



# DROUGHTS, FIRES AND FLOODS

## Integrated Planning for Resilient Communities



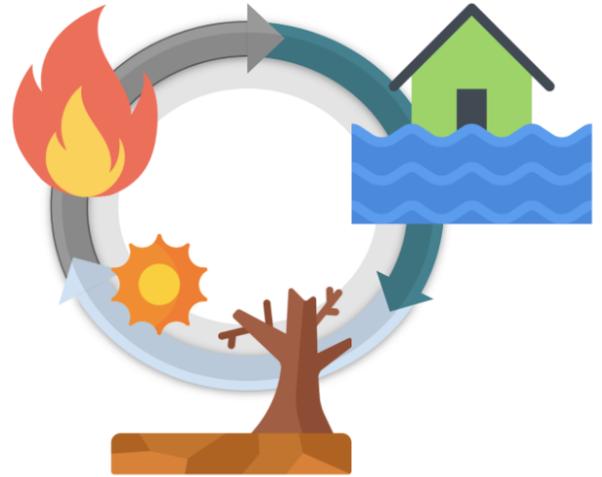
**California's natural cycle of droughts, fires, and floods can wreak havoc — not only on our social and physical infrastructure, but on the ecosystems on which we depend. Climate change is exacerbating these natural occurrences, putting communities at risk and disrupting local economies. Proactive, integrated planning can help reduce these impacts, especially for our most vulnerable community members.**

California is already experiencing an increase in extreme weather events caused by climate change. The level of risk from these events is largely determined by a community's exposure to the threat, as well as the relative preparedness of the community. Already under-resourced communities are most susceptible to these events for many reasons, including outdated infrastructure, deferred maintenance, and minimal capacity for pre-disaster planning or post-disaster recovery. Additionally, extensive research on climate vulnerability suggests that risks are closely associated with other vulnerability factors, such as education, income, languages spoken, and ethnicity<sup>1</sup>. This nexus between exposure and vulnerability highlights the existing inequity in our statewide climate resilience work, and the need for more strategic action for climate justice. Preparedness through collaboration among sectors and infrastructure resilience is needed urgently. Through these efforts, we can use multi-benefit approaches to prepare and modernize our aging water infrastructure, improve groundwater storage capacity, increase flood protection, and focus growth in areas less vulnerable to flood and wildfire.

<sup>1</sup> Cooley, Heather, and Pacifica Institute. Social vulnerability to climate change in California. Sacramento, CA: California Energy Commission, 2012.

Emergency preparedness and response planning is typically the responsibility of local and state agencies. The work is disjointed, divided up between multiple agencies with competing priorities and overlapping jurisdictions. The federal government typically gets involved only if a state of emergency is declared. Yet natural disasters do not follow jurisdictional boundaries, and impact all sectors. Coordinating disaster preparedness efforts between sectors and across regional boundaries can reduce costs and achieve multiple benefits. There is an urgent need for emergency preparedness coordination among water agencies, city planners, and elected officials, to explore resilience strategies that minimize local and regional impacts during extreme weather events.

**The interconnectedness of natural resource planning, especially between water and land use, is particularly apparent in the context of natural disasters.**



Integrating water and land use decision-making through coordinated planning is one way communities can improve their resilience in the face of inevitable disasters, greatly reducing impacts to our most vulnerable community members, through a more holistic approach to natural resource management. We can build off public awareness of disasters to further engage and educate the residents, increasing their resilience, while also building political will amongst local and regional decision-makers.

## Drought

Californians are most aware of their connection to water during periods of water shortage - when water use is restricted and rates may increase. Water-insecure communities, communities with poor water quality, and communities solely dependent on groundwater are hit the hardest when drought strikes. These communities then have to rely on imported water supplies, either getting their water from portable tanks or bottled water. Droughts not only reduce overall water supply for our communities, but also deprive our natural ecosystems of the water necessary for healthy function.



Folsom Lake, California

An integrated approach to drought preparedness includes modernizing our built infrastructure, such as our outdated dams and spillways. It also uses financing mechanisms and water rate structures that incentivize conservation and promote efficient water usage.

