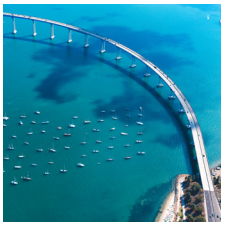
Advancing Decentralized Non-Potable Water Use in the San Diego Region

BLUEPRINT DOCUMENT








public health alliance®
of southern california
A Partnership for Healthy Places

December 2019

EXECUTIVE SUMMARY

"You can't cross the sea merely by standing and staring at the water."

– Rabindranath Tagore

The Blueprint for Advancing Decentralized Non-Potable Water Use in the San Diego Region (Blueprint) is the recommendations report issued by the Public Health Advisory Committee to augment on-site water reuse, as the second component of a larger project entitled Advancing Safe, Healthy Non-potable Water Use for the San Diego Region (the Project). This multi-sector and multi-jurisdiction Project seeks to identify and overcome challenges related to the expansion of on-site non-potable water reuse efforts. The Project is part of a planning grant led by the University of California San Diego (UCSD) and the San Diego Housing Commission (SDHC), funded by California Proposition 1, through the San Diego Integrated Regional Water Management (IRWM) program. In this Project, on-site non-potable water systems encompass greywater, stormwater, rainwater, and air conditioning (A/C) condensate reuse in any type and size of building. The purpose of this Blueprint is to provide a series of recommendations to aid in the development of non-potable water reuse strategies, with a focus on under-resourced communities and food production. This report discusses recommendations for the San Diego region with an emphasis on the cities of Chula Vista, Imperial Beach, and San Diego, as well as the County of San Diego, which are actively participating in the Project. The recommendations include actionable steps to develop best practices under the Section "Charting 5 Waterways for Successful Decentralized Non-Potable Water Systems," and pave the way toward a regional approach that ensures health and equity and value all water, as discussed in Section "Catalyzing an Equitable Water Future." Through the adoption of these recommendations we can increase conservation efforts, enhance water supply diversification, ensure water resilience in a changing climate, and support a healthy environment and vibrant communities. These recommendations are informed by the valuable insights garnered during the Project's first undertaking, a Discovery Document published in May 2019, which identified the barriers to implementing decentralized non-potable water reuse technologies. The next phase of the Project will consist of devising a Communication and Outreach Strategy to promote the recommendations of the Blueprint among our communities of interest.

The Project consists of three (3) main components:

* Discovery Document (key barriers), published in May 2019
* Blueprint for Advancing Decentralized Non-Potable Water Use in the San Diego Region (providing recommendations and suggesting best practices)
* Communication and Outreach Strategy

All efforts undertaken as part of the Project are overseen and approved by a Public Health Advisory Committee, comprised of a diverse range of multi-sector experts.

Our vision for this Blueprint, formulated by the Advisory Committee, is as follows:

> "TO FORGE A NEW WATER PARADIGM FOR SAN DIEGO – ONE IN WHICH ALL LOCAL WATER IS VALUED AND 80 PERCENT OF WATER IS LOCALLY SOURCED BY 2070."

Additionally, the Advisory Committee has identified seven (7) core values to inform the Project and support the vision described:

- ◊ Enhance Health and Equity;
- ◊ Encourage a One Water Philosophy;
- ◊ Promote the Right Water for the Right Use;
- ◊ Create an Ethic of Place;
- ◊ Maximize Water and Regulatory Literacy;
- ◊ Utilize a Holistic, Ecosystem Approach; and
- ◊ Prioritize a Positive Community Experience.

The Blueprint has been developed to guide further implementation of decentralized non-potable water systems, by providing a series of recommendations based on local, state, national, and international best practices. The document is divided into two main Sections. The first, **Charting 5 Waterways for Successful Decentralized Non-Potable Water Systems**, addresses regulatory, educational, financial, environmental, implementation, operation, and maintenance recommendations, through five main objectives (organized into chapters). These objectives guided the development of our recommendations that utilize best practices to implement and use on-site non-potable water systems, and to address upcoming state requirements for on-site water treatment. Development of best practices is informed by data collection, therefore recommendations to continuously collect data and feedback are suggested and discussed. Additionally, water is intrinsically connected to many existing programs and initiatives, thus recommendations are offered to include water strategies in climate action plans to ensure greater resilience and adaptation of our cities and communities. Lastly, art projects have been proven to be effective and powerful in developing a sense of ownership in communities. Recommendations to leverage art are included to

enhance the outcomes of water projects and actively engage with communities.

The second Section of the Blueprint, **Catalyzing an Equitable Water Future**, creates a pathway for health and equity to be integrated in organizational frameworks and fully embedded in the development of water programs and initiatives. Valuing all water in the region through the establishment of "One Water San Diego" (One Water SD) is highlighted to ensure greater water resilience. Advocacy for equitable water rates is also essential to ensure water equity in our community.

The Blueprint report provides recommendations for:

CHARTING 5 WATERWAYS FOR SUCCESSFUL DECENTRALIZED NON-POTABLE WATER SYSTEMS

- Promote Decentralized Non-Potable Water Systems
- Address Upcoming State Requirements for On-Site Treated Non-Potable Water Systems at a Regional Level
- Ensure Data-Driven Decision-Making
- Incorporate Water Strategies in Climate Action Plans
- Leverage Art for Community-Driven Water Projects

CATALYZING AN EQUITABLE WATER FUTURE

- Integrate Organizational Health and Equity Frameworks
- Establish One Water San Diego
- Advocate for Equitable Water Rates

A recurring theme of the Blueprint is an emphasis on a holistic regional approach, in which non-potable water reuse can be examined and addressed from multiple perspectives and levels. Focusing on these issues through a multi-pronged, multi-organizational approach provides the opportunity for greater collaboration and cooperation, resulting in improvements to conservation as well as health and equity outcomes. Education, data collection, feedback loops, and funding are also emphasized throughout the recommendations as they are essential elements to ensure that both regional and local needs and challenges are considered.

Currently we face a future in which water resilience and climate adaptation will become increasingly imperative. By taking proactive measures and voluntarily implementing the recommendations related to non-potable water capture and reuse that are laid out in this Blueprint, the San Diego region will be better positioned to weather the uncertainty of our water future. These recommendations provide a blueprint for a new water landscape – one in which we recognize and value water's connectedness to our environment, values, health, and well-being.

ACKNOWLEDGEMENTS

The Public Health Alliance of Southern California, which facilitated the development of this Blueprint, would like to express its deepest appreciation for all the members of the Public Health Advisory Committee who volunteered their time and provided invaluable insights and expertise during the development of this document.

We appreciate city and county officials' assistance in reviewing the existing research on the regulatory landscape and for the constructive feedback provided by field experts. We gratefully acknowledge the University of California San Diego Bioregional Center for Sustainability Science, Planning & Design; the City and County of San Diego; and the San Diego County Water Authority for administering and supporting these activities, as well as the San Diego Housing Commission which partnered on the project.

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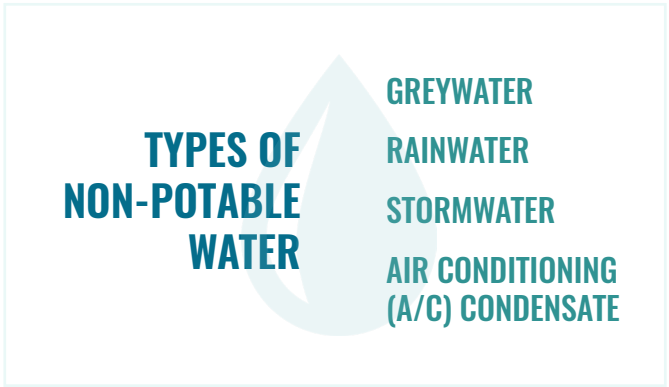
PROJECT DESCRIPTION

Advancing Safe, Healthy Non-Potable Water Use (the Project) is an effort led by Public Health Alliance of Southern California (Public Health Alliance). Public Health Alliance is a coalition of local health departments that is committed to the furthering community health and equity. The purpose of the Project is to identify obstacles that impede the adoption of decentralized on-site non-potable water reuse projects in underserved communities and propose recommendations to overcome them. This Project is part of a larger planning grant led by the UC San Diego and the San Diego Housing Commission (SDHC). It is funded by the California Department of Water Resources via the Integrated Regional Water Management (IRWM) Program and California Proposition 1. The goal of the larger planning grant, "Alternative Non-Potable Water Supplies, Xeriscape Design, and Flood Prevention for Disadvantaged Communities," is to design safe, localized non-potable water systems and xeriscape/low water landscape designs for sites in disadvantaged communities (as defined and identified by California Communities Environmental Health Screen Tool, CalEnviroScreen) in the cities of Imperial Beach, Chula Vista, and San Diego. **This Project specifically addresses on-site non-potable water capture and reuse, which encompasses greywater, rainwater (capture of precipitation above grade), stormwater (capture of precipitation at or below grade), and air conditioning (A/C) condensate for applications in any size and type of buildings and neighborhoods, or groups of properties within a smaller radius than that of a city.** The primary goal of the Project is to expand use of these technologies in order to improve community health and equity, however an undertaking of this nature poses considerable challenges. This Project seeks to facilitate collaboration between residents, business owners, and governments in order to overcome barriers and identify solutions that can be applied locally and more broadly in the San Diego region. On-site non-potable water reuse is a key element in enhancing our region's water portfolio as it advances water conservation efforts, which is the most cost-effective way of ensuring our communities have access to water resources.



The Project consists of three main components:

1. The development of a Discovery Document to include: Project Core Values, the State of the Water in San Diego, the Regulatory Framework, and Identified Barriers
2. The Blueprint for Advancing Decentralized Non-Potable Water Use in the San Diego region: A Recommendations Report (this document) highlighting best practices and providing recommendations on how to address the barriers identified in the Discovery Document
3. A Communication and Outreach Strategy to disseminate key requests to leadership in various agencies and elected officials

A health and equity lens is infused throughout the recommendations contained in this Blueprint to ensure a special focus on strategies and supports for enhanced and expanded use in under-resourced communities. Additionally, it aims to ensure that the benefits of these water sources are leveraged in food production.

All of the work of the Project is conducted under the guidance and oversight of the Public Health Advisory Committee. The Advisory Committee is comprised of a broad range of experts across multiple sectors including water management and regulation, academia, social justice, housing, public health, food systems, and community outreach. The diversity on this Advisory Committee assures that inclusion of different perspectives, creativity, robust discussion and debate, and consensus building infuses all efforts undertaken by the Project. A full list of members is provided in Appendix A.

VISION FOR THE BLUEPRINT

The report, *San Diego, 2050 is calling. How will we answer?* by Climate Education Partners[1] invites readers to envision San Diego in 2050 and provides an overview of the impact of climate change on water supply in our region. The first step in combating the effects of climate change on our water resources is the establishment of a far-reaching and inspiring vision of our water future in San Diego.

Several water leaders in the country are showing how a broad vision for their region is making a powerful impact on their communities. In 2012, the San Francisco Public Utilities Commission set the goal of valuing all water and ensuring a long-term reliable water supply. The Watershed Management Group developed a 50-year vision to restore their regional watersheds to year-round, free flowing rivers in Tucson, AZ. Both are examples of a transformative, bold perspective that can support initiatives and cohesively lead an entire region toward the same goals. An inspiring vision with vested community support creates lasting change.

Our vision for this Blueprint, crafted by our core team in the Public Health Alliance with feedback from our Advisory Committee is as follows:

This vision is supported by seven core values described hereafter.

"To forge a new water paradigm for San Diego – one in which all local water is valued and 80 percent of water is locally sourced by 2070."

1 http://catcher.sandiego.edu/items/usd/2050.pdf

CORE VALUES

A set of seven core values have been devised by the Public Health Advisory Committee to guide the Project's mission of advancing safe, healthy, and efficient use of on-site non-potable water with a focus on under-resourced communities. These core values, fully described in the Discovery Document,[2] have informed the recommendations formulated in this report and support our bold vision in the blueprint.

FIGURE 1: Seven Core Values to Guide the Project

2 Discovery Document, p.2

SUMMARY OF THE DISCOVERY DOCUMENT

The Discovery Document, A Descriptive Exploration of Issues and Challenges for Greater Use of Non-Potable Water in the San Diego Region (May 2019), compiles a review of the current regulatory framework of on-site non-potable water use, a discussion of the state of water in the San Diego region, and an analysis of the barriers to mainstreaming use of these decentralized strategies.[3]

Through an extensive literature review, stakeholder interviews, and field experiences collected during the investigation, five main categories of barriers emerged, as seen in Figure 2. The primary barriers include: regulatory barriers, a lack of knowledge and education, and inadequate access to accurate information. Upon closer examination, it became apparent that two other overarching systems-level barriers were contributing to, and even reinforcing, these barriers. These systems-level barriers were identified as a lack of system integration and an inequitable set of competing economics, including a preference for large infrastructure projects, advantages for centralized versus decentralized infrastructure, a lack of assessment of externalized costs and benefits, and a lack of financial safety net for low-income water users.

The barriers laid out in the Discovery Document provided the context and foundation for the recommendations contained in this Blueprint, which seek to overcome the challenges described above and disrupt the status quo in regard to water issues in our region.

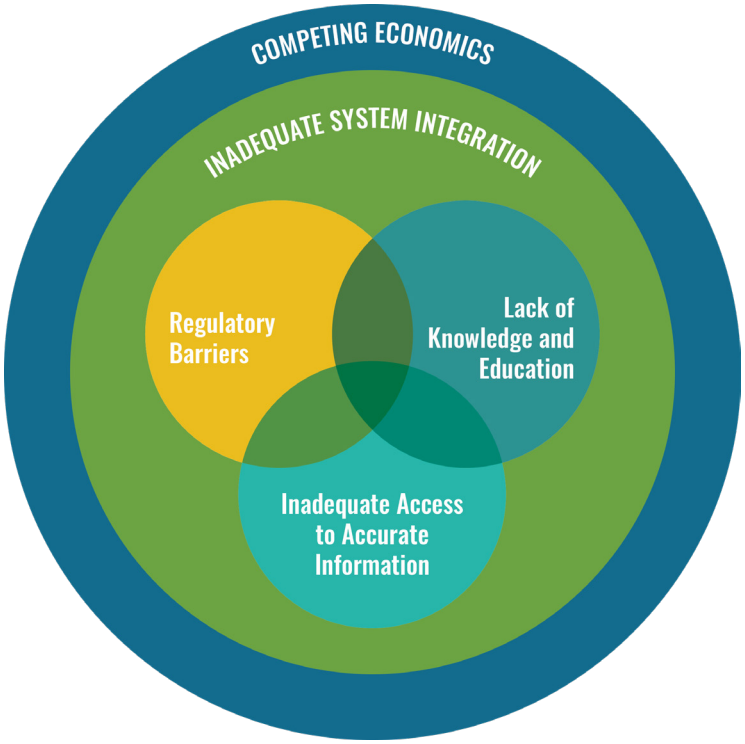


FIGURE 2: Main Categories of Barriers Identified in the Discovery Document

3 https://phasocal.org/wp-content/uploads/2019/09/Discovery-Document_PublicHealthAlliance_2019-05_final.pdf

COMPONENTS OF THE BLUEPRINT

The goal of this Blueprint is to provide a series of recommendations to advance on-site non-potable water use, with a focus on under-resourced communities and food production, taking into account the economic, regulatory, social, environmental, and geological conditions of the region. Through an investigation of international, state, and local literature on best practices; conducting local and out-of-state stakeholder interviews; and hosting workshops with experts in the field, a set of recommendations to provide innovative solutions tailored to our regional needs has been developed.

RECOMMENDATIONS OF THE BLUEPRINT

A decentralized non-potable water reuse strategy presents potential benefits that will help the San Diego region improve its water conservation efforts, increase its local water portfolio, and support greater resilience for the community while protecting environmental ecosystems. The Blueprint has been developed to help encourage and facilitate implementation of on-site non-potable water systems throughout the region, based on a wide range of well-documented best practices. Recommendations are grouped into two main Sections: **Charting 5 Waterways for Successful Decentralized Non-Potable Water Systems**, and **Catalyzing an Equitable Water Future**.

The first section, **Charting 5 Waterways for Successful Decentralized Non-Potable Water Systems** is organized into five chapters, each representing an actionable step or objective based on best practices that aims to address the barriers to implementing decentralized non-potable water systems discussed in the Discovery Document. We have developed recommendations in each of these chapters that aim to facilitate the implementation of on-site systems, gain a broader knowledge of impacts, educate more consistently across jurisdictions, water agencies, tradespeople and residents, share resources in the development effort, and advance the use of on-site systems more proactively.

The second section, **Catalyzing an Equitable Water Future**, provides transformational strategies that will intentionally and effectively support systemic change for a greater enhancement of health, equity and water in the San Diego region. This Section discusses the integration of organizational health and equity frameworks, establishment of a One Water San Diego (One Water SD) ethos, and advocacy for equitable water rates, into three chapters. Recommendations of Catalyzing an Equitable Water Future Section are envisioned as foundational to enhance greater outcome of the implementation of the 5 Waterways (recommended in the first Section).

TOPICS WEAVED INTO THE BLUEPRINT

Equity, health, education, data collection, feedback loops, and funding are emphasized throughout the recommendations, highlighting the importance of these subjects in supporting the core values of the Project. Health and equity are specifically addressed in the first chapter of Catalyzing an Equitable Water Future but are referenced repeatedly throughout the recommendations to ensure that under-resourced communities are represented in all policy and decision making, and that the nexus of local food resources and water resilience is enhanced. Education is essential in increasing awareness and improving water and regulatory literacy. Several recommendations discuss approaches and best practices to consistently expand and increase educational efforts. All efforts

should be supported by additional data collection, research, and feedback loops. Data collection and well-designed evaluation will enable adaptability as regulatory requirements and innovative practices evolve. Lastly, as financial resources are needed to sustain any program, funding mechanisms are frequently addressed, whether through regional or local strategies.

RESOURCES AND ASSETS

Several organizations and jurisdictions throughout the country are advancing the use of on-site non-potable water. Through discussion and research, these resources have been used to decipher the details of the Blueprint recommendations and will continue to inform efforts aimed at the development and implementation of decentralized non-potable water solutions. They are referenced throughout the document and in Appendix F. This resource can be used to aid in rolling out educational materials, or to identify potential advisory groups as regional policies are developed.

For example, the San Francisco Public Utilities Commission (SFPUC) has been leading the way since 2010 in developing and implementing a strategy to increase the use of on-site non-potable water systems. Their conservation strategy integrates greater reuse of non-potable water to augment local water supplies and increase water resiliency. The Public Health Advisory Committee participated in a workshop led by Paula Kehoe, Director of Water Resources at SFPUC, in January 2019. This workshop was the first step for the Advisory Committee to learn more about their efforts and benefit from the perspective of an outstanding partner. SFPUC has offered their continued technical assistance to the Public Health Advisory Committee and to partners of the region. Their continuous assistance throughout this Project has helped shape some of the recommendations presented in this Blueprint. Additionally, SFPUC's groundbreaking work provides many resources to inform best practices, water assessments, and policies.[4]

Another example of this approach is one being undertaken in Tucson, Arizona. The Watershed Management Group (WMG) is a non-profit organization, based in Tucson, that is dedicated to providing community-based solutions in restoring and protecting the watersheds of the County of Pima and the City of Tucson. In March 2019, the Public Health Advisory Committee participated in an informative webinar led by Catlow Shipek, Policy and Technical Director, to learn more about their best practices and successful efforts.Their work will inspire best practices in stormwater management.[5]

Additionally, the San Diego region is home to many local assets that should be engaged to further advance on-site non-potable water use. Examples include regional organizations, water agencies and jurisdictions, educators, local non-profit organizations, community-oriented organizations, and more. A number of these entities are referenced throughout the Blueprint and additional information and details are provided in Appendix C.

4 sfwater.org/np

5 watershedmg.org/

Charting 5 Waterways for Successful Decentralized Non-Potable Water Systems

PROMOTE DECENTRALIZED NON-POTABLE WATER SYSTEMS

1. Develop regional data-driven best practices vis-à-vis non-potable water reuse systems, with an emphasis on fit-for-purpose systems
    A. Develop a strategy for identifying fit-for-purpose systems across all sectors.
    B. Craft appropriate and easy-to-use guidelines for community gardens, schools, and other public places to implement on-site non-potable water reuse projects.
    C. Enhance stormwater on-site use and reuse strategies to leverage this resource on different scales.
2. Develop on-site non-potable water reuse policies and educational materials that promote equity, health, and co-benefits across the region.
3. Streamline the regulatory process for non-potable water reuse systems.
    A. Develop pre-approved plans for simplifying and making cost-effective permitting processes.
    B. Create a legal infrastructure for property boundary crossing.
4. Create and enhance water conservation incentives that prioritize the most effective and equitable conservation strategies.
5. Embed non-potable water reuse best practices in the nexus between green building certification programs and jurisdictional codes.
6. Create feedback loops for permitting, rebate programs and education at all levels, from jurisdictional to residential, to continuously improve best practices.

Charting 5 Waterways for Successful Decentralized Non-Potable Water Systems

ADDRESS UPCOMING STATE REQUIREMENTS FOR ON-SITE TREATED NON-POTABLE WATER SYSTEMS AT A REGIONAL LEVEL

1. Create a regional working group charged with the creation of an infrastructure and guidelines by which to roll out on-site non-potable water reuse across all sectors.
2. Join the National Blue Ribbon Commission for Onsite Non-potable Water Systems Working Group.
3. Adopt a performance-based framework for regulating non-potable water reuse with a health and equity lens.

ENSURE DATA-DRIVEN DECISION-MAKING

1. Use non-potable water reuse data to elucidate benefits and challenges across ecological, cultural, health, and built environments.
2. Develop a consistent set of cross-jurisdictional non-potable water data collection practices and metrics for success.
3. Improve water reporting in commercial buildings and public places across the region.
4. Collect data on existing local non-potable water systems at the scale of single-family dwellings.
5. Use existing state, national and international data to help inform our best practices for non-potable water reuse.
6. Collect data annually on permitted non-potable water reuse systems to support feedback loops that evaluate economics and best practices.
7. Assess watershed potential to create local water supply, with an optimized One Water approach.
8. Demonstrate the importance and impact of art through the collection of data on non-potable water reuse.

Charting 5 Waterways for Successful Decentralized Non-Potable Water Systems

INCORPORATE WATER STRATEGIES IN CLIMATE ACTION PLANS

1. All projects in Climate Action Plans should assess and prioritize water measures in addition to GHG requirements and strategies to meet our unique regional needs for resilience.
2. Leverage co-benefits to enhance both water resilience and climate adaptation.

LEVERAGE ART FOR COMMUNITY-DRIVEN WATER PROJECTS

1. Utilize art as a key strategy for outreach, engagement, and education across a diverse array of communities.
2. Create an arts network/collaborative.
3. Create a sustainable source of funding for arts as a communication tool for community projects.
4. Develop artistic branding to promote water initiatives, including a regional One Water San Diego.

CHARTING 5 WATERWAYS FOR SUCCESSFUL DECENTRALIZED NON-POTABLE WATER SYSTEMS

This Section identifies a number of recommendations to enhance wider implementation of healthy, safe, and useful on-site non-potable water systems. An emphasis is placed on the importance of elevating decentralized non-potable water systems and educating all stakeholders on the different systems, scales of implementation, and outcomes of using these systems throughout the region. Upcoming state requirements for on-site treated non-potable water systems will be best implemented through a regional approach by first developing a greater understanding of on-site water reuse. Data collection and assessment of the impact, safety, and effectiveness of decentralized water systems across a broad range of metrics are critical. Best practices, supported by data and emphasizing a performance-based approach, should be embedded in existing programs, like Climate Action Plans (CAPs), to move toward adaptation and water resilience in our region. Art projects can advance equity, and help under-resourced communities be co-participants and co-creators of water projects that enhance community resilience by improving water literacy and allowing community members a voice for self-advocacy.

PROMOTE DECENTRALIZED NON-POTABLE WATER SYSTEMS

"All the water that will ever be is, right now."

– National Geographic

Overview

This chapter discusses the importance of implementing a regional set of best practices for on-site non-potable water systems across various levels of public and private entities. By developing a set of data-driven best practices for San Diego County that are consistent throughout the region and at multiple levels – from regulatory authorities to homeowners – we can increase the adoption of on-site non-potable water systems. Devising a set of best practices that is regionally appropriate and supported by data will help overcome challenges and barriers described in the Discovery Document and ensure that systems are well designed for optimal and safe operation. By unifying these best practices throughout the region, a One Water SD (discussed in the second Section) will be better supported by greater regulatory integration, collaboration, and planning, and will ensure multiple benefits are considered when devising strategies that enhance the water resilience of the region. Adoption of the same set of best practices by all jurisdictions and agencies in San Diego County is not a mandate, however by developing a unified set of best practices that is tailored to our region, we can facilitate voluntary adoption and support cohesive and consistent efforts across the region.

We envision a unified agreement on the beneficial use of decentralized systems to help reduce the reliance on imported water, benefit the environment, curtail inequity, and provide the potential to save consumers and jurisdictions money. Best practices for greywater, stormwater, rainwater, and A/C condensate (as defined in

TABLE 1: Definition of Non-Potable Water Sources Addressed in this Project

NON-POTABLE WATER SOURCES	DEFINITIONS
Greywater	Untreated wastewater which has not come into contact with toilet waste. It includes used water from bathroom sinks, bathtubs, showers, and clothes washers, but does not include wastewater from toilets, kitchen sinks, dishwashers, or laundry water from soiled diapers due to potential health issues.
Rainwater	Precipitation from rain events that is collected and diverted directly from a roof surface located above ground.
Stormwater	Precipitation runoff from rain events that flows over land and/or impervious surfaces (e.g., streets, parking lots) rather than infiltrating or being taken up by natural processes. Stormwater includes runoff from surfaces located at or below grade surface.
A/C condensate	Water that condenses on air conditioning system pipes when hot air from a building comes into contact with the cold coil pipes, and cools down.

Table 1, and in the Discovery Document[6]) can be developed for any type of building and at all scales, with indoor and outdoor applications that best fit the water sources and building specifications. Additionally, developing best practices for on-site non-potable water use and reuse with the intention of leveraging multiple benefits can be achieved through the design of "green" infrastructure (GI). GI can be implemented to restore the water cycle within the built environment. It encompasses an array of products, technologies, and practices that use natural systems—or engineered systems that mimic natural processes—to enhance overall environmental quality and provide utility services including capturing, cleaning, and infiltrating stormwater; creating wildlife habitat; shading and cooling streets and buildings; and calming traffic.[7] Redefining the end-uses of water and envisioning opportunities for on-site use and reuse can create impactful perspectives.

- Greywater reuse can generate opportunities for beautiful, productive landscapes, while using less imported water and requiring less impact on wastewater treatment facilities. Best practices at a regional level can include a suggestion that all new developments have greywater stubouts based on well-documented instances of implementation in other places.
- Stormwater engineering can include water capture for on-site reuse as a viable option to eliminate stormwater runoff, shifting the mindset around stormwater from one that considers it a nuisance to one that considers it a beneficial resource.
- Use of rainwater can be maximized and better valued by changing the perspective and understanding of what volume of rainwater can be harvested. A simple shift in language can make a difference in education, how rebate programs are developed, and how people design and develop systems, as well as what is available on the market. Rainwater for indoor non-potable reuse applications can be a valuable opportunity for buildings that do not require landscape irrigation.
- A/C condensate can be used for landscape irrigation where possible and may be considered a resource for cooling tower supply where appropriate.

By first establishing a regional acceptance of decentralized on-site non-potable reuse, we can devise a variety of solutions that rely on data and best practices modeled locally, nationally, and internationally. These solutions should integrate equity, health, and the generation of multiple benefits, and this can be achieved through the development of educational materials that highlight these issues as priorities.

Creating more regulatory uniformity throughout the region will alleviate confusion and support greater knowledge among various stakeholders. Cohesion at the regional scale will help different agencies and jurisdictions better streamline the process of permitting, inspecting, maintaining, and monitoring on-site non-potable water systems. This will help create clear pathways that have a similar basis around the region, and overcome barriers discussed in the Discovery Document: regulatory gaps and inconsistencies; confusion created among regulators, practitioners and residents; a lack of system integration; and competing economics.

When developing these best practices, it will be important to consider conservation strategies that are supported by equitable incentives. In addition, embedding strategies and objectives derived from green building certifications, such as Leadership in Energy and Environmental Design (LEED)[8] or Living Building Challenge,[9] in jurisdictional codes will help foster a greater use of non-potable water systems by building developers, designers, and owners.

6 Discovery Document, Table 6: Sources Generating Greywater as Defined per Jurisdiction, p.21

7 https://www.tucsonaz.gov/files/water/docs/LID-GI-manual.pdf

8 https://new.usgbc.org/leed

9 https://living-future.org/lbc4/

Lastly, these unified best practices should be supported by feedback loops that examine their efficiency and the success or challenges of the permitting process and educational outreach efforts.

SUPPORTING CORE VALUES

- Enhance Health and Equity
- Encourage a One Water Approach
- Promote the Right Water for the Right Use
- Maximize Water and Regulatory Literacy
- Utilize a Holistic, Ecosystem Approach

ADDRESSING BARRIERS

- Regulatory Barriers
- Lack of Knowledge and Education
- Inadequate Access to Accurate Information
- Inadequate System Integration
- Competing Economics

Opportunities and Challenges for Project Implementation at Various Scales

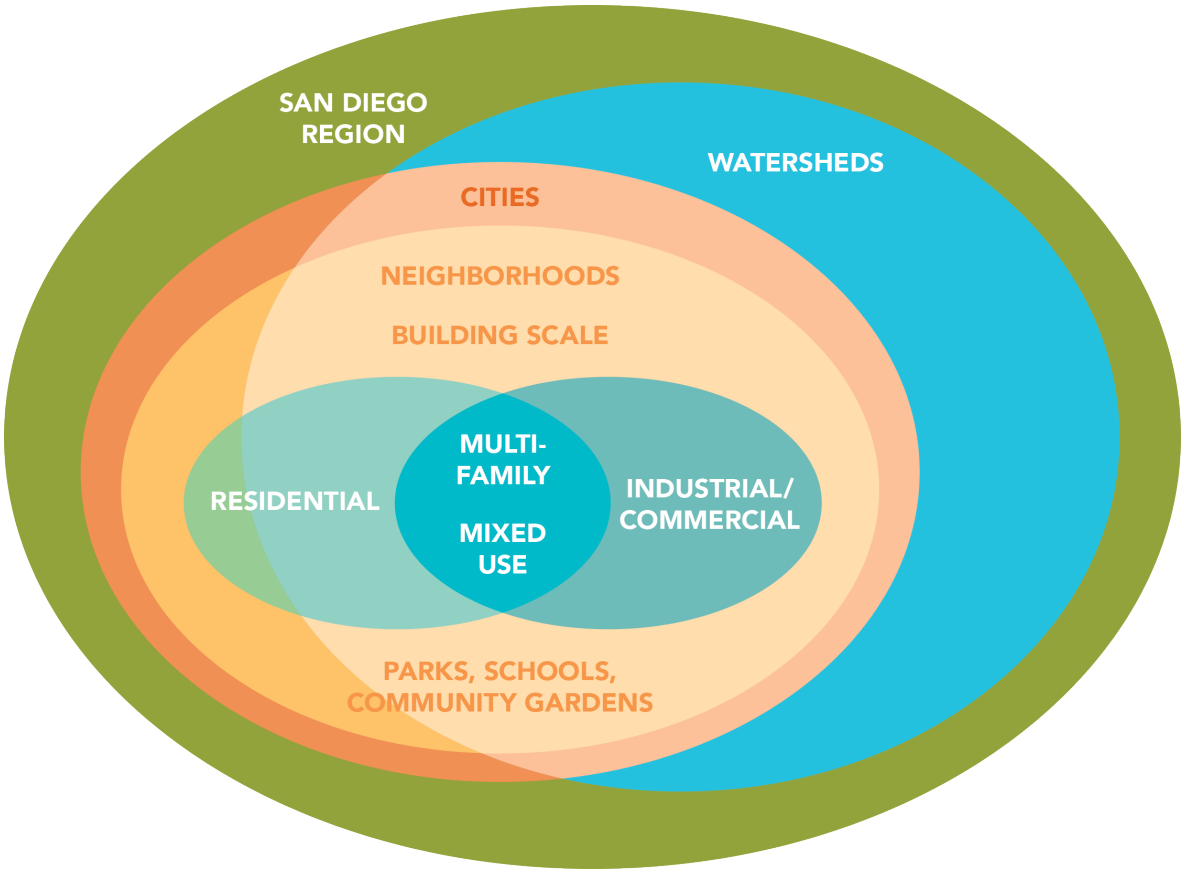


FIGURE 3: Scales of Implementation of Best Practices

On-site non-potable water systems are decentralized water systems in which water is collected, stored, possibly treated, and used on-site, as opposed to being managed by a public utility and transported to a centralized treatment or recycling facility before being redistributed or discharged to the ocean. Within the scope of this Project, this encompasses the reuse of greywater, and the capture and use of stormwater, rainwater, and air conditioning condensate. Best practices can be implemented at various scales, from that of a single home to the entire San Diego region. This graphic is intended to illustrate the interconnectedness of best practices and how their implementation can overlap. Several resources are provided in Appendices E and F to guide the development of these best practices.

Additionally, this section can be used as a standalone summary of challenges and opportunities to implement on-site non-potable water systems at various scales.

SINGLE-FAMILY RESIDENCE SCALE

On-site non-potable water reuse strategies at the single-family residence scale most often encompass rainwater capture, A/C condensate and greywater reuse for landscape irrigation. Rainwater and Greywater use are regulated by the California Plumbing Code, often require the lowest investment, and are the most abundant water sources at this scale. Indoor use of non-potable water is not well understood and regulation is just emerging. This is an expensive option for the single-family

TABLE 2: Challenges and Opportunities for On-site Non-potable Water Reuse at the Scale of Single-family Home.

WATER SOURCES	CHALLENGES	OPPORTUNITIES
Greywater	Difficult and costly permitting process for landscape irrigation for homeowners. Lack of understanding by developers on opportunities for greywater utilization technologies.	Use for landscape irrigation or indoor toilet flushing. Streamlined permitted process and clear guidelines to reduce cost of installation and support better education. Developing best practices supporting installation of stub outs in new homes.
Stormwater	Stormwater design usually does not include active stormwater harvesting due to lack of knowledge and understanding by engineers or prohibitive regulations.	Use for landscape irrigation and flood mitigation.
Rainwater	Rainwater is mostly discussed in terms of barrels (capacity below 200 gallons) throughout the region, limiting the incentives and use of this resource, while cisterns up to 5,000 gallons are allowed per California Plumbing Code without a permit.[10]	Use for landscape irrigation, indoor non-potable reuse, potable use, flood mitigation. A shift in jurisdictional outreach, education and publications language from "barrel" to "cistern" (above 200 gallons) can create a behavioral change among residents. Rainwater storage can be a strategy in fire protection planning as well as emergency water supply.
A/C condensate	Regulations vary widely across the region, sometimes mandating it to be directed to the sewer without consideration for reuse.	Use for landscape irrigation – this is a great match, since it is only generated in hot dry times when irrigation is most needed.

residential scale, but for homes that generate more greywater than required by landscaping needs, this presents a great option for closing the loop. Table 2 summarizes the challenges and opportunities encountered at this scale by water source.

