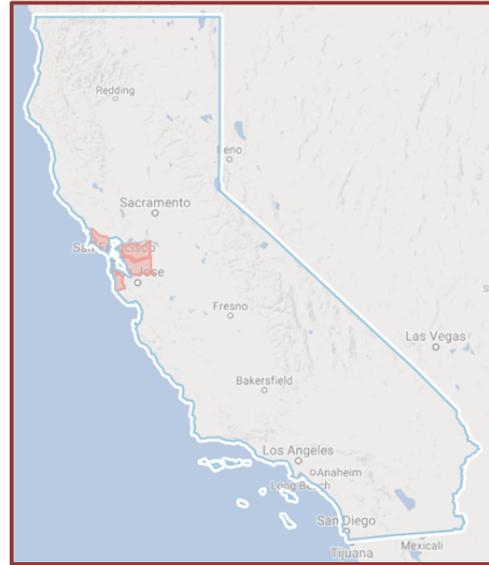
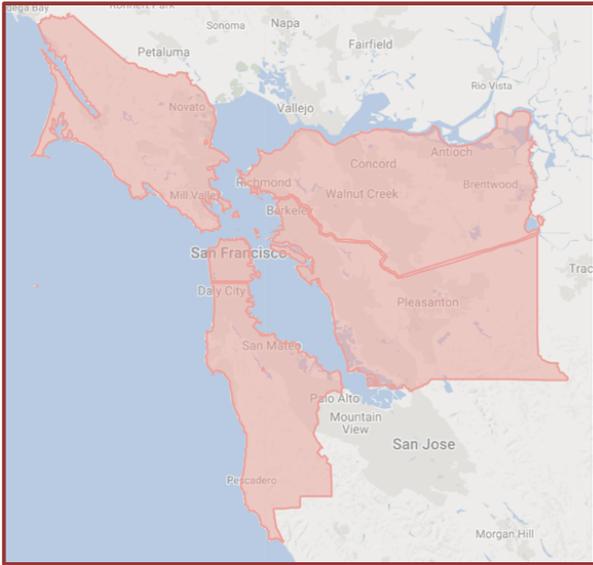


San Francisco Region



DEFINING THE REGION

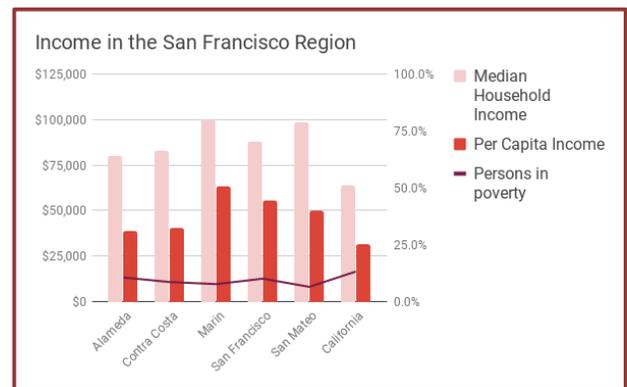
For the purposes of this project, the San Francisco region comprises the following five counties: **Alameda, Contra Costa, Marin, San Francisco, and San Mateo**; and encompasses **65 cities**. All data presented herein refers to these geographic boundaries.

Demographics

The San Francisco region is home to **4.6 million people - that's 11.5% of the state's population**.

The region's population is steadily increasing, which will continue to strain available land and water resources. A **growing economy** and job opportunities are drawing younger people to the region, especially in San Francisco and San Mateo Counties, where the median age has actually decreased. As the region's population grows and becomes more youthful, it is also becoming more ethnically diverse, with growing Hispanic and Asian populations.

This diversity correlates to wealth disparity. While the San Francisco region has significantly higher income (\$103,000) than the state average (\$77,000), the regions percentage of people living in poverty is also higher than the state average.



Graph made using data from US Census Bureau



Water Management

The unique geography of the San Francisco region, nestled between the Pacific Ocean and steep mountains of the Coastal Range, limits available land and water resources for communities surrounding the San Francisco Bay. Thanks to human ingenuity and infrastructure investments, the region secured a reliable water supply drawing on natural resources from hundreds of miles away. Effective water use efficiency and conservation efforts enable the region to continue growing without increasing its overall water footprint. The San Francisco region will need to augment its water supply and/or continue to reduce its per capita water use if it is to accommodate continued population growth.

Watersheds

The entire five-county region is encompassed within the San Francisco Bay watershed. Many local streams and tributaries, as well as urban and suburban stormwater runoff drain into the Sacramento - San Joaquin Delta, a confluence of two large rivers, which then flow into the Pacific Ocean via the San Francisco Bay. This watershed is part of a vast, complex estuary ecosystem of great importance to the entire state - for both its ecological value and its role in statewide water conveyance.

