CASE STUDY 2 OF 6: ORANGE MEMORIAL PARK IN SAN MATEO COUNTY

Capturing Stormwater to Diversify Water Supplies

SERIES OVERVIEW

In 2022, California is in the midst of a severe drought — just a few years after the worst drought in a millennium ended in 2017. This pattern of accelerating and deepening droughts is consistent with climate change models for the state, which forecast longer, more severe and more frequent droughts punctuated by heavy rain and flooding. Unlike past droughts, these events are not periods to survive until "normalcy" returns. Instead, they are a sign that the climate is changing — and that the state must fundamentally change how it uses water.

These six case studies — a follow-up to SPUR and Pacific Institute's report *Water for a Growing Bay Area* — highlight leaders who are pioneering more sustainable approaches to water in Northern California. We highlight public water agencies, private corporations, nonprofit affordable housing developers and local land use authorities who are using water more efficiently, protecting groundwater supplies, reusing stormwater and recycling water.

Water sustains life, and its status — whether it is plentiful or scarce, clean or polluted, fresh or salty — shapes the well-being of all living creatures. These six case studies illustrate strategies for California to meet the challenge of a changing climate and emerge with a healthy environment and flourishing communities.

Key Takeaways

- Stormwater, the rainwater that falls on hard surfaces of cities, has traditionally been treated as a nuisance rather than a resource.
- Capturing, treating and using stormwater reduces water pollution and flood risk, while providing water supply.
- Stormwater projects often appear cost-ineffective when only considering the amount of useful water generated from a project. But stormwater reuse is a strong investment when supply, pollution control and flood control benefits are considered jointly.

Stormwater is the rain that falls on the roofs and pavement of cities and runs off into streams, the Bay and storm sewers. In the best of circumstances it is a precious resource, refilling waterways and aquifers. But in an urban environment like the Bay Area, stormwater too often carries with it a generous dose of pollution: cigarette butts, automotive fluids, pet waste, household gardening chemicals and trash accumulated in gutters. San Francisco, San Pablo and Suisun bays together make up the San Francisco Estuary. The three bays fail to meet Clean Water Act standards for 10 pollutants in all, including trace metals, pesticides and now-banned industrial chemicals.[1]

1 State Water Board. Appendix A: Proposed 2018 303(d) List of Impaired Waters. https://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/2018_integrated_report.html. San Francisco Bay (North, Central, and South), San Pablo Bay, and Suisun Bay altogether are impaired for Chlordane, DDT (Dichlorodiphenyltrichloroethane), Dieldrin, Dioxin compounds (including 2,3,7,8-TCDD), Furan Compounds, Invasive Species, Mercury, and PCBs (Polychlorinated biphenyls).

These pollutants primarily reach the estuary and its tributaries via stormwater runoff.[2]

Stormwater used to be viewed primarily as a nuisance to be disposed of as quickly as possible. But increasingly urban areas are beginning to actively manage their stormwater by capturing and treating it. The primary motivation for managing stormwater for most cities and counties, including San Mateo County, is to reduce pollution so they can meet the requirements of their state stormwater discharge permits.

Many stormwater projects are constructed for pollution control but deliver important co-benefits. Stormwater projects can augment water supplies to irrigate parks, mitigate flood risk, reduce urban temperatures, improve natural habitat and create recreation spaces.[3] Stormwater projects are typically a cost-effective source of new water supply, especially when constructed at larger scales and when considering multiple economic benefits of the projects.[4] Stormwater is particularly cost-effective relative to expensive supply alternatives such as seawater desalination. In San Mateo County, stormwater is particularly cost-effective given that it can replace expensive wholesale water from the San Francisco Public Utilities Commission.[5]

Despite the multiple benefits of stormwater management, municipalities have been slow to construct stormwater management projects, largely because of a lack of funding.[6] California Proposition 218, which requires that local taxes and property-related fees be approved by voters, has been interpreted by the courts to mean that stormwater fees must be treated as a new property-related fee.[7] Under Prop. 218, such fees can only be passed through a two-stage process: First, notify property owners and give them opportunity to protest. If a majority do not protest, then the fee may be placed on the ballot. To pass, the fee must be approved by either two-thirds of all voters, or more than 50% of those required to pay the fee (property owners and some renters).[8] Given the daunting process for setting a new stormwater fee, most municipalities in California have no consistent funding stream for stormwater management.[9] Much of the money for local stormwater projects comes from voter-approved state bond measures. The grants from bond measures help, but they can only be used for capital costs and create a boom-and-bust cycle for funding.

Transforming Stormwater from Waste to Resource on the Peninsula

San Mateo County has developed a comprehensive plan to capture, treat and use stormwater. One of its most ambitious stormwater projects is at Orange Memorial Park, a city park of about 30 acres in the middle of South San Francisco. Colma Creek runs through the grassy park in a concrete culvert. The

2 San Francisco Bay Nonpoint Source Program. https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/nps/index.html#:~:text=San%20Francisco%20Bay%20is%20impaired,largely%20from%20nonpoint%20source%20pollution.