BUILDING SCALE

The building scale encompasses different types of buildings: multifamily, mixed-use, commercial, and industrial. Cities and counties have predefined zones allowing for specific types of developments, which may include different kinds of buildings in one zone, or only one kind of a building in a zone.[11] At this scale, there are often impervious surfaces (e.g., roofs, parking lots) that contribute to runoff, while also reducing the opportunity for outdoor reuse by displacing landscaping. Many of these buildings present opportunities for indoor non-potable reuse for toilet flushing, utility sinks, or other non-potable washing. Table 3 summarizes opportunities and challenges of reusing on-site non-potable water at this scale.

Storing and treating water may be viewed as challenging as added costs will occur when developing these kind of systems for buildings. However, installing these systems will generate benefits for the building owners and users as well benefits for the community such as water conservation and efficiency, water supply augmentation and resilience, flood management, and stormwater pollution prevention. The cities, county and water agencies of the region can evaluate the cumulative impacts of these projects in contrast to centralized projects to develop funding and grant strategies to incentivize developers. This approach has been taken by the San Francisco

10 California Plumbing Code, Chapter 16, Nonpotable Rainwater Catchment Systems, Section 1601.3 Permit, http://epubs.iapmo.org/2016/CPC/mobile/index.html#p=370

11 https://www.sandiego.gov/development-services/zoning-maps

Public Utility Commission when developing their decentralized non-potable water strategy to enhance water resilience and conservation in their region and can inspire the stakeholders of the San Diego region (this is further developed in the recommendation 1 of this chapter).[12]

Scale jumping, as defined by International Living Future Institute (ILFI), is a term used to describe going outside the limits of the site boundary where a project is implemented to leverage better solutions.[13] It can aggregate opportunities by allowing water resources generated at one site to be used at a neighboring site, thus crossing property boundaries. Sometimes water generated on-site is not a great match for the building itself, but a nearby building may benefit from that water. For example, a commercial structure might generate a significant amount of A/C condensate, but have no use for landscape irrigation. Meanwhile, the commercial building next-door may require a large amount of landscape irrigation, but produce only a small amount of A/C condensate. The ability to send resources from one site to another will be co-beneficial to the neighborhood. In another example, a parking lot might drain into a neighboring property. Rather than installing drains that go to the street, using that stormwater as a resource for a thirsty landscape will reduce flooding during storm events.

Multifamily Residence Buildings

This scale groups housing complexes of two or more dwellings with a shared landscape and infrastructure. Although there are opportunities to reuse greywater at this level in many existing structures, there are no current guidelines and standards in place. One example is shared laundry facilities. This presents a great opportunity to easily reuse a large amount of water in nearby landscaping since there is no need to alter the building's plumbing and these systems can be low cost. But since there is no regulatory pathway, most building owners forgo opportunities to reuse on-site water, thus missing out on an opportunity to capitalize on an available on-site resource. Furthermore, some building owners may opt to install a greywater system, but do not have access to appropriate educational information. Thus, they neglect to supply appropriate soaps to the users of the laundry facilities creating plant health and growth issues in the landscape.

Mixed-use Buildings

These buildings are comprised of storefronts combined with residences. Mixed-use buildings can generate large amounts of greywater and rainwater, while often having lower landscape watering demands. These buildings could potentially capture rainwater and reuse greywater for indoor non-potable reuse. However, there are currently no standard and streamlined regulations, making implementation of on-site systems tedious, complex, and expensive.

Commercial Buildings

These buildings are intended for businesses that provide consumer goods and services, as well as a wide variety of commercial, retail, office, and recreational uses. A growing number of commercial complexes are including community gardens in their landscapes to enhance the quality of life of people working onsite. Storing rainwater for these gardens can be a great way to offset additional water demands by these spaces. Furthermore, vegetable washing stations generate water that can be used to irrigate nearby landscaped areas rather than being discharged into wastewater lines, putting water to use twice. Where landscape opportunities do not exist, rainwater/stormwater can potentially be used for toilet flushing.

Industrial Buildings

Industrial buildings and areas are intended for research and development, manufacturing, warehousing and other industrial uses. These buildings present the same opportunities and

12 https://www.sfwater.org/index.aspx?page=686

13 https://living-future.org/lcc/basics/

TABLE 3: Challenges and Opportunities for On-site Non-potable Water Reuse at the Building Scale

WATER SOURCES	CHALLENGES	OPPORTUNITIES
Greywater	Permitting for landscape irrigation or non-potable reuse in larger buildings is not currently well-defined in building and plumbing codes in San Diego.	Use for landscape irrigation or indoor toilet flushing. Senate Bill SB966 will require building codes to be adjusted to ensure there is a pathway for indoor use at building scales (see in the chapter Address Upcoming State Requirements for On-Site Treated Non-Potable Water Systems at a Regional Level).
Stormwater	Design usually does not include active stormwater harvesting due to oversight or prohibitive regulations (i.e., engineers overlook active storage)	Use for landscape irrigation, flood mitigation. Use for large complexes with large impervious areas and large landscapes, and later use for irrigation. Scale jumping to share resources between neighboring practices.
Rainwater	Allowances at these building scales is unclear in the regulatory process. Space requirements often make rainwater harvesting difficult at this scale for above-ground systems.	Use for landscape irrigation, indoor non-potable reuse, flood mitigation. Storing water under parking lots can be a useful way to accommodate large rainwater storage on sites where area is limited. Rainwater storage can be a strategy in fire protection planning as well as emergency water supply. Scale jumping to share resources between neighboring properties.
A/C condensate	Regulations vary widely across the region, sometimes mandating discharge to the sewer without consideration for reuse.	Use for landscape irrigation – this is a great match, since it is only generated in hot dry times when irrigation is most needed. It can be used to supply water for cooling towers. Scale jumping to share resources between neighboring properties.

challenges for rainwater capture as in other buildings. Industrial operations may also create opportunities for water reuse and conservation. For example, some processes like beer brewing are extremely water intensive, yet much of that water can be reused for non-potable applications with the right regulatory pathways in place. Since San Diego has a large number of microbreweries, using rainwater or A/C condensate could be a great way to reduce imported water demand for industrial brewing processes. Breweries require a lot of water in their cleaning operations. Stone Brewing treats about 17 to 18 million gallons of water per year, with an on-site treatment system compliant with Title 22 of the California Code of Regulation, Division 4, Chapter 3 for Water Recycling Criteria.[14] The treated water is reused for non-potable cleaning, boiler feed water, and cooling tower feed water.[15,16] The advancement of

14 https://govt.westlaw.com/calregs/Browse/Home/California/CaliforniaCodeofRegulations?guid=IE8ADB4F0D4B911DE8879F88E8B0DAAAE&originationContext=documenttoc&transitionType=Default&contextData=(sc.Default)

15 Discussion with Stone Brewing Water Operations Supervisor, Nov. 2019

16 https://thefullpint.com/breweries-archive/stone-brewing/stone-brewing-escondido-named-p3s-facility-of-the-year-from-the-california-water-environment-association/

TABLE 4: Challenges and Opportunities for On-site Non-potable Water Reuse in Community Space

WATER SOURCES	CHALLENGES	OPPORTUNITIES
Greywater	No guidance to reuse for landscape irrigation: underutilized resource or poorly implemented systems.	Greywater generated by drinking fountains, veggie washing stations, hand washing stations, and bathroom sinks can be reused to irrigate landscape.
Stormwater	Underground storage for reuse is not common or even considered. Stormwater generated can be more than needed for on-site operations.	Use for landscape irrigation, flood mitigation. Use for large areas of land with large impervious areas and large landscaped areas. Scale jumping to share resources between neighboring properties.
Rainwater	Few clear protocols for permitting use of rainwater for public areas as it relates to public health.	Use for landscape irrigation, utility sinks with non-potable washing purposes. Storing water under parking lots can be a useful way to accommodate large rainwater storage on site where area is limited or public spaces are not conducive to having rainwater containers accessible.
A/C condensate	Underutilized resource.	Use for landscape irrigation (e.g., schools often produce a lot of A/C condensate that could be reused in landscapes).

new technologies is even showing opportunities for rainwater and A/C condensate to be reused for on-site potable applications.[17,18]

COMMUNITY BUILDINGS AND SPACES

These can be parks, community gardens, schools, libraries, etc. Water infrastructure is not always in place in these areas, creating opportunities for decentralized systems to be installed and safely managed, as described in Table 4.

NEIGHBORHOOD SCALE

The neighborhood scale refers to projects that may span multiple properties in an area smaller than the city limits. Decentralized non-potable water use projects may encompass multiple properties, cross or be implemented in the public right-of-way.

Opportunities: At this scale, the capture and use of stormwater occurs through green infrastructure being applied to parks and streets to reduce the impact of flooding and enhance the appearance, value, and livelihood of neighborhoods. In the stormwater management sector, as described in County of San Diego's Appendix K of Best Management Practices (BMP) design manual, green infrastructure is an approach to stormwater and flood management that protects, restores, and mimics the natural water cycle using vegetation, mulch, soils, and natural processes while creating healthier environments.[19] GI encompasses low impact development (LID) techniques provided by BMP design manuals to reduce and treat stormwater at its source. As described by the County of San Diego in a presentation done in 2016, GI is a cost effective and resilient approach to managing wet weather impacts, and delivering environmental, social and economic benefits.[20] As a general

17 https://www.rainharvest.com/info/beer/

18 https://www.craftbrewingbusiness.com/news/heres-how-ballast-point-just-brewed-beers-out-of-thin-air/

19 https://www.sandiegocounty.gov/content/dam/sdc/dpw/WATERSHED_PROTECTION_PROGRAM/watershedpdf/Dev_Sup/County_BMPDM_App_K.pdf

20 https://app.box.com/s/7gnze8tfc0m7i7rgjo4cvh7sfowb71ko

principle, GI techniques use soils and vegetation to infiltrate, evapotranspirate, and/or recycle stormwater runoff, and can be viewed in opposition to grey infrastructure which refers to conventional piped drainage and water treatment systems, designed to move urban stormwater away from the built environment. There are also opportunities to address water resources that originate from and are used across multiple properties using the concept of "scale jumping."

Challenges: Because neighborhoods are regulated as a series of separate properties, opportunities to combine resources are often missed. For example, a roofline that sheds water and creates a flooding issue for a neighboring property is generally addressed as a problem for the offending neighbor to deal with rather than a resource to be shared. Likewise, flooding on a street is managed by civic infrastructure rather than also weighing the potential of treating flooding using a series of individual solutions (per household or property) that can accomplish the same goal much more cost effectively. If civic funds were used to give property owners the means to harvest rainwater and stormwater, accounting for the cost and benefits, flood management would be resolved at a much more cost-effective level with less infrastructure.

CITY SCALE

Cities have boundaries that include commercial, residential, and industrial buildings, as well as neighborhoods, roads, open spaces and public recreational areas. San Diego's cities might include parts of different watersheds, or can be wholly within one watershed as one of many cities that share that watershed. Cities can also share infrastructure like roads and open spaces.

Opportunities: Neighboring cities can collaborate on water infrastructure projects if they share a joint set of ethics and values related to water use and watershed protection. By creating a cohesive regional approach to valuing water, neighboring cities can share resources, and reduce overhead in creating separate regulatory structures governing on-site non-potable water reuse projects.

Challenges: Some projects may create shared positive outcomes and solve shared issues (such as flooding) for neighboring buildings. However, when very similar projects are located in different cities, the lack of regional consistency and best practices forces developers to have an understanding of different regulatory and permitting processes, slowing down the adoption of these practices.

WATERSHED SCALE

Watersheds are limited by natural boundaries that define drainage basins. Generally, watersheds incorporate many jurisdictions, and local jurisdictions may be part of more than one watershed. By exploring issues like flooding and water quality at a watershed scale, we can solve problems downstream by addressing them upstream and increasing more local and on-site rainwater and stormwater reuse applications at building and neighborhood scales. This only works if jurisdictions in the upstream part of the watershed are communicating with jurisdictions downstream and share a common set of ethics and values about how to value and manage water resources.

REGIONAL SCALE

The San Diego region is a large area encompassing 11 watersheds, the unincorporated county, and 18 cities, and it includes the southern part of Orange County and Riverside County. One of our region's watersheds crosses an international border as well, further complicating management of our water resources. A collaborative effort to manage regional water resources and regional water quality issues by elevating the value of decentralized water reuse will ensure financial resources are better managed while enhancing water and the ecological benefits to the communities.

The following recommendations provide strategies to help promote the use of the decentralized non-potable water systems.

1. Develop regional data-driven best practices vis-à-vis non-potable water reuse systems, with an emphasis on fit-for-purpose systems.

A key to more widespread adoption of decentralized non-potable water systems is acknowledgement of these systems as relevant at the highest levels (Copermittees – municipal and county governments and special district entities – established under the Municipal Separate Storm Sewer System Permit,[21] Integrated Regional Water Management Program, County water authority, watershed managers, etc.). By including language in materials used throughout the region (i.e., all water conservation programming, watershed best management practices, etc.) that identifies greywater, stormwater, rainwater, and A/C condensate as a resource, jurisdictions can implement policies and practices that account for them as a resource. By ensuring that best practices are supported by data from local, state, national, and international sources, jurisdictions can choose how to integrate these strategies appropriately within their own regulatory, geographical, and population structures. With guidance at the regional level, jurisdictions can more easily regulate appropriately. This will help to close regulatory gaps and resolve inconsistency, educate stakeholders at all levels, overcome the lack of system integration, and move beyond competing economics. It will also ensure the restoration of the natural water cycle and will integrate a health and equity lens.

The process of devising best practices for the entire region can be informed by a project on food recovery done at the scale of the State of California by Public Health Alliance of Southern California (Alliance) in 2017. Through comprehensive research and an extensive collaboration with the California Conference of Environmental Health Directors (via an iterative process of feedback and consensus decision making), the Alliance developed a set of best management practices and guidelines on food redistribution, a training curriculum, adaptable toolkits for internal best management practices, and toolkits for outreach, education, and facilitation of surplus food donation. This project was initiated due to state mandates requiring the reduction of solid waste by 75 percent by 2020, in which food waste is accounted for 16 percent. At the time of the project, the knowledge and practices on food recovery and donations were insufficient, leading to missed opportunities to both divert food waste from landfills and help address hunger issues and food insecurity throughout California. The food recovery project shows a clear parallel with our Project in which we seek to elevate all water sources as a resource (instead of disposing of and wasting it), creating opportunities to conserve water and become more water resilient.

Although the adoption of the food donation best practices is done on a voluntary basis, most of the jurisdictions throughout California have implemented at least one of the best management practices. The material and trainings were so well received that it led the Los Angeles County Department of Public Health to request additional training to educate 500 of their environmental health regulators – nearly the full number of staff. The project team (the Alliance) provided these food donation best practices as a service to environmental health departments to alleviate the burden of developing best practices within each jurisdiction. This effort provides a model for the San Diego region in developing and implementing a set of best practices for on-site non-potable water reuse that will help alleviate barriers created by technology and regulation novelty (including the upcoming state bill on on-site treated non-potable water systems discussed in the following chapter). Developing such best practices will provide guidance to each jurisdiction, which may decide to adopt some of them on a voluntary basis. The best practices will be best developed by engaging key stakeholders

21 See Definitions in Appendix B and Establish One Water San Diego Chapter for more information

as described in Table 7 at the end of this chapter, notably departments related to land and building development, stormwater, and water conservation.

A key concept in maximizing the benefits of on-site non-potable water reuse is matching the **right water to the right use**. This strategy values all water sources and recognizes that end uses should be determined by the type of water. Every drop of water can be used several times within every system from small individual residential sites to multifamily and commercial sites all the way up to Pure Water San Diego before being sent back into the ecosystem. Choosing an end use that is specific to a certain water quality will also be a way to limit unnecessary treatments that require expensive investments. This strategy will provide more cost-effective water while improving our region's water resilience by closing the loop on our local water cycle.

This concept uses water quality criteria to determine the appropriate water end use.[22,23] This is also known as **fit-for-purpose water**. Fit-for-purpose water systems elevate the value of lower quality water, which can have the effect of **creating more affordable water supply** solutions for various end uses. Using fit-for-purpose water systems, treatment levels are adapted to the quality required for the end use; not all end uses require potable water, for example. As presented in the Discovery Document in the Current Regulatory Framework chapter,[23] there are different levels of requirements for the water source and the end use. The quality of the water source varies with the type and concentration of contaminants, and the requirements for the end use will depend on the level of health risks and exposure to human contacts. This is further discussed in the following chapter, where we address upcoming state requirements, which require all jurisdictions to shift from code-based to performance-based standards for on-site non-potable water reuse. **By matching lower quality water with an end use that poses lower health risks, complex layers of monitoring and control can be avoided.** The fit-for-purpose concept presents a new way of viewing water, helping us to reduce our reliance on imported water and heavy treatments, thus increasing our resilience and re-aligning the built environment with the natural hydrologic cycle.

A good design process is essential when developing safe alternative water systems. Setting a clear critical path for all stages of development of projects at different levels will ensure the successful implementation and maintenance of projects for years to come. **Water balance, sometimes called water budget**, is an important element in the analysis of a building project's water impact, and thus of the design process. This concept requires an assessment of the anticipated amount of non-potable water supplied by each source in the building. It helps to inform the appropriate reuse and recycling strategy. Assessing the water balance helps a building achieve net-zero water goals. The San Francisco Public Utilities Commission (SFPUC) has developed several tools that can be used by developers and other jurisdictions to better assess the feasibility and economic analysis of on-site non-potable water projects,[24] such as Water Calculators, developed to assess the water budget of a single building[25] and projects covering multiple buildings.[26]

It is important to rely on data to ensure that these best practices are implemented based on proven results. As we onboard these strategies, we can look to data sets at the state, national, and even international levels, as discussed further in the Data-Driven Decision-Making chapter.

22 Discovery Document, p.14 discusses the treatment requirements defined by NSF/ANSI 359 and the California Code of Regulation Title 22, Division 4, Chapter 3.

23 Discovery Document, Chapter "Current Regulatory Framework," Findings of the Regulatory Landscape, Different Level of Requirements Depending on the Water Source, p.23

24 www.sfwater.org/np

25 https://sfwater.org/Modules/ShowDocument.aspx?documentID=5234

26 https://sfwater.org/modules/showdocument.aspx?documentid=5233

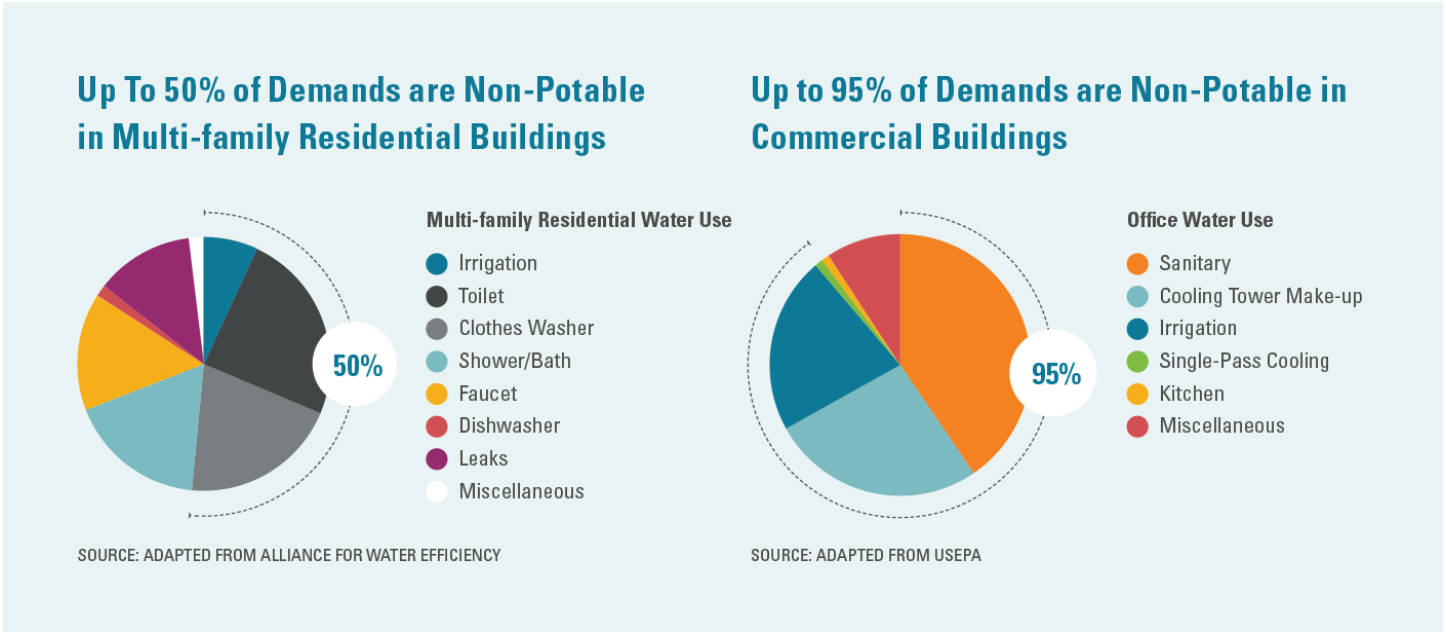


FIGURE 4: Water Demands in Multi-Family Residential Buildings and in Commercial Buildings.[27]

A. *Develop a strategy for identifying fit-for-purpose water systems across all sectors.*

On-site non-potable water systems can be installed at different scales, whether it be a single-family home; a multi-family dwelling; or a mixed use, commercial, or institutional building; a park, or a street. In all cases, considerations need to be made for how the water is used, the quantity and quality, and how it is discharged, with a conservation perspective in mind. Understanding that buildings produce different types of water with different quality is key in developing best practices.

In our modern society, we spend more time than ever in buildings. It has been shown that up to 50 percent of water demands in multi-family residential buildings and up to 95 percent in commercial buildings have the potential to be met through the use of non-potable water, as shown in Figure 4. In single-family residential homes, at least 50 percent of water is used for irrigation and can be easily met by non-potable water. .[27]

Depending on the buildings and scale, various opportunities for non-potable water use can be identified, as shown in Figure 5. This is a key step toward developing best practices that will align the right water to the right use.

As a model of leadership for their region, SFPUC used their own administrative building to showcase alternative water solutions. Their building is a demonstration site with a 25,000-gallon cistern to capture rainwater for irrigation, and a wetland treatment system with a 5,000 gallon per day capacity to collect and treat the building's wastewater for toilet flushing reuse. As their goal was to advance non-potable water reuse, SFPUC used their site development as an opportunity to perform the exercise of defining sources and end uses, and matching them as effectively as possible. This strategy is fundamental in matching the right water to the right use. Figure 6 shows the different water sources that they identified for reuse in a building.[28] SFPUC used their building design process to inform their Blueprint, the document they created to roll-out best practices to advance

27 https://static1.squarespace.com/static/5c73f31eb10f25809eb82de2/t/5d62f94154372300016bf9bb/1566767439639/WaterReuseGuide_FINAL.pdf

28 https://www.sfwater.org/modules/showdocument.aspx?documentid=6057

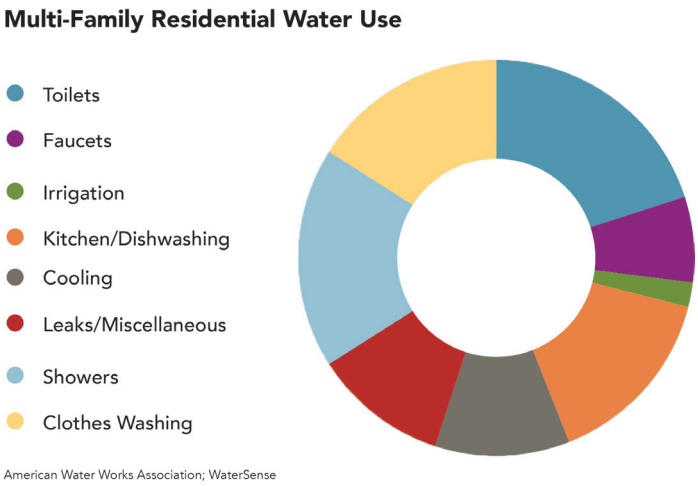


FIGURE 5: Identification of Water Uses per Building Type.[28]

non-potable water reuse throughout the city. This strategy can also be applied in our region. For example, the San Diego Green Building Council (SDGBC) is currently exploring a project for a new TERI School campus,[29] which will implement on-site non-potable reuse. TERI is a non-profit organization serving children and adults with developmental and learning disabilities. Their Campus of Life located in San Marcos is designed to be sustainable in every way possible.[30] SDGBC has suggested that lessons learned from the process be integrated into building codes and best practices across the region.

The identification of fit-for-purpose solutions can be aided by a practice guidebook developed by the William J. Worthen Foundation.[27] This practice guide is intended to help developers, building owners, designers, and engineers implement on-site non-potable water systems. This comprehensive guide helps designers maximize resource recovery from water sources and assess the viability of using non-potable water with clear flowcharts. It discusses what end uses are appropriate depending on the water quality. As designers get further along in the process, the William J. Worthen Foundation's guidebook lays out how to navigate the regulatory

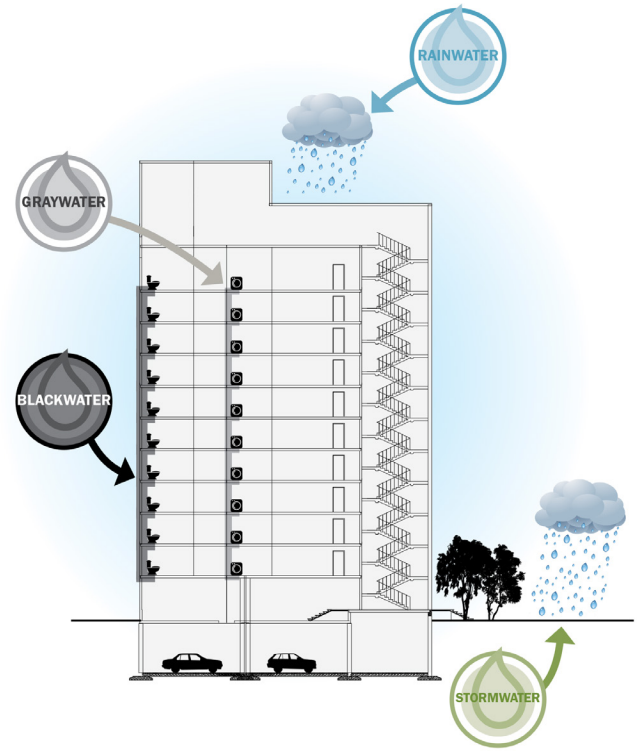


FIGURE 6: On-site Non-potable Water Sources Scoped by SFPUC's Blueprint.[28]

29 https://www.teriinc.org

30 https://www.teriinc.org/campus-of-life-2-2/

ATTRIBUTING YOUR WATER SOURCES CORRECTLY

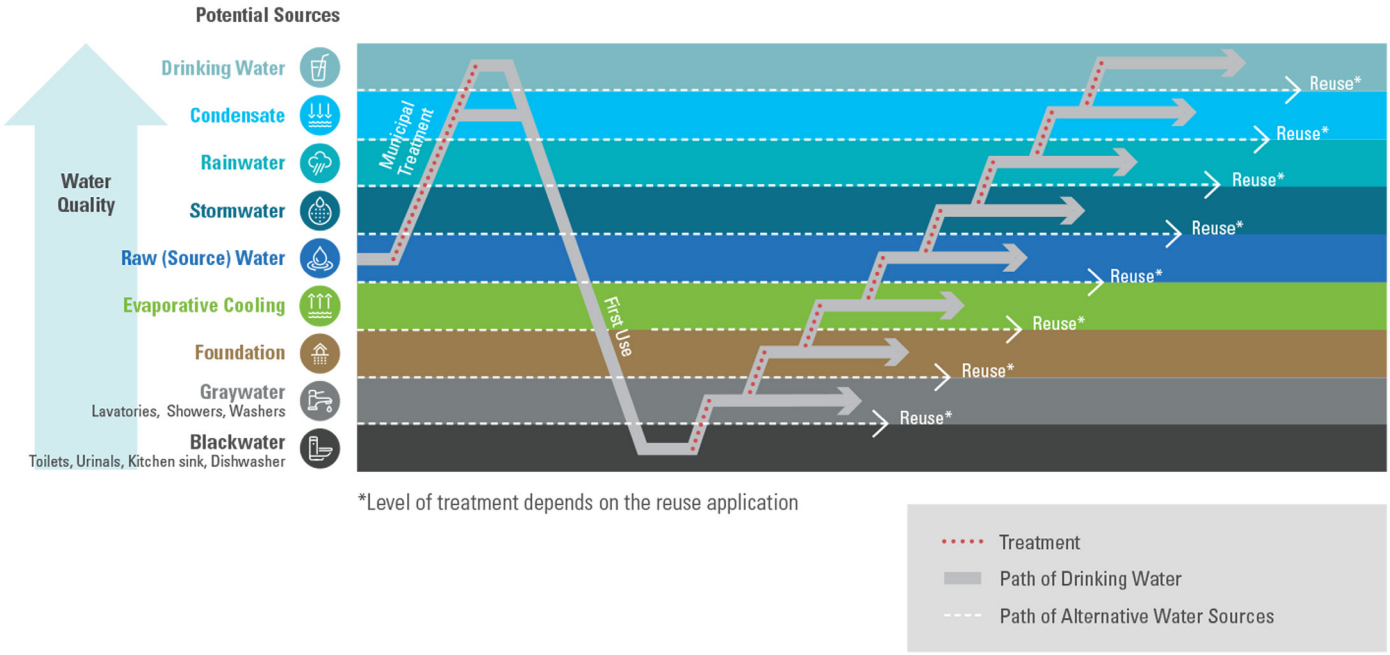
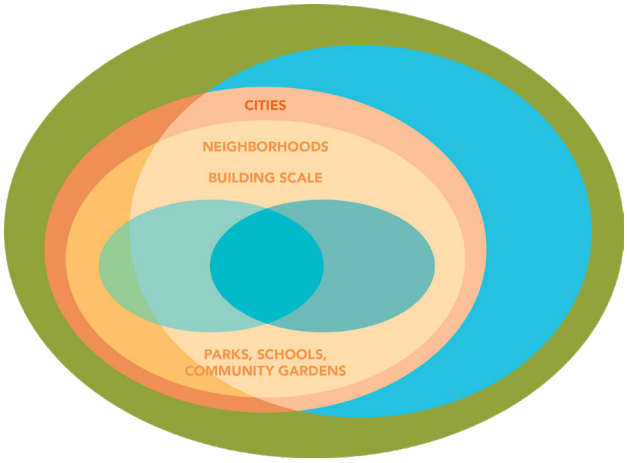


FIGURE 7: Attributing the Water Source Correctly.[27]

requirements and permitting process. Figure 7 shows how the source and quality of the water impacts the choice of use and how much treatment it will require.

The guidebook discusses the installation, operation and maintenance of water reuse systems, detailing the technical aspects of water treatment systems, as well as the required level of treatment depending on the desired water quality. It also serves as an excellent tool and resource to educate and train building professionals on non-potable water systems.

B. *Craft appropriate and easy-to-use guidelines for community gardens, schools, and other public places to implement on-site non-potable water reuse projects.*



Many public places throughout our urban areas generate and use water, yet have no basis for applying non-potable reuse techniques. The current California Plumbing Code (CPC) contains

no references to systems in places like community gardens, schoolyard gardens, community centers, agricultural teaching facilities, and parks. As discussed in the Health and Equity, Data-Driven Making-Decision, and Equitable Water Rates chapters, community gardens and public parks play an important role in building healthy and resilient communities, and creating a sense of place. Moreover, environmental and social justice (ESJ) communities are those who have less access to fresh and local produce and less tree canopy.[31] Developing best practices that allow non-potable water use and reuse in public places within ESJ communities will create opportunities to reduce costs associated with water. For underfunded community garden projects, the cost of water interferes with the ability of the garden to thrive, as discussed in more detail in the Equitable Water Rates chapter. Thus, reusing on-site water is a way for low-income communities to meet their watering needs without the support of outside organizations. Oftentimes there are small grant opportunities to implement technologies such as rainwater catchment that organizations can apply for to help offset their cost burden. Reusing water generated by hand-washing or veggie-washing stations will also help offset water supply issues when it is used for fruit trees, pollinating plants, and more. These are examples of use of non-potable water that are oftentimes missed or not fully leveraged as the practice is not well understood nor fully regulated. Table 5 can serve as a reference to study the different options for water sources and water uses and develop appropriate best practices and policies.

Best practices can be studied and developed to include the safe use of water from hand-washing or veggie washing stations, for example. Many public places, including community gardens and schoolyard gardens use these stations. However, connecting these stations to sewer or septic systems may not be feasible or can be costly and invasive. Under the current California Plumbing Code (CPC), there is no allowance for a washing station that does not tie back into the sewer or septic system. This creates a missed opportunity for reusing water on-site.

TABLE 5: List of potential non-potable water sources and uses that can be implemented in community gardens, schoolyard gardens, and public places.

POTENTIAL NON-POTABLE WATER SOURCES
Hand-washing
Veggie-washing
Drinking fountain
Rainwater
Stormwater
Air conditioning condensate
POTENTIAL NON-POTABLE WATER USES
Fruit tree, vine watering (could be done with rainwater or greywater)
Non-edible landscape, such as pollinators, natives, etc. (could be done with rainwater, greywater or stormwater)

National and international data can help in the development of best practices for safely implementing non-potable water reuse systems that are effective for augmenting water supply for agricultural applications. For example, an in-depth article refers to several studies around the world examining heavy metals and bacteria from different roofs and under different conditions.[32] In another article, a study in New Jersey specifically looked at pathogens in rainwater and the results of using that rainwater on vegetables.[33] The results were mixed but generally showed a low indication of contamination and suggested a set of best practices to ensure safety when using rainwater to water vegetables. In a local example discussed in the Discovery Document,[34] a school garden missed the opportunity to reuse rainwater due to a lack of clear guidelines to design and implement their system. A better understanding of the water quality generated

31 https://www.environmentalhealth.org/images/FINAL-Full-Doc---Web---An-EJ-Assessment-of-the-CAP.pdf

32 https://www.sightline.org/2015/01/07/a-green-light-for-using-rain-barrel-water-on-garden-edibles/

33 https://www.nacaa.com/journal/index.php?jid=205

34 Discovery Document, p.60, in chapter Inadequate System Integration, Section "Lack of Integrated Risk-based Approach"

by various systems will allow for the creation of practices for non-potable water reuse and increase the water supply of public gardens and parks. As discussed in the chapter addressing upcoming state requirements, risk assessment and performance-based codes will help overcome these challenges, and support the safety and compliance of non-potable water reuse. Finally, these types of public spaces present key opportunities to educate a wide range of people of all ages and different cultural backgrounds about best practices in our region, both on using water wisely and how to increase soil health and grow food. Having unified best practices across the region will help better educate the public and avoid confusion when visiting places in neighborhood jurisdictions.