# Fire

Droughts create an environment prone to wildfire disasters, especially during “red flag” weather conditions — when high winds are coupled with the dry heat. California wildfires occur most often in rural areas, which are also often unincorporated communities located a significant distance from critical facilities. Without the institutional backing of a municipality, unincorporated communities are reliant on their County representation, and often competing with other high priorities for limited financial resources and staff capacity. California's sprawling suburban communities along the wildland-urban interface are particularly vulnerable to wildfire. Fires can completely destroy a community's water infrastructure - literally melting plastic pipes into the ground - leaving residents reliant on mobile water tanks indefinitely. This was the case with the 2017 Tubbs fire in Santa Rosa, and the more recent Camp fire in Paradise.<sup>2</sup>

The traditional approach to wildfire disasters in California has focused on post-disaster recovery — such as rebuilding as quickly as possible and getting water to residents; an integrated approach focuses on proactively building communities that are inherently resilient to natural disasters and managing forests in a more holistic manner.



Camp fire, Paradise, California

# Flood

Floods are already exacerbated by changing precipitation patterns associated with less frequent and more intense storms. Fires tend to increase the severity and frequency of flooding. After a fire, the vegetation that would otherwise absorb runoff has burned, forcing more water to flow through the system, which increases the risk for flash floods and mudslides for surrounding communities. Floods preceded by fire can also impair drinking water supplies from the ash and other debris that are carried away by floodwaters. Unmanaged floods move too quickly to recharge groundwater basins, especially if the soil was previously damaged by fire. It can take up to five years for the vegetation, which would minimize these effects, to regrow.<sup>3</sup>



Elk Grove, California

Floods can strike any community, and immediate impacts are widespread. Yet community members who cannot afford flood insurance face the longest term effects. Managing floodwaters through integrated water and land use planning provides an opportunity to simultaneously benefit our ecosystems, recharge groundwater basins, and protect residents. We can utilize rapidly evolving technology to better forecast storm events in real time and therefore best prepare for flood events.

<sup>2</sup> Bizjak, Tony. "Rare Toxic Cocktail from Camp Fire Is Poisoning Paradise Water. It Could Cost \$300 Million to Fix." The Sacramento Bee, 18 Apr. 2019.

<sup>3</sup> Federal Emergency Management Agency. Flood After Fire Fact Sheet. National Flood and Insurance Program. 2012.

# Opportunities

There are many institutional and physical challenges to achieving water and land use integration. A multitude of opportunities to address these challenges at all scales also exist. With a sense of urgency, we can improve California's communities to make them more resilient to change. To address impacts of the drought-fire-flood cycle, California needs to take action at all scales and from all directions. Local and state leaders need to look at how their decisions regarding land use, and water management contribute to climate change — and therefore the intensity of natural disasters. Instead of spending a majority of our resources on emergency recovery, we can instead invest more time and money into community education and emergency preparedness through climate resilience that emphasizes equitable water and land use integration.

## Practical strategies to increase resilience:

- Update existing water supply systems to ensure they are adequate to combat fire and flood events.
- Invest in upgrading or consolidating water systems that chronically violate safe drinking water standards.
- Use green infrastructure to manage localized flooding and recharge groundwater basins for greater supply reliability.
- Encourage collaboration to identify local and regional solutions instead of state mandates.

Educating leaders and building genuine political will are necessary steps to achieving a more resilient California. Now is the time to enact long-range preventative measures, so we can spend less energy on reactionary cleanup and recovery. We must work together on all scales to transform our systems — including our water and building infrastructure. Most imminent is regional and statewide collaboration, such as through California's Alliance of Regional Collaboratives for Climate Adaptation (ARCCA), which is a network of leading regional collaboratives and allies from across California that work together to advance adaptation statewide and increase local capacity to build community resilience.

By coordinating efforts across the state, we will progress toward providing the human right to water for all Californians. We can decrease vulnerability in these situations by empowering regions to proactively assess land-use patterns and by assessing these land use decisions with water supply in mind. We can exercise regional authority over our communities on a local scale by investing in climate resilient infrastructure and nature based solutions. When we focus on multi-beneficial, coordinated efforts, we can better protect the health, safety, and wellness of our communities while also protecting the environments on which we depend.