Integrated Regional Water Management

The Bay Area IRWM group - a voluntary planning collaborative - comprises 9 counties, including the 5 counties of the San Francisco region. Nineteen public agencies and NGOs participate in collaborative planning efforts and project identification for competitive funding. The IRWM group updated their plan in September 2014, with an emphasis on regional collaboration and integration of water resource management.

Water Supply

The San Francisco region has very limited local water supplies (e.g., groundwater and recycled water), and is therefore highly dependent on imported surface water supplies from regional, state, and federal infrastructure projects.

The City of San Francisco, for instance, receives its water from the historically controversial Hetch Hetchy system piped in from 167 miles away in the Sierra Nevada mountains.



Hetch Hetchy Reservoir, USGS

WATER INITIATIVES

San Francisco Region water agencies are working together to expand the Los Vaqueros Reservoir, owned by the Contra Costa Water District. A past expansion completed in 2012 improved drinking water quality, met water demand, and enhanced water supply reliability for CCWD's customers. This next expansion phase will improve water supply reliability for other partners throughout the region.

Water Providers

The San Francisco Public Utilities Commission is the major water supplier for the region. One-third of their water goes directly to “retail” customers – residents and businesses who pay a water bill to the Utility. The other two thirds of SFPUC water is “wholesale” – sent to 27 municipalities, water suppliers, and private entities in Alameda, Santa Clara, and San Mateo counties, who then distribute the water to their own customers. This is a complex governance and management network to provide water to the Region’s 4.6 million residents.

Groundwater

The San Francisco Region sits atop four groundwater basins ranked “medium priority” (based on degree to which the groundwater aquifer is overdrafted). The 2014 Sustainable Groundwater Management Act (SGMA) requires all groundwater basins identified as medium priority to form new Groundwater Sustainability Agencies (GSAs) and develop Groundwater Sustainability Plans (GSPs) by 2022, and achieve sustainability by 2024. Nine new GSAs formed to manage the Region’s groundwater – adding additional layers of governance to the region’s already complex water management system.

Water Affordability

The San Francisco region is highly reliant on imported water supplies. Water agencies are proactively working to increase local water independence – through efficiency, recycling, and other technologic advances. But these methods are expensive, and require water agencies to increase water rates for their customers.

Community members living in poverty are the most impacted by these increased costs, and yet are easily overlooked in discussions around water and equity. This is due in part to the false

assumption of ubiquitous wealth in the San Francisco region. Communities already facing disadvantages have less capacity to engage in governance discussions via public meetings or forums, and are also less likely to vote on rate increases. This is especially true of undocumented residents, those for whom English is a second language, and individuals who rent rather than own their homes.

INCREASING COSTS

The average monthly water bill for SF Region residents has more than doubled since 2010. As the region continues to grow and develop, water supply is increasingly stressed. Meeting water demand becomes more costly for water agencies, which must raise their rates to cover those increasing operational costs. With the already high cost of living in the SF region, this will likely overburden communities already facing disadvantages, leaving them unable to afford their water bills.

CHANGING NEEDS

The increasing population and changing demographics of the region add pressure to the water supply system. Urbanization leads to land use changes and a highly competitive housing market. Development patterns largely determine resource availability. Without proper planning in place, water and land resources will not be adequate to serve the changing community.

In October 2016, the University of California at Santa Cruz (UCSC), the Resource Conservation District (RCD) and the Pajaro Valley Water Management Agency (PV Water) started the Recharge Net Metering program. The Pajaro Valley Water Management Agency is a special district created by the State Legislature. This is a unique 5-year pilot program that provides a financial incentive to landowners in the form of a rebate issued by PV Water for building a managed aquifer recharge (MAR) system on their property, where it can seep into the ground and recharge underground water aquifers.

The program will be tested for five years to assess the benefits to the Pajaro Valley Groundwater Basin and its residents. The primary focus of the program is on stormwater collection from hillslopes linked to infiltration, using a variety of techniques, to improve groundwater supplies. We refer to this as "distributed stormwater collection - managed aquifer recharge," or DSC-MAR. The functional goal of the ReNeM program is to offset some of the on-the-ground costs associated with operation and maintenance of DSC-MAR projects.

This groundbreaking program has occurred through the agency's partnership with the Resource Conservation District of Santa Cruz County and UC Santa Cruz Professor Andrew Fisher.

