (in particular, capital and infrastructure investments) to climate impacts.

The climate adaptation and resiliency needs of vulnerable populations and communities harmed by decades of underinvestment and social inequity require efforts that address systemic issues, including high levels of poverty and pollution, deficiencies in critical infrastructure, and disproportionately high costs for water. When communities are authentically engaged and connected to resources, they are more adaptive to changing situations, resilient to climate impacts, and responsive when external response resources are limited, which conserves resources and improves emergency response outcomes. Community engagement on the potential impacts of climate change and the climate-related needs of community residents is critical to developing projects that address climate adaptation and resiliency.

To support community resilience, climate adaptation and resiliency activities should incorporate community engagement early and often (See the Equity Checklist).³

³ Governor's Office of Planning and Research (2018). Executive Order B-30-15 Resiliency Guidebook- See Related Documents: Vulnerable Populations; and Equity Checklist. <https://opr.ca.gov/planning/icarp/resilient-ca.html>

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I. EXAMPLE PROJECTS

See the list below for examples of how projects funded by SADW may increase community resilience or help communities adapt to the impacts of climate change:

- Ensuring safe and affordable drinking water throughout the water provision life cycle, from source protection and treatment technology, to delivery at the tap
- Providing interim measures (e.g., bottled water, point-of-use or point-of-entry treatment device installation) while long-term solutions are implemented;
- Use of locally available water supplies to improve water quality and/or decrease imported water reliance;
- Supporting Improved technical, managerial, and financial capacity for water systems serving small, disadvantaged communities threatened by impacts of climate change, such as drought and wildfire risk;
- Water conservation measures such as developing and implementing water conservation plans, and upgrading systems and infrastructure to safeguard long-term water supplies, including during an acute drought emergency;
- Renewable energy generation, such as solar PV energy generation, and utilization of battery storage and micro grids to reduce the carbon intensity of water delivery processes, increase energy reliability in the case of a natural disaster, and reduce the risk of wildfires;
- Treatment technology coupled with reliable renewable energy sources;
- Infrastructure to protect water supply treatment or distribution systems threatened by sea level rise;
- Educational and job opportunities related to construction, water utility operations and management that build community capacity for sustainable operations and maintenance; and
- Addressing drought-induced contamination or dry wells for households that rely on domestic wells.

II. RESOURCES

Information and guidance on climate adaptation and resiliency strategies and planning may be found at:

- **The California Adaptation Clearinghouse**
Governor's Office of Planning and Research
A database of resources, guidance, and case studies
<https://resilientca.org/>

Highlighted resources that are included in the Adaptation Clearinghouse:

- **Water-specific topic page**
<https://resilientca.org/topics/water/>

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- **2020 California State Adaptation Planning Guide**
Support and best practices for adaptation planning, available late 2020
<https://resilientca.org/apg>
- **Safeguarding California Plan: 2018 Update**
The adaptation strategy for California
<https://resources.ca.gov/Initiatives/Building-Climate-Resilience>
- **Defining Vulnerable Communities in the Context of Climate Adaptation**
Support for holistic understanding of climate and community vulnerability
http://opr.ca.gov/docs/20180723-Vulnerable_Communities.pdf
- **Creating Resilient Water Utilities**
United States Environmental Protection Agency (US EPA)
Support and best practices for water utility resilience planning
<https://www.epa.gov/crwu>
 - **Resilient Strategies Guide for Water Utilities**
<https://www.epa.gov/crwu/resilient-strategies-guide-water-utilities#/>
 - **CREAT Risk Assessment Application for Water Utilities**
<https://www.epa.gov/crwu/creat-risk-assessment-application-water-utilities>
 - **WaterSense**
<https://www.epa.gov/watersense/join-watersense>
- **Results of a local or regional vulnerability assessment of a Project Community**
Searchable Adaptation Clearinghouse database
(search by locality for existing assessments)
<https://resilientca.org/topics/water/>

Technical and scientific information about the impacts of climate change, risk, and exposures on the community may be obtained using:

- Locally developed, down-scaled climate projection models, such as projection models developed by consultants, community-based organizations, or government institutions. When models that are specific to the community are available, these should be used first.