EXAMPLE 1: Feaster Elementary School in Chula Vista is currently on schedule to undergo modernization as part of the parent project of this Blueprint, "Alternative Non-Potable Water Supplies, Xeriscape Design, and Flood Prevention for Disadvantaged Communities." This project looked at rainwater capture off of school roofs for the school garden as well as the use of A/C condensate for watering planters to enhance the greenspace of an otherwise largely paved area, which creates hot, uninspiring places for kids to play between classes.

EXAMPLE 2: Second Chance, based in San Diego, is an organization that provides job skills to at-risk communities including youth, men, and women who may have criminal backgrounds or are at risk of abuse, addiction, and recidivism.[35] Their farms provide opportunities for local teens to gain job experience in farming, business, and food preparation through programs that provide Community Supported Agriculture (CSA) boxes to local residents and sell produce at farm stands and to local restaurants.[36] Their harvested vegetable washing station is in high use, yet without guidance for the use of such a system, the water generated during weekly harvesting was draining without any control mechanism and being washed into the storm drain. By routing it through simple bioswales to berry vines and banana trees, they were able to maximize production of their space without using more water and eliminate the opportunity for this water to reach the storm drain.

C. Enhance stormwater on-site use and reuse strategies to leverage this resource on different scales.

Stormwater is defined as precipitation runoff from rain events that flows over land and/or impervious surfaces (e.g., streets, parking lots) at or below grade, while rainwater is captured above grade and thus contains less contaminants than stormwater.[37] The current regulation under the Municipal Separate Storm Sewer System (MS4) Permit requires jurisdictions to manage stormwater to limit flooding and improve the water quality to prevent ocean and ecosystem pollution. However, as previously detailed in the Current Regulatory Framework chapter of the Discovery Document,[38] stormwater management practices have often failed to recognize the value of stormwater capture as a means to increase the local water supply for on-site use and reuse, and benefit the local ecosystem.

Currently, the Best Management Practice (BMP) Design Manual, used by jurisdictions to comply with the MS4 Permit describes Low Impact Development (LID) as practices of "stormwater management and land development strategy that emphasize conservation and the use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely reflect pre-development hydrologic functions."[39] Through projects that incorporate natural features such as vegetation, soil, and rocks, these practices increase

35 https://www.secondchanceprogram.org/

36 https://www.secondchanceprogram.org/youthgarden

37 https://sfwater.org/Modules/ShowDocument.aspx?documentID=10493, Chapter 3, Risk-Based Pathogens Reduction Targets

38 p.29, Section "Mismatch Between Stormwater Management and On-site Reuse"

39 https://www.sandiegocounty.gov/content/sdc/dpw/watersheds/DevelopmentandConstruction/BMP_Design_Manual.html

water infiltration; groundwater recharge, capture and use; and pollution reduction by biofiltration. LID contrasts from grey infrastructure (pipes, ditches, etc.), which is a built infrastructure that aims only at diverting water away from a location (to reduce flooding) without providing additional benefits for that specific area. LID projects are designed to reduce the impact of stormwater in the same way as grey infrastructure, but with the advantage of creating multiple benefits, such as the enhancement of urban landscapes, streets, and parks; an increase in property values; and a reduction of the size and amount of heat islands generated by the built environment. All of this is achieved while simultaneously increasing water conservation and augmenting site-level water supply. These practices can be used at different scale, whether it is to enhance a neighborhood, a street, a park, or commercial centers. By buffering the flooding effect of large rain events off the urbanized impervious infrastructure, the ecosystem is less impacted during the flooding events, and natural patterns of water seeping into the waterways over a longer period of time after a storm event are more closely mimed, which enhances stream /river flow, reduces pollution concentration, and helps offset erosion.

As we develop unified best practices, BMP Design Manuals will benefit from a revision to include practices that maximize the use and reuse of stormwater to augment on-site water supply, regenerate soil, benefit ecosystems, and create green areas for communities. This aims at enhancing stormwater practices beyond the prevention of flooding and the reduction of pollution. Table 6 shows the range of on-site stormwater practices that can be implemented. When designed to maximize the on-site use and reuse, stormwater can be envisioned as a true source of water supply. It is important to note that rainwater capture and use is also considered an LID BMP, however the quality of the water source being better than stormwater, this LID BMP is not included in Table 6.

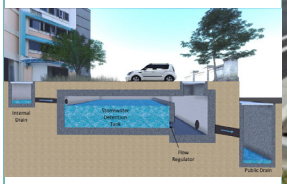
The County of San Diego recently conducted a study that examined how to better manage stormwater in our region and assessed practices ranging from on-site capture and use to centralized treated water reuse. It also examined the feasibility of executing these practices throughout the county. It included a set of criteria for the prioritization of various stormwater use and reuse alternatives, such as the potential volume of stormwater use, the cost per volume, the additional benefits (water quality, environment, flood management, and community), and constraints and opportunities of each alternative. It also identified a number of planning tools that can be used by other agencies in the development of new projects. The study highlighted the usefulness of strategically combining decentralized and centralized techniques, which unifies competing interests by leveraging greater integration.[40,41]

The study serves as an excellent overview of potential stormwater solutions for Southern California. It provides examples of stormwater use alternatives proposed for implementation in the San Diego region, including on-site irrigation using large and small systems, discharge to groundwater basins, and controlled discharges to wastewater treatment facilities for further reuse. Some of these projects are already completed and a few others are pending or are still in the conceptual stage. For example, National City has built a "green" street along “A” Avenue to improve infiltration to groundwater and provide water storage for irrigation. As explained in the study, "the project constructed infiltration basins that are capped with river rock to prevent erosion and include a thick layer of rock and sediment through which water percolates into the natural groundwater system. In addition to the infiltration basins, the project also constructed a filtration and 30,000-gallon cistern system beneath Kimball Park to both provide irrigation water for the park and improve water quality for water discharged to Paradise Creek." Annually, the project captures 90.5 acre-feet of stormwater.

40 http://www.projectcleanwater.org/download/swcfs-report-november-2018/?wpdmdl=7118&ind=1557770602143

41 http://www.projectcleanwater.org/?s=SWCFS

TABLE 6: Range of On-site Stormwater Use and Reuse

	GREY INFRASTRUCTURE	LOW IMPACT DEVELOPMENT			STORMWATER TREATMENT AND REUSE
		Flow-thru treatment control BMP's	Biofiltration BMP's	Retention BMP's	
					
FEATURES	No infiltration in natural environment. Conventional piped drainage and water treatment systems.	Vegetated swales, media filters, sand filters, dry extended detention basin, proprietary flow-thru treatment control.	Shallow basins filled with treatment media and drainage rock that treat stormwater runoff by capturing and detaining inflows prior to controlled release through minimal incidental infiltration, evapotranspiration, or discharge via underdrain or surface outlet structure.	Infiltration BMPs that capture, store and infiltrate stormwater runoff: engineered, no design surface discharge; includes infiltration basins, bioretention, permeable pavement, dry wells.	Capture of stormwater for treatment and non-potable water reuse. Treatment and reuse subject to California Code of Regulation Title 22. Within the scope of SB966 - upcoming requirements for treatment and reuse.
BENEFITS / DISADVANTAGES	Scale Environmental cost externalized Maintenance cost: cleaning storm drain, street sweeping, ocean pollution.	The least efficient LID BMP to keep pollutants on-site.		The most efficient LID BMP to keep pollutants on-site.	Engineering consideration. Human health consideration. Scale jumping may offer additional benefits. Requires cost/benefit analysis encompassing multiple benefits.

Although the implementation of green infrastructure is currently well documented (additional references are discussed below and in the next recommendations), there is a distinct gap in clear permitting and regulating best practices for true on-site stormwater non-potable reuse at many building-scale levels. As the volume of water is a criterion of alternative selection in the County's feasibility study, centralized strategies may be prioritized. Yet a combination of two or more decentralized strategies when applied across a large cross-section of a watershed or neighborhood has the potential to achieve the same impact as a centralized strategy. However this is not valued in the same way in the study. Additionally, as discussed in this Stormwater Capture and Feasibility Study, a lack of clear regulatory pathways and agency agreement and support are constraints to implementation. This Blueprint, and more specifically this chapter, provides a roadmap to

unlocking these constraints. A set of best practices with clear implementation, operation, and maintenance pathways will aid in further promoting the use of GI and enable innovative applications, including stormwater projects for neighborhoods where the concept of "scale jumping" is oftentimes applicable, allowing on-site reuse to benefit parks and community gardens.

EXAMPLE 1: As part of this Project, the Public Health Advisory Committee participated in an informative webinar led by Catlow Shipek, Policy and Technical Director at Watershed Management Group (WMG), and learned about the successful efforts of the City of Tucson and the County of Pima to restore their watersheds using GI.[42] They developed and implemented green infrastructure to successfully maximize the positive impact of stormwater management in the restoration of soil systems, ecosystems, and watersheds. The City of Tucson and County of Pima have developed a guidance manual to implement low impact development and green infrastructure. Their guidance manual is a detailed compilation of principles, assessment, planning, and designing practices that can be used as an example for our region to develop a guidance document that would ensure that GI and elements such LID are maximized and provide the desired results, including correctly infiltrating water, restoring soil, and providing a space where plants grow and provide a "green" space.[43] WMG's expertise can be useful in the development of similar best practices in the San Diego region. Two lessons learned are important to consider:

- It is important to include an oversight entity to assess the design, and inspect the project site upon completion to ensure that the intended objective has been carried out.
- The maintenance of these systems is also critical for the long-term success of a project. Consequently, WMG notes the necessity of adequately trained system operators. WMG has developed a certification that provides appropriate training for these specific types of systems. WMG also provides technical support and maintenance for some infrastructure projects.

Similar strategies for on-site stormwater reuse can be envisioned for smaller private properties, either through the routing of stormwater into small basins or by the capture of rainwater in tanks and cisterns. However, the design of infiltration basins for private properties is not well promoted, mostly due to a lack of streamlined processes and permitting and regulating issues. While this strategy can provide many benefits to the occupants of nearby buildings and the environment, as described in the following example, designers and civil engineers are not inclined to implement it. By establishing clear practices for various scales of implementation, and promoting them as described in the following recommendations, it will become easier to mainstream on-site stormwater reuse.

EXAMPLE 2: Feaster Elementary School described in recommendation 1B has been redesigned to reduce significant flooding in the schoolyard, which causes attendance issues. While current plans for updates include strictly grey infrastructure updates such as routing all downspouts to underground culverts, the project has developed an alternative strategy to capture stormwater flows in infiltration basins populated with low water use plantings to green the schoolyard. Additional benefits include cooler spaces for students to play, less use of A/C for nearby classrooms, educational opportunities about native plant species, and the application of appropriate technology for our region's local ecology. This design will also allow stormwater to permeate the soil and limit the amount of water discharged into storm drains, which reduces the burden on wetlands and estuaries during storm events. Designs like this can be mimicked at schoolyards to enhance student's daily experience in addition to providing flood control.

42 Webinar held on March 12, 2019

43 https://www.tucsonaz.gov/files/water/docs/LID-GI-manual.pdf

Lastly, **stormwater capture and reuse** has the potential to satisfy the MS4 Permit while also augmenting the water supply of a site. These systems are comprised of a storing area and a treatment chain allowing for non-potable reuse. Such systems are currently subject to requirements under the California Code of Regulation Title 22, and National Sanitation Foundation, NSF 350. Additionally, the upcoming state legislation (under the Senate Bill 966) for on-site treated non-potable water reuse will encompass such systems.

EXAMPLE 3: The San Diego County Regional Airport Authority is a leader in water capture and reuse in the San Diego region, as they have explored many opportunities to conserve water and reuse it on-site. The Airport Authority has installed a stormwater capture and treatment system to collect water from the Terminal 2 parking structure to reuse it in their cooling tower. The underground basin has a capacity of 107,000 gallons and the potential volume to capture and reuse is estimated at 2 million gallons per year, offsetting approximately 10 percent of potable water. This project is a good example of designing with sustainability goals in mind. The overall cost of the project was roughly $500K. Feasibility for this project was assessed not only on meeting the "new/redevelopment" requirements of the MS4 Permit but also a series of additional benefits including: alignment with the San Diego International Airport Sustainability Goals, alignment with their Water Stewardship goals to limit the use of potable water for non-potable purposes and to identify alternate sources of water, capturing rainwater appeared crucial considering the climate of the San Diego region, preventing polluted stormwater runoff from reaching San Diego Bay, and alignment with the desire to be a regional and industry leader in stormwater pollution prevention and water conservation. The development of this stormwater capture and reuse system evolved after the installation and use of other on-site non-potable water systems at the airport. Starting in 2014, A/C condensate collected from systems were installed on jet bridges to be reused in many non-potable applications: washing of pavement and vehicles, composting cans, irrigation, and toilet flushing. Their effort can serve as a regional model, and data collected to monitor the water quality can inform best practice development.[44,45]

Stormwater capture, use and reuse is gaining traction throughout the state and the country. These additional resources can be useful in developing best practices and advancing further reuse of stormwater:

- California Stormwater Quality Association (CASQA) on LID and GI supports the California stormwater management community.[46]
- Green Infrastructure by the US Environmental Protection Agency (US EPA).[47]
- The San Diego Regional Climate Collaborative's 2017 report on Challenges and Opportunities for Climate-Smart Stormwater Management in San Diego identifies the challenges in developing and implementing stormwater management practices to adapt to a changing climate. This report details the gaps and obstacles in the design and application of stormwater infrastructure in our region and identifies some solutions.[48,49]

44 Visit of the San Diego International Airport Authority, September 2019, Stormwater Capture and Treatment System for Reuse in Cooling Tower, and A/C Condensate Capture for Non-Potable Reuse in Washing Station

45 http://2015-sustain.san.org/operational/

46 https://www.casqa.org/resources/california-lid-gi

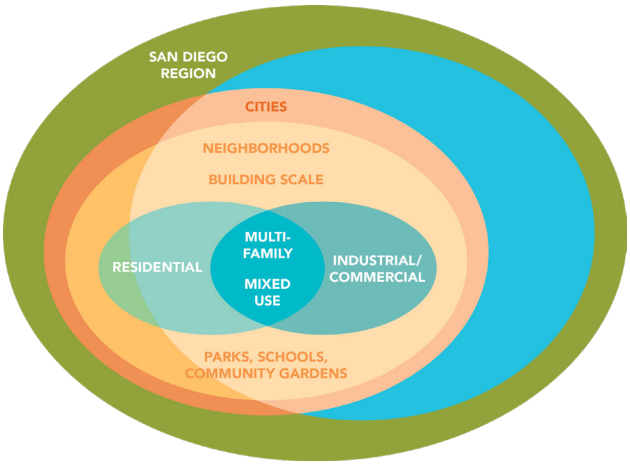
47 https://www.epa.gov/green-infrastructure

48 https://docs.wixstatic.com/ugd/f0db5c_f2b039bc7a6e4ff69c5bcd-f3e100679a.pdf

49 https://docs.wixstatic.com/ugd/f0db5c_e8a6fb6e153a484abf3c-8c9fbd9f5da9.pdf

- The Water Research Coalition and the San Diego Chamber of Commerce's workshop series to assess the potential of stormwater capture and reuse in San Diego County. The report presents case studies of stormwater reuse projects conducted in the Los Angeles area and the San Diego region.[50]

2. Develop on-site non-potable water reuse policies and educational materials that promote equity, health, and co-benefits across the region.



As highlighted in the Discovery Document, alternative water reuse is partially described in programs, policies, and codes. The siloed approach taken thus far has led to inconsistencies and gaps in policies, misalignment with the greater goal of augmenting on-site water supply to support communities' water resilience, and confusion on practices throughout the region.

The California Plumbing Code (CPC) and the Municipal Separate Storm Sewer System (MS4) Permit along with its BMP Design Manuals and Jurisdictional Runoff Management Plans, as well as municipal ordinances that comply with state requirements on landscape irrigation are policies that address non-potable water reuse. However, they do not necessarily encompass the entirety of alternative water use, nor are they intended to align with one another, which has led to confusion. The MS4 Permit will benefit from including greywater requirements in alignment with existing codes, such as the CPC. Additionally, as we move toward a public health performance-based framework as discussed in the following chapter, it will be important to develop a set of consistent policies that encompass unified best practices to prevent additional confusion among regulators and tradespeople. We are also recommending the inclusion of water measures in CAPs, therefore it will be important to incorporate consistent best practices as well.

Equity considerations are important to include in developing best practices for community gardens and public parks, and in developing the permitting and implementation process to ensure ESJ communities' needs and challenges are addressed.

Better alignment of policies can help to clarify best practices. For example, SFPUC has developed a guidebook to help achieve synergies for compliance between non-potable water use and stormwater use ordinances.[51] It compares requirements and helps designers and developers in navigating the ordinances. This type of document reduces barriers to alternative water reuse and facilitates communication between regulators, tradespeople, and homeowners.

A critical component in the application and ultimate success of any set of best practices is education and training. Whether it be a large-scale system on a municipal street maintained by city staff, or a smaller system at the home scale, good design and installation followed by appropriate maintenance is critical. Ensuring that all key parties are well trained is essential. This point has been reiterated by all experts that have been interviewed. This section describes some examples of how education and training have been addressed depending on the users and the outcomes generated.

50 https://www.altaenviron.com/uploads/5/0/5/6/50569859/final_stormwater_capture_and_use_workshop_and_summit_whitepaper_october_2017_.pdf

51 https://www.sfwater.org/Modules/ShowDocument.aspx?documentID=10420

REGULATORY AUTHORITIES

On-site non-potable water systems are a new technology for many regulatory authorities who may lack the knowledge to help design and permit healthy and safe systems. As explained by Paula Kehoe, the Director of Water Resources for SFPUC, during her presentation to the Public Health Advisory Committee, identifying the skills and knowledge required to design and permit treatment systems is essential in ensuring that these systems meet risk-based water quality standards. Ongoing education and training will be important for maintenance crews to maintain their currency in the field vis-à-vis new regulations and emerging alternative solutions.

Although jurisdictions in the San Diego region sometimes lack the training and education to support the advancement of such systems, other regions have made significant progress, which our regional regulatory authorities and policymakers can draw from. Based on nearly a decade of experience, SFPUC developed a Blueprint for Onsite Water Systems that describes a 10-step process that may be used by other localities in the development of a local program.[52]

Additionally, programs like the Green Infrastructure Leadership Exchange have been developed to create a community of practitioners who can learn and collaborate through participation in this network.[53] The GI Leadership Exchange develops and shares resources to promulgate the benefits and viability of green infrastructure.

PROFESSIONALS/TRADESPEOPLE

As discussed in the Discovery Document, the growing demand for alternative water systems requires more and more trained professionals that can operate and properly maintain these systems. A lack of adequately trained personnel has been observed on many occasions, demonstrating how critical it is to build operator and technician capacity to ensure appropriate system operation and maintenance. New educational programs for professionals and businesses are emerging to answer the demand for qualified employees and tradespeople. For example, Paula Kehoe explained that an operator certificate program will be released mid-2019 to train professionals.[54]

In Tucson, AZ, WMG has developed technical training programs on water harvesting to advance the knowledge and skills of the community. These programs stress that education and training in green infrastructure is key to ensuring that water harvesting is applied appropriately, and the health of the ecosystem is maintained. The WMG reported that in one instance, a GI project complied with requirements on paper, but did not provide the intended goal of heat island reduction or ecosystem enhancement. Their certificate program provides the tools and skills for people to design, implement, operate, and maintain various alternative water systems, such as rainwater tank installation; greywater systems; and GI design, construction and maintenance.[55]

Other certifications and even professional degrees have been developed. The Northwest Water & Energy Education Institute at Lane Community College, based in Eugene, Oregon, has launched a new online Water Conservation Technician two-year degree to prepare new technicians and professionals. Students of this program will become proficient in addressing future issues related to water use, conservation, and natural resources stewardship.[56] Additionally, the Water Environment Federation launched a National Green Infrastructure Certification Program (NGICP) in 2018 to train and certify employees, technicians, and contractors.[57]

52 https://www.sfwater.org/modules/showdocument.aspx?documentid=6057

53 https://giexchange.org/

54 Presentation Jan. 2019

55 https://watershedmg.org/learn/training

56 https://www.nweei.org/2-year-degrees/waterconservation.html

57 https://ngicp.org/

Additionally, the San Diego Sustainable Living Institute (SDSLI) has been leading the way in training residents, select professionals, and tradespeople on how to install and maintain greywater and rainwater harvesting systems through regular workshops since 2012. SDSLI is hosting the first Water Harvesting Certification Course in San Diego in Fall 2019.[58] They also organize a biannual Water Harvesting Bike Tour that highlights sites that employ water harvesting techniques, and shows ways in which systems can be integrated into single-family residential sites and how these systems perform over time.

PUBLIC AND RESIDENTS

Santa Barbara County has developed a comprehensive greywater handbook that can be of value when developing and communicating greywater best practices in the San Diego region. This handbook compiles information regarding greywater, from design to permitting, building, operating, and maintaining greywater systems at home in great detail. It is a good example of educational material for homeowners.

The City of Tucson provides a detailed brochure about their rainwater and greywater programs, including a list of licensed contractors (projects are required to employ a licensed contractor in order to receive a rebate for projects over $1,000), a list of demonstration sites, and other resources. In addition to hiring a licensed contractor, in order to receive a rebate, residents must attend a three-hour workshop offered by three different organizations.[59] By hinging the rebate upon the completion of a mandatory training session, the city has found a way to increase education and understanding on rainwater and greywater systems. Residents become educated enough to be advocates for themselves and are able to keep contractors accountable to achieving the level of quality that is more lasting for the community. In addition, by linking the educational component to a rebate, the city can collect accurate data about how many and what type of systems are being installed by residents.

The San Diego County Water Authority (SDCWA) offers the San Diego Sustainable Landscapes Program, which provides educational materials on building and maintaining sustainable home landscapes.[60] It is a resource that assists San Diego County residents in adopting sustainable landscaping best practices through education and training, technical assistance, providing information on landscaping materials, and financial incentives. For example, homeowners can visit their demonstration garden to learn more about water-wise irrigation, soil preparation, and plant choice.[61] The SDCWA also provides a WaterSmart Landscape Makeover Program to help homeowners convert turf areas into low-water use gardens.[62] These programs can be enhanced through inclusion of information related to installation, operation, and maintenance of simple greywater and cistern systems. On-site non-potable water reuse system details should either be included within the existing program or within a new, separate program for homeowners that is linked to the WaterSmart Landscape Makeover Program. Homeowners should learn about these systems at a level of detail similar to this existing WaterSmart program.

58 https://www.sdsustainable.org/Water%20Harvesting%20Certificate%20Registration

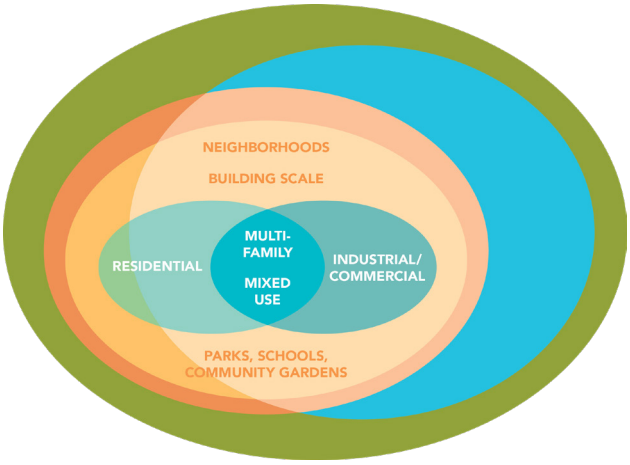
59 https://www.tucsonaz.gov/files/water/docs/RWH_Resource_List_July_2019.pdf

60 https://sustainablelandscapessd.org/

61 https://sustainablelandscapessd.org/key-principles/

62 https://landscapemakeover.watersmartsd.org/

3. Streamline the regulatory process for non-potable water reuse systems.



One key component that was highlighted in the Discovery Document, in the Regulatory Barriers chapter[63] and in the Inadequate System Integration chapter,[64] is the lack of clear permitting processes for non-potable reuse across all sectors. This Blueprint recommends a broad engagement of local and regional stakeholders to address the challenge of permitting, monitoring, and operating on-site non-potable water reuse systems. This is a critical step in order to advance safe and healthy on-site water reuse to improve the region's water resilience and reliability. This will also support the effort that is required to address the upcoming state requirements for on-site treated non-potable water systems, as discussed in the following chapter.

It is important to mention some of the barriers to on-site non-potable reuse. Here we highlight two. First, on-site non-potable reuse techniques are rather new, and are not easily integrated into the regulatory processes. However, there are many that are now known and well-understood. With this added body of knowledge, it will become easier to mainstream and simplify the regulatory process for non-potable water reuse systems, while still addressing the current focus of the regulatory process that includes backflow protection and cross-connection testing to protect potable and sewer connections.

Additionally, the siloed regulatory structure within a jurisdiction does not allow an easy integration of systems that are at the interface of several departments. During the workshop led by SFPUC to present their innovative approach to the Public Health Advisory Committee, they reiterated the importance of streamlining the regulatory process to facilitate a more widespread adoption of decentralized non-potable water reuse. Once established, a clear approval process saves time and effort for regulators, inspectors, and applicants, while reducing the cost of permitting. SFPUC developed a Blueprint for Onsite Water Reuse that explains how to create a local program and help streamline the regulatory and permitting process.[65] The suggested process includes (1) convening a working group, (2) selecting the types of alternate water sources and (3) identifying the end uses that will be considered. It is then necessary to (4) establish water quality standards and (5) identify and supplement local building practices, which will help (6) establish monitoring and reporting requirements, and (7) prepare an operating permit process. The final steps consist of (8) implementing the guidelines and program, (9) evaluating the program, and (10) growing the program.

EXAMPLE 1: In San Francisco, the process that ultimately led to the Non-potable Water Ordinance and program began with the identification of the roles and responsibilities of the different departments of the City of San Francisco – namely SFPUC, Department of Public Health and Environmental Health (SFDPH-EH), Department of Building Inspection (SFDBI), and Public Works (SFPW), as seen in Figure 8. This collaboration was key to overcoming the challenges caused by a siloed regulatory structure. In 2012, the Non-potable Water Ordinance was established in order to give appropriate authority to the agencies to permit

63 Discovery Document, section "Multiple Siloed Departments," p.34

64 Discovery Document, section "lack of clear critical path," p.61 and section "Regulatory Silos Inhibit Use of New, Innovative Practices," p.62

65 https://sfwater.org/modules/showdocument.aspx?documentid=6057

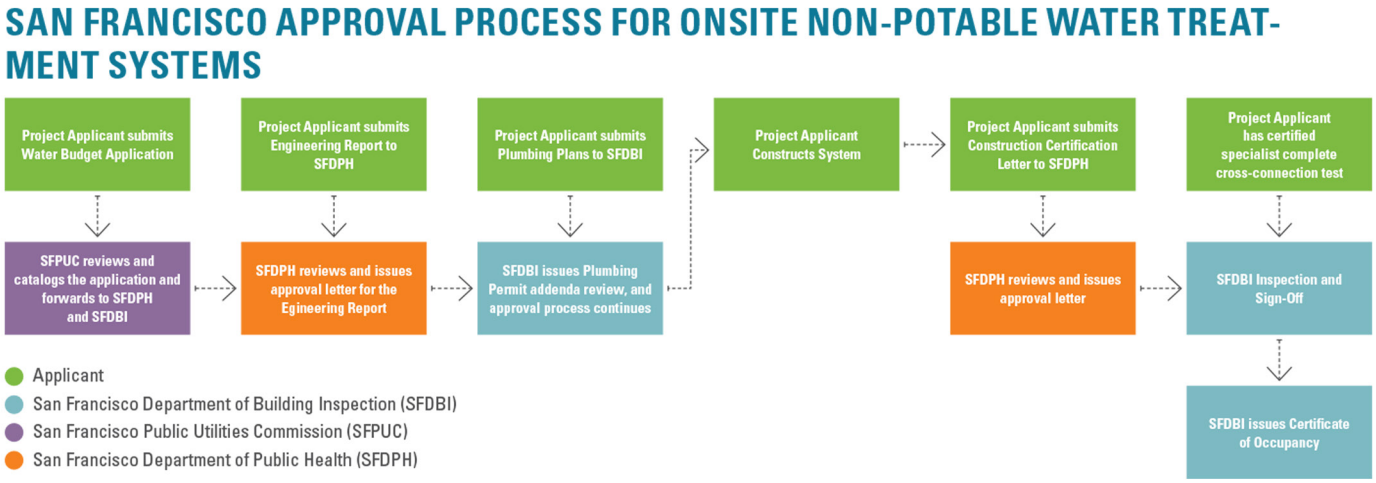


FIGURE 8: San Francisco Approval Process for On-site Non-Potable Water Treatment Systems.[27]

and oversee the systems.[66] In addition, SFPUC developed a detailed guidebook that described the step-by-step process to implement on-site non-potable water systems.[67]

One key point to note is that San Francisco benefits from being both a city and a county, which reduces the bureaucratic hindrances that can occur when trying to implement a large-scale program among several autonomous municipalities, as is the case in San Diego County. Despite this difference, SFPUC blueprint and guidebook still serve as outstanding models for successful program development and implementation that could be adopted in the San Diego region.

EXAMPLE 2: The City of Seattle streamlined their permitting process and was successful in reducing the process time by 25 percent.[68] Shortening the overall timeline also reduces the cost of permitting, allowing a greater number of buildings and homeowners to install more systems.

A. *Develop pre-approved plans for simplifying and making cost-effective permitting processes.*

By making pre-approved greywater system designs readily available from the permitting agency, homeowners and regulatory agencies can save on costs. By creating well understood and widely available documentation supporting non-potable reuse systems, more residents will have access to these opportunities. A local example of a similar effort can inform this strategy. The City of Encinitas has developed a program to assist property owners in creating accessory unit dwellings, Permit-Ready Accessory Dwelling Units (PRADU). This program, part of the housing plan of the city, aims at supporting a greater access to housing and more diverse housing options. The program provides eight (8) permit-ready, customizable plans that have been developed to help homeowners expedite the permitting process and reduce preconstruction fees.[69] This strategy could also be applied to the installation of alternative water systems. Furthermore, by integrating alternative water systems into new construction during the design phase, and integrating input from all of the departments involved in the process, systems can

66 https://sfwater.org/Modules/ShowDocument.aspx?documentID=10422

67 https://sfwater.org/Modules/ShowDocument.aspx?documentID=11629

68 https://opus.lib.uts.edu.au/bitstream/10453/36477/1/ForEva_water_book_single_FINAL.pdf

69 http://encinitasca.gov/pradu

be more easily inspected, approved, and permitted by city staff, eliminating some of the confusion resulting from a lack of training (highlighted in the Discovery Document).

In Arizona, the use of the Arizona Greywater Guidelines, developed by the Arizona Department of Environmental Quality, provides a unified and streamlined process to install permit-free greywater systems for single-family dwellings.[70,71] With a suitable educational investment, the information has been made widely accessible thereby ensuring people have access to the appropriate technology and information and reducing the cost spent by homeowners and utilities overall. Some cities in Australia are encouraging widespread use of greywater by eliminating permitting fees altogether. Yet, a permit is required for all greywater systems, which allows the cities to maintain statistics on greywater systems.[72]

B. Create a legal infrastructure for property boundary crossing.

Urban settings can present challenges for water reuse projects due to space constraints. However, this situation also presents opportunities for neighboring buildings to use each other's water resources. This concept of scale jumping is worth exploring for projects that either produce a large amount of water or demand a high volume of water through their operation.

EXAMPLE 1: A project for the development of residential, commercial, and light industrial buildings in Victoria, BC, Canada designed an on-site treatment plant that treats 100 percent of wastewater generated by the development and redistributes it for toilet flushing, irrigation, and water features within the development and to neighboring industrial buildings.[73]

70 https://www.harvestingrainwater.com/wp-content/uploads/Arizona_Greywater_Guidelines_in_English.pdf

71 https://legacy.azdeq.gov/environ/water/permits/download/graybro.pdf

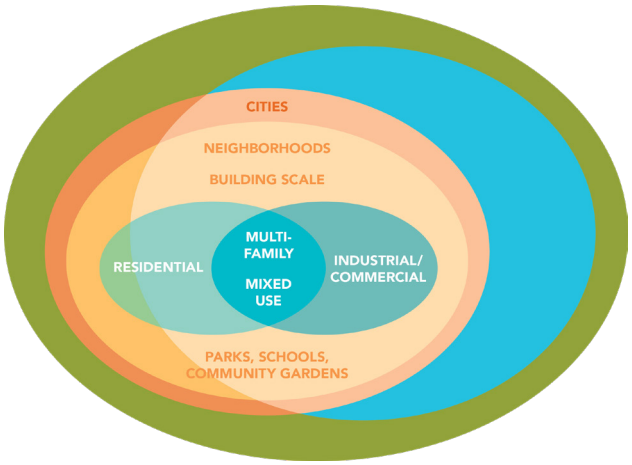
72 https://ww2.health.wa.gov.au/Articles/F_I/Greywater

73 https://access.living-future.org/sites/default/files/web_Water_Policy_Brochure_low%20res.pdf

EXAMPLE 2: In the City of San Francisco, two organizations, NRG Energy, Inc. and Bay Area Rapid Transit (BART), partnered to offset their water use. NRG Energy, Inc. has a high demand for potable water for its district energy plant and BART produces foundation drainage water at their Powell Station. The project was fully implemented at the beginning of 2019 and its long-term goal is to reuse foundation drainage water for the underground steam loop of the energy plant to offset 15 million gallons of water per year.[74,75]

In San Diego, opportunities for similar collaborations have been mentioned during stakeholder interviews. For example, the Jacobs Medical Center located on the campus of UC San Diego produces four million gallons of water per year and is located near a power plant that uses a similar amount of potable water to makeup the water loss of the cooling tower.[76]

4. Create and enhance water conservation incentives that prioritize the most effective and equitable conservation strategies.



While there are limitations to how water pricing structures can be tailored for low-income families,

74 San Francisco Public Utilities Commission, Presentation to Public Health Advisory Committee, Jan. 2019

75 https://www.districtenergy.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=1404d258-88e8-7d11-498d-837f7cf-9943c&forceDialog=0

76 Interview of Gaby Schubert, Water Tech Alliance, October 2018

as addressed in the Advocate for Equitable Water Rates chapter, low-income households are also limited in how they can address conservation. The initial investment can be too costly and deter them from installing new solutions, even if it helped them conserve water and save money in the long run. For example, rebates for new high efficiency washers may not significantly offset the price for a low-income family, or the delay in receiving the rebate after purchasing a rainwater cistern or a greywater system (about six weeks) may not be feasible for a low-income family that lives on a tight budget. New strategies are needed in order to overcome this hurdle.

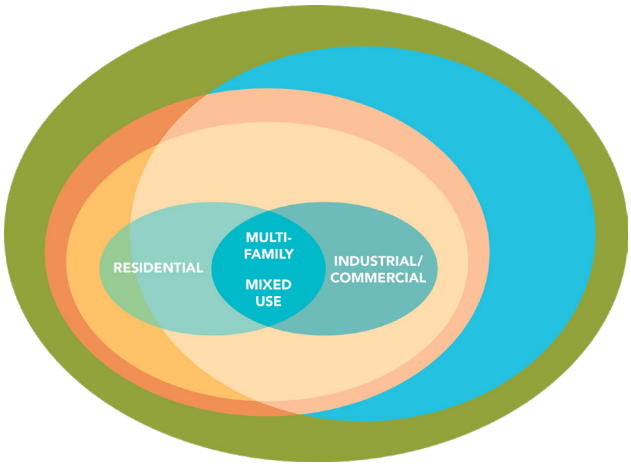
Below, we describe two programs that the City of Tucson is using to help offset the burden for low-income families:

1. Tucson Water partnered with the Sonoran Environmental Research Institute (SERI) to develop a pilot program funded by the Environmental Protection Agency (EPA) Environmental Justice Small Grants Program to encourage low-income families to participate in a rainwater program. This pilot program served as a model for the development of Tucson Water's Low-Income Rainwater Harvesting Program.[77] The Low-Income Rainwater Harvesting Program now offers zero-interest loans to build systems, in addition to offering a rebate program. Very low-income families—at or below 50 percent of the area median income—are eligible for grants as well as loans.
2. The City of Tucson is looking to develop a program with pre-qualified contractors who would directly apply the rebate to the final bill. Thus, the homeowners would not have to pay the full amount upfront and be reimbursed afterwards. This strategy would open the program to more homeowners. This is a good example of proactive support services to fund conservation efforts and make on-site non-potable water reuse technologies accessible to all communities, with a very minimal impact on customer rates.[78]

While these solutions apply at the single-family scale, other strategies exist for larger buildings. One tool SFPUC implemented is a capacity charge adjustment, which can be a great incentive for building owners to implement alternative water solutions. A property that conserves water on-site through non-potable water reuse can anticipate a lower water demand and wastewater discharge that can be reflected on the capacity charge fees; these fees can be adjusted in coordination with the water utility and the project leader. This strategy can be applied to lower the cost burden of utilities for renters in multi-family buildings and businesses.

Additional strategies include green building certifications and programs that encourage building designers, developers, and owners to pursue on-site non-potable water reuse. This is further discussed in the following recommendation.

5. Embed non-potable water reuse best practices in the nexus between green building certification programs and jurisdictional codes.



Building designers and owners who are inclined to adopt and implement on-site non-potable water reuse are often aiming to design a "green" building.

77 http://uswateralliance.org/organization/sonoran-environmental-research-institute

78 Comment made by WMG, March 2019 webinar

We now know that the comfort and the experience of a building's occupants can make a big impact on their lives and behaviors. For example, it has been shown that employees are more productive, and feel happier and more fulfilled when working in a healthier environment.[79,80,81] For these reasons, the green building movement has been gaining traction and recognition in the business community. Several factors determine if a building is designated as "green;" water is one them and on-site non-potable water systems are a key element in achieving green status.

Several national and international organizations provide certifications and instructions on the design and construction of a green building. Among them, the International Living Future Institute (ILFI)[82] and Green Building Council (GBC)[83] provide third-party certifications: The Living Building Challenge (LBC) and Leadership in Energy and Environmental Design (LEED) certifications, respectively. These certifications are well respected and can be excellent incentives for building designers to integrate green building elements.

The ILFI certification supports several of the Project's core values including encouraging an equity framework, a One Water approach, utilizing a holistic, ecosystem approach, and promoting the right water for the right use. In addition to water, energy and building considerations, the Living Building Challenge provides the foundation to improve community equity and a sense of place through two certification requirements.[84,85] Moreover, their expertise goes beyond the certification as they offer assistance at the local level, working with regulatory requirements while also offering a broader level of experience in providing solutions that have been put in place in other certified buildings around the country. For example, ILFI has developed model ordinances for water use in buildings that could be tailored for the San Diego region. Their expertise and resources can greatly inform the development of unified best practices for San Diego County. Locally, the San Diego Green Building Council, which is partnering with ILFI, has also initiated projects that assess the regulatory roadblocks in our region. This organization can help provide the tools to embed green building certification programs and jurisdictional codes.

In many cases, there is a close collaboration between these organizations and local jurisdictions to incentivize green construction. For example, a building that aims at achieving certain "green" building standards may see a reduction in permit fees from the permitting agency, or other cost or time-related offsets during construction. The County of San Diego has developed a green building program to advance the design and construction of more efficient buildings.[86] Projects can qualify if they meet one of the conservation measures required by the County: Natural Resources Conservation, Water Conservation, or Energy Efficiency. This voluntary program is promoted through incentives such as a reduced plan check turnaround time, a 7.5 percent reduction in plan check and building permit fees, and the elimination of fees for the building permit and plan check of residential photovoltaic (solar) systems.[87] Projects that comply with the Water Conservation measure through the installation of greywater systems are eligible for these incentives. This program is a great example of how a local agency can stimulate the use of on-site non-potable water reuse as part of a broader conservation agenda.

79 Kellert, S.F., J.H. Heerwagen, & M.L. Mador Eds. (2008). Biophilic Design: The Theory, Science & Practice of Bringing Buildings to Life. Hoboken, NJ: John Wiley & Sons. https://journals.sagepub.com/doi/abs/10.1177/1937586715618076?journalCode=hera

80 Browning, W.D. & J.J. Romm (1994). Greening the Building and the Bottom Line. Rocky Mountain Institute. https://journals.sagepub.com/doi/abs/10.1177/00139160121973115

81 Example of the Bullit Center: https://living-future.org/biophilic/case-studies/bullitt-center/

82 https://living-future.org/

83 https://new.usgbc.org/

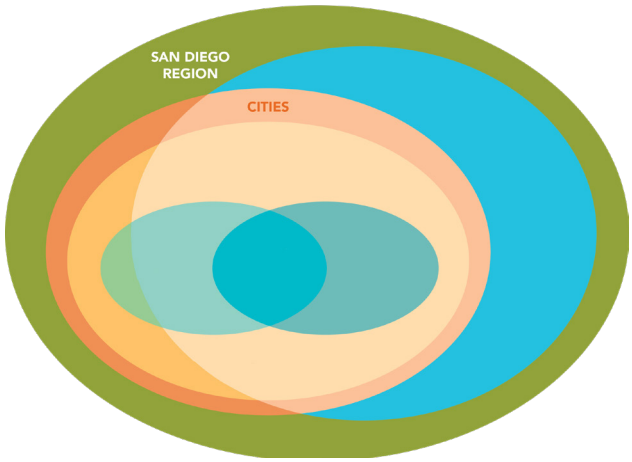
84 https://living-future.org/lbc/water-petal/

85 https://living-future.org/basics/

86 https://www.sandiegocounty.gov/pds/greenbuildings.html

87 https://www.sandiegocounty.gov/content/dam/sdc/dplu/docs/pds273.pdf

6. Create feedback loops for permitting, rebate programs, and education at all levels from jurisdictional to residential, to continuously improve best practices.



The wider adoption of on-site non-potable water reuse projects will provide lessons about what works and what does not. This learning phase will help guide regulatory requirements and policymakers, who should have the flexibility to modify policies as progress is made. A feedback loop should be built-in to the regulatory framework so that improvements can be made on a regular basis as new information and performance results become available.

At the regional and jurisdictional level, the permitting process can be continuously assessed as observations and feedback are shared by regulators. Through this collaboration between jurisdictions, the process can be improved for the entire region.

At the scale of large commercial buildings, permitting and regulating processes will encompass the upcoming state requirements of a performance-based framework (as discussed in the following chapter) and will be better informed with a well-defined feedback loop that monitors the efficiency and use of the systems.

At the residential scale, information such as the ease of understanding the permit process can be assessed when homeowners and tradespeople install on-site non-potable water systems. Permitting fee structure and rebates can be evaluated to see if they match the needs and challenges of communities. Operation and maintenance instruction is critical to ensuring the long-term benefits of these systems. This can only be provided through an adequate educational program. Although funding is required to sufficiently roll out educational programs at this level, the savings in infrastructure and water conservation will offset the initial cost of the funding. This same pattern has been seen in other water conservation efforts like the Landscape Transformation Program.[88]

In San Diego, the Groundwork Home Makeover Project (funded by an IRWM grant), which took place in the Chollas Creek neighborhood of Oak Park, involved installing rainwater cisterns and greywater reuse systems for 50 homes. Ongoing observations of these sites demonstrate that continued feedback from these sites is necessary to ensure future installations are built on the successes and bypass the shortcomings illuminated by this unique project in San Diego. It has become apparent that providing a longer period of maintenance and operation support for the users of the non-potable systems has been a missed opportunity in ensuring ongoing success for this project. For more widespread success of these projects, processes should be developed based on the low to high maintenance estimates. All installers should be required to give users a maintenance manual. For publicly funded projects, funds should be allocated for two years of maintenance to ensure the projects are working properly over time, and data and feedback should be inserted back into the funding cycle to improve future project implementations, especially for ESJ communities. Thus it is key to identify the operation and maintenance needs in the design phase to ensure funds are adequately allocated and secured.

These feedback loops will be better implemented and informed through the adequate monitoring and

88 http://www.bewaterwise.com/

reporting of data as described in the Data-Driven Decision-Making chapter.

EXAMPLE: The food recovery project performed by the Alliance in 2017 (described in recommendation 1) is a good example of a feedback loop that was implemented due to concerns that were observed and reported through surveys and stakeholder interviews. Within the context of this project, the biggest concern for retail food facilities was the fear of incurring liability. This was addressed not only by adapting best practices but also by advocating for a legislative support, which addressed it in subsequent state mandates.

The recommendations provided in this chapter will be best achieved through collaboration. Table 7 provides a non-exhaustive list of stakeholders that are important to engage.

Conclusion

By identifying and developing best practices for on-site non-potable water reuse throughout the region, we can streamline water use performance, financial efficiencies for agencies, and ensure that a wider base of communities have access to water education and conservation opportunities, while maintaining the health and abundance of our human and ecological communities. Clear critical pathways will aid designers, developers, and engineers to more easily implement non-potable water systems. Unified best practices can support the creation of skilled jobs and certified operators, which will help our region continue to thrive under climactic and economic pressures. We envision the possibility of net zero, and even net positive water, for some buildings through these best practices. Best practices should rely on data sets that are updated frequently, which is discussed further in the Data-Driven Decision-Making chapter.

TABLE 7: Key Stakeholders

KEY STAKEHOLDERS
Departments (or equivalent departments) of Development and Services, Planning, Public Works, Sustainability, and Stormwater of all local jurisdictions (cities)
Department of Planning and Development Services, Public Works and Environmental Health (County of San Diego)
Integrated Regional Water Management Planning
San Diego Regional Water Quality Control Board and Committees
San Diego Green Building Council
Building Industry Association
San Diego Regional Climate Collaborative
The San Diego Foundation
The Project Clean Water
San Diego Housing Commission
San Diego County Regional Airport Authority
Universities
California Stormwater Quality Association (CASQA)
California Plumbing Code

ADDRESS UPCOMING STATE REQUIREMENTS FOR ON-SITE TREATED NON-POTABLE WATER SYSTEMS AT A REGIONAL LEVEL

Overview

In September 2018, Senate Bill 966 (SB 966), "Onsite Treated Non-potable Water Systems,"[89] was signed by Governor Jerry Brown. As a result of its passage, the California State Water Resources Control Board (SWRCB), in consultation with the California Building Standards Commission, is now required to adopt regulations for risk-based water quality standards for on-site treated non-potable water and its reuse, on or before December 1, 2022. Additionally, the bill requires local jurisdictions that want to establish a program for on-site treated non-potable water systems to adopt an ordinance that includes these risk-based water quality standards. This bill concerns multifamily residential, commercial, and mixed-use buildings of any size but does not address single-family dwellings. In addition, it does not address untreated greywater and rainwater regulated by the California Plumbing Code (CPC) under Chapters 15 and 16, respectively.

This bill requires a shift in assessing water quality standards for on-site non-potable systems from strictly code based to performance based. The current regulatory framework uses a code-based approach specifying system mechanisms and structures. It is based on plumbing and building considerations as presented in the Current Regulatory Framework chapter of the Discovery Document. [90] The new regulatory approach will shift toward performance-based metrics, with a focus on health outcomes. The new requirements mandate the establishment of performance criteria that assure human exposure to pathogens in water are minimized, while leaving room for innovative solutions, by not dictating the form that is used to achieve the performance based standards. A system is in compliance as long as water quality meets the standards defined for a specific end use. This new regulatory framework represents an important paradigm shift in terms of the standards, performance criteria, and regulatory and permitting structures surrounding these systems. We refer to this structure as a performance-based framework to emphasis the sought-after health outcomes and performance criteria. The senate bill and the NBRC refer to a risk-based framework.

Because the bill encourages establishment of local programs as early as December 2022, it is important that jurisdictions address this soon. As discussed in the Regulatory Barriers chapter of the Discovery Document, several challenges prevent the installation of on-site non-potable water systems in larger-scale commercial, multifamily residential, and mixed-use buildings. Innovation and technology in the field of non-potable water systems is currently outpacing the regulatory framework. Jurisdictions need to adapt to the changing landscape and local regulators and policy-makers need to be educated on how to implement and enforce the new legislation. Although some regulatory requirements have been established for single-family homes, scaling these systems to larger commercial buildings presents a greater challenge that is not comprehensively addressed by the current regulatory structure. Larger buildings are more complex in terms of regulation, human impact, and how the use of decentralized systems interfaces with current centralized systems. In order to support conservation efforts, water cycle restoration,

89 https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB966

90 Discovery Document, p.13

community demands, and upcoming regulatory requirements, it is important to devise a strategy for on-site non-potable water systems in commercial buildings.

Planning of implementation and enforcement strategies should be undertaken at the regional level, in order to engender a shared learning experience. Additionally, this is an opportunity to model one aspect of the larger concept of a regional One Water approach. Currently, elements of on-site non-potable water systems are at the intersection of many governmental agencies including the cities' building departments, stormwater services departments, public water agencies, and the County of San Diego Department of Environmental Health. As seen in the Discovery Document in the Regulatory Barriers chapter,[91] the siloed structure of these agencies can hinder regulatory advances and policy changes that support the use of on-site non-potable water systems. Thus, a regional working group can more effectively address SB 966 state requirements. Options regarding the development of standards, ordinances, scope, and implementation processes are further discussed in Recommendation 1. Additionally, existing national coalitions can support the working group's efforts, as presented in Recommendation 2. Finally, in Recommendation 3, we discuss the importance of adopting a health and equity perspective when developing a performance-based framework, in order to ensure that environmental social and justice (ESJ) communities are fully considered.

91 Discovery Document, p.34-35

SUPPORTING CORE VALUES

- Enhance Health and Equity
- Encourage a One Water Approach
- Promote the Right Water for the Right Use
- Maximize Water and Regulatory Literacy

ADDRESSING BARRIERS

- Regulatory Barriers
- Lack of Knowledge and Education
- Inadequate System Integration

1. Create a regional working group charged with the creation of an infrastructure and guidelines by which to roll out on-site non-potable water reuse across all sectors.

The creation of a regional working group is recommended, as it will support a collaborative space to build capacity and develop shared strategies and regulations to address the new mandates under SB 966. Formation of a working group will ensure that a decentralized approach toward using non-potable water can be implemented throughout the region in a unified manner, while preserving public health and maintaining equity. Small jurisdictions in particular, which may have limited capacity for program implementation, will benefit from joining a regional coalition. The coalition can be comprised of various stakeholders as described in Table 8 including governmental agencies, building organizations, policy advocacy groups, and the San Diego County Regional Airport Authority which has already implemented treatment systems to reuse stormwater and A/C condensate on-site at San Diego International Airport.[92] Application of an equity lens will be reinforced by ensuring that this group reflects the community it serves and/or is supported by a community advisory group

92 Visit of the San Diego International Airport Authority, September 2019, Stormwater Capture and Treatment System for Reuse in Cooling Tower, and A/C Condensate Capture for Non-Potable Reuse in Washing Station

as discussed in recommendations 3 and 6 of the Health & Equity chapter.

The senate bill was sponsored by SFPUC, and is based on their innovative work to advance on-site non-potable water reuse. Thus, a regional working group will benefit from aligning with SFPUC guidelines in the development of regional standards and guidelines for San Diego County. Additionally, SFPUC has generously offered continuous assistance to support the development of this Blueprint and forthcoming regional efforts. As discussed in the second recommendation of this chapter, the working group will also benefit from joining the National Blue Ribbon Commission formed at the national level to learn from the efforts underway in other jurisdictions.

Since the SWRCB is required to establish water quality standards for on-site non-potable water under SB 966, the working group will benefit from developing a working relationship with water boards to provide input, feedback, and potential recommendations to help craft these standards.

As explained in the previous Section, the San Diego Green Building Council (SDGBC) can play an important role in convening the jurisdictions and their community of developers, designers, engineers, and various contractors. In 2018, SDGBC led a project to work on a permitting roadmap based on ArchNexus' "Mapping Water Re-Use in California."[93] This roadmap lays out the regulatory elements that permit and regulate on-site non-potable water systems in buildings. This roadmap can serve as a first step in moving forward. Moreover, SDGBC plans on launching pilot projects to explore best practices and implementation methods that will help advance regulation and permitting processes for on-site non-potable water following the requirements mandated by SB966.

Additionally, the County of San Diego has proactively joined the Public Health Advisory Committee in support of advancing on-site non-potable water use. The San Diego County Department of Environmental Health (DEH) is studying strategies to address the upcoming state requirements, and plans on contracting with a third-party company to help them move forward. The DEH has expressed an interest in expanding this contracted project to encompass a collaborative effort between the county and its cities in the establishment of county-wide standards, which can subsequently be adopted at the jurisdictional level. This provides an example of ways in which the cities of the region and the County of San Diego can work together on efforts to comply with SB 966 requirements.

Alternatively, some jurisdictions may wish to remain more autonomous in their implementation of the new state mandates. The working group could provide guidance to these jurisdictions on ways in which they can adopt SFPUC guidelines in their cities that align with a broader regional effort. The regional working group would help craft region-wide standards and guidelines, streamline processes, develop a model ordinance, and establish the scope and implementation process through an iterative and collaborative process with participating jurisdictions.

A collaborative effort at the regional scale will also help to address competing economics that have arisen between centralized and decentralized systems as discussed in the Discovery Document.[94] Often, when comparing centralized and decentralized systems, the economic benefits of decentralized systems are better illustrated when evaluated at a regional scale as opposed to the individual scale. A regional working group will be better equipped to conduct this type of economic evaluation, and determine the feasibility, scale, and the types of projects that will be addressed by new regulations. Moreover, a regional approach will provide greater uniformity and support the unification of best practices as recommended in

93 https://living-future.org/wp-content/uploads/2019/01/CALIFORNIA-WATER-RE-USE-MAP.pdf

94 Discovery Document, p.66

the Promote Decentralized Non-Potable Water Systems chapter. Additionally, a streamlined process and coordination between different jurisdictional departments are required to fully enable the implementation of such systems. Several departments play key roles in permitting and regulating different pieces of a project. This represents an opportunity for collaboration between a jurisdiction's Building Department, Stormwater Services Department, Development and Planning Department, and Office of Sustainability (where applicable), depending on the scope of the project. A unified and comprehensive process developed by the regional working group will allow individual jurisdictions to more effectively streamline their regulatory structure.

Financial aspects are important to consider when developing the regional working group. As discussed in the One Water SD chapter, existing financing structures such as those employed by the Storm Water Program may inform the development of this regional collaborative.

Effort will also be required to promote this program and spearhead its implementation. SDGBC is one of the best suited local assets to help propel this effort by building capacity throughout their network. As demonstrated by SFPUC, a program expanding on-site non-potable water systems will create new jobs and it is important to set the stage to ensure operators and technicians are adequately trained to operate and maintain these new systems. SDGBC can play a role in providing certified trainings.

As discussed previously, employing a set of unified best practices will facilitate consistent education and training of regulators, city staff, and policy-makers, and allow them to adapt to regulatory, technological, and local challenges and changes. The regional working group can ensure the long-term viability of programs by conducting continuous evaluations, adapting to changes, and ensuring improvements are made. This continuous effort can be informed by best practices on feedback loops as suggested in recommendation 6 of the previous chapter.

Similar to SFPUC strategy, San Diego's jurisdictions can start implementing programs on a voluntary basis before the move to mandatory projects. A tiered phase-in period can be an effective way to rollout new legislation, as it offers an opportunity for jurisdictions to learn valuable lessons prior to the required implementation period. In San Francisco, currently only projects larger than 250,000 square feet are required to implement on-site non-potable water systems.

2. Join the National Blue Ribbon Commission for Onsite Non-Potable Water Systems Working Group.

The US Water Alliance is leading a national effort to expand implementation of on-site non-potable water systems. Several entities, including SFPUC have participated in extensive efforts to develop a new approach in managing these water systems. This undertaking was led by the National Blue Ribbon Commission (NBRC) for Onsite Non-potable Water Systems, launched in 2016 by the US Water Alliance and the Water Research Foundation (WRF).[95] The NBRC works with many public organizations throughout the country to provide support to governmental agencies and regional working groups, which can join the Commission.

Local governmental agencies and members of the Public Health Advisory Committee, who had the opportunity to discuss the topic with SFPUC in January 2019, have already been invited to join the NBRC. By joining this commission, the regional working group will have the opportunity to gain invaluable support. The work performed by the US Water Alliance and the NBRC is currently the most comprehensive resource to help address the new state legislative requirements. They have successfully devised guidelines and a performance-based framework for public health guidance,[96] and developed best practices based on world-class research that support local implementation of on-

95 http://uswateralliance.org/initiatives/commission/

96 https://sfwater.org/Modules/ShowDocument.aspx?documentID=10493

site non-potable water systems. In addition, model state regulation, model local ordinance, and model program rules have been developed to ease the rollout of the implementation process.

Several cities, counties, and states throughout the country have joined the NBRC and are moving forward with this performance-based framework. For example, the State of Colorado has amended its regulation on reclaimed water for centralized and decentralized systems to adopt a performance-based framework.[97] Other states, including Minnesota,[98] Washington State,[99] Oregon, Hawaii, Texas, and Alaska have followed Colorado's example and are working to fully or partially implement this performance-based framework.

EXAMPLE: The Minnesota Department of Health (MDH) participated in the development of a series of NBRC reports and guidelines to advance decentralized non-potable water use.[100] The MDH subsequently published a report of the interagency workgroup on water reuse in response to the Minnesota Legislature's demand to "prepare a comprehensive study of and recommendations for regulatory and non-regulatory approaches to water reuse for use in the development of state policy for water reuse in Minnesota."[98] This report is an example of an effort spearheaded at the state level to comprehensively advance safe and sustainable water reuse that is aligned with a risk-based approach and utilizes performance criteria to set standards for non-potable water quality. This report offers complementary resources from other jurisdictions in the United States and internationally.

3. Adopt a performance-based framework for regulating non-potable water reuse with a health and equity lens.

As discussed in recommendation 2 of this chapter, adopting a framework for regulating on-site non-potable water reuse based on performance criteria and health outcomes, is one of the legislative requirements of SB 966, which will take effect in December 2022. Without prescribed water quality standards and programs in place, jurisdictions will not be permitted to implement alternative water reuse systems. This framework requires a focus on health outcomes and should also encompass an equity perspective to ensure that policies and programs benefit all communities, including ESJ communities, as detailed below.

This framework will set appropriate performance criteria for on-site water reuse systems, ensuring the water quality is adequate for its use, while assessing and addressing health risks. It will also spur the development of a structure or structures to manage, monitor, and permit these systems.[101] This undertaking will positively impact the way we develop and implement on-site non-potable water systems, as the current regulatory structure limits innovation by relying only on plumbing and building codes.

The performance-based framework required under SB 966 is the result of intensive work initiated by SFPUC and the US Water Alliance, through the National Blue Ribbon Commission initiative. The NBRC's report entitled *Risk-Based Framework for the Development of Public Health Guidance for Decentralized Non-Potable Water Systems*,[101] constitutes the primary document that regulators and policy-makers can use to develop and implement regulatory requirements for on-site non-potable water systems. This report was sponsored by SFPUC, WRF, and Water Environment and Research Foundation (WE&RF), and was supported by a Public Health Coalition and a Stakeholder Advisory Committee, comprised

97 https://www.sos.state.co.us/CCR/GenerateRulePdf.do?ruleVersionId=7824&fileName=5%20CCR%201002-84

98 https://www.health.state.mn.us/communities/environment/water/docs/cwf/2018report.pdf

99 https://www.doh.wa.gov/CommunityandEnvironment/WastewaterManagement/WaterReclamation

100 http://www.uswateralliance.org/initiatives/commission/commissioners

101 https://sfwater.org/Modules/ShowDocument.aspx?documentID=10493

of representatives from governmental agencies throughout the country. Members of the coalition helped evaluate existing standards for alternative water sources, identify data gaps and research needed, and develop recommended guidelines.

Following the NBRC guidelines and with the continued technical assistance offered by SFPUC, as well as the support of the national commission, the regional working group should develop a framework and model regulations that meet the needs of our region, help overcome regulatory barriers, and create an opportunity for more integration to address the challenges discussed in the chapter Inadequate System Integration of the Discovery Document.[102]

The NBRC presents in its report an evaluation of the risk for water contamination and human exposure to contaminants, as well as their suggestion for a risk management structure, a methodology to develop and implement water quality performance criteria, and the role and responsibilities of the regulatory authorities. This risk management structure represents a shift in addressing health protection, moving away from a prescriptive code-based approach to a structure that aims at reducing the risk of exposure and contamination considering the size and type of the systems, the water quality, and health criteria. A summary of the methodology and suggested structure can be found in Appendix F.

The report also addresses the need for permitting, monitoring, and reporting and how the role and responsibilities of local entities can be identified to fit the characteristics of the region. The report discusses in great detail the different processes of permitting, validating, and evaluating, and provides recommendations to implement this framework. This work helps create (or restructure) an organizational flow for the different agencies that are involved in the permitting and regulating process. Lastly, the NBRC developed model ordinances, rules, and programs that local jurisdictions can adopt before SB 966 takes effect in order to ease the transition once the mandate is instituted.[103] This extensive work can serve as a model for public agencies in the San Diego region in their development and implementation of a public health performance-based framework for on-site non-potable water systems as they address the new state requirements.

Finally, we recommend that an equity lens be applied to all programs and policies developed through this process. This can be achieved through a systematic assessment of programs and policies for equity enhancement as discussed in the recommendations of the Health & Equity chapter. Additionally, the regional working group will be better informed and more effective if it reflects the communities of the San Diego region and is supported by a community advisory group. The San Diego Housing Commission (SDHC) is looking into innovative solutions to enhance the efficiency of its buildings and offer alternatives to potentially reduce the cost of living for low-income families because their water bill may decrease. The SDHC can provide expertise in developing a regulatory process and provide feedback for implementation purposes. As explained during stakeholder interviews and detailed in the Inadequate System Integration chapter of the Discovery Document, a clear critical work path would help ensure "the success of new initiatives, such as non-potable water strategies."[104]

102 Discovery Document, p.60

103 http://www.uswateralliance.org/initiatives/commission/resources

104 Discovery Document, p.61-62

TABLE 8: Key Stakeholders

KEY STAKEHOLDERS
San Diego Green Building Council
San Diego Housing Commission
Departments (or equivalent departments) of Development and Services, Planning, Public Works, Sustainability, and Stormwater of all local jurisdictions (cities)
Department of Planning and Development Services, Public Works and Environmental Health (County of San Diego)
The San Diego International Airport Authority
The National Blue Ribbon Commission
San Francisco Public Utilities Commission
Policy advocacy groups (e.g., WateReuse...)
Universities (e.g. University of California San Diego, and University of San Diego, Department of Health and Human Services)

Conclusion

The upcoming state requirements necessitate a comprehensive approach that will be best achieved through the establishment of a regional working group, which will be able to tackle challenges specific to the San Diego region, and develop strategies to address funding issues. This group can also serve as a starting point to develop a One Water approach as described in the second section of the Blueprint. The extensive work performed by the US Water Alliance with the NBRC and SFPUC can serve as a roadmap that will allow the San Diego region to get a head start on addressing this challenge. Although this approach requires a shift in regulation to move toward a performance-based framework, it will result in better health outcomes and allow for more innovation. Finally, applying a health and equity lens to this effort will ensure that ESJ communities are fully considered when developing these new programs and policies.

ENSURE DATA-DRIVEN DECISION-MAKING

"We don't know what we don't know."

Overview

Data are important in gaining a comprehensive view of the regional contributions of decentralized non-potable water reuse systems. They can illuminate multiple benefits, the positive and negative impacts of these systems on human and ecological health, climate and geological conditions, with financial and water supply ramifications put in context relative to centralized solutions.

Unfortunately, as determined in the Discovery Document, data on decentralized non-potable water systems is limited, while data sets for centralized systems are well documented and widely understood. These centralized systems are viewed as safer and more cost effective than decentralized systems, because they have well-established data collection methods in place that monitor water quality, operational costs, maintenance conditions and requirements, and public health-related issues. A similar data collection system is envisioned and recommended for decentralized non-potable water reuse systems in order to fully advance and mainstream on-site non-potable water reuse. Through better data collection practices, questions such as how, whether, and to what degree decentralized systems affect municipal systems can be answered. Additionally, various ancillary, multiple benefits also called co-benefits that relate to health, soil conditions, or ecosystem benefits can be effectively generated by intentionally designing policies, regulations and programs. The appropriate collection of data will help us better understand these co-benefits and their impact. Multiple benefits and co-benefits are used interchangeably as they appear in climate actions plans and other widespread strategies and document.[105] Unifying data collection practices and metrics throughout the region will also allow comparison and data cross referencing to inform regional investments, and unlock cross-sector funding sources. Greater cohesion in regional data collection and dissemination across a wide range of jurisdictions and entities will result in improved programs and policies that better meet the needs of our communities while keeping the public safe and healthy.

As we examine alternative water sources through a health and equity lens, it is important to consider the benefits and challenges of implementation and their impacts on environmental and social justice. By broadening the types of data that are available to us, we can consider a larger array of impacts such as the effect of water pricing on environmental and social justice communities and community gardens.

In this chapter, we recommend actions to encourage the development of processes and programs to improve data collection; provide better access to existing local, national, and international data, and use data more efficiently and effectively across multiple sectors to improve how water-related programs impact our region. These data will aid in the development of feedback loops that can provide continuous evaluation processes in jurisdictions and water agencies. As discussed in the Upcoming State Requirements for On-Site Treated Non-Potable Water Systems chapter, the region is moving from a code-based to a performance-based approach,

105 Co-benefits is a term also used for public health strategies for example.

and additional data will help inform best practices, programs, and policies related to risk assessments. Lastly, better reporting will help us determine how to maximize our local water supplies through the leverage of on-site non-potable water reuse programs.

SUPPORTING CORE VALUES

Enhance Health and Equity

Encourage a One Water Approach

Create an Ethic of Place

Promote the Right Water for the Right Use

ADDRESSING BARRIERS

Regulatory Barriers

Lack of Knowledge and Education

Inadequate System Integration

Competing Economics

1. Use non-potable water reuse data to elucidate benefits and challenges across ecological, cultural, health, and built environments.

Elucidating the benefits and challenges of on-site non-potable water reuse will best be achieved by collecting data on a wide array of sectors. This will provide a full assessment of the impact of on-site non-potable water reuse on culture, health, and natural and built environments. Multiple benefits, such as water resilience, access to food, public health, quality of life, and air quality are directly and indirectly related to water use and access. Data on non-potable water use will support a greater understanding of these benefits and better inform decisions on investments and programs.

One particularly useful function of data collection is the identification and quantification of co-benefits. There are tools to assess these co-benefits, which have been adopted by various agencies. For example, the California Air Resources Board (CARB) provides assessment methodologies[106] to evaluate various co-benefits, including transportation and energy efficiencies, water efficiencies, soil health, individual health, community engagement, and more. CARB provides guidance on quantification methods and reporting of co-benefits to administering agencies and is discussed in more detail in the Climate Action Plans chapter, in recommendation 2. These guidelines can help evaluate the priority of investments. In addition, a list of some co-benefits with references can be found in Appendix E.

Co-benefits can be leveraged across many sectors such as food, water, land use, and community health. For example, community gardens are important for communities that may not have land access or are in food deserts. Food deserts are defined as areas with limited or no access to fresh produce, and nutritious and affordable food.[107] They are often located in environmental and social justice communities. Yet, water to irrigate community gardens, which provide a valuable food source, is charged at the same rate as a resident watering their lawn. If we can better elucidate and quantify the co-benefits of spaces like this in our communities, we can make a case for allowing creative planning within a variety of agencies.[108] Multiple benefits can be achieved such as providing access to local and nutritious food, enhancing carbon sequestration from improved soil conditions, improving stormwater management from a site designed to infiltrate water, and creating community benefits of socialization, knowledge sharing, and generational connections (to name a few). A local example of the importance and relevance of community gardens is included in a report by the San Diego non-profit organization, International Rescue Committee (IRC), which explains that "The IRC operates two large community gardens in San Diego County, one

106 https://ww2.arb.ca.gov/resources/documents/cci-methodologies

107 https://www.ers.usda.gov/data-products/food-access-research-atlas/documentation/#definitions

108 https://nonprofitquarterly.org/community-gardening-boon-neighborhoods-crisis/

in the neighborhood of City Heights, San Diego and the other in the City of El Cajon. Across these sites more than 120 families represent over 30 countries and grow a wide range of foods. In 2015, more than 67,000 pounds and $100,000 worth of produce was grown by community gardeners. In annual surveys with gardeners, IRC has found that:

- 97 percent of gardeners reported improvements to their health since receiving a garden plot;
- 73 percent said their household eating habits improved as a result of their participation in the garden;
- 91 percent of gardeners felt more connected to their neighbors and surrounding community since they started gardening; and
- 36 percent said their household income improved. Seventeen community gardeners regularly sell at local farmers markets to supplement their income. These gardeners make $50-$100 per market day on average. Some gardeners have been able to access additional land outside IRC gardens and generate upwards of $300 per market day. This supplemental income is critical to assisting gardeners to maintain financial stability at home. In 2015, gardeners selling at the El Cajon Farmers Market sold $18,582 worth of fresh, garden-grown produce."[109]

Evaluating co-benefits can also be useful for updating existing studies such as the San Diego Basin Study (Basin Study or SDBS), performed by the Bureau of Reclamation and the City of San Diego, in which certain concepts in their trade-off analysis had incomplete scoring.[110,111] "The purpose of the San Diego Basin Study is to determine potential climate change impacts on water supplies and demands within the San Diego region, and to analyze structural and non-structural concepts that can assist the region in adapting to the uncertainties associated with climate change." As part of the Basin Study, a trade-off analysis tool was developed to be used by water agencies to "assist in decision-making as the San Diego region considers future investments in water supply management."[112] Although the extensive research for this study was conducted over a five-year period, without further funding, the information in this paper is now relatively static and relies on projects completed under IRWM grant funding opportunities. As explained in the SDBS report, the trade-off analysis did not score all concepts due to a lack of data.[113] This lack of data and the resulting failure to score all concepts led to a missed opportunity to validate the link between social justice, environmental justice, and on-site non-potable water reuse. For example, objectives such as impact on climate resilience, environmental and social justice, water quality, and watersheds were not scored for all types of water, making it difficult to equally compare the impact of greywater reuse, centralized recycled water, potable reuse, and desalinated water. Additionally, data scoring was based on sample projects that may not be representative of a range of other projects. This demonstrates the need to better assess environmental and social justice by improving data collection practices.

We recommend that IRWM implement a feedback loop that ensures IRWM funded projects have a strategy in place early on to collect appropriate data that allows for evaluation of environmental and social justice, along with other important measures. The Basin Study and similar projects could benefit from including a broader variety of data (such as those presented in recommendation 4 of this chapter on greywater systems installed

109 https://static1.squarespace.com/static/54b30bbae4b0fc-4c2291385e/t/57a7d97fb3db2b8908f90daa/1470617994160/CAP-P+White+Paper_Establishing+Community+Gardens_72816_FINAL.pdf

110 https://www.usbr.gov/lc/socal/basinstudies/SDBasin.html

111 https://www.usbr.gov/lc/socal/basinstudies/SDBSTask2.5TradeOffAnalysisandOpportunitiesReport_6.2019.pdf

112 https://www.usbr.gov/lc/socal/basinstudies/SDBSTask2.5CustomizedTradeOffAnalysisTool_5.2019.xlsx

113 https://www.usbr.gov/lc/socal/basinstudies/SDBSTask2.5TradeOffAnalysisandOpportunitiesReport_6.2019.pdf - p. ES-10, Figure ES-3: Trade-off analysis results for a subset of environmentally-related Evaluation Objectives.

in single-family dwellings throughout the region) or data collected by organizations that specifically assess health and equity. Moreover, by recording data on how communities, water pricing, and public health are affected by natural disasters and changing climate, we can choose strategies for the San Diego region that increase our resilience over time.

2. Develop a consistent set of cross-jurisdictional non-potable water data collection practices and metrics for success.

Jurisdictions and water agencies collect different types of data on water. Thus, by having more consistency in data collection practices, data will be more easily comparable and aggregated to provide greater clarity on regional conditions. There are opportunities that can be leveraged in existing programs, such as in the regional Storm Water Programs that implement the MS4 permit. Copermittee representatives have reported that discrepancies in data collection within the same watershed have led to some challenges in reporting on water quality, as required under the MS4 permit. This reporting process, laid out in the Water Quality Improvement Plan (WQIP) of a watershed, is an example of an opportunity for unifying data collection practices and metrics to allow Copermittees to more easily report and compare their data. A stormwater tracking tool is being developed as part of the Orange County Stormwater Program, in collaboration with Orange County Public Works, MS4 Copermittees, and other organizations within the South Orange County Watershed Management Area.[114] The development of this tool offers an opportunity for Copermittees of the different watersheds of the San Diego region to track data in a more unified manner.

More consistency in data collection practices will help jurisdictions compare information more accurately, and will provide greater regional context, which will make it easier to cross-reference data between programs. In the subsequent Water Strategies in Climate Action Plans chapter, we recommend that water use be more accurately factored into CAPs. Additionally, data collection efforts should be consolidated in order to reduce redundancy. For example, data collection is required as part of both CAPs and WQIPs. Data collected as part of the WQIP may be able to be used to evaluate CAP measures, and data collected as part of the CAPs may also be applied to WQIPs. By strengthening and unifying data collection methods across multiple programs, we will enhance the recommendations and best practices included in these important planning tools. Furthermore, through regional-level collaborations on reporting and data collection, the regional goals and metrics of various programs will be more appropriately applied.

3. Improve water reporting in commercial buildings and public places across the region.

Collecting accurate data on water consumption is key to better understanding how to reduce water use in buildings. A greater awareness of water use will inform agencies on how to achieve water consumption reductions in buildings, encourage innovation through performance-based metrics, and provide a better understanding of the water-energy nexus at the building scale. This information will aid in the establishment of water efficiency measures and more accurate calculation of the contribution of water use to greenhouse gas (GHG) emissions, which can be integrated into CAPs. A reporting process can be envisioned following the example provided by New York City (NYC), which developed a requirement to report energy use. This process resulted in the creation of a benchmark for energy consumption, and provides a way to view and compare building efficiency, and keep track of improvements in consumption over time.[115] The NYC Benchmarking Law scores buildings on energy efficiency and is implemented in two phases. The first phase involves establishment of a reference point (consisting of the average

114 https://www.ocstormwatertools.org/

115 https://www1.nyc.gov/html/gbee/html/plan/ll84.shtml

consumption and the range of consumption) and the **second phase requires improvement on this reference point**.[116] A similar policy can be enacted in our local jurisdictions, but with a focus on water reporting and use. Such a policy could establish a benchmark for water consumption and efficiency in various buildings across the region and set improvement goals.

The establishment of an online portal to allow San Diego's jurisdictions, building developers, academic institutions, private and commercial building owners, and other agencies to track their respective water use and savings for their on-site water reuse projects will greatly enhance our regional understanding of impact. By maintaining a regional database that is easily accessible, reporting throughout the entire region can be integrated into CAPs, MS4 permitting processes, and grant programs, etc. Public Health Advisory Committee members suggest hosting this portal through the San Diego IRWM database[117] or the San Diego region's Project Clean Water.[118]

Data collection at the commercial building scale, in combination with data collected on single-family dwellings (discussed in the following recommendation) will help create a pool of data that can inform regional decisions and investments, and illustrate the impacts of on-site non-potable water reuse systems.

4. Collect data on existing local non-potable water systems at the scale of single-family dwellings.

Without accurate data on decentralized non-potable systems in single-family dwellings, there are many phases of education, programming, water policy, and water planning that are missing out on potential savings and higher-level opportunities.

A recent UC San Diego (UCSD) research study, *Mapping and Analyzing Greywater's pH Effects on Different Soil Types in San Diego*, (the MAG study) compiled information from over 200 greywater systems and 200 residences with cisterns (200 gallons or larger) installed in the San Diego region since 2009.[119,120] At the time of this report, only an estimated 50 percent of the total data set was recorded. Much more work can be done on collecting local data across the region including soil quality, water quality, maintenance, effectiveness of these systems over time, and additional benefits (trees, edibles, pollinator habitat, etc.).

Based on this study, it is possible to estimate the potential volume of rainwater that can be harvested in San Diego County over the course of one year. This volume has been estimated at 1.2 billion gallons of rainwater per year, based on the average storage capacity of 2,000 gallons per year for every single-family home, combined with census data indicating that San Diego County has 623,740 single-family homes. In addition, the study estimated that a single family can save over 7,000 gallons of water per year (based on the average volume of water for four loads of laundry per week). By installing rainwater and greywater systems in all detached single-family homes, it is estimated that San Diego County could save 5.6 billion gallons (or over 17,200 acre-feet) of water per year, which translates to a savings of $30.4 million per year. The economic savings were calculated using the San Diego County Water Authority wholesale cost of $5.42 per 1,000 gallons.[121] By considering a residential daily usage of 91 gallons of water per day per capita, this equates to a water savings equivalent to 5.1 percent of the total residential water usage for San Diego County (which is home to approximately 3.3 million people).[122]

Accurately assessing this data can help inform and improve the quality of conservation programs

116 https://www1.nyc.gov/html/gbee/downloads/pdf/nycbenchmarking-law.pdf

117 http://irwm.rmcwater.com/sd/login.php

118 http://www.projectcleanwater.org/

119 Marco Coronel, Uday Govindswamy, Alexandra Haisley, Kimberly Reyes, Selina Yip, UCSD student research, sponsored by CatchingH2O/H2Ome, Mapping and Analyzing Greywater's pH Effects on Different Soil Types in San Diego, June 2019

120 GIS map: https://www.arcgis.com/home/webmap/viewer.html?webmap=cbf4a12ff9bd4f63b2ec053fc40c02eb&extent=-117.6199,32.6921,-116.0021,33.4333

121 https://www.sdcwa.org/annualreport/2018/innovation-business-services.php

122 https://www.sdcwa.org/water-use

throughout the region. For example, the City of San Diego recently changed their rainwater rebate program to apply to rain barrels with a capacity of less than 200 gallons only, as stated in their rainbarrel guidelines: *"Receive up to $1.00 for every gallon of rain barrel storage capacity up to 400 gallons and $400 per property. Barrel capacity cannot be less than 45 gallons or greater than 200 gallons."*[123] Prior to 2019, City of San Diego residents could collect up to $350 from SoCal Water$mart[124] and up to $400 from the City of San Diego for large rainwater storage cisterns (200 gallons and larger). A rebate of $400 goes further when purchasing one large cistern rather than several smaller barrels. Because of this recent change, investment in large rainwater storage cisterns is now less accessible for City of San Diego residents, who can only apply for rebates from SoCal Water$mart when installing a cistern. These rebates are available to customers of water agencies which are members of the San Diego County Water Authority (SDCWA),[125] a member agency of Metropolitan Water District (MWD);[126] for example customers of Otay Water District and Sweetwater Authority in Chula Vista can apply for these rebates. However, California American Water, which serves residents of the City Imperial Beach, is not a SDCWA member agency. Consequently, their customers do not qualify for these rebates. The data sets presented in the MAG study of over 200 sites show that people who are properly educated on the costs and benefits of rainwater collection choose to install, on average, 2,000 gallons of rainwater storage. Data collected from both cistern systems and rain barrel systems can provide stored water quality, volume of water redirected from storm drains, average water saved, and ecological health of the landscape. A rebate program aimed at maximizing the benefits to the community would take into account all of these metrics.

123 https://www.sandiego.gov/sites/default/files/rain_barrel_guidelines_fy_19_0.pdf

124 socalwatersmart.com

125 https://www.sdcwa.org/sites/default/files/Agency-map.png

126 http://www.mwdh2o.com/WhoWeAre/Member-Agencies/Pages/default.aspx

Another example is the City of Tucson's well-developed rainwater and greywater harvesting program, as mentioned in the Decentralized Non-Potable Water Systems chapter, that offers up to $1,000 for greywater and $2,000 for rainwater harvesting systems. Their informative online brochures offer detailed information and numerous resources. Additionally, homeowners are required to take a free three-hour class on rainwater harvesting through one of three different organizations.[127,128] Because of the quality and quantity of information provided by this program, more people seek rebates and thus the city is more easily able to assess how many and what type of systems are being installed throughout the city.[129]

In another example, the City of San Diego has pioneered rebates for greywater systems for single-family homes in our region, however stakeholders at the San Diego Public Utilities Department have expressed trouble justifying the cost of running their greywater rebate program because few people have applied for rebates, and administrative costs to process the rebates run high. By accessing the data sets available through the MAG study, the number and type of systems actually installed throughout the county can be better accounted for. Knowing the volume of greywater redirected through these systems, the actual costs of the systems, and the specific factors that lead to project success or multiply co-benefits, including maintenance issues, or accessibility of information or materials for construction of the systems, a rebate program can be more effectively conceived and implemented.

5. Use existing state, national, and international data to help inform our best practices for non-potable water reuse.

Innovative systems are implemented and researched at the state, national, and international level to help solve worldwide water issues. In addition

127 https://www.tucsonaz.gov/files/water/docs/RWH_application.pdf

128 https://www.tucsonaz.gov/water/rainwater-harvesting-rebate

129 https://www.tucsonaz.gov/files/water/docs/RWH_Resource_List_July_2019.pdf

to data collected locally as discussed in the two previous recommendations, local jurisdictions can rely on external data and research. These practices and studies can illuminate what can or might be possible in San Diego County.[130] The expansion of alternative water use will benefit from collaboration between researchers and regulators. This collaboration will help all parties understand both the technical and regulatory challenges and advances. Studies have been conducted that demonstrate the co-benefits provided by decentralized non-potable water systems. For example, the University of Maryland studies the impact of green infrastructure that reuse stormwater and ultimately increase water resilience, compared to grey infrastructure built solely to divert water and prevent flooding.[131]

EXAMPLE 1: Ecology Action, a non-profit organization in Santa Cruz County, piloted a Rainwater Harvesting program for non-potable indoor use through Proposition 84 funding. They monitored the quality of rainwater treated by eight on-site systems and studied their efficiency to assess potential health risks. In addition, this project helped assess the costs/benefits of decentralized treatment systems. Although, the current return on investment of the technology is still low for residents, the study encourages dual plumbing in new construction projects, in preparation of a future in which the use of alternative water sources will become cost-effective. This study provides a basis for performance-based results for similar systems that can be used to inform regulations moving forward.[132]

EXAMPLE 2: A relatively high percentage of Australian urban populations (10 percent in Adelaide, South Australia) drink untreated rainwater. This presents a unique opportunity to study rainwater quality and its health impacts. While these studies seek to collect more data on how public health can be impacted by the use of rainwater,[133,134] there is already a significant body of work we can begin to review and analyze as we consider best practices. It will be important, however, to interpret these data carefully to ensure similarities and differences are considered in terms of evaluating applicability to other populations and locations.

Several state, national, and international studies already exist, a collection of which are in Appendix F. We can use these to craft best practices that draw from research that assesses health risks and economic and environmental advantages along with appropriate technologies for non-potable reuse.

6. Collect data annually on permitted non-potable water reuse systems to support feedback loops that evaluate economics and best practices.

As we onboard new solutions for non-potable reuse throughout the county, it is important to ensure a regional dialog on lessons learned during design, permitting, implementation, and maintenance of these systems. In the spirit of accurate and adequate feedback loops, it is recommended that all non-potable reuse permits include a reporting and data collection process that informs regional jurisdictions of what works and what does not - not only as a project matures, but also during the permitting and building process within the agency. Jurisdictions that deliver non-potable water system permits can require data reporting before and after permitting. Unifying these practices throughout the region will help create a regional process and promote data sharing on water quality, system efficiency, and maintenance issues (to name a few key elements to monitor). This data collection is essential in improving jurisdictional cohesion in issuing subsequent permits and should not place a cost burden on residents and contractors. We recommend capturing data on water quality;

130 See Appendix F for additional reference

131 https://www.estormwater.com/watershed-management/watershed-study-shows-impact-green-infrastructure

132 http://www.rcdsantacruz.org/rainwater-harvesting-indoor-uses

133 https://www.waterra.com.au/publications/document-search/?download=41

134 https://www.waterra.com.au/publications/document-search/?download=39

operational challenges and problems; what works and what does not; suggestions for simplifying the permitting process; volume of water produced, treated, and reused; quality of soil before and after installation, taken at regular intervals (if the water is used for landscape use); frequency of maintenance (actual vs. recommended); and other metrics that may be decided upon by a working group.

In 2019, the first permitted greywater to toilet flushing for residential system in San Diego was installed.[135] The process required extensive research and collaboration with regulators from the City of San Diego due to the novelty of the practice. In order to offset the lack of experience at the city-level with this type of system, the homeowner agreed to a pre-intake meeting, at additional expense, in which project engineers met with city staff to explain the system design. The engineer of the system explained, "The design followed code carefully because the systems are new and the code is all the reviewers have to fall back on. They do not have years of experience in alternate water systems that gives them the ability to allow deviations for the code." The hope is that systems like this will become more common, however permitting agencies need to share their knowledge of these types of systems throughout the region to ensure that each permitting agency does not have to reinvent the process, which increases the cost burden for building owners and permitting agencies. In this example, a specific issue arose around requirements for how much stagnant water can sit in the pump station based on the reviewer's visit to the site during a stage of installation. With a cohesive regional communication line, each jurisdiction will have access to this information for their own purposes as projects come across their counters.

In another example, one of the first rainwater systems for non-potable indoor use was installed in Southern California at the new Trailhead building in Avalon on Catalina Island. The system, installed in 2019, uses 2,000 gallons of rainwater storage with desalinated seawater as backup for a variety of building uses including two janitor sinks, hose bibs, and irrigation.[136] The system was extensively modified from its original engineering to achieve cost savings while not compromising quality, and since being online, has required significant detailed tweaking to ensure proper functionality. Including all of this data in a regional database will save future installations expense and time. Meanwhile, since the project is now online, there is no way to reflect these updated changes through the permitting process.

We can unpack the regulatory issues that create cost restrictions or permitting barriers for future implementation of these two systems and learn how to make these types of systems more readily available to our communities when appropriate. Development of this process can be informed by an alternate example from a different sector: The San Diego City Community Garden Permitting Process, which was streamlined in 2009. New Roots Community Garden was the first community garden permitted by the City of San Diego. Because it was a novel project, the process cost the IRC $40,000 and took two years. Because of the work done at the time to record and subsequently refine the process, permitting a community garden in the City of San Diego through the Urban Agriculture Incentive Zone Program[137] has been streamlined and the permit fees are under $250 (if a water meter is already installed on the property), as documented on the City of San Diego's website.[138]

7. Assess watershed potential to create local water supply, with an optimized One Water approach.

Currently our local water resources are an underappreciated asset. Some of our reservoirs located near upper-watersheds are not designed to fill with local rainwater, but rather with imported

135 https://www.sdgreenhomestour.org/murph-zero

136 https://catchingh2o.com/innovative-water-treatment-in-avalon

137 https://www.sandiego.gov/economic-development/business/starting/urban-agriculture

138 https://www.sandiego.gov/sites/default/files/uaiz_faqs_v2_-_final.pdf

supplies.[139,140] Meanwhile, the lower portions of our watersheds have little potential for large storage as these areas are highly urbanized and house high-value real estate as the water moves closer to Coastal San Diego. Moreover, we have paved over vast amounts of our urban watershed, hence the water we do receive during rain events is largely lost directly to waterways that drain quickly to the ocean. As we begin to think more cohesively as a region, we should consider the potential of our local water supply. With improved water conservation programs supported by a wider array of data and efficient feedback loops as discussed in the previous recommendations, we can start modeling water generated by different means (e.g., outputs in dry weather vs. wet weather) and examining opportunities for storage and reuse (on-site rainwater and stormwater capture at residential, commercial, and neighborhood levels as well as A/C condensate use, for example). This will help us to reimagine the local total water supply and visualize a One Water SD, which is described in the following Section Catalyzing an Equitable Water Future, with the potential to create a more resilient water future. By adopting a One Water approach that values our local water resources, we can address the integration of centralized and decentralized systems and their impact on natural ecosystems in a more holistic manner. Additionally, jurisdictions can meet multiple objectives, such as meeting their MS4 Permit and CAP requirements while improving watershed protection and creating a local resource.

8. Demonstrate the importance and impact of art through the collection of data on non-potable water reuse.

In a report by Helicon Collaborative (2017), they report on the growing movement of socially-engaged and community-based artwork, sometimes referred to as placemaking. Although community-based art has always been used to create social change and positively support disadvantaged communities, its impact and use is not well documented. As a result, the structure and strategies of the current non-profit art system does not inherently support socially-engaged artists and projects. [141] The report highlights the need to measure and collect data about arts projects' impact on social and environmental justice in underrepresented communities.

There are several organizations throughout the San Diego region that develop arts programs and projects that involve placemaking in a variety of communities: organizations dedicated to empower people such as A Reason To Survive in National City,[142] water agencies that use an artistic approach to build demonstration gardens or sites,[143] universities or schools that want to enhance healthy living and placemaking,[144] or organizations whose missions are dedicated to enhancing placemaking,[145] including the Port of San Diego,[146] the San Diego International Airport,[147] and various cities.[148,149] This is further described in the chapter Leverage Art for Community-driven Water Projects. Documentation and reporting on how these arts projects are engaging with underrepresented communities will better inform the grant and project selection criteria and expand funding for the arts. This is a process that could begin as part of an art collective dedicated to using art as a catalyst for community outreach and engagement. This is further discussed in the Art for Community-Driven Water Projects chapter and more specifically in recommendation 2.

Conclusion

139 https://www.sdcwa.org/water-supplies

140 https://www.usbr.gov/lc/socal/basinstudies/SDBSTask2.5TradeOffAnalysisandOpportunitiesReport_6.2019.pdf

141 http://artmakingchange.org/wp-content/uploads/2017/09/Mapping_the_Landscape_of_Socially_Engaged_Artistic_Practice_Sept2017.pdf

142 https://www.areasontosurvive.org/

143 Sweetwater Authority was reported as an example by stakeholders

144 https://ucsdcommunityhealth.org/work/livewellcommunitymarketprogram/

145 http://www.pop-arch.com/

146 https://www.portofsandiego.org/experiences/waterfront-arts-activation

147 http://arts.san.org/

148 https://www.escondido.org/public-art-program.aspx

149 http://www.pop-arch.com/ https://www.chulavistaca.gov/residents/cultural-arts

TABLE 9: Key Stakeholders

KEY STAKEHOLDERS
Universities
Non-profit organizations monitoring ecosystems and watersheds (e.g. San Diego Coastkeepers, Tijuana River National Estuarine Research Reserve)
Departments (or equivalent departments) of Development and Services, Planning, Public Works, Sustainability, and Stormwater of all local jurisdictions (cities)
Department of Planning and Development Services, Public Works and Environmental Health (County of San Diego)
San Diego Regional Water Quality Control Board and Copermittees
Integrated Regional Water Management Planning
San Diego Association of Governments
San Diego Green Building Council
San Diego Regional Climate Collaborative
The San Diego Foundation, and the Equinox Project
Project Clean Water
San Diego Housing Commission
San Diego County Regional Airport Authority

Improving data collection will better inform local and regional decision-making processes to improve the overall resilience of the region. Data collection is already performed by several organizations throughout the region. For example, some local non-profit and conservation groups (such as Coastkeeper, Sierra Club, San Diego River Valley, etc.) receive and procure funding for data collection. Stormwater Management groups have mandates to collect certain data, and SANDAG has been identified as a key player in regional data collection. Additionally, local universities can be employed to manage regional data collection across different water sectors. By combining the capability of these organizations and instituting greater uniformity across all sectors vis-à-vis data collection practices and metrics, we will gain a better understanding of the impacts of using alternate and existing local water sources. Continuous improvement through feedback loops will be a critical element as we move toward a One Water approach.

INCORPORATE WATER STRATEGIES IN CLIMATE ACTION PLANS

"We need everyone, everywhere doing everything, all the time, as quickly as possible."

– Jill MacIntyre Witt

Overview

Climate Action Plans (CAPs) are intended to reduce greenhouse gas (GHG) emissions and many of them also include adaptation strategies. Other sectors impacted by climate change, such as water, can also be integrated into CAPs and linked to GHG reduction measures. Incorporating water strategies into CAPs provides an opportunity to increase local water supplies, enhance community resilience in the face of climate change, and ensure water equity is considered. Thus, in this chapter, we discuss how water is embedded into the conversation about energy and that addressing the water-energy nexus is key to both reducing GHG emissions and improving water resilience in our region. Instead of targeting one outcome, it is possible to address multiple issues through coordinated efforts. Health and equity are also essential considerations to include in CAPs. As discussed in the Health and Equity chapter, adding an equity commitment is important to ensure that the needs of environmental and social justice communities are given priority when implementing programs. This applies to the rollout of any new initiative, including those related to both water and climate change. Prioritizing these communities provides greater resilience and benefits all communities, as explained by the US Water Alliance in their report *An Equitable Water Future*.[150] Therefore, we encourage the inclusion of an equity commitment in jurisdictional CAPs as supported by the Environmental Health Coalition in their report, "Start Here, Start Now: An Environmental Justice Assessment of the San Diego Climate Action Plan."[151] Additionally the San Diego region Report includes a "climate justice" chapter that identifies several equity issues related to impacts in the San Diego region.[152]

As described in the previous chapter, regional data collection and reporting is important to reach a more complete understanding of what water resilience can look like in San Diego County. Thus, including data and metrics related directly and indirectly to water, such as data on public health and ecology within CAPs, can help track the outcomes of multiple benefits. A regional coalition can use this data to inform planning policies and water measures that can be included in jurisdictional CAPs, helping all jurisdictions by suggesting key actions.

150 http://uswateralliance.org/sites/uswateralliance.org/files/publications/uswa_waterequity_FINAL.pdf

151 https://www.environmentalhealth.org/images/FINAL-Full-Doc---Web---An-EJ-Assessment-of-the-CAP.pdf

152 https://www.energy.ca.gov/sites/default/files/2019-07/Reg%20Report-%20SUM-CCCA4-2018-009%20SanDiego.pdf

SUPPORTING CORE VALUES

Enhance Health and Equity

Encourage a One Water Approach

Promote the Right Water for the Right Use

Utilize a Holistic, Ecosystem Approach

ADDRESSING BARRIERS

Lack of Knowledge and Education

Inadequate System Integration

Competing Economics

1. All projects in CAPs should assess and prioritize water measures in addition to GHG requirements and strategies to meet our unique regional needs for resilience.

By definition, Climate Action Plans are "comprehensive plans that help local governments and private entities reduce their Green House Gas (GHG) emissions. These plans are a piece of the global effort to mitigate climate change."[153] GHG emissions are calculated following specific protocols, such as those created by the ICLEI - Local Governments for Sustainability network and the US Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions.[154] These protocols are used to provide an inventory of GHG sources and identify the largest contributing sectors, as seen in Figure 9.[155] Water delivery and treatment (simply called "Water" in the GHG inventory) and wastewater treatment are two sources that play a role in climate change. The California Department of Water Resources reports that about 12 percent of California total energy consumption is related to water[156] which includes 10 percent for end-customer uses (heating, cooling, pressuring and

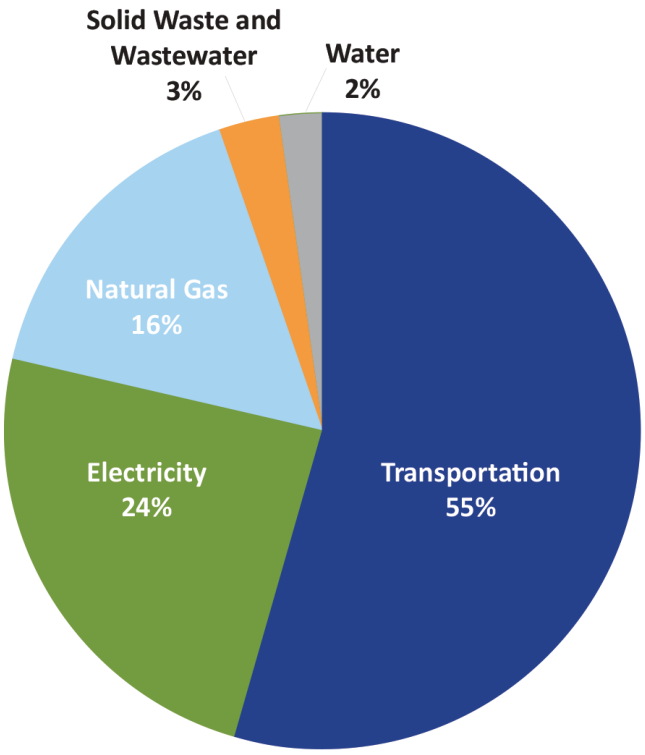


FIGURE 9: 2010 Community-wide Emissions Inventory for the City of San Diego.[155]

industrial processes).[157] This shows the complicated intersection of water and energy, also called the water-energy nexus, which can be difficult to address. However, this reporting does not tell the whole story, and the true contributions of water use on GHGs is in fact much larger than those calculated by most accounting methods.

It is important to point out that these water and wastewater accounting protocols report GHG emissions linked to upstream supply and conveyance, water treatment and local distribution, and wastewater conveyance and treatment.[158] They do not take into account the end-customer uses of water in buildings. The energy related to water use is instead accounted for in the electricity and natural gas sources as it cannot be easily separated due to

153 https://www.climateactioncampaign.org/climate-action-plans-101/

154 http://icleiusa.org/ghg-protocols/

155 https://www.sandiego.gov/sites/default/files/final_july_2016_cap.pdf

156 https://water.ca.gov/Programs/All-Programs/Climate-Change-Program/Water-Energy-Nexus

157 https://water.ca.gov/-/media/DWR-Images/Energy/12-percent-Image.jpg?la=en&hash=50830D23D01F791D7E55A38502DE3D7BD32F4710

158 Per protocols WW14 and WW15 described in Appendix F of the US Community Protocols for Accounting and Reporting GHG Emissions, ICLEI. http://icleiusa.org/ghg-protocols/

the difficulty of collecting appropriate data.[159] The practice of folding energy for water use in buildings into natural gas and electricity GHG calculations encourages centralized, large-scale solutions. However, by examining GHGs at a smaller scale, we can devise decentralized solutions that work in concert with centralized solutions to meet GHG emission goals. As seen in the recently published San Diego Basin Study (presented in the Data-Driven Decision-Making chapter), planned and conceptual projects like Enhanced Conservation and Gray Water Use were more effective than Desalinated Seawater, Imported Water, or Potable Reuse projects in GHG mitigation, and were more cost effective. The study also evaluated different conservation approaches in the categories of Climate Resilience, Operation and Maintenance, Project Simplicity to Implement, and Project Scalability, with Gray Water Use ranked as a top scorer in each area. The San Diego Basin Study is an important tool for planners moving forward and we encourage planners to look more deeply into decentralized opportunities.[160] From the results of this study, it is clear that more widespread use of decentralized non-potable water reuse systems will create reductions in energy and water use.

Several California agencies, such as the State Water Resources Control Board,[161] the California Department of Water Resources (DWR),[162] and the California Air Resources Board (CARB),[163] explain the relationship between water and climate change, and support initiatives for more climate adaption and water resilience. This is built on the notion of creating co-benefits as discussed previously in the Data-Driven Decision-Making chapter, as well as reducing vulnerabilities to projected climate changes and increasing the local capacity to adapt.[164] As mentioned in the Health and Equity chapter (Recommendation 1), improving water resilience starting with the most impacted communities will benefit the whole region.[165]

As the San Diego region relies heavily on imported water, any action to diversify the water portfolio and increase local water supply will help the region become more resilient. Alternative water sources and conservation strategies are some of the solutions considered by our local jurisdictions. This can be expanded to include recommendations in CAPs, such as the addition of water assessment and the use and reuse of decentralized non-potable water in buildings. CAPs can vary between jurisdictions and we recommend including these best practices during the next CAP revision phase. Jurisdictions can also adopt the added measure of enacting a dedicated Water Resilience Plan or a Climate Adaptation Plan.

Two local examples of best practices that can be emulated are the City of Chula Vista and the City of San Diego. The City of Chula Vista is currently a leader in this sector with the implementation of their CAP where the first of four key objectives is dedicated to Water Efficiency and Reuse with three water-focused sub-objectives each with specific strategies.[166] In addition to the CAP, the publication of their **Water Stewardship Plan** is a tandem effort to increase water conservation and reuse.[167] As part of this plan, the City of Chula Vista aims to reinforce their commitment to increase water resilience by raising the visibility of water use and reuse programs, and promoting and expanding water capture and reuse. This encompasses an expansion of rainwater harvesting to include collection at municipal facilities, the use of fit-for-purpose water to increase reuse of

159 https://www.sandiego.gov/sites/default/files/city_of_san_diego_appendix_for_2018_cap_annual_report.pdf

160 https://www.usbr.gov/lc/socal/basinstudies/SDBSTask2.5TradeOffAnalysisandOpportunitiesReport_6.2019.pdf -- section 4.1.1

161 https://water.ca.gov/Programs/All-Programs/Climate-Change-Program/Water-Energy-Nexus

162 https://www.waterboards.ca.gov/lahontan/water_issues/programs/climate_change_adaptation/

163 https://ww2.arb.ca.gov/resources/documents/cci-methodologies

164 https://www.adaptationclearinghouse.org/resources/san-diego-california-climate-action-plan.html - p.55

165 http://uswateralliance.org/sites/uswateralliance.org/files/publications/uswa_waterequity_FINAL.pdf

166 https://www.chulavistaca.gov/home/showdocument?id=15580

167 https://www.chulavistaca.gov/Home/ShowDocument?id=14439

greywater for outdoor and indoor applications, streamlining the greywater permitting process, enabling the capture and reuse of condensate runoff from cooling equipment, and more. Their plan also encourages water efficient landscape decisions through drought tolerant landscaping, and a better alignment between water stewardship and urban forestry objectives by incorporating water conservation into tree selection. Lastly, the City of Chula Vista is promoting greater implementation of green infrastructure and low-impact development by adopting guidelines and best practices that incorporate emerging water conservation and reuse technologies and associated policies. This Water Stewardship Plan is a great example of a multi-pronged approach that elevates the importance of all types of water via a city's programs and policies.

Additionally, the City of San Diego has dedicated a **chapter on adaptation** in their CAP with the goal of developing a Climate Adaptation Plan.[168] The City identifies vulnerabilities that should be considered for inclusion in this plan, such as public health and safety protection, water supply diversification, environmental health protection, and local food production. Following the lead of these two local examples, other jurisdictions in the San Diego region can find a path forward in integrating water and adaptation into their CAP.

EXAMPLE: The City of Flagstaff's Climate Action and Adaptation Plan is another key example that describes why and how to address both the need to reduce GHG emissions and improve climate adaptation by making the community, resources, and economy more resilient. This CAP prioritizes the needs of communities that are projected to be most impacted by climate change. The city identified the resources and sectors most affected by the climate risks of their region (namely wildfire, higher temperatures, drought, and flooding) to develop a plan that addresses both climate mitigation and adaptation. Water supply, quality and infrastructure are among the vulnerable resources that are addressed. An assessment of co-benefits, climate change impacts, and cost of action and inaction were used to inform their CAP and other city plans (such as their Water Strategic Plan and Watershed Management Plan) and to develop and update their goals, targets, and policies. Through these efforts, they developed strategies to further increase water conservation, expand One Water concepts (although the city is still studying various approaches and has not yet made the decision to commit to One Water), and maximize passive and active community rainwater infiltration. A key feature of their CAP lies in the summary of actions, which clearly identifies the cost of implementation; co-benefits generated; the lead entity; potential partners; time frame; levers (such as management, policies, education, etc.); and whether it is a mitigation or adaptation action, or both. This example can assist our local jurisdictions in the development of similar climate action plans.[169]

2. Leverage co-benefits to enhance both water resilience and climate adaptation.

As discussed in the Data-Driven Decision-Making chapter, co-benefits can be better understood when metrics across water, energy, public health, and ecology sectors are considered together so that overlapping advantages are clearer. Several tools are already available and as the water and energy nexus is becoming better understood, new tools are being developed. These tools can be used to estimate co-benefits and fund projects that will help reduce GHG emissions while generating additional beneficial outcomes. Two sources of co-benefits that are becoming more widely understood are soil and tree canopy.

For example, the benefits of healthy soils in reducing GHG are well documented. Projects like the Healthy Soils Program[170] are being rolled out to allow farmers greater access to opportunities to transition large areas of land to carbon

168 https://www.sandiego.gov/sustainability/resilience

169 https://www.flagstaff.az.gov/DocumentCenter/View/59411/Flagstaff-Climate-Action-and-Adaptation-Plan_Nov-2018

170 https://www.cdfa.ca.gov/oefi/healthysoils/

sequestration—the process of capturing and storing atmospheric carbon dioxide to mitigate the impact of climate change—zones. In our region, the San Diego Food Systems Alliance (SDFSA) started a collaborative initiative to promote carbon sequestration through "carbon farming," with key partners such as the San Diego County Farm Bureau.[171] A San Diego Carbon Farming Task Force, comprised of over 40 multi-sector organizations, was officially launched in January 2019. Carbon farming, also called climate-smart agriculture, is "a set of farming and ranching practices that build soil carbon, turning carbon pollution in the atmosphere into the forms of carbon that build and nourish living things."[172] This concept is based on the interconnectedness of climate change and agriculture. Increased GHG emissions have a direct impact on temperature increases and frequency of drought, which lead to plant stress and crop losses, thus negatively impacting the farming economy. As a consequence, farm lands are converted to urban lands which exacerbate GHG emissions. In contrast, carbon farming is a mitigation and regenerative solution that takes carbon from the atmosphere, redeposits it in the soil, and helps to develop sustainable agriculture. **This practice has tremendous positive impacts on water as it helps increase the water holding capacity of the soil, improves drought tolerance and crop yields, reduces runoff and subsequently improves water quality, reduces downstream storm flows, and increases water infiltration into the deep soil.**

There are also many opportunities in urban areas to improve soil health. Through the data sets collected in the MAG study mentioned in recommendation 1 of the Data-Driven Decision-Making chapter, UC San Diego students recorded qualitative data showing a marked difference in the landscapes of homes that were using greywater and rainwater harvesting techniques versus homes that were not, namely: increased vegetation, a predominance of food growing and native plants, rich soils, and more trees. By observing more of these hundreds of local sites, we can better understand the confluence between GHG and water resilience, especially with regard to the positive impact that appropriate implementation of non-potable reuse can have on our urban environments. Additionally, the MS4 Permit can integrate information on the co-benefits of healthy soils on stormwater, and this permit can have overlapping requirements with Climate Action Plans, in which similar needs are met, even though CAPs and MS4 Permit may operate differently.

The benefits of tree canopy in urban areas is also widely cited. The Tree Benefits Calculator,[173] for example, allows users to understand the numerous benefits of various trees in specific locations, including economic and environmental value. In another report, an analysis on the benefit of trees to public health notes that investment by the public health sector in tree planting represents a promising cross-connection of co-benefits with an excellent return on investment.[174] A 2013 study found that "urban trees remove enough particulate matter from the air to create up to $60 million worth of reductions in healthcare needs at the city level... If spending for public health in cities increased by just 0.1 percent or $10 per person, that would create enough public investment to finance the maintenance and expansion of urban forests and deliver the resulting health benefits." The US Environmental Protection Agency (US EPA) also explains the direct impact of the tree canopy on reducing the urban heat island effect.[175] Trees and vegetation present an excellent mitigation strategy as they provide shade and help lower the surface and air temperature of the built environment. Studies report that a shaded area can be 20-45°F

171 http://www.sdfsa.org/carbon-farming

172 https://static1.squarespace.com/static/54b30bbae4b0fc-4c2291385e/t/5b05d8f4758d4649fa910904/1527109930713/Climate_Friendly_San_Diego.May2018.web.notsearchable.pdf

173 http://treebenefits.com/calculator/

174 https://www.fastcompany.com/40474204/cities-should-think-about-trees-as-public-health-infrastructure?fbclid=IwAR026e-wproSwj0ZuVFWZw-drrdYeWC5hZRYy3zwQ_ZhV_caAX6zwFBe2Ajo

175 https://www.epa.gov/heat-islands/using-trees-and-vegetation-reduce-heat-islands#1

cooler than the peak temperature of unshaded areas. Increasing the tree canopy thus improves the atmospheric conditions of the urban setting, making the environment healthier for communities. **Notably, on-site non-potable water reuse is a low-cost way to effectively grow tree canopy in our urban areas.** The California Health Places Index includes an indicator of tree canopy coverage down to the census tract level. This HPI indicator can help visualize the current coverage locally and compare with other communities.

A useful tool that highlights the importance of co-benefits through CAPs is the California Climate Investments (CCI) Co-benefit Assessment Methodologies provided by the CARB. This tool incorporates a wide-range of methodologies to calculate and help report co-benefits of projects in parallel with GHG reduction methodologies. **These methodologies are used to select projects eligible for California Climate Investments that are partially funded by the Greenhouse Gas Reduction Fund.**[176] CARB has developed twelve (12) methodologies that help evaluate co-benefits, including assessment for water supply and availability, soil health and conservation, and community engagement and job creation (to name a few). The methodology to assess the co-benefits of improving the water supply and availability includes the impact of water conservation, and the improvement of water retention capacity of soils and watersheds, for example.[177] CARB explicitly mentions existing CCI projects that can be affected by co-benefits generated by water measures, such as the Transportation and Sustainable Communities, Clean Energy and Energy Efficiency, and Natural Resources and Waste Diversion programs. By using this tool to assess projects like this before they are finalized and by enhancing the co-benefits of large infrastructure projects, funding opportunities can be further maximized.

Additionally, the Climate Registry (TCR) is a non-profit organization that designs and operates voluntary compliance GHG reporting programs. They help public and private organizations measure, report, and verify their carbon footprint. TCR employs the Climate Registry Information System (CRIS) platform, which is used throughout North America. TCR has recently developed an additional tool built in CRIS: The Water Energy Nexus (WEN) Registry. This registry helps calculate, report, and verify data that inform the water/energy nexus. TCR also provides protocols, trainings, and support to all participants. The WEN Registry is currently open to organizations that operate in California, at no cost. Existing GHG reporting in the San Diego region can be enhanced by using a tool like TCR to ensure co-benefits are achieved and that the carbon footprint of jurisdictions, public and private entities are assessed with an emphasis on the water/energy nexus.

176 https://ww2.arb.ca.gov/resources/documents/cci-methodologies

177 https://ww3.arb.ca.gov/cc/capandtrade/auctionproceeds/ucb_lit_rev_on_water_supply_availability.pdf?_ga=2.226773018.640581899.1565045125-1452355413.1556551021

TABLE 10: Key Stakeholders

KEY STAKEHOLDERS
Departments (or equivalent departments) of Development and Services, Planning, Public Works, Sustainability, and Stormwater of all local jurisdictions (cities)
Department of Planning and Development Services, Public Works and Environmental Health (County of San Diego)
San Diego Regional Water Quality Control Board and Copermittees
Integrated Regional Water Management Planning
San Diego Association of Governments
San Diego Green Building Council
San Diego Regional Climate Collaborative
The San Diego Foundation, and the Equinox Project
Project Clean Water
San Diego Housing Commission
San Diego County Regional Airport Authority
Port of San Diego
Universities
Non-profit organizations monitoring ecosystems, watersheds and climate change impact (e.g. San Diego Coastkeepers, Tijuana River National Estuarine Research Reserve, Climate Science Alliance)

Conclusion

By including more comprehensive information in CAP reporting, maximizing co-benefits of our rural and urban planning, and using existing tools described in this section and data sets available in our community, **there will be more opportunities to enhance climate resilience through maximized funding strategies**; the identification of co-benefits and positive impacts generated by policies, programs, and strategies will better support grant funding applications. Overall it will generate enhanced outcomes in GHG reductions and water reuse strategies. Including water measures in CAPs will help become more water resilient and move toward GHG reductions and climate adaptation. Additionally, by seeking to leverage data in a more holistic and consistent way, it will be possible to leverage co-benefits to help increase the impact of actions, programs, and policies, and integrate them in CAPs.

LEVERAGE ART FOR COMMUNITY-DRIVEN WATER PROJECTS

"The arts, it has been said, cannot change the world, but they may change human beings, who might change the world."

– Maxine Greene

Overview

The use of art presents a novel and creative way to communicate with and engage communities on water-related issues. Art reaches and affects people in ways that traditional outreach methods cannot. Art will engage, empower, and educate. It will galvanize people of all different backgrounds, regardless of age, ethnicity, cultural differences, or socioeconomic status. Art has the power to transform how we perceive and use water, and by extension, the communities in which we live.

The use of art will help create a more inclusive and equitable environment as it transcends language, honors cultural differences, and enhances collaboration by bringing people together around common places and projects. Moreover, it can be used as a strategy to educate people in fun, meaningful, or interactive ways. A water project itself may become an educational tool where people learn as they design and build it.

By integrating an arts perspective at the onset, the effectiveness of a water project can be greatly enhanced. By promoting the direct participation of community members and engaging the communities from design to implementation, projects have a better chance of fitting the community needs and characteristics, and enabling a unique perspective often missed by engineers and highly technical professionals. This approach, known as creative placemaking, will enhance a sense of ownership in communities. When residents feel more invested in the place in which they live, they are more apt to improve and protect their communities, a concept known as creative placekeeping. Creative placemaking and placekeeping both increase the likelihood that a project will be successful and valued by the community.

In addition, art enhances a community's value of water by enabling the concept of "in sight, in mind;" the movement of water through our cities becomes visible through artwork instead of remaining hidden behind concrete. Art can be used to express important concepts about water quality, watershed health, water sourcing, and the difference between stormwater and wastewater. **By making these concepts more tangible through community-driven art, our communities will connect with their daily choices and how those choices impact their water resources and local environment.** As art helps basic water literacy to take root in communities, more subtle concepts like which water is best for which purpose will be discussed.

Lastly and importantly, art will enhance community members' experiences as it becomes an interactive modality that fosters fruitful discussions and provides needed community input, in which people are able to openly express their ideas, questions, and concerns on water-related issues in a safe and encouraging environment. It will bring individuals within a community together, and in turn, bring different communities together around a single cause. Art will help to instill a sense of value, a sense of place, and a sense of community.

SUPPORTING CORE VALUES

Arts projects will play a critical role in the promotion of the Core Values laid out by the Project. If leveraged properly, art can be used to: engage people on issues surrounding equity and health; elevate the value of water and encourage individuals and communities to take ownership of it; help people to visualize how water is used, where it comes from, and where it goes; educate on proper water use practices and regulations; connect people to the environment in which they live; and encourage the discussion of water issues in an interactive, open, safe, and inclusive manner.

- Enhance Health and Equity
- Encourage a One Water Approach
- Promote the Right Water for the Right Use
- Create an Ethic of Place
- Maximize Water and Regulatory Literacy
- Utilize a Holistic, Ecosystem Approach
- Prioritize a Positive Community Experience

ADDRESSING BARRIERS

The use of art will also help to overcome some of the barriers to better water stewardship practices and implementation of water reuse projects faced by the communities of interest as part of the Project.

- Lack of Knowledge and Education
- Inadequate Access to Accurate Information
- Inadequate System Integration
- Competing Economics

The following recommendations will help in achieving these goals.

1. Utilize art as a key strategy for outreach, engagement, and education across a diverse array of communities.

Local jurisdictions, water agencies, and utilities can develop and improve partnerships with local artists to implement strategies that will increase community engagement, involvement, and consequently, education.

Community-based arts projects have an essential role to play in the promotion of more responsible water use in our region. Art has been shown as a useful educational tool, and a means of creatively engaging with stakeholders in the development of projects that value and safeguard both water and people through the integration of community input. Importantly, these projects should be reflective of the diversity and cultural values of the communities in which they are implemented, and priority should be given to those that serve environmental and social justice communities. A number of water projects across the country have been successful in unifying the needs of communities, industry, and government through the use of community-led art collaboratives. The San Diego region has an opportunity to simulate similar projects in our area, through partnerships with various local stakeholders.

We lay out two strategies that will positively impact relationships with communities and create beneficial outcomes for all stakeholders. These strategies are inspired by examples provided in the literature.

- Develop bidirectional and participatory processes as a mechanism to engage and educate the public so residents can provide input and get involved at the very beginning of projects to enable creative innovation. A participatory process will be very helpful in engaging ESJ communities to ensure that their challenges are specifically addressed. It is an approach that prioritizes equity.
- Develop creative ways to engage people through arts projects. Projects will become tools to educate people. Art will transcend language and cultural barriers, fostering an ethic of place.

The US Water Alliance explains how and why arts projects will serve water leaders and guide projects, in their report *Advancing One Water Through Arts and Culture: A Blueprint for Action*.[178] This blueprint for action was informed by an in-depth study performed by Helicon Collaborative,[179] which reviewed numerous academic and non-academic sources, and arts and culture projects. This study lays out how arts and culture projects can amplify and accelerate environmental progress as environmental leaders are reaching the limits of more traditional tools and methods. This helped the US Water Alliance tailor their Blueprint for Action to support a One Water approach and its key visionary elements (discussed in the One Water chapter). The Helicon Collaborative's report describes seven primary outcomes with multiple benefits to various stakeholders (ranging from water utilities to community members). These are summarized below and additional details are provided in appendix F.

- *Help people understand and connect to water through sensory and emotional experience:* the concept of "in sight, in mind" is becoming more important to help water agencies' ability to deliver water and reliable service.
- *Inform water resource planning with new perspectives:* in the context of unpredictable and evolving climate conditions, city planners, engineers, and designers are seeking creative methods to adapt and include the different components of ecosystems. The report emphasizes the importance of finding "new ways of living with water, rather than trying to control and contain it." Designing and building facilities with the help of artists will bring new perspectives and provide support for engineers and experts to think differently, and more creatively.
- *Engaging communities in participatory processes:* envision and co-create water projects with the community through the help of artists. It helps to integrate what the community wants and envisions with what engineers and designers can do. Including the community in the decision-making process will be a powerful creative process that will ensure greater success.
- *Build bridges across different sectors and stakeholder groups:* artists are outside of the water sector, and will be assets in the creation of more open-minded and tolerant spaces. They help promote diversity and inclusion and create settings where various stakeholders can meet and find common ground, despite different languages, perspectives, and goals.
- *Mitigate the disruptive effect of construction projects:* opposition to projects can be strong when people think only about the short-term losses caused by a project and do not view the long-term benefits. Artists can create visual representations of the conceptual design of a new project which will help the community envision the outcomes and benefits of the project once completed.

178 US Water Alliance, Advancing One Water Through Arts and Culture: A Blueprint for Action, 2018

179 Helicon Collaborative, commissioned by ArtPlace America, Farther, Faster, Together: How Arts and Culture Can Accelerate Environmental Progress, 2018 - https://www.artplaceamerica.org/view/pdf?f=/sites/default/files/public/pictures/environment.pdf

- *Integrate water infrastructure into the fabric of a community:* art can be used to showcase and beautify water infrastructure and show the interconnectedness of water projects and the community.
- *Support community activism:* art will help build an emotional and sensory bond between community members and the place in which they live. The more connected the individuals in community feel to their environment, the more active they will be in the protection of that environment, and the greater their civic engagement. As noted in the report, "arts help fortify the social infrastructure that is essential for resilience and civic participation."

Overall, the arts improve quality of life of community members by keeping them engaged and active, and by making changes visible and beautiful.

The following are examples of art projects identified by the reports described above that provide a model for community and government engagement on water-related issues:

EXAMPLE 1: The Minneapolis Water Bar is a sought-out example by many community leaders.[179,180] The concept was started by two artists to engage people on water issues and allow for an open dialogue between various stakeholders. The "bar" is brought to the public during events and staffed by "water tenders," who are public officials, ecologists, activists, and community members that work on water-related issues. Water from various sites in the state is served to showcase each local source. The concept is mobile and the "bar" can be replicated and moved to different locations. The Water Bar provides an opportunity to break free from political, geographical, and social barriers through its approachable, accessible, interactive, and novel application.

180 https://www.water-bar.org/

EXAMPLE 2: The Fargo Project in Fargo, North Dakota, is an example of an artist-led community-based approach to design and rethink infrastructure and city building projects, and eventually the entire watershed.[179] Through its artist-led concept, rather than a traditional engineering approach, the community was challenged to think about water and infrastructure differently, discuss it in new ways, and devise creative solutions to longstanding challenges. The project identified 15 lessons learned, which included the importance of bringing an artist into the project early and giving the artist leadership authority.[181] In this case, this was done prior to problem identification and definition which led to a more dynamic project, in which the community took greater ownership of the shared solutions formulated during the planning phase.

In San Diego County, various arts commissions have already implemented arts projects to educate about water and energy use and its impact on the environment through community engagement. For example, in a project at the Chula Vista Civic Center Library, a mural was created in partnership with the Chula Vista Elementary School District using a storytelling format to explain the different types of energy sources and the environmental impact of each energy source. The local community was engaged and involved throughout the entire project. It served many purposes: educating people through the project, creating a sense of ownership and place, and enhancing the beauty of the building.[182] One important concern is that some murals are being used to promote gentrification and development instead of promoting artist-led projects that serve local communities and emphasize their needs.[183] It is critical that community-based projects are led by artists, with the aim of advancing social justice and enhancing the culture of a community. This can be supported by collecting appropriate

181 http://www.thefargoproject.com/wp-content/uploads/2017/08/IntegratingArtistsCityPlanningTheFargoProjectLessonsLearned.pdf

182 Discussion on April 2019 with Lynnette Tessitore, Cultural Arts Manager, City of Chula Vista

183 http://inthesetimes.com/article/21732/street-art-murals-corporations-advertising-los-angeles-muralism-graffiti

data as explained above in Recommendation 6 of the Data-Driven Decision-Making chapter.

2. Create an arts network/collaborative.

We envision a network comprised of local jurisdictions' arts and culture commissions, water utilities and agencies, local artists, and local organizations with the goal of identifying and designing arts projects that advocate for clean water and watershed protection, and make meaningful connections to the communities of San Diego County.

This network can help support partnerships and collaborations between organizations and stakeholders who otherwise tend to work separately. The collaborative should be a bridge between artists/community arts organizations and various water stakeholders such as Integrated Regional Water Management (IRWM), water agencies, department and city staff, utilities, scientists, educators, and local communities that possess a shared stake in water issues. Ideally stakeholders will be integrated into the collaborative, and members of the collaborative will take part in stakeholder discussion. The goal is to enhance collaboration to educate on water using the arts.

The collaborative can also help assure financial support for local artists through the leverage of local existing assets. For example, it can take responsibility for announcing grant opportunities to all members of the network. The collaborative can act as a pipeline for potential funding, ensuring that partners of the collaborative are informed on available resources that will make community arts projects possible.

This collaborative can follow the example of similar networks and organizations in the region. San Diego County has a variety of organizations and stakeholders that use art to advance science and environmental issues. The Climate Science Alliance is a good example of an existing collaborative that has created a network of scientists, educators, and artists to educate about climate change and its impacts in the San Diego region, in order to build resilience, capacity, and communities. Through this collaborative, the Climate Science Alliance has educated young people and the general public by supporting creative projects with artists in the network. As an example, the collaborative has created a program called the "Traveling Trunk" to help schools and teachers educate children on climate change.[184] As explained by the Climate Science Alliance, "Climate Kids Traveling Trunks provide all the resources you need to teach climate science in the classroom. Each trunk includes background information, lesson plans, PowerPoints, activities, and materials to increase climate literacy for K-12th grade youth. Our three trunks feature interactive and hands on science, storytelling, and art curriculum aligned to Next Generation science standards." The collaborative also authors reports and prepares educational materials to inform local governments and the public about the impacts of climate change. One recent project was aimed at studying San Diego County ecosystems, showing the ecological impacts of changing climate conditions.[185]

In another example, the complexity of the research conducted by the Tijuana River National Estuarine Research Reserve can sometimes be difficult to translate to the general public, so they employed arts projects to communicate their studies. As a result, they have found that even complex science can be communicated effectively when relayed through art.

3. Create a sustainable source of funding for arts as a communication tool for community projects.

Each jurisdiction can develop strategies that provide a continuous stream of support for the use of art in water-related projects. This will show the commitment of the jurisdictions and ensure a sustainable source of funding. Regional arts funding could also be a topic explored by jurisdictions participating in the regional One Water approach

184 https://www.climatekids.org/traveling-trunk

185 https://www.climatesciencealliance.org/sdc-ecosystems-assessment

and develop approaches for funding arts projects that employ community outreach and engagement for specific projects (selected on defined criteria). This can also be supported by the arts collaborative described in the previous recommendation.

Some potential funding strategies include:

- An ordinance such as a "percent-for-art."
- A policy within an organization that fosters an internal commitment to support water projects with an arts component.
- Prioritizing allocation of funds based on selected criteria including projects that serve disadvantaged communities.

For example, the City of San Francisco, in collaboration with the San Francisco Arts Commission, has taken a leadership role in advancing the arts through the mandate that a certain percentage of construction costs be set aside for public arts projects. The City of San Francisco has two such appropriation projects:

- Art Enrichment Ordinance: Requires that 2 percent of total construction costs for all public buildings go toward arts and culture projects.[186]
- 1 percent Art Program: Requires that 1 percent of total construction costs for all private new developments go toward arts and culture projects. It also requires that redevelopment projects of 25,000 square feet or more in specific areas of downtown be set aside for arts and culture projects. The goal is to mitigate urban density and keep public access to open space.

Locally, the City of San Diego[187] and the City of Carlsbad[188] have implemented "percent-for-art" ordinances similar to those adopted in San Francisco. Alternatively, some jurisdictions like the City of Encinitas have opted to review projects on a case-by-case basis to avoid conflicts with developers.[189] In all cases, jurisdictions can develop mechanisms to promote the creation of art projects that will support and showcase water infrastructure. The City of Escondido has also developed a Public Art Program starting in 1988 to enrich the community by seeking, promoting, and providing publicly accessible art that reflects community goals and desires.[190]

While developing these strategies, it is important to point out that the funding process will be better informed with an equity lens. This will help ensure that artists reflect the different cultures and ethnicities of the communities they serve. The funding process can help support a diversity of water arts projects through the selection of artists that represent the different backgrounds of community members. A report published by Helicon Collaborative in 2018 presents some key considerations to better elucidate the importance of an equitable funding process.[191] It reveals that there is inequity in the funding of community arts projects. Another report by Helicon Collaborative published in 2017, *Not Just Money: Equity Issues in Cultural Philanthropy*, explains the disparity that exists in cultural philanthropy.[192] Similar to the pattern of wealth distribution in our modern society, arts funding is also disproportionally distributed to wealthier communities, putting underserved communities at a greater disadvantage. This finding emphasizes the importance of equity criteria when allocating funds to support the broad spectrum of artists and art forms, including disadvantaged communities. In 2016, the location of every work

186 https://www.sfartscommission.org/content/art-enrichment-ordinance

187 https://www.sandiego.gov/arts-culture/publicart/

188 http://www.qcode.us/codes/carlsbad/?view=desktop&topic=2-2_18-2_18_110

189 https://www.delmartimes.net/encinitas-advocate/art/sdea-encinitas-public-funds-art-2015nov19-story.html

190 https://www.escondido.org/public-art-program.aspx

191 Helicon Collaborative, commissioned by ArtPlace America - Farther, Faster, Together: How Arts and Culture Can Accelerate Environmental Progress, 2018 - https://www.artplaceamerica.org/view/pdf?f=/sites/default/files/public/pictures/environment.pdf

192 http://notjustmoney.us/docs/NotJustMoney_Full_Report_July2017.pdf

of art in the City of San Diego was mapped.[193] The map shows a disproportionately lower number of public arts projects in ESJ communities. In combination with the data collected from water-related projects, this map will help foster more equity in water arts projects and direct funds accordingly.

Lastly, several local jurisdictions and authorities provide funds to arts projects to enhance public experience. The Port of San Diego[194] and the San Diego International Airport[195] dedicate specific funds to arts projects. These examples provide inspiration for how to further engage the public on specific topics related to water using art.

4. Develop artistic branding to promote water initiatives, including a regional One Water San Diego.

Art will be useful in creating branding for water projects, including the regional One Water approach (as described in the following Section), that will be better promoted through a visual representation that people can identify easily and quickly. This idea was implemented by One Water LA in partnership with local schools. Young students were asked to draw what water meant to them and the drawings were collected and then assembled into the shape of a water droplet. This artwork became a way to visually promote One Water LA.[196] A similar project could be implemented in San Diego with the aim of creating a visual "brand" to promote One Water San Diego (OneWater SD), ensuring cohesiveness and pride in valuing water and protecting our watersheds. This can also be part of the communication plan suggested in recommendation 5 of the One Water SD chapter.

The organizations in Table 11 have been identified as potential stakeholders, who could act as key

FIGURE 10: Picture of the artwork that One Water LA used in their branding.[196]

TABLE 11: Key Stakeholders

KEY STAKEHOLDERS
All local government cultural arts departments and arts and culture commissions
Local water agencies who develop community and water infrastructure projects (e.g., SD County Water Authority, PureWater San Diego, IRWM, etc.)
Local organizations advocating for clean water and watershed protection (e.g., Tijuana River National Estuarine Research Reserve, Coastkeeper, Surfriders, I Love A Clean San Diego, WildCoast, Groundwork San Diego, San Diego River Foundation, etc.)
Local artists, and arts and culture organizations or groups who can provide community engagement programs and projects (e.g., Imperial Beach Arts Bureau, A Reason To Survive (ARTS): a non-profit organization working with youth in National City, Climate Science Alliance, etc.)

193 https://www.voiceofsandiego.org/topics/arts/every-piece-of-public-art-in-san-diego-mapped/

194 https://www.portofsandiego.org/experiences/waterfront-arts-activation

195 http://arts.san.org/

196 https://www.lacitysan.org/cs/groups/sg_owla/documents/document/y250/mdmx/~edisp/cnt031540.pdf

partners in advancing water-based arts projects in our region.

Conclusion

These recommendations illustrate the critical role that community-based art projects will play in reshaping the water-use landscape. The use of art cultivates outreach and engagement with community members, and the establishment of an arts collaborative and sustainable funding sources for arts projects, along with the creation of a visual brand, will assure the long-term viability of a community arts program that encourages responsible water use.

Catalyzing an Equitable Water Future

INTEGRATE ORGANIZATIONAL HEALTH AND EQUITY FRAMEWORKS

1. Develop explicit organizational commitments and actions to integrate health and equity, ensuring that the organization's practices promote a healthy and just system.
2. Train and create a dedicated in-house health and equity team to proactively roll out and monitor equity and health programming within the organization.
3. Assess the makeup of the workforce within organizations (jurisdictions, water boards, convening bodies, etc.) to determine if leadership and staff are reflective of the communities they represent and ensure that hiring and leadership development processes prioritize this aim.
4. Assess elected and appointed governance boards to determine if they reflect the communities they represent.
5. Conduct a systematic assessment of organizational programs, services, and policies to evaluate the degree to which they promote health and equity.
6. Create a Community Advisory Board with the aim of engaging community members and ensuring community involvement in organizational decision-making processes before, during, and after program implementation.
7. Develop water health/equity action plans that provide transparency in the decision-making process and hold organizations accountable to plans they present to the public.
8. Ensure organizations engage in business practices that promote health and equity in the community.
    A. Develop or embrace programs that enhance community equity in contracting processes.
    B. Use data and grant scoring criteria to elevate and award health and equity considerations when choosing projects and project partners.

Catalyzing an Equitable Water Future

9. Reduce barriers to engagement by underrepresented communities.
10. Improve organizational outreach to underrepresented communities through tailored messaging and education.

ESTABLISH ONE WATER SAN DIEGO

1. Continue to engage jurisdictions and stakeholders in order to identify opportunities to achieve a regional One Water San Diego approach.
2. Establish a vision and guiding principles for One Water San Diego.
3. Analyze the economics of a regional One Water San Diego.
4. Identify and engage potential organizational and community stakeholders.
5. Outline a regional communication plan.
6. Create an evaluation strategy for One Water San Diego that ensures its success and relevance in the future.
7. Advocate for additional resources that will support a regional effort at the state level.
8. Advocate for a regional effort at the local level.
9. Identify decision-makers that can champion decentralized non-potable water use.

ADVOCATE FOR EQUITABLE WATER RATES

1. Secure a legislative solution that creates equitable rates for low-income communities.
2. Create water programs for community gardens to enhance food and equity in communities.

CATALYZING AN EQUITABLE WATER FUTURE

This Section is focused on the identification of ways in which we can achieve greater equity in water availability, allocation, and use. It includes recommendations for organizations to incorporate both inward facing and outward facing strategies to more fully advance equity principles and to develop and nurture a culture of equity. In an effort to bring resilience and adaptation to changing climate and environmental conditions in the San Diego region, it is important to view and value water in all of its forms and ensure an equitable access to our communities. Health and equity considerations are essential to ensure under-resourced communities can access and benefit from non-potable water use, as the presence of decentralized systems throughout our region will provide more water resilience. As we move toward a regional approach, establishing One Water SD can help emphasize collaboration among jurisdictions and their agencies and entities, and create opportunities to leverage multiple benefits. This Section also addresses the equity issues related to state legislative restraints that create inequity in cost and water pricing in our region, which affects low-income households, under-resourced communities, and community gardens. These recommendations have been developed to inspire jurisdictions, decision-makers, and leaders of the San Diego region help secure a resilient, vibrant and healthy water future.

INTEGRATE ORGANIZATIONAL HEALTH AND EQUITY FRAMEWORKS

"Hope springs eternal in every human breast."

– Alexander Pope

Overview

Everyone in San Diego County should have the opportunity to live a full and healthy life. Unfortunately, life expectancy at birth varies dramatically depending on one's neighborhood, ranging from 77 to 85 years using the lowest and highest census tracts in San Diego County. Community conditions such as economics, education, housing, environment, transportation, and safety are important drivers that predict health outcomes. Gaps in community conditions are often historically linked to disinvestment policies and systems that disenfranchise underrepresented communities. In 2012, the State of California recognized that water is "a human right" through Assembly Bill (AB 685, 2012)[197] declaring that "every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes." As of January 1, 2018, cities and counties state-wide are required to either adopt an Environmental Justice Element in their General Plan or integrate Environmental Justice policies and goals into the elements of their General Plan "upon the adoption or next revision of two or more elements concurrently" according to California Government Code Section 65302(h)(2).[198,199] This chapter aims to identify ways in which public and private sector organizations in the San Diego region can ensure that they are supporting health and equity throughout the region.

Under-resourced communities face many challenges that can be overcome only with intentional equitable processes to address them. The Barriers chapter of the Discovery Document identifies several challenges associated with wider equitable adoption of non-potable reuse strategies including language barriers, a lack of cultural sensitivity, a lack of financial resources to access alternative water systems, and regulatory barriers that can complicate the installation of such systems. Acknowledging these obstacles is the first step in developing more equitable solutions. Overcoming these challenges requires both internal and external strategies in which organizations examine their own internal practices and policies, as well as how they engage with the community. These practices can help inform organizations' understanding of the distinct concerns and needs of their communities, and identify solutions that arise from community engagement and consensus building, and place an emphasis on equity. By viewing water reuse strategies through a health and equity lens, we can see the financial burden that arises from unclear, complicated, and sometimes costly regulatory processes. By constructing a health and equity framework at the core of any set of proposed solutions, an organization can better meet the needs of the whole community as it will inform the entire development process from the very early stage. Elements that are critical to the successful

197 http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201120120AB685

198 https://www.unfamiliarterrain.law/2018/01/environmental-justice-element-required-californias-general-plans/

199 https://law.onecle.com/california/government/65302.html

development of any equity framework include a definition, structure, and means of implementation.

SUPPORTING CORE VALUES

- Enhance Health and Equity
- Encourage a One Water Approach
- Promote the Right Water for the Right Use
- Create an Ethic of Place
- Maximize Water and Regulatory Literacy
- Utilize a Holistic, Ecosystem Approach
- Prioritize a Positive Community Experience

ADDRESSING BARRIERS

- Regulatory Barriers
- Lack of Knowledge and Education
- Inadequate Access to Accurate Information
- Inadequate System Integration
- Competing Economics

Many organizations are recognizing the importance of improving community conditions. As explained by the California Environmental Justice Alliance, "People of color, low-income residents, immigrants, and indigenous communities tend to experience disproportionate environmental burdens and related health issues, due to a complex set of factors ranging from poor land use planning to discriminatory housing policies."[200] This is supported by many studies throughout the country,[201,202,203] including a report by the California Environmental Protection Agency (Cal EPA) and the Office of Environmental Health Hazard Assessment (OEHHA) that provides scientific evidence for cumulative impacts.[204] By addressing the needs of disadvantaged communities, we ensure that all communities become healthier and more resilient. Even the term "disadvantaged communities" itself is undesirable and/or offensive to many of the communities it seeks to identify. All communities have assets and unique features which should be valued — and that begins with our vocabulary. The term environmental and social justice (ESJ) communities more broadly takes into account groups of people who are and have been historically underserved and encounter a disproportionate burden of negative environmental impacts. ESJ communities commonly include but are not limited to:

- low-income communities;
- communities of color;
- communities that are underrepresented in the policy setting or decision-making process;
- communities subject to a disproportionate impact from one or more environmental hazards;
- communities likely to experience disparate implementation of environmental regulations and socio-economic investments in their communities;
- the top 25 percent of communities identified by Cal EPA's CalEnviroScreen;
- communities in the lowest 25 percent of the CA Healthy Places Index (HPI);
- all Tribal lands;
- low-income households (household incomes below 80 percent of the area median income); and
- low-income census tracts (census tracts with household incomes less than 80 percent of the area or state median income).

The term "ESJ communities" is broad and individual state and local programs may focus their efforts in different ways. For the purpose of this report, we will use the term ESJ communities

200 https://caleja.org/wp-content/uploads/2018/08/CEJA-CES-Report-2018_web.pdf

201 https://www.sciencedaily.com/releases/2009/12/091222174919.htm

202 https://www.liebertpub.com/doi/pdf/10.1089/env.2009.2402

203 https://nca2018.globalchange.gov/

204 https://oehha.ca.gov/media/downloads/calenviroscreen/report/cireport123110.pdf

to encompass all underserved communities as described above. For example, this Project defines disadvantaged communities using the CalEnviroScreen (CES) methodology, determined by CalEPA. However, it is important to recognize that different methodologies can yield different results. For example, the CES methodology calculates that 37 census tracts in San Diego County are included in the lowest quartile, while 107 census tracts are within the lowest quartile of the Healthy Places Index, a statewide index that highlights the impacts of social and economic conditions, more strongly, as they relate to life expectancy at birth.[205] Respectively, this equates to 5.9 percent (168,218 inhabitants) and 17 percent (542,037 inhabitants) of all county census tracts in 2010. The discrepancy in the results shows the importance of choosing the appropriate methodology to identify ESJ communities.

One strategy for tackling water-related health and equity issues is to employ both **inward facing** (within the organization) and **outward facing** (community facing) organizational strategies.

Inward facing strategies are strategies that target the internal operations of an organization. They include hiring policies, staffing decisions, and training programs at both staff and leadership levels. Outward facing strategies are those actions that directly relate to how the organization interacts with the public. They encompass an organization's environmental practices, business undertakings, and their level of investment in the local community. The two approaches are interrelated and there is a degree of overlap between them, but they will be outlined in a dichotomous manner for simplicity. Addressing both is necessary to shift the paradigm of an organizational culture toward greater equity.

The following are recommendations that **every jurisdiction as well as any public or private organization** can begin to undertake now to advance community health and equity surrounding water-related issues. They are low or zero cost and encompass foundational changes that have the potential to transform our water agencies and operations to one that is just, equitable, and healthy for all. We have arranged these into a checklist, included in Appendix D for organizations to use.

Inward (Internal Organization) Facing Strategies

1. Develop explicit organizational commitments and actions to integrate health and equity, ensuring that the organization's practices promote a healthy and just system.

Organizations can undertake internal measures that respond to the health and equity needs of the surrounding community and support it to its fullest potential. The following three changes can aid in the development of internal actions that ensure adherence to this commitment:

- Include health and equity objectives in mission and vision statements
- Create health and equity action plans
- Conduct data assessments that evaluate where resources are currently distributed and ensure that there are, or will be, significant investments in low-income communities

An organization that is committed to the integration of health and equity into its core structure has the potential to impact the larger community. Through leading by example, an organization can model best practices and encourage other organizations to take similar steps, engendering transformational and sustainable change in a community.

EXAMPLE 1: In 2001, the City of Seattle developed a Race and Social Justice Initiative (RSJI) that aims to transform the city government and end institutional racism.[206] This initiative was launched after recognizing the discrepancy between the racial makeup of the community and that of the city's public agencies. Through this initiative, the city's departments drafted RSJI action plans and created

205 https://healthyplacesindex.org/

206 http://www.seattle.gov/rsji

"Change Teams," whose mission is to support the different departments in achieving the RSJI goals. The city's first priority was to take concrete internal steps to end institutional racism in its agencies.[207]

EXAMPLE 2: The City of Madison, Wisconsin, also developed a Racial Equity and Social Justice Initiative to support their commitment to livability and sustainability.[208,209] This program supports all of the city's departments to ensure equity at all levels. They developed various programs, trainings, and resources to support their commitment.[210] The full list of resources is compiled in Appendix F.

The Environmental Health Coalition (EHC) published an assessment of the City of San Diego's Climate Action Plan (CAP) through an equity lens. Their report, *Start Here, Start Now: An Environmental Justice Assessment of the City of San Diego Climate Action Plan*, provides a baseline to assess the efforts made to support environmental justice communities.[211] They recommend the establishment of an explicit organizational equity commitment within the City of San Diego's Climate Action Plan in the form of an equity action plan. CAPs can include goals that promote equity and ESJ elements, supported by metrics that show the outcomes of implemented strategies. This is further discussed in the recommendation 5 of this chapter.

2. Train and create a dedicated in-house health and equity team to proactively roll out and monitor equity and health programming within the organization.

An organization can benefit from having its own in-house health and equity team. The goal of an in-house team is to support, empower, and provide solutions and tools to foster a culture around equity and health. Using the Health and Equity Checklist supplied by this Blueprint as a guide,[212] dedicated staff can address challenges, provide adequate training, and ensure health and equity are fully considered in projects, initiatives, programs, and services employed by an organization. This team can also collect data and conduct research on economics, food and water access, and health.

EXAMPLE: As presented in the previous example 1 under recommendation 1, the City of Seattle created "Change Teams" within their departments to support the goals directed by RSJI. These change teams are comprised of approximately 10 to 12 people. They provide trainings, solutions, and tools to over 1,300 employees of the Seattle Public Utilities department and develop partnerships with community-based organizations.[207]

3. Assess the makeup of the workforce within organizations (jurisdictions, water boards, convening bodies, etc.) to determine if leadership and staff are reflective of the communities they represent and ensure that hiring and leadership development processes prioritize this aim.

A community is represented by its members – all of them. In order to truly understand the needs and challenges of a community, it is important for an organization to reflect that community in its workforce and leadership team. Employees make the vision and mission of their organization a reality and carry out the objectives established by the leadership team in their daily job and actions. Organizational training designed to identify and overcome equity challenges is key to empowering and enabling a workforce to grow an equity culture from within. This balanced representation helps ensure a decision-making process that truly, meaningfully, and positively supports the community.

207 US Water Alliance, An Equitable Water Future: A National Briefing Paper, p.42 http://uswateralliance.org/sites/uswateralliance.org/files/publications/uswa_waterequity_FINAL.pdf

208 https://www.cityofmadison.com/civil-rights/programs/racial-equity-social-justice-initiative

209 https://www.cityofmadison.com/civil-rights/documents/EWplan2017.pdf

210 https://www.cityofmadison.com/civil-rights/programs/racial-equity-social-justice-initiative/tools-resources

211 https://www.environmentalhealth.org/images/FINAL-Full-Doc---Web---An-EJ-Assessment-of-the-CAP.pdf

212 See Appendix D - Health and Equity Checklist

Successive and iterative steps can be taken to shift the culture of an organization that include an assessment of the workforce and leadership, a response to any gaps identified during the assessment phase via the development of equity action plans, and the execution of these action plans and training programs for organizational workforce and leadership:

- Assess the staffing of the organization: Does the workforce reflect the community?
- Assess the leadership team: Does leadership reflect the local community? Is it also in alignment with the composition of the staff?
- If necessary, take steps to assure a balance in staff and leadership through the creation of action plans that include revisions to recruitment and selection procedures.
- Develop an emerging leader program to create a strong pipeline of future leaders.
- Train the workforce and provide appropriate tools to achieve equity goals. Training may address issues such as unconscious bias, racial injustice, cultural humility, and historic imbalances of power.

The Figure 11 shows the assessment loop that can be implemented at each stage and level of the organization to ensure health and equity are truly prioritized.

EXAMPLE 1: Following the commitment of the City of Seattle, the Environmental Justice and Service Equity Division (EJSE) was launched in 2005 by the Seattle Public Utilities (SPU) to carry out the citywide RSJI.[213] They developed a strategy to embed the city's initiative into their activities, better engage with the community, and further align goals within SPU.[214] SPU now provides mandatory

FIGURE 11: Assessment Loop

trainings to support all staff members.

EXAMPLE 2: Through the Racial Equity & Social Justice Initiative, the City of Madison developed a checklist and a guide to ensure each hiring decision is as equitable as possible. It provides templates and explanations that can be easily applied and used by other organizations.[215] In addition, the city provides a progress report on actions taken to foster more equity within the workforce.[216]

4. Assess elected and appointed governance boards to determine if they reflect the communities they represent.

Inequity is sometimes unknowingly embedded in the culture of an organization or agency due to recurring historical behaviors and decision-making processes that are inherently unjust. In these instances, it is often difficult to recognize systemic biases that may be impeding progress toward more equitable practices. To counter this, governance boards can benefit from having an internal equity champion or bringing in an outside equity champion to help challenge the status quo. It is critical that the board and leadership team make a

213 US Water Alliance, An Equitable Water Future: A National Briefing Paper, http://uswateralliance.org/sites/uswateralliance.org/files/publications/uswa_waterequity_FINAL.pdf

214 http://www.seattle.gov/Documents/Departments/SPU//EJSEStratPlanOverview.pdf

215 Equitable Hiring Tool, City of Madison, Racial Equity & Social Justice Initiative. https://www.cityofmadison.com/employeenet/documents/human-resources/RESJequitableHiringTool.pdf

216 City of Madison, Racial Equity & Social Justice Initiative, Equitable Workforce (Affirmative Action) Plan 2017 Report, https://www.cityofmadison.com/civil-rights/documents/EWplan2017.pdf

conscious and intentional effort to integrate diverse and representative community voices to ensure they find ways to address the needs of the community. The Assessment Loop presented in Figure 11 can guide governance boards toward implementing these changes. The following questions are examples of how to assess the structural system:

- Does the board composition reflect the community demographics?
- If the board composition does not reflect the community what proactive steps can be put in place to address this inequity?
- Does the organization have a community committee?
- Does the organization provide training on equity?
- Does the organization challenge its leadership to ensure equity is accounted for?

The EHC in San Diego provides Social Change for Justice Model guidance that include three components: 1) the definition of a vision, mission, and goals; 2) a method of analysis, planning, evaluation, and actions; and 3) a training for leadership development to empower the community.[217,218] This model seeks to build fair, robust, and just foundations on which to expand social justice and equity. The EHC structure and measures were developed to demonstrate their message and vision, and the beneficial impact of social inclusion. This recommendation can be supported by instituting an emerging leaders program, to foster the abilities and ambitions of young community leaders, and ensure the newest generations of community members are fully prepared.[219]

217 https://www.environmentalhealth.org/index.php/en/who-we-are/social-change-for-justice

218 https://www.environmentalhealth.org/index.php/en/what-we-do/leadership-development

219 www.cpisandiego.org

5. Conduct a systematic assessment of organizational programs, services, and policies to evaluate the degree to which they promote health and equity.

One important task for the equity team of an organization is to ensure that programs, services, and policies truly include health and equity components. Conducting a comprehensive assessment of an organization is critical in achieving this end, however, this assessment can only be done if the right metrics and tracking systems are in place, which requires the creation of a data collection and evaluation process. This will inform the first step of an equity assessment. Based on these results, the equity team can then retool and adjust if necessary, then reassess, to continually improve their organization's pursuit of greater justice and fairness. Organizations and equity teams can also find support in partnering with non-profit organizations that focus their effort on environmental and social justice to address equity in policies.[220]

EXAMPLE 1: In 2016, the Los Angeles Department of Water & Power (LDWP) launched their Equity Metrics Data Initiative (EMDI) to track, measure, and report on their programs. These metrics include assessments of water and power infrastructure investment programs, customer incentive programs, and procurement and employment. EMDI provides information about LADWP services and operations and helps ensure they deliver their services with fairness and equity.[221]

EXAMPLE 2: Seattle Public Utilities developed a Racial and Equity Toolkit that helps encompass equity in their planning, policies, programs, and services. This toolkit helps test projects for possible inequities and provides a step-by-step process to implement fairer decision-makings and best practices. SPU equity efforts are a foundational framework for all their activities. Their equity strategy is an excellent example that could be used

220 https://www.foodandwaterwatch.org/solution/advocate-fair-policies

221 www.ladwp.com/equitymetrics

throughout the San Diego region.[222]

EXAMPLE 3: The City of Madison, Wisconsin, developed a tracking tool to assess equity within all their departments.[210]

Outward (Community) Facing Strategies

A second approach to developing a health and equity framework is to create and implement strategies that directly involve the communities that the organization seeks to support. Engaging in two-way communication with a community is key to understanding the health concerns that a community faces and the issues surrounding inequality.

6. Create a Community Advisory Board with the aim of engaging community members and ensuring community involvement in organizational decision-making processes before, during, and after program implementation.

The first step toward integrating community members into the decision making-process of an organization is the formation of a Community Advisory Board. This entity should be reflective of the local community and should be comprised of individuals who can engage with community members in meaningful and productive ways. Members of the advisory board should assure that community input is considered in any action undertaken by the organization. This will provide a means for stakeholders to vet organizational decision-making, more accurately predict the impacts of policy decisions, and help improve community outreach efforts. This Community Advisory Board can also serve as a pipeline for future community-driven leadership opportunities such as water board representation and participation in the water workforce. In an effort to increase participation, it is important to consider supporting this Community Advisory Board by providing transportation, daycare, language interpretation, and stipends, and by selecting meeting times that do not conflict with employment hours. Assessment methodologies are available to help develop community outreach programs, such as the Co-benefit Assessment Methodology for Community Engagement provided by the California Air Resources Board.[223]

The Global Action Research Center (Global ARC) is a local San Diego organization experienced in community outreach and engagement: "The Global ARC acts as a transformational facilitator between the institutions of science, research and technology and local communities to develop and maintain a process that facilitates authentic bi-directional learning."[224] They can provide the tools and training to build meaningful relationships between the community and the organization. They can support and guide the process of creating and sustaining a community advisory board.

7. Develop water health/equity action plans that provide transparency in the decision-making process and hold organizations accountable to plans they present to the public.

Several steps can be taken in order to improve health and equity in communities. The recommendations laid out in this chapter can serve as a basis for planning a systematic approach toward meeting this end. Organizations should develop and implement specific and achievable action plans related to improving health and equity in their communities. These action plans should be presented to the public in order to assure transparency and accountability.

At the state level, the California Public Utilities Commission (CPUC) supports equitable and affordable access to energy and water through various initiatives. The CPUC published an Environmental and Social Justice Action Plan

222 http://www.seattle.gov/utilities/about-us/spu-and-the-community/environmental-justice-and-service-equity/equity-planning-and-analysis-

223 https://ww3.arb.ca.gov/cc/capandtrade/auctionproceeds/final_communityengagement_am.pdf?_ga=2.253704649.1330938752.1565122968-580087425.1532989930

224 http://www.theglobalarc.org/what-we-do/transformational-facilitation

in February 2019 to describe their roadmap to achieving the state's equity goals. The CPUC established nine goals including the integration of equity and access considerations throughout their proceedings and other efforts; investment in clean energy resources; and increased access to high-quality water, communications, and transportation services to benefit environmental and social justice communities.[225]

8. Ensure organizations engage in business practices that promote health and equity in the community.

Below are key business practices that can be undertaken by organizations to foster greater equity and community engagement.

A. Develop or embrace programs that enhance community equity in contracting processes.

Water related organizations have multiple contracting opportunities. These contracts and procurement opportunities can serve as a powerful asset to improve conditions and local economies in ESJ communities. Governmental agencies have developed programs that direct contracts to companies that improve the local economy and better serve low-income communities. This type of program is designed to cultivate public-private partnerships in the community and it requires that selected private companies meet certain criteria. For example, these companies must demonstrate that their activities create community benefits or community enhancement, or that they are committed to foster an equity culture from within. In some instances, non-profit organizations that support low-income community members in finding jobs and training can help public agencies tap into this workforce.

The utility sector is active in California and the San Diego region in providing supplier diversity programs. For example, the California Public Utility Commission (CPUC) developed and maintains a clearinghouse of business enterprises owned and/or operated by women; minorities; members of the lesbian, gay, bisexual and transgender (LGBT) community; and disabled veterans.[226] Utilities, such as California American Water which serves the City of Imperial Beach,[227] are encouraged to contract with these businesses as a means of supporting under-resourced communities. Additionally, the non-profit organization, GRID Alternatives, installs solar panels in ESJ communities, while at the same time, providing green jobs training and creation for residents of those communities.[228]

EXAMPLE 1: Second Chance is known in San Diego to disrupt the cycle of incarceration and poverty among formerly incarcerated individuals by providing adequate training for job reentry, preparing future leaders, and supporting youth through various programs throughout the region.[229] Organizations such as Second Chance, which are already embedded in the community and engaged in activities that focus on social justice and community building, make excellent candidates for the appropriation of contracts for which equity is a prerogative.

EXAMPLE 2: San Francisco Public Utilities Commission (SFPUC) developed a program called the Community Benefits Program that encourages contracting with private companies that meet certain equity and community enhancement criteria. They have even included this commitment into their One Water principles. In 2009, SFPUC adopted an Environmental Justice Policy, followed by a Community Benefits Policy in 2011. SFPUC partners with professional services firms that include community benefits commitments as part of their contract with SFPUC. It has enabled SFPUC to leverage approximately $5 million of private sector

225 http://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/UtilitiesIndustries/Energy/EnergyPrograms/Infrastructure/DC/Env%20and%20Social%20Justice%20ActionPlan_%202019-02-21.docx.pdf

226 https://www.cpuc.ca.gov/supplierdiversity/

227 https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/About_Us/BusinessCommunityOutreach/GO156ProcurementPlans/2018/Supplier%20Diversity%20-%20CA_2018SupplierDiversityReport_FINAL-rev%204.22.19.pdf

228 https://gridalternatives.org/sandiego

229 https://www.secondchanceprogram.org/

funds in the form of direct financial contributions; volunteer hours; and in-kind donations to local non-profits, small businesses, and schools. SFPUC also supports "adult and youth workforce programs that connect local residents – particularly those who are low-income or low-skilled – to job training and apprenticeship opportunities," as explained in their community benefits program brochure.[230]

EXAMPLE 3: The Supplier Clearinghouse was created in response to a General Order issued by the CPUC in May 1988 requiring all investor-owned electric, gas, water, and telecommunications utility companies with gross annual revenues in excess of $25 million (as well as their regulated subsidiaries and affiliates) to develop and implement programs to increase the number of Women and Minority Owned Businesses. The Supplier Clearinghouse has expanded their efforts to include service-disabled veterans and LGBTQ business owners as well. Although this is a mandate for certain investor-owned utilities, other organizations can use the list of businesses identified by the Supplier Clearinghouse to invest in businesses and contractors who more closely represent the diversity in their own communities.

B. Use data and grant scoring criteria to elevate and award health and equity considerations when choosing projects and project partners.

Grant and project guidelines can ensure health and equity are embedded in the development and implementation of programs. This can be done by attributing grant scoring criteria that prioritize the health and equity components of a project. These criteria can be informed by various index systems. CalEnviroScreen (CES) 3.0 is widely used throughout California to guide policy-making processes and allocate funding to projects that address equity challenges. The Healthy Places Index (HPI) developed by Public Health Alliance of Southern California is an additional tool that provides a wide range of data to explore local factors that predict life expectancy at birth and compare community conditions across the state.[231] At the time of this writing, HPI has over 60 documented uses from state, local, and regional government agencies and other organizations and is used as a criterion for equity/disadvantaged communities' eligibility for more than $320 million in grants.

EXAMPLE 1: The assessment of the City of San Diego's Climate Action Plan conducted by the EHC found a clear lack of data on how much funding has been allocated to ESJ communities.[211] Thus, they recommend improving transparency, data collection, and reporting. Their recommendations can be extended and applied to water strategies included in climate action plans (as discussed previously in the Water Strategies in Climate Action Plans chapter). To achieve this end, a clear set of grant criteria can be developed that support projects that advance equity and benefit ESJ communities.

EXAMPLE 2: The grant scoring process established by the San Diego IRWM program helps this group select projects that are in alignment with IRWM goals. Out of nine criteria, a project that includes disadvantaged/environmental justice communities and systems can receive points that can total up to 10percent of the overall score. The weight of each criterion can then vary, giving them more or less emphasis. Applying a higher score to a specific criteria, such as health and equity, and community representation, can further improve their considerations in projects. Expanding on the IRWM criterion, the sample Equity Scoring Criteria worksheet on the previous page provides additional criteria that can help strengthen the equity consideration of projects.

230 https://sfwater.org/modules/showdocument.aspx?documentid=3678

231 https://healthyplacesindex.org/

Sample Equity Scoring Criteria Worksheet

1. This worksheet provides guidance to assign scoring points to projects.
    a. The project invests and provides equity benefits to ESJC (Integrated Regional Water Management existing criterion with the following priority scoring system)
    b. Direct investments in ESJC water systems, consolidation, or training; provides the highest score
    c. Other direct benefits that improve overall conditions in DACs (e.g. habitat improvement); provides a half score
    d. Indirect benefits; provides the lowest score
2. The project applicant demonstrates an equity commitment
    a. Through their mission and/or vision
    b. By providing equity/ implicit bias training for staff
    c. By ensuring that workforce & leadership represent the community
    d. By including equity evaluation metrics for their operation and organization
3. The project develops and implements community outreach and engagement through arts and the creation of a community advisory group.
4. The project supports local hires and/or minority-owned businesses and organizations.

9. Reduce barriers to engagement by underrepresented communities.

Public organizations such as water utilities have the responsibility to ensure robust community engagement. This means reaching three goals: 1) get input from the community, 2) educate the community, and 3) accomplish a certain level of participation.

Water agencies should undertake efforts to better understand the needs of the community and engage with residents through attendance at community workshops and meetings. Often, however, under-resourced communities lack the resources and means to attend community outreach and engagement meetings. Although water agencies may organize community events, participation by community members may still be low. An important metric that is often overlooked is the actual level of participation of community members in community outreach programming. Community engagement is often not measured and thus collecting the appropriate data is key. Many factors can influence levels of community participation including language, access to transportation, availability of child care, time commitment, etc. However, until the reasons for low community member turnout have been identified, a set of appropriate remedies cannot be devised. Solutions might include increasing their outreach strategies and budgets, changing the location of their events, providing child care, or offering financial support for transportation to the event. It is important that the actual number of community members that participate in EJSC is measured and evaluated on an ongoing basis, so that outcomes are at least proportional to engagement in other communities. Making the adjustment in outreach strategies is not enough, it needs to result in actual sustained community engagement.

Community engagement can be enhanced by collecting and reporting appropriate data. A number of tools are available to improve outreach efforts and evaluate the outcomes from an efficient community engagement process, such as level, quality and diversity of participation. These assessment tools can also help unlock funds that would leverage benefits of combining efforts to reduce greenhouse gas emissions and

increase community engagement, as described by the California Air Resources Board co-benefits methodologies.[232]

A robust community engagement strategy may require innovative approaches such as employing art and artist perspectives to help establish a strong connection between water agencies and the community. This is further discussed in the chapter "Leverage Arts for Community-driven Water Projects."

EXAMPLE: The San Diego IRWM recently published a report that assessed the water needs in the San Diego region.[233] This report acknowledged the difficulty of comprehensively mapping all communities and highlighted the need to intentionally identify additional communities. The recommendations presented in this chapter can potentially be used to expand and support this identification.

10. Improve organizational outreach to underrepresented communities through tailored messaging and education.

Language barriers and a lack of cultural sensitivity by organizations are challenges that often prevent underrepresented communities from accessing information and securing adequate access to education. Underrepresented communities might have concerns and needs that differ from other communities. Strategies must be appropriately tailored for the culture and language of that particular community. Equity in outreach and education calls for rebalancing budgets, rethinking strategies, and broadly changing perspectives through a greater understanding of under-resourced communities. One novel approach to reaching underrepresented communities is through the leveraging of art. Art can be used as a tool to increase engagement and cultural understanding. Artists can create a safe environment for community members to share ideas and discuss their concerns. Art can help illuminate solutions that would otherwise remain invisible. This concept is explored in more details in previous chapters.

TABLE 12: Key Stakeholders

KEY STAKEHOLDERS
Integrated Regional Water Management
San Diego Regional Water Equality Control Board
San Diego Association of Governments
Council members of all local jurisdictions (cities and county)
Policymakers
San Diego Housing Commission
Water and wastewater agencies
San Diego County Water Authority
Environmental and social justice organizations (e.g., Environmental Health Coalition, Mid-City CAN, etc.)
Climate change advocacy organizations (e.g., Climate Action Campaign)

Conclusion

San Diego County boasts an immense richness in diversity – both in terms of its landscapes and its people. Residents of San Diego vary widely in terms of culture, income level, age, education, immigration status, ability, and sexual orientation. This diversity is one of the qualities that makes San Diego such a desirable place to live for so many different types of people. However, it is also necessary to recognize the challenges this heterogeneity poses for the provision of services in ways that are just and equitable to all residents in our region. Unfortunately, environmental and social justice communities do not have access to the same level of power, resources, and access as those in affluent communities, which results in poorer health outcomes and systemic inequity in some of our most vulnerable communities. With that in mind, the

232 https://ww3.arb.ca.gov/cc/capandtrade/auctionproceeds/final_communityengagement_am.pdf?_ga=2.253704649.1330938752.1565122968-580087425.1532989930

233 Woodard & Curran, Climate Science Alliance, and Rural Communities Assistance Corporation for the Tri-County Funding Area Coordinating Committee, San Diego Funding Area Water Needs Assessment, May 2019. http://sdirwmp.org/pdf/SDIRWM_Appendix_7E_FINAL_2019.pdf

Project has made the integration of organizational health and equity frameworks one of its primary prerogatives. This perspective informs all of the recommendations contained in this document to advance safe and healthy decentralized non-potable water systems. It is a critical element in the success of any project that seeks to improve community health outcomes and it represents a foundational change in the status quo for many organizations in our region. Another foundational change will be discussed in the next chapter, which addresses One Water SD.

ESTABLISH ONE WATER SAN DIEGO

"A drop of water, if it could write out its own history, would explain the universe to us."

– Lucy Larcom

Overview

Water is an essential resource for life, yet our way of life has made it increasingly limited; our built environment has disrupted the natural hydrologic cycle of water that would otherwise sustain the ecosystem in a renewable manner. It is more important than ever to positively value water, whether potable, non-potable, or wastewater.

The Water Research Foundation (WRF) provides the following definition of One Water: "One Water is an integrated planning and implementation approach to managing finite water resources for long-term resilience and reliability, meeting both community and ecosystem needs."[234] The term 'One Water,' used within the field of comprehensive planning, is also known as Integrated Water Resource Management (IWRM) within the field of water management.[235] **One Water is a holistic approach that considers the full hydrologic cycle of water and its interconnectedness with the built environment, green spaces, and residents.** In a One Water concept, the meaning of the word 'waste' fades away as all types of water are considered a source for an end use. This chapter explores how a One Water approach can be adapted to the San Diego region, the efforts that are currently underway, and how it can be enhanced.

As discussed in the Discovery Document in the Regulatory Barriers and Inadequate Systems Integration chapters, water resource management by regulatory authorities often considers water supply, wastewater and stormwater management, and planning through a siloed view and framework. Although this framework, developed decades ago, has supported the development of cities and ensured that basic water needs are met, it has notable limitations. The use of this model has resulted in unintended consequences such as the disruption of the natural hydrologic cycle of water, difficulty in controlling and mitigating ocean pollution via stormwater runoff, a limit on our ability to restore natural ecosystems around creeks and rivers, and most importantly, it has led the region to become overly reliant on imported water. San Diego County is unique in that 75 percent of its water resources from hydrological systems begin hundreds of miles away,[236] and local water storage capacity exceeds regional rainfall. Furthermore, water purveyors deliver water across multiple jurisdictions from a variety of suppliers, creating gaps in efficient water management within jurisdictions. These challenges, combined with a demand per capita exceeding the national average, have created the need for a regional solution to address San Diego County's water issues. A holistic approach with greater integration of water resource management practices is increasingly prioritized and valued by regulatory authorities.

234 https://www.waterrf.org/research/projects/blueprint-one-water

235 https://planning.org/knowledgebase/watermanagement/

236 https://www.sdcwa.org/water-supplies

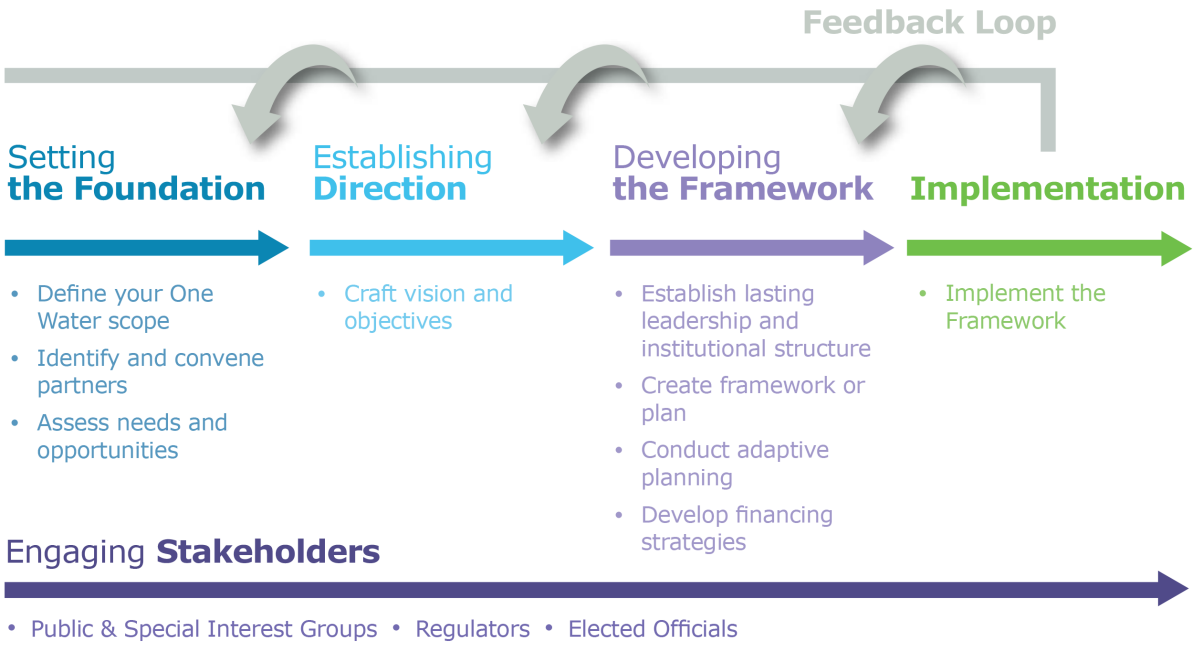


FIGURE 12: Step-by-Step process Defined by The Water Research Foundation to Implement One Water.[234]

This integration would be greatly facilitated by the development of a One Water approach at the scale of the San Diego region. This effort can be informed by national organizations such as the US Water Alliance, WRF, and WE&RF, which dedicate some of their work to studying the benefits and challenges of One Water and developing planning and implementation processes. In addition, case studies such as OneWaterSF and One Water LA 2040 will help inform the development of One Water San Diego (One Water SD).

The One Water approach is informed by multiple research studies, mostly funded by the WRF and the US Water Alliance. One of the resources that can be very useful in initiating One Water SD is the WRF's Blueprint for One Water. It describes the step-by-step process to implement a One Water program, from setting the foundation to implementation, including the stakeholder engagement process (See Figure 12).[234,237]

This roadmap provides key fundamental steps that have been applied by various jurisdictions and organizations across the country. The uniqueness of each project is defined by its scope; vision; guiding principles; and characteristics of the organization, jurisdiction, or region that is developing the One Water initiative. An essential factor in the resilience of this One Water strategy is the set of built-in feedback loops that allow the program to continually evolve as it is informed by successes and gaps. This Blueprint reinforces the importance of feedback loops throughout all of its recommendations.

The San Francisco Public Utilities Commission (SFPUC) is one of the early adopters of a One Water approach. They implemented OneWaterSF a decade ago to break the silos between their three enterprises—Water Enterprise, Energy Enterprise, and Sewer Enterprise—and help them leverage multiple benefits through collaboration. Their work has illustrated many invaluable lessons. SFPUC is the third largest municipal utility agency in California and serves 2.7 million residential, commercial, and industrial customers in the Bay Area.[238] They developed OneWaterSF at the

237 https://csengineermag.com/article/blueprint-for-one-water/

238 https://sfwater.org/index.aspx?page=355

organizational scale and then expanded it to other city departments.

More recently, the City of Los Angeles developed One Water LA 2040 led by Los Angeles Sanitation (LASAN) and the Los Angeles Department of Water and Power (LADWP) to help them achieve their water resource management goals. One Water LA has been developed under the leadership of the Mayor's office at the city scale. Los Angeles is home to 4 million people, covering an area of 472 square miles, with four watersheds. Despite its large population and diverse water requirements, political will converged with environmental demands, providing the impetus for the pursuit of One Water LA.

We envision One Water SD at the regional scale, however a regional model presents some unique challenges. San Diego is comprised of 18 cities, one county, and 11 watersheds and spans over 4,200 square miles. Its population is estimated at 3.3 million. After interviewing many stakeholders throughout the county and state, we believe One Water SD will be best developed through a collaborative effort led by various regional organizations. Unlike the Cities of San Francisco and Los Angeles, which are comprised of a single jurisdiction, the vision for a regional One Water SD presents additional challenges due the complexity of coordinating with 19 jurisdictions, and the numerous water and wastewater agencies.[239] Currently, the San Diego region does not benefit from regional leadership that can advance One Water SD. However, the region can build upon the successes of the current efforts underway by San Diego Integrated Regional Water Management Planning (IRWM),[240] the San Diego Regional Water Quality Control Board (RWQCB),[241] and the San Diego Association of Governments (SANDAG).[242] Moreover, existing regional entities can help implement recommendations and solutions in an incremental manner that will lead toward a more comprehensive One Water SD.

In recognition of the fact that a regional One Water is an ambitious undertaking that requires the buy-in and support of multiple stakeholders, the development of a vision and guiding principles that describe the scope and goals of a One Water SD is critical. San Diego County's unique characteristics can be encompassed in this vision in support of its economy, diversity of urban and rural communities, community health and equity, and natural ecosystems. A set of Core Values, as defined by the Public Health Advisory Committee, can be used to establish these principles for One Water SD.

It is also key to take a comprehensive, multi-pronged approach when engaging and involving stakeholders. Stakeholders from multiple sectors can help address key aspects of One Water, whether through economic assessment of centralized and decentralized systems, development of regional policies to address non-potable water reuse, or inclusion of water strategies and measures in existing programs. Opportunities exist for regional organizations to secure additional resources and greater authority that will help overcome challenges such as siloed regulatory structures, a lack of regional leadership, and a lack of funding to run continuous programs. We explore how advocating for specific administrative and legislative support can help advance on-site non-potable water use for the whole region and foster a regional One Water.

It is important to note that a One Water ethos goes beyond planning for water supply and stormwater management. It conveys a message of unity between communities and stakeholders in the region and fosters a greater sense of connection to water in our region. It takes into account the interconnectedness of water, energy, food, and people, and helps to set the stage for the development of a set of innovative regional practices. A One Water SD "brand" can foster a cohesive and collaborative approach that transcends language barriers; supports consistent information and education across jurisdictions;

239 https://www.sdcwa.org/member-agencies

240 sdirwmp.org

241 https://www.waterboards.ca.gov/sandiego/

242 sandag.org

unifies residents through a greater understanding of the benefits of our water supply; creates resilience in our local environmental, water, and food systems; and creates efficiencies in the water management sectors by multiplying benefits.

SUPPORTING CORE VALUES

- Enhance Health and Equity
- Encourage a One Water Approach
- Promote the Right Water for the Right Use
- Create an Ethic of Place
- Maximize Water and Regulatory Literacy
- Utilize a Holistic, Ecosystem Approach
- Prioritize a Positive Community Experience

ADDRESSING BARRIERS

- Regulatory Barriers
- Lack of Knowledge and Education
- Inadequate Access to Accurate Information
- Inadequate System Integration
- Competing Economics

1. Continue to engage jurisdictions and stakeholders in order to identify opportunities to achieve a regional One Water San Diego approach.

One Water SD is an ambitious goal, involving many jurisdictions and various organizations throughout the region. However, this approach will support more unification and cohesion in the broader understanding of and respect for our local water issues, elevating the value of water in all urban and rural activities. This chapter provides recommendations to achieve this vision. The development of an implementation strategy may begin with voluntary participation laid out in a regional memorandum of understanding. By cooperatively evaluating the benefits and disadvantages of a regional approach to water management, greater agreement among jurisdictions is likely.

The watersheds of the San Diego region connect the mountains in the eastern portion of the county to the coastal areas in the west, crossing over many jurisdictional boundaries. Water flows from the waterheads at higher elevations to the ocean, and along the way, creates surface water features such as rivers, lakes, and wetlands, and feeds local groundwater. San Diego County is not characterized by large bodies of water as compared to regions with greater rainfall, and as such, protection and conservation of our limited natural water resources is paramount. Human-caused alterations affecting the watershed at any location can impact water quality, the various ecosystems of the region, and local water supply. Thus, **only collaborative work at a regional scale that encompasses the watersheds can truly enable us to bridge the divide between the built environment and the natural hydrologic cycle in a way that will create resilience for our region's current and future water demands**.

The biggest challenge in implementing One Water SD resides in the regional scope that this Blueprint is proposing. San Diego County is comprised of 19 jurisdictions, counts 25 water agencies,[243] and various wastewater agencies. To date, no model has been identified that is similar in size and breadth. The San Diego region does not benefit from cohesive and unified leadership, like the single jurisdictions of the City of Los Angeles, which leads One Water LA, and the City of San Francisco, in which OneWaterSF was initiated at the utility level (San Francisco Public Utility Commission). One Water SD will therefore require a unique level of collaborative leadership and political drive, which is yet to be forged. It will also necessitate administrative funding, the support of administrative staff and organizations, strong community engagement and education,

243 https://www.sdcwa.org/member-agencies

and the ability and willingness to share data across jurisdictions and agencies.