3 Sarah E Diringer, Morgan Shimabuku, and Heather Cooley, "Economic Evaluation of Stormwater Capture and Its Multiple Benefits in California," Plos One 15, no. 3 (2020): e0230549.

4 ibid.

5 BAOWN pp. 8, https://stanford.app.box.com/s/wjht1riwa4vg5z4hweq04tb1sejn0sho

6 California Stormwater Quality Association and SCI Consulting Group, Stormwater Funding Barriers and Opportunities, 2017, https://www.casqa.org/sites/default/files/downloads/casqa_wp1_sw_funding_barriers_opportunities_-_2017-06-30.pdf.

7 California Stormwater Quality Association, "Proposition 218 Proceeding," accessed February 16, 2021, https://www.casqa.org/resources/funding-resources/creating-stormwater-utility/proposition-218-proceeding.

8 Legislative Analyst's Office, Understanding Proposition 218, 1996, https://lao.ca.gov/1996/120196_prop_218/understanding_prop218_1296.html#chapter5.

9 California Stormwater Quality Association and SCI Consulting Group, Stormwater Funding Barriers and Opportunities, 2017, https://www.casqa.org/sites/default/files/downloads/casqa_wp1_sw_funding_barriers_opportunities_-_2017-06-30.pdf.

10 Resilient South City, pp. 2. http://www.resilientbayarea.org/resilient-south-city

FIGURE 1

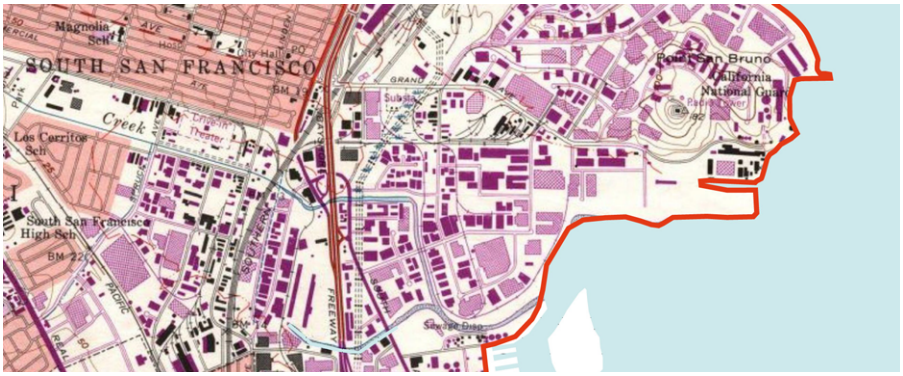
The Degradation of Colma Creek

Colma Creek has changed from serving as the main artery of an interconnected watershed to a drain for an urban landscape.

Source: Hassell+, Resilient South City, 2018, http://www.resilientbayarea.org/resilient-south-city

Colma Creek in 1947:

Colma Creek in 1980:



creek originates on San Bruno Mountain, runs southwest down its slopes to the flatlands, and curves southeast to run through the urban areas of Daly City, Colma and South San Francisco before meeting the Bay. Historically, the creek's banks were lined with willows and dogwood, and it reached the Bay as a river delta fringed with salt marshes (Figure 1). Since the creek's watershed has largely been paved over, storm runoff reaches the creek quickly and generates sudden, brief high flows. The lower creek has mainly been confined to concrete culverts to prevent flooding. But despite these efforts, Colma Creek has overtopped the edges of its culverts regularly in the past several decades.[10] Flooding is projected to become more common as extreme storms become more frequent, exacerbated by sea level rise.[11]

The Orange Memorial Park stormwater capture project seeks to reduce flooding, improve stormwater quality, augment water supplies and create new opportunities for community recreation. Water will be diverted from Colma Creek, filtered to separate out trash and sediment, and stored in two subsurface chambers. Some water will percolate from the chambers into the groundwater, recharging the local aquifer, which is tapped for potable water supply. Another portion will be used for irrigation of the park. The project will reduce loads of pollutants discharged to the Bay, including dangerous substances such as mercury and PCBs. In total, the project will divert 640 acre-feet of water per year, infiltrate 240 acre-feet into groundwater, treat and return 360 acre-feet to Colma Creek and offset 40 acre-feet a year of potable water presently used to irrigate

11 San Mateo precipitation model 2018. Sea level rise projections: Resilient South City, pp. 46. http://www.resilientbayarea.org/resilient-south-city

12 https://static1.squarespace.com/static/5d15010cd6d79a0001a375bc/t/5d3f23c2eec09d0001fe7308/1564419020646/Fabry_StormwaterWorkshop_072519_reduced.pdf

the park (Figure 2).[12] For comparison, 40 acre-feet is equivalent to one year of water for about 550 residents in the Bay Area.[13] Using stormwater for irrigation of the park will save the city $40,000 a year on water bills.

Stormwater has the potential to become a larger share of San Mateo County's water portfolio. Modeling done by the City/County Association of Governments projects that the county will need to capture and clean 3,500 to 4,500 acre-feet of stormwater each year to meet some of the county's water quality targets.[14] Some portion of this water can be reused for a relatively modest marginal cost.

A number of factors limit the use of stormwater for supply in San Mateo County. The Bay Area has a Mediterranean climate, meaning most rain falls in the winter while summers are warm and dry. The unfortunate result is that stormwater is abundant when demand for irrigation is low. Saving stormwater for the season when it can be used requires large storage capacity. Alternatively, stormwater can be percolated down into the groundwater for later use. However, much of the region's soils have slow percolation rates.

Strategies to Increase Stormwater Capture and Reuse

Consider stormwater's multiple benefits when assessing the costs and benefits of using it as a water supply.

While stormwater may not have a large potential as new supply for the Bay Area relative to some alternatives such as recycled wastewater, it is an environmentally sustainable and often cost-effective source of new supply. Evaluating multiple benefits is key to developing an accurate view of the cost-effectiveness of a stormwater project. Given that municipalities already need to manage more stormwater to meet their pollution discharge limits, the marginal cost of reusing stormwater makes it a cost-effective option. Stormwater can be used onsite to water landscaping, infiltrated into groundwater, or piped elsewhere for use.

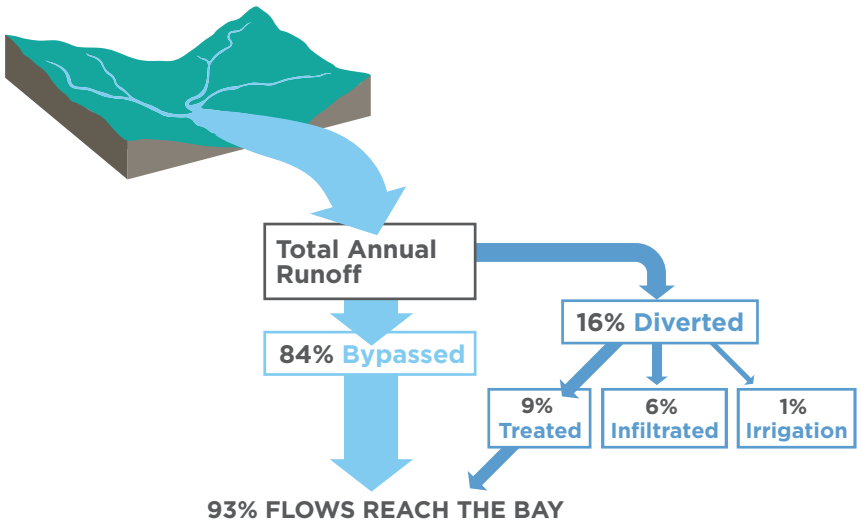
Who has authority: Entities that can greenlight stormwater projects including drinking water, wastewater and stormwater systems; cities and counties; and grant fund managers

FIGURE 2

Planned Water Flows Through Orange Memorial Park

The proposed project will capture 16% of the water from the Colma Creek watershed. A portion will be treated and returned to the Bay, one share will percolate into groundwater and the remainder will be used to water the grass and landscaping in the park.

Redrawn from Matt Fabry, "Stormwater Management in San Mateo County," https://static1.squarespace.com/static/5d15010cd6d79a0001a375bc/t/5d3f23c2eec09d0001fe7308/1564419020646/Fabry_StormwaterWorkshop_072519_reduced.pdf.



13 Based on 2016 average residential water use of 65 gallons per capita per day for the San Francisco Bay Hydrologic Region. Legislative Analyst's Office, 2017. https://lao.ca.gov/Publications/Report/3611#:~:text=Average%20Residential%20Water%20Use%20in,person%20per%20day%20in%202016

14 Matt Fabry, Manager, San Mateo Countywide Water Pollution Prevention Program, pers. comm. 1/4/2021.

Colma Creek in Orange Memorial Park today.

A designer's vision of the creek that is wider, greener and borders a pedestrian and cycling path.

Photos courtesy Dicklyon via Wikimedia Commons (left), Hassell +, *Resilient South City* (right)

Reform or clarify Proposition 218 to make stormwater fees a type of sewer fee not subject to the full process for property-related fees.
Municipalities need a consistent source of funding for stormwater management. There are two potential avenues to reach this goal: A court could overturn precedent or voters could approve a constitutional revision to Proposition 218 on a statewide ballot. Formally revising Prop. 218 on the ballot is a daunting process that would require action by the Legislature and voters. Perhaps a coalition of stakeholders could successfully make the case that aspects of the law are used in ways the voters never intended. In the meantime, local government will have to look for creative funding sources for stormwater.

Who has authority: Clean water advocates, the California State Legislature, California voters

Include stormwater in future bond measures.
The last state water bond, Proposition 1, passed in 2014, and much of the money is already allocated. Bond measures, for now, are the most realistic source of funding for stormwater projects.

Who has authority: Water bond supporters, the Legislature, water agencies in charge of grant funds

Read all the case studies at spur.org/watershedmoments

Acknowledgments

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