When such information is unavailable, please consult tools and data such as:

- **California's Fourth Climate Change Assessment**
California Department of Conservation, California Natural Resources Agency, and California Energy Commission
Scientific summaries of climate impacts expected for regions
<http://www.climateassessment.ca.gov/regions/>

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- **Cal-Adapt**
Geospatial Innovation Facility at University of California, Berkeley, the California Energy Commission and California Strategic Growth Council
State climate data information that is downloadable for use
<https://www.cal-adapt.org>
- **California Heat Assessment Tool, Cal-Heat (CHAT)**
California Natural Resources Agency
A tool that allows users to explore and understand how extreme heat will impact specific communities across the state
<https://www.cal-heat.org/>
- **Coastal Storm Modeling System (CoSMoS)**
United States Geological Survey
Detailed predictions of sea level rise, including storm-induced coastal flooding, erosion, and cliff failures over large geographic scales
<https://www.usgs.gov/centers/pcmsc/science/coastal-storm-modeling-system-cosmos>
- **Hazard Exposure Reporting and Analytics (HERA)**
United States Geological Survey
A tool that links CoSMoS flood projects to sociodemographic, infrastructure, and other economic information
<https://www.usgs.gov/apps/hera/>
- **California Building Resilience Against Climate Effects (CalBRACE) Project**
California Department of Public Health
Climate risks, climate change-related health impacts and vulnerable populations for each county (Climate Health Profile Reports)
<https://www.cdph.ca.gov/Programs/OHE/Pages/ClimateHealthProfileReports.aspx>
 - **Climate Change and Health Vulnerability Indicators for California**
<https://www.cdph.ca.gov/Programs/OHE/Pages/CC-Health-Vulnerability-Indicators.aspx>
- **Human Right to Water Framework and Data Tool (CalHRTW 1.0)**
Office of Environmental Health Hazard Assessment
Web-based data tool and report with statewide quantitative assessment of: water quality, water accessibility and water affordability.
<https://oehha.ca.gov/water/report/human-right-water-california>
- **CalEnviroScreen**
Office of Environmental Health Hazard Assessment
Screening tool that evaluates pollution burden and population vulnerability
<https://oehha.ca.gov/calenviroscreen>

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- **Drinking Water Contaminants Indicator**
<https://oehha.ca.gov/calenviroscreen/indicator/drinking-water-contaminants>
- **Groundwater Threats Indicator**
<https://oehha.ca.gov/calenviroscreen/indicator/groundwater-threats>
- **Impaired Water Bodies Indicator**
<https://oehha.ca.gov/calenviroscreen/indicator/impaired-water-bodies>
- **California Healthy Places Index**
Public Health Alliance of Southern California
A tool to help understand and compare community exposures to social, economic, and environmental conditions that affect health
<https://healthyplacesindex.org/>
- **Regional Opportunity Index**
UC Davis Center for Regional Change
Index of California community and regional social and economic opportunities
<https://interact.regionalchange.ucdavis.edu/roi/>
- **Adaptation Capability Advancement Toolkit**
Local Government Commission, California Natural Resources Agency, ICF International, Susanne Moser Research & Consulting, and ARCCA
Tools for local governments to overcome institutional barriers to implementing local adaptation strategies
<http://arccacalifornia.org/adapt-ca/>
- **Fire and Resource Assessment Program (FRAP)**
California Department of Forestry and Fire Protection (CAL FIRE)
Maps estimating community wildfire risk and fire threat conditions
<https://frap.fire.ca.gov/mapping/maps/>
 - **Map of Communities at Risk from Wildfire**
Communities within the wildland-urban interface and within 0.5-1.5 miles of areas of High or Very High wildfire threat, based on data observations as of 2015 (not based on modeled future status projections)
https://frap.fire.ca.gov/media/10291/commatrisk_19_ada.pdf
 - **Fire Threat Map**
Fuel conditions and fire potential in the ecosystem, representing the relative likelihood of “damaging” or difficult to control wildfire
https://frap.fire.ca.gov/media/10315/firethreat_19_ada.pdf
- **Search and compare additional tools and resources on the Adaptation Clearinghouse:**
<https://resilientca.org/tools/>