Through investigations and stakeholder interviews, this Project has identified three potential organizations that could potentially house and lead One Water San Diego: San Diego Integrated Regional Water Management (IRWM) Program, San Diego Association of Governments (SANDAG) and the San Diego Regional Water Quality Control Board (SDRWQCB or SD Water Board). Ideally, one of these organizations will act as the leading team to sustain the effort, and provide a venue to house a task group to begin the process of identifying a Vision and Guiding Principles described in the second recommendation of this chapter.

The San Diego IRWM Program is an interdisciplinary effort comprised of water retailers, wastewater agencies, stormwater and flood managers, watershed groups, the business community, local indigenous tribes, agricultural industry representatives, and non-profit stakeholders to improve water resources planning.[240] Although the IRWM mission and composition are in alignment with One Water SD, it technically lacks the authority to direct jurisdictions and water agencies. The directive for IRWM has been to distribute state bond funds and with no further bond funding in sight as of December 2019, IRWM does not have much power to continue to direct policy and projects. However, by housing One Water SD, the IRWM could expand and renew its commitment to build an integrated water management approach for the wider San Diego region and potentially seek for new funds. The Regional Advisory Committee (RAC) represents a natural fit to lead this effort, as its member composition reflects the diversity of our region. We discuss the potential for IRWM to gain additional authority from the state in recommendation 7 of this chapter.

SANDAG possesses the capability to oversee One Water SD,[242] as they already convene local governments and have authority in implementing regional solutions. Water is not one of the issues currently addressed by this group, and adding it to their portfolio could potentially result in its dilution amongst other priorities. However, SANDAG's ability to tackle large, regional issues could be leveraged if their members demand it.

The San Diego Regional Water Quality Control Board (SDRWQCB or the SD Water Board) is an organization that represents a natural fit for housing One Water San Diego. SDRWQCB, working with the State Water Resources Control Board (called Water Board), clearly supports an integrated water approach, with the specific aims of reducing water pollution and improving water quality.[244] Not only do they have the authority to bring jurisdictions together, they also set standards and requirements for water quality and wastewater discharges mandated by the state. Their role and mission have led to the creation of a structure that is based on watershed boundaries. The Water Boards oversee the Storm Water Program (described in further detail below) and have the responsibility of setting water quality standards for on-site non-potable water. They also support initiatives to respond to climate change and increase resilience. The Water Boards' 2017 resolution requires proactive actions from all boards to include climate change considerations in all programs and activities.[245] The co-benefits of joining forces and collaborating on projects to tackle water and climate change issues are further described in the Water Strategies in Climate Action Plan chapter. Based on a discussion with the Public Health Advisory Committee, we recommend that a presentation and request be made to the SD Water Board to develop One Water SD and advance specific water measures, including requesting financing support.

Each convening body presented above presents its own set of benefits and shortcomings in potentially spearheading this effort. To overcome this challenge, we can envision another more incremental approach that capitalizes on opportunities in established

244 https://www.waterboards.ca.gov/sandiego/water_issues/programs

245 https://www.waterboards.ca.gov/water_issues/programs/climate/

programs such as the Storm Water Program, IRWM program, and Climate Action Plans (CAPs). These projects are appealing because their existing structures can be leveraged to advance One Water SD. Additionally, projects that incorporate a regional approach and unified best practices can be piloted by these organizations. Further, by implementing recommendations presented in this report, these programs can strengthen and expand their impacts, creating a mutually favorable partnership. Importantly, the benefits of incorporating any of these recommendations must reinforce and maximize the original purpose of the programs, as described below.

Storm Water Program: The main purpose of this program is to enhance water quality and help reduce pollution in stormwater. Inclusion of recommendations to further advance best practices for non-potable water use, such as green infrastructure development and rainwater or air conditioning condensate reuse, will not only help conserve water but also help improve water quality. These recommendations are further discussed in the previous Section.

The Storm Water Program, which is a regulatory obligation under the Municipal Storm Water Permit is comprised of Copermittees (municipal and county governments and special district entities) organized by watershed.[246] Under the municipal separate storm sewer systems (MS4) permitting process, Copermittees are required to monitor and control water pollution, and implement strategies to minimize and possibly eliminate this pollution. Copermittees are organized into committees and subcommittees to work collaboratively as follows:

Level 1: Regional Management Committee (RMC)

Level 2: Program Planning Subcommittee (PPS)

Level 3: Land Development Workgroup (LDW)
Education and Outreach Workgroup (EOW)
Ad Hoc Workgroup

The Copermittees have an annual budget that is funded through contributions by each individual Copermittee based on criteria such as population density and acreage. "There are no dedicated utility funds for storm water because of the restrictions from Proposition 218" as explained by a member of the Public Health Advisory Committee, thus "for most agencies, municipal funding for storm water is from the General Fund." This budget is used to support education and outreach efforts, and specific projects based on annual priorities. Through this program, Copermittees are required to develop model plans, such as the Best Management Practices Design Manual, and collect data.[247] Data collection is discussed further in the Data-Driven Decision-Making chapter.

The Copermittees have the ability to present certain issues to the SD Water Board and per the Public Health Advisory Committee, the committee best suited to consider the recommendations laid out in this Blueprint is the Program Planning Subcommittee. There are several existing plans and programs that can integrate these recommendations: the Water Quality Improvement Plans (WQIPs), the Best Management Practices (BMPs) Design Manual, and the Jurisdictional Runoff Management Plans (JRMPs). The MS4 permit is also reviewed and updated approximately every five years, with the next iteration being developed starting in 2020. Recommendations in this Blueprint can potentially be considered for inclusion in the updated version.

The structure of the different work groups, the funding process, and the regulatory pathways of the Storm Water Program can serve as a model for

246 https://www.waterboards.ca.gov/sandiego/water_issues/programs/stormwater/

247 projectcleanwater.org/about/

One Water SD or other regional efforts such as the development of on-site treated non-potable water reuse programs.

IRWM Projects and Grants: As discussed above, the main challenge for the IRWM remains securing funds to roll-out new projects and programs. However, in order to support One Water SD, some key recommendations can be laid out in preparation of the next round of grant applications. The scoring system offers an opportunity to include recommendations that demonstrate high-level co-benefits, further prioritizing health and equity, water supply, and water conservation, for example.

While a regional approach is ideal, the recommendations included in this Blueprint can also be implemented at a jurisdictional level.

One Water in each jurisdiction: Taking another approach, a regional One Water can also be envisioned at a jurisdictional level. In this scenario, each jurisdiction develops their own approach and jurisdictions are encouraged to meet together to share best practices. This will allow the region to roll out a One Water approach at a smaller scale, while building the capacity for a more regional approach in the future. Notably, however, this approach may result in missed opportunities that can be leveraged only at a regional scale.

Climate Action Plans (CAPs): Recommendations on water conservation can help reduce greenhouse gas emissions generated by the transportation, treatment, and use of water. Best practices can help enhance water resilience and encourage CAPs to incorporate climate adaptation plans that include a commitment to equity. This is previously discussed in the Water Strategies in Climate Action Plans chapter.

Synergies between policies and programs: Programs and plans are currently being implemented without integration, as discussed in the Regulatory Barriers chapter of the Discovery Document. Aligning best practices and permitting processes will improve each individual program and plan, and also enhance understanding of these practices at a regional level, as discussed in the chapter Promote Decentralized Non-Potable Water Systems. Established programs (such as the Storm Water Program and CAPs), as well as the newest program required by state legislation related to on-site treated water reuse will benefit from greater alignment with existing policies. Future programs or initiatives, such as San Diego Green New Deal, will also benefit from water strategy integration to enhance their outcomes. Greater synergy amongst the policies themselves can also support this move toward a regional effort.

Finally, a discussion with stakeholders revealed that data collection could greatly benefit from more integration as each program requires some level of reporting and monitoring. Through the collection of a standardized set of data, a clearer picture of community needs and opportunities emerges. The chapter on Data-Driven Decision-Making discusses in greater detail the need for the dissemination of data that communicates the positive impacts of a One Water SD.

Regardless of the implementation scale, whether undertaken through a regional approach, an intermediate approach within existing programs, or a jurisdictional approach, the subsequent recommendations will aid in guiding the process as these efforts unfold.

2. Establish a vision and guiding principles for One Water San Diego.

Once a One Water approach is pursued, a key step described in the WRF's Blueprint for One Water is the establishment of a vision and guiding principles. This step is critical for a successful and sustainable implementation. Adopting a vision creates a unifying goal for a collaborative group to work toward. A set of guiding principles will instruct stakeholders how to achieve the goals and ensure the outcomes are met and benefits are actualized.

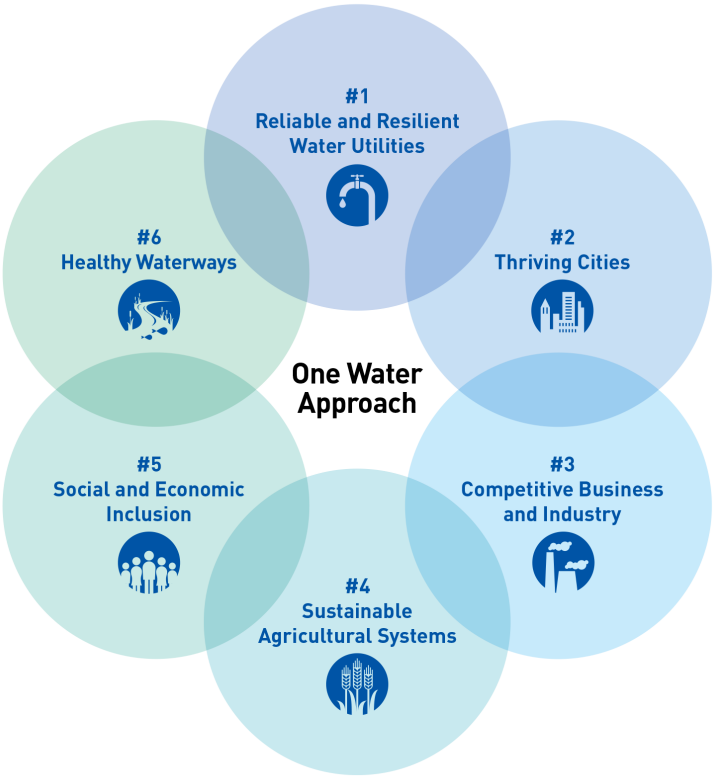


FIGURE 13: Key Visionary Elements Defined by The US Water Alliance[250]

TABLE 13: Summary of the Visionary Elements Defined by the US Water Alliance

VISIONARY ELEMENTS	EXPLANATION
Reliable and Resilient Water Utilities	Supports utility efforts in supply diversification; stormwater management using green infrastructure; and the need to develop a new and more sustainable model for the utilities, private businesses and communities.
Thriving Cities	Highlights the importance of integrated planning to achieve multiple benefits. It aims at laying the foundation for cities and counties to enhance environmental, economic, and community health and well-being.
Competitive Business and Industry	Reinforces the role of businesses, and various industries in supporting a One Water approach. This principle provides key points that businesses can address such as implementing water stewardship into a company strategy, utilizing tools and strategies to improve water efficiency, stormwater management and water reuse systems in industrial facilities, and developing partnerships with upstream and downstream communities to maximize the positive impacts on the overall watershed.
Sustainable Agricultural Systems	Discusses the importance of water in developing sustainable agriculture practices. This is a key element to ensure a sustainable local food supply chain, to protect the environment and public health, and to ensure farmer profitability.
Social and Economic Inclusion	Places the community and residents at the center of the conversation. It highlights the importance of access to safe, clean and affordable water and wastewater, as well as the importance of community engagement and social inclusion in the efforts of implementing a One Water approach.
Healthy Waterways	Discusses the health and protection of water bodies, watersheds, and ecosystems.

As described in the first chapter of the Catalyzing an Equitable Water Future Section, using a Health and Equity Framework to inform the vision and guiding principles of One Water SD is crucial. A "social and economic inclusion" element should be developed to assure that projects and programs include affordability, generate benefits for all communities in the region, and enhance community capacity and engagement. The vision should be a concise and impactful message that will resonate with all members of a community.

As described in the Current Regulatory Framework of the Discovery Document,[248] the San Diego region is comprised of multiple jurisdictions and various entities, and water can be at the interface of many collaborative projects and programs. A set of guiding principles will define, structure, guide, and inform an approach in which jurisdictions and entities can work together to achieve a unified One Water SD.

Defining the guiding principles for One Water SD will also provide a common support and foundation to advance projects and programs that can provide multiple needed benefits to the region. These guiding principles will be informed by the Core Values[249] established at the beginning of this Project (Figure 1). They will take into account our region's unique geography, including soils, microclimates, habitats, urban and rural interfaces, etc., in order to comprehensively address water supply and watershed health. These guiding principles will also focus on equity and economic concerns by encouraging partnerships between local businesses and under-resourced communities, and address rural and urban farming as well as community gardens to provide healthy and equitable foundations for human habitation needs that all rely on water. As integration and collaboration are elemental objectives, ensuring cooperative and bold leadership for One Water SD should be one of the key guiding principles. The leadership entities described in the previous recommendation can establish these guiding principles. Their effort can be informed by several examples and studies done by other organizations in the state and throughout the country.

The US Water Alliance describes six key elements in their *One Water Roadmap: The Sustainable Management of Life's Most Essential Resource*. These elements take into account the broad picture of the impact and benefits of a One Water approach, as seen in Figure 13. This Roadmap can serve as a source of inspiration for the San Diego region's stakeholders as they define the guiding principles that will shape One Water SD.[250]

The combination of these principles encompasses all aspects of the economic, environmental, and social landscape of a region, including the consideration of water utilities and infrastructure, the integration of city planning, business and industry sectors, the agricultural sector, and a range of community types and interests. Each of them can then be adapted to the needs and characteristic of a region.

WRF's Blueprint for One Water shares similar guiding principles, however some notable variations exist. The WRF places a stronger emphasis on the role of bold leadership, how to include regulation and legislation, build capacity and citizen engagement, and support more collaboration in planning strategies. This research was conducted based on a national survey of several agencies and jurisdictions. Based on the survey, the elements of Economics and Finance, and Regulation and Legislation are the two areas that present the greatest challenge in advancing a One Water approach.

Defining One Water SD's vision and guiding principles can also be informed by examining the planning efforts of OneWaterSF and One Water LA.

248 Discovery Document, p.17

249 Discovery Document, p.2

250 http://uswateralliance.org/sites/uswateralliance.org/files/publications/Roadmap%20FINAL.pdf

OneWaterSF Vision

With our OneWaterSF approach, San Francisco will optimize the use of our finite water and energy resources to balance community and ecosystem needs, creating a more resilient and reliable future.

FIGURE 14: OneWaterSF Vision.[251]

OneWaterSF

The San Francisco Public Utilities Commission (SFPUC) crafted a vision to improve the city and county resilience in water and energy.[251]

OneWaterSF's vision is supported by eight guiding principles that can be seen in greater detail in Appendix F. These guiding principles have been used to develop several successful projects. Below we highlight a few key principles from OneWaterSF.

Matching the Right Resource to The Right Use is the first guiding principle of OneWaterSF. For example, SFPUC is encouraging rainwater harvesting for irrigation purposes. This practice is encouraged through rebates on barrels and cisterns of up to 550 gallons and on permitting fees, as applicable.[252] Moreover, SFPUC has partnered with the city's Community Challenge Grant Program to offer Urban Watershed Stewards Grants for community-based projects that are aimed at using ecological techniques to manage stormwater as a resource. This collaboration promotes greater reuse of rainwater in the region and enhances the ecological resilience of the community by mimicking the water cycle.

Piloting State of the Art Technologies is a OneWaterSF guiding principle that has enabled the development of new business practices to respond to a changing industry. SFPUC has issued three Green Bonds specifically dedicated to climate change mitigation and adaptation projects. They also created tools and forums to facilitate the transition to new resource utilization and building techniques, and a certification program that trains professionals to build, maintain, and inspect green infrastructure. This has generated new jobs and training programs to support those jobs.

Pursuing Partnerships is another guiding principle that SFPUC developed to boost the local economy. In this model, utilities partner with other agencies, the private sector, and stakeholders to generate novel and creative ideas for the reuse of water and water treatment byproducts. For example, SFPUC partnered with the University of Washington to study the use of biosolids produced by a water treatment facility as a soil amendment. This idea was generated based on the observation that healthy soil supports plant growth, helps mitigate the impacts of climate change, and improves resilience in the face of drought. This example showcases benefits to both the local economy and the environment through strategic partnerships across many sectors where a holistic approach is central to the common vision of the partners.

One Water LA

The City of Los Angeles started to envision One Water LA 2040 (One Water LA) in 2014 "to meet the region's near- and long-term water supply challenges."[253] The approach builds on the success of the Water Integrated Resources Plan, and was developed in two phases. This endeavor is led by representatives from both the Los Angeles Bureau of Sanitation (LASAN) and the Los Angeles Department of Water and Power (LADWP). One

251 https://view.joomag.com/onewatersf-2018-initiatives/0532177001490224577?short

252 https://www.urbanfarmerstore.com/wp-content/uploads/2018/10/Sizes-Prices-SF-Subsidy-Program-2018-9s.pdf

253 https://www.carollo.com/projects/one-water-la

One Water LA is a collaborative approach to develop an integrated framework for managing the City's water resources, watersheds, and water facilities in an environmentally, economically, and socially beneficial manner.

One Water LA will lead to smarter land use practices, healthier watersheds, greater reliability of our water and wastewater systems, increased efficiency and operation of our utilities, enhanced livable communities, resilience against climate change, and protection of public health.

FIGURE 15: One Water LA's Vision.[254]

Water LA is housed by the City of Los Angeles under the leadership of the Mayor's office. Although this Blueprint envisions One Water SD as a regional program, the cohesive and collaborative leadership exemplified by One Water LA is worth noting.[254]

One Water LA's seven guiding principles are referenced in appendix F.

One Water LA aims at achieving several goals set by the city and Mayor's office as seen in Figure 16.

Securing water supply reliability is one of the biggest challenges that the City of Los Angeles faces. As described in their plan, the City of Los Angeles currently relies on 65-75 percent imported water. Interestingly, during dry years, they rely heavily on water imported by the Metropolitan Water District (MWD) (70 percent in 2015), while in wet years, they import more water through the Los Angeles Aqueduct (LAA). This water supply depends on the amount of snowfall in the Sierra Nevada and was projected to account for 72 percent of their portfolio in 2017-2018. The City of Los Angeles lies above eight groundwater (GW) basins that supply between 8 and 17 percent of the city's water depending on the recharge level and average

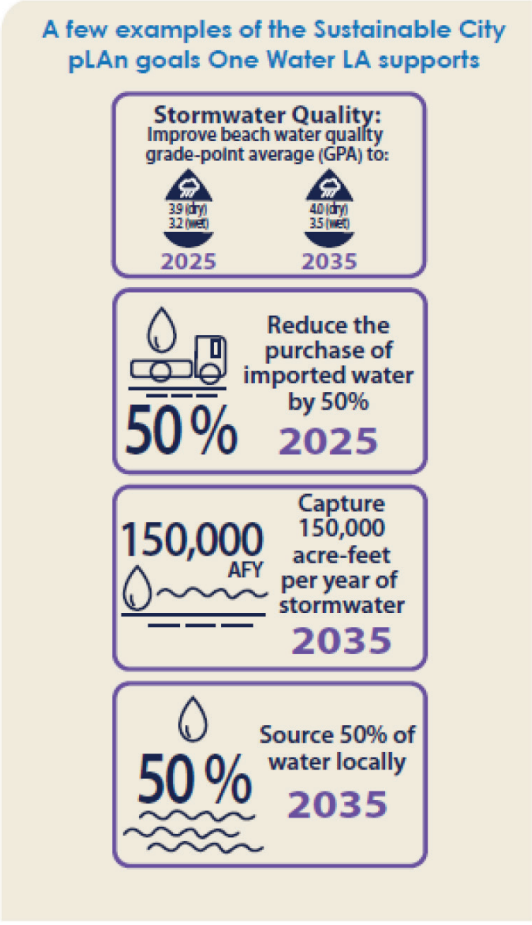


FIGURE 16: Goals Supported by One Water LA.[254]

254 https://www.lacitysan.org/cs/groups/sg_owla/documents/document/y250/mdmx/~edisp/cnt031540.pdf

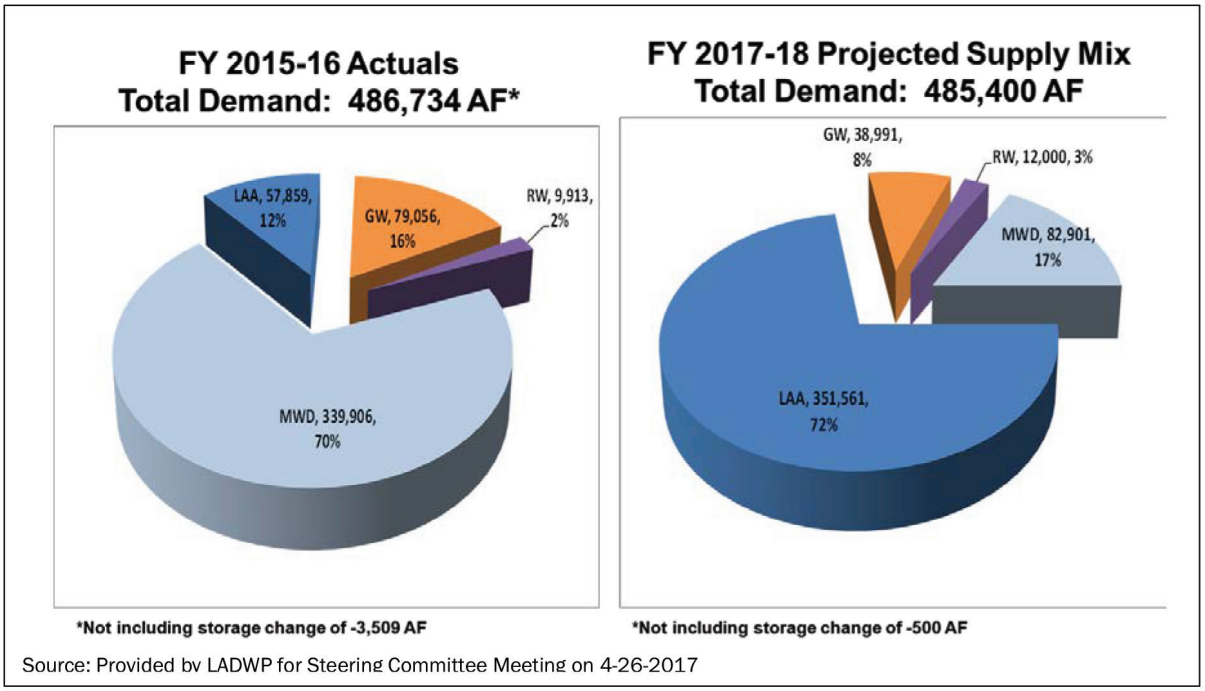


FIGURE 17: Supply Mix in FY 2015/16 (Dry) and Projected for FY 2017/18 (Wet).[255]

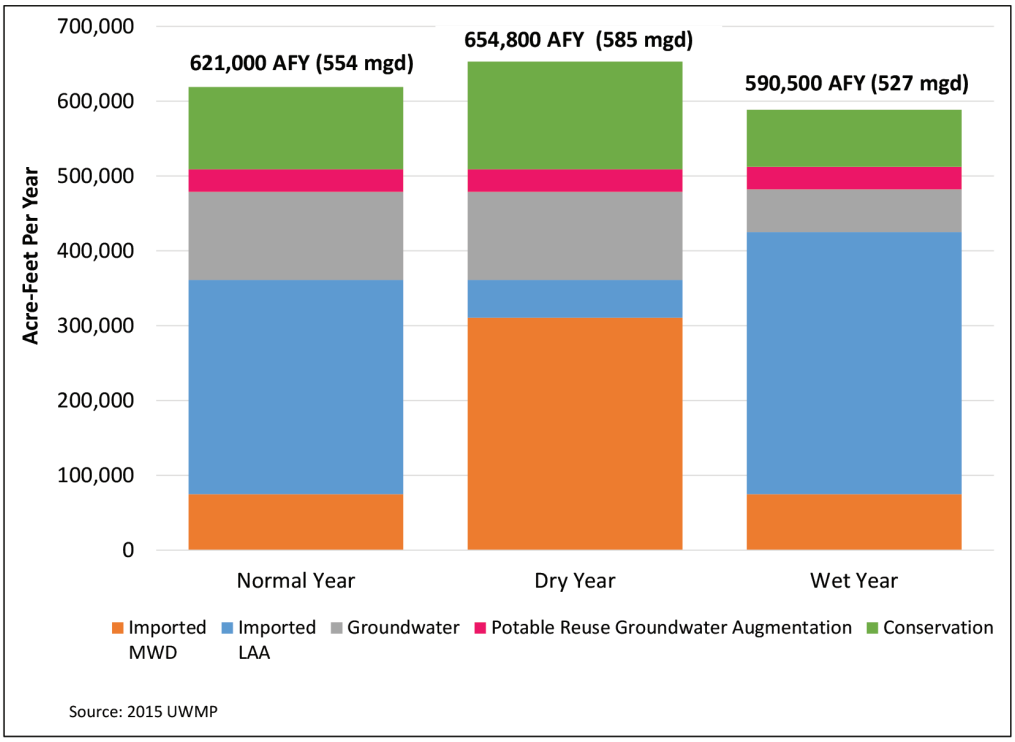


FIGURE 18: Projected Supply Mix for Year 2040.[255]

precipitation for the year.[255] Figure 17 shows the variation of the water portfolio depending on the amount of precipitation in acre-feet per year (AFY). Conserving water is another key component of their portfolio and water conservation is projected to expand with an additional 111,100 acre-feet per year (AFY) or 144,000 AFY by 2040, in average rainfall years or dry rainfall years, respectively. Recycled water (RW) is currently minimal in the portfolio of the city and it only accounts for 2-3 percent of their supply. Figure 18 shows their projected portfolio by 2040.[256]

Because Los Angeles' and San Diego's water supply portfolios are different, strategies adopted by One Water LA may not reflect the needs and opportunities of San Diego County. Los Angeles benefits from a greater groundwater basin resource than San Diego, but has not developed the use of recycled water as much as our region. However, the variation in water portfolios Los Angeles experiences between a dry and a wet year can inform how San Diego County approaches the management of local water resources, especially if one of the goals is to increase San Diego's reliance on local water. This example appears relevant for comparison.

Using the examples of OneWaterSF and One Water LA, the US Water Alliance's One Water Roadmap, and this Blueprint, we have a head start on crafting our own unique regional One Water SD vision and guiding principles, within a Health and Equity framework, that ensures all inhabitants of our region have equitable access to water resources for generations to come.

3. Analyze the economics of a regional One Water San Diego.

Funding will be necessary to develop One Water SD. Similar to the approach taken in the Health & Equity chapter, securing and maximizing financing can benefit from a two-fold strategy: inward-facing and outward-facing strategies.

Each jurisdiction can enhance economic opportunities by optimizing their own internal structures. The work done by the City of Los Angeles provides a model for this strategy. Through One Water LA, a "Special Topic Group," which included experts in local financial issues related to water, was created to tackle the specific challenges related to the identification of funding strategies. This helped them develop a repeatable and transparent plan for each program or project through a cost-sharing process for each department. This cost-sharing is based on several factors such as defining the benefits gained by the respective agencies and departments, identification of secondary partner agencies who can benefit from a project (either directly or indirectly), and the ability to participate in and fund the agency's respective share of the program. This strategy can optimize the budget to support key areas recommended in this report: art, equity, best practices, outreach, and education, for example.

Externally, competing economics at the regional level have been identified as a barrier to mainstreaming non-potable water reuse in the Discovery Document. A specific working group at the regional level will help overcome individual, siloed views that have created economic conflicts. An accurate regional economic assessment will allow for more integration between centralized and decentralized systems, inform decisions and investment, and help demonstrate the economic impact by including the multiple benefits of the various systems.

In our discussion with SFPUC, the importance of studying the revenue impacts of conservation and reuse programs was repeatedly emphasized. Implemented individually, these programs can be seen as competing with water utilities and centralized treatment facilities. More integration, however, can provide a better financial overview and perspective and provide new ways of incentivizing

255 https://www.lacitysan.org/cs/groups/sg_owla/documents/document/y250/mdi2/~edisp/cnt026188.pdf, p.3-5.

256 https://www.lacitysan.org/cs/groups/sg_owla/documents/document/y250/mdmx/~edisp/cnt031540.pdf

water conservation and reuse.

By carefully assessing the revenue and costs associated with water resources and water policies, we can better evaluate the true costs of new programs relative to potential co-benefits based on a holistic approach to designing the programs across jurisdictions. Economics and feasibility studies done with a holistic perspective will more likely provide greater benefits. This important step can better inform programs before they are set and implemented. For example, in San Diego County, the resilience of our regional food systems is assessed in ways that take into account emergency preparedness and climate change. This same type of approach is recommended for water so that our communities have a more comprehensive view of our regional water supplies, including local supplies, to better evaluate our climate resilience and ability to respond to emergencies that may impact immediate water availability.

The MS4 permit also provides a model for a viable financing structure for One Water SD through its cost-sharing and collective budget.

Although centralized distribution systems benefit from being able to distribute large quantities of water to pay back the initial investment, the combination of a variety of centralized and decentralized systems will generate various advantages, for example energy savings and/or ecological improvements. These benefits can be captured economically when assessed as a whole.

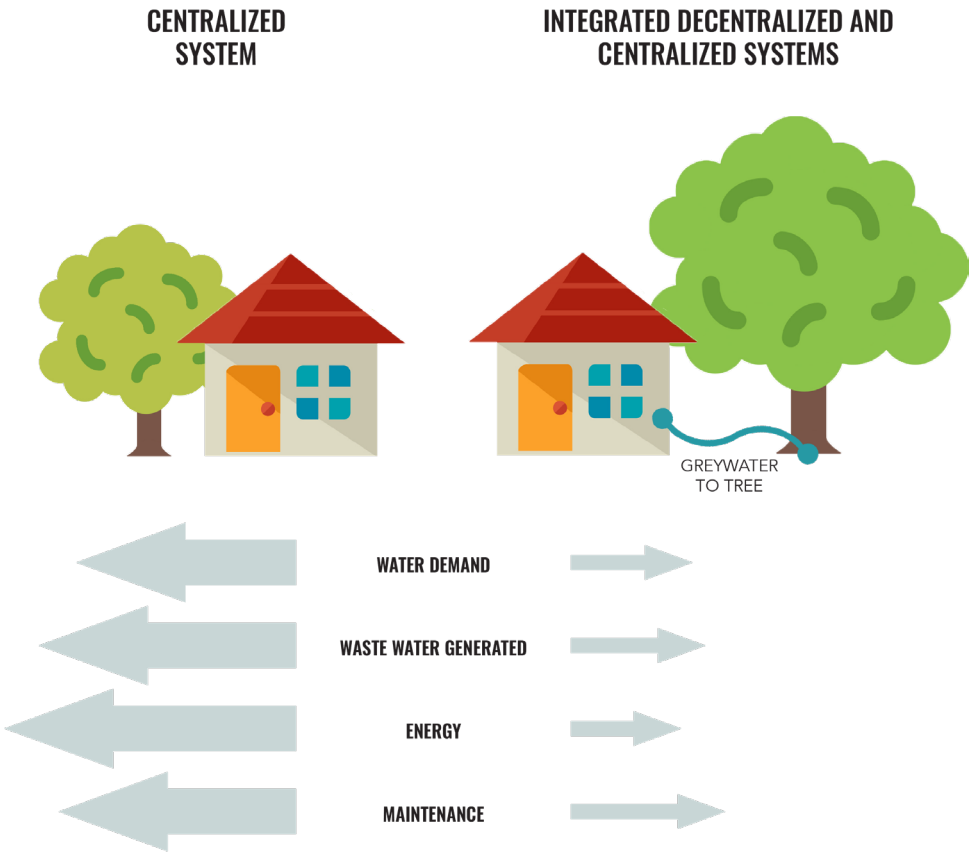


FIGURE 19: Water and Energy Offset from Decentralized Systems on Centralized Infrastructure

4. Identify and engage potential organizational and community stakeholders.

As described in several recommendations throughout the report (and more specifically in the One Water SD, Best Practices, Data Collection, and Water Strategies in Climate Action Plans chapters), water connects all jurisdictions in our region through the complicated web of watersheds, water delivery agencies, wastewater treatment facilities, and city boundaries. Developing and implementing efficient water measures will be better supported by a regional coalition, whether it is part of the One Water SD effort or a standalone group of stakeholders (comprised of water agencies, development departments, local environmental groups, etc.).

A regional coalition formed in a way that it reflects communities (as suggested in Recommendation 3 of the Health and Equity chapter) will ensure that water measures also encompass a health and equity lens. As discussed with a stakeholder involved in developing One Water LA, key elements of development include a multi-pronged approach with comprehensive public involvement and community engagement to develop outreach strategies and formulate policies. This approach will be better supported by involving various working groups and stakeholder workshops where the role of each stakeholder is defined before engaging them. In addition, the outreach strategy can be combined with a regional communication plan, as described in the following recommendation, to enhance the outcomes.

Our investigation has shown the importance of convening all stakeholders and jurisdictional departments that oversee and interface with water management. This engagement and involvement will be necessary to develop the key steps of One Water SD. We do not aim at identifying all stakeholders in this document. However, we have started a list in the following table that may provide a foundation.

TABLE 14: Key Stakeholders

KEY STAKEHOLDERS
Regional planning entities: San Diego IRWM, San Diego Regional Water Quality Control Board, San Diego County Water Authority, San Diego Association of Governments (SANDAG)
Departments (or equivalent departments) of Development and Services, Planning, Public Works, Sustainability, and Stormwater of all local jurisdictions (cities)
Department of Planning and Development Services, Public Works and Environmental Health (County of San Diego)
City's and County's elected officials
Policymakers
Water and wastewater agencies
Port of San Diego
San Diego County Regional Airport Authority
San Diego Regional Climate Collaborative
NGOs (climate change advocacy entities, community organizations, etc.)
Environmental advocacy groups (such as Sierra Club, San Diego Coastkeeper, Surfrider Foundation San Diego, San Diego River Conservancy, and other watershed protection non-profits)
Universities
Developers
Building and water industry associations

Convening stakeholders throughout the entire region of San Diego can be informed by the process implemented by the City of Los Angeles. One of their remarkable efforts was to involve all departments employed in water management. They engaged more than 500 stakeholders, including over 200 organizations. The extensive stakeholder commitment and engagement was key in the successful drafting of One Water LA 2040. Figure 20 shows the structure of stakeholder engagement and the various departments comprising the One Water LA Steering Committee.[257] This collaboration aided in the development of a transparent process

257 https://www.lacitysan