Fisher's team has mapped the lands in the district that have the hydrologic and geologic conditions necessary to absorb stormwater and recharge the aquifer. Some property owners in these areas are being offered a reduction in the Water District's groundwater pumping fees proportional to the volume of water that they have captured and percolated into the aquifer. This program has been termed "Recharge Net Metering (ReNeM)."

The Resource Conservation District has contracted for the management of the program with the University providing the technical information needed to perform the recharge net metering calculations.

First initiated in 2016, the first year of the recharge net metering program tested on a 5 acre parcel of farmland was highly successful and has since been expanded to other properties.

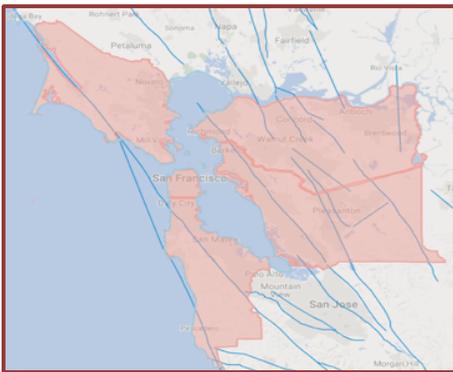


Land Use Planning

The San Francisco region is expected to nearly double in the next twenty years. To accommodate that growth, the Association of Bay Area Governments (ABAG) and Metropolitan Transportation Commission (MTC) created **Plan Bay Area 2040**. The plan's land use and transportation strategies address two main goals:

- 1) Reduce per-capita carbon dioxide emissions from passenger vehicles
- 2) Provide adequate housing for projected population growth.

Landscape Features



The region's most iconic feature is of course the 550 square mile San Francisco Bay, which each of the five counties border. The San Francisco region's geography is a mix of rolling foothills and rugged mountains from the ancient volcanic coastal range. Five major rivers feeds into the Bay-Delta which forms the largest estuary ecosystem on the west coast, draining over 60,000 square miles into the Pacific Ocean. Several major fault lines run through the five-county region, making the area highly susceptible to earthquakes. Communities closest to the bay rest on water-saturated soils, which are much more prone to damage from post-earthquake liquefaction.

Flooding

Flooding is a serious threat to many areas of the San Francisco region, particularly those in low lying areas. Flooding occurs as a result of poor drainage during heavy storms as well as sea level rise impacting the Bay. Low-income communities tend to be most impacted by flooding, as their neighborhoods are often in greater need of infrastructure improvements, and they are least able to repair damage caused by flooding. Additionally, these communities often lack the economies of scale to adequately prepare for the risk of sea level rise.

LITTLE TO WORK WITH

Land use decisions permanently change the landscape of a region. The more a region's natural systems are altered by urban development, the less resilient they become to impacts. Threats such as sea level rise, flooding, and water supply variability make planning for the future more difficult. The geographic constraints of the San Francisco region exacerbate these challenges.

Development Patterns

The San Francisco Region is an extremely densely-developed. The City of San Francisco has been a world-recognized metropolitan center for generations. As San Francisco became built out, the regional areas became increasingly urbanized. This is due in part to sharp rises in population. The primary development challenge in the region is meeting the demand for housing, especially affordable housing for lower income residents.

Densely developed urban communities like the San Francisco region have greater areas of impervious surface – paved or structural areas where water cannot soak into the soil and percolate down into the groundwater aquifer. This ultimately limits the resilience of a region’s local water supply. The San Francisco region can improve its resilience by protecting existing undeveloped areas, focusing future development in already urbanized areas, replace impervious surfaces with permeable paving options where possible, and using green infrastructure to capture and treat stormwater.

Transportation

As competition for housing increases, low wage-earners are forced out of urban centers and must travel farther distances to get to work. The Region’s Plan Bay Area 2040 includes short and long-term transportation investments, focusing on existing infrastructure maintenance and improved transportation efficiency.

Roadways serve a dual purpose as flood management infrastructure and stormwater conveyance. They also contribute significantly to surface water pollution. Integrated solutions such as green infrastructure to capture and treat stormwater can maximize a region’s transportation investments



EQUITY

Access to affordable housing is the most prominent equity challenge in the San Francisco region. The high demand and limited availability of housing – especially multi-family units – results in steep competition and rising costs for both renters and homeowners. Residents facing disadvantages – especially low wage earners – are priced out of the local housing market. Displacement and homelessness are major threats to individuals and families within the San Francisco region. Displaced individuals must then face higher costs for transportation and temporary housing.

Access to safe, reliable, affordable drinking water and wastewater infrastructure is another equity issue in the San Francisco Region. While the overall quality of the water supplied to the region is high, the quality of service infrastructure varies widely from community to community within the region. Lower-income communities are more likely to have aging infrastructure with deferred maintenance. This can degrade water quality and result in higher rates of leaks at the household scale. These community-members are thus paying the same price for lower quality water and wastewater service, and water they are not receiving (due to loss through leaks on the household’s side of the meter).

Additionally, the ability to pay for water service varies widely across the region. A water rate that is affordable for a family near the median income level is unbearable for a family living at or near the poverty line. The San Francisco Public Utilities Commission (SFPUC) instituted a low rate assistance program to support families in this situation. However, the program is not being taken advantage of. This could be a result of ineffective outreach methods, a lack of trust of government, or a combination of factors.

Every community has residents with the skills, experiences, and strategies needed to solve the local and regional problems they face. As part of the Resilient by Design Bay Area challenge, the Permaculture + Social Equity team (P+SET) created a social **design process** which builds community capacity and climate change literacy to address the challenges of coastal adaptation and resilience planning, particularly in vulnerable communities that have experienced generations of marginalization and exclusion.

The P+SET design concept approach is a Community Partnership Process (CPP) to establish local leadership across generations by partnering with residents. The CPP specifically designs programs for individual communities based on their unique assets and needs. Asset-based methodology for sustainable community development focuses on using a community's assets as a means of building local solutions to challenges. In this process, community members are actors with agency. Local residents including individuals,

groups, associations, and institutions bring knowledge, skills, and passions as strengths to the process to influence their physical space, foster exchanges, and foreground culture, history, and community vision. Based on community perspectives, P+SET provided the technical expertise and education to give members the skills to interpret and solve immediate challenges (such as flooding in a particular location). Small scale projects will be implemented leading to larger more elaborate collaborative designs. P+SET piloted this capacity building program in Marin City, which resulted in a "People's Plan" that authentically reflects the aspirations and intentions of the residents who live there. This process also allowed the community to enhance their existing advocacy practices and literacy to more effectively engage with municipal, regulatory, and regional stakeholders.

The Community Partnership Process is applicable for any community with permanent human settlement.



INTEGRATION

The unique geography and demographics of the San Francisco region highlight the importance and value of water-land use integration to ensure the region can adequately bear the impacts of a changing climate. Only by closely aligning future development plans - for housing, transportation, and open space - with accurate water demand forecasting and investments in water supply reliability - will the region be able to meet the needs of its community members without overburdening those individuals already facing the greatest disadvantages.

Expert Perspectives

Water and land use experts from the San Francisco Region elevated 3 themes including Planning, Coordination, and Economics.

Challenges

- **Coordination and alignment** between agencies is difficult due to the **limited staff capacity** within agencies, as well as the sheer number of local public agencies with jurisdiction for the region.
- **Uncertainty** about future water supply reliability contributes to fear and protectionist mentality, thus eroding the trust necessary for cross-sector collaboration.
- **Dense urban development limits physical space** for multi-benefit water and land use projects.
- **Little flexibility** exists within the region's water supply and demand, as previous success in reducing water use "hardened" demand - the region has already taken advantage of their "low hanging fruit" conservation efforts. This will make achieving future water use reductions more difficult.



Strategies & Opportunities

- **Existing institutional infrastructure** - especially multi-jurisdictional collaboratives such as BAWSCA and the San Francisco IRWM - can be leveraged to increase water/land use integration. The San Francisco region is a hub of advanced technology that can be used to discover water conservation and efficiency solutions.
- **Maximizing local water supply** (e.g, groundwater, seawater, and surface water) **through technology and innovation**, especially for new property development, is well within reach for the tech-hub San Francisco region.
- **Equitable water pricing and housing affordability strategies** such as low-income rate assistance and income-based rent structures will greatly benefit overburdened community members in the region.

RECOMMENDATIONS

\$ Advocate for water access and affordability for community members facing disadvantages.

This includes supporting potential legislation similar to the following bills:

- SB 623 or SB 844 & 845 that would establish a safe drinking water fund
- SB 778 which incentivizes water agency consolidation
- SB 1000 which requires all General Plans to include an Environmental Justice element

\$\$ Provide venues for local leaders in both the water & land use sectors to interact with one another. Effective models include the Sonoran Institute “Growing Water Smart” program and the Local Government Commission’s Alliance of Regional Collaboratives for Climate Adaptation (ARCCA).

\$\$\$ Partner with technology companies, policy hubs, and community-based organizations to establish workforce development opportunities within the housing and water sectors to provide living-wage jobs within the community and increase diversity across the profession. Positive models include the Governor’s Initiative AmeriCorps program CivicSpark; Eastern Municipal Water District’s Youth Ecology Corps, and Local Conservation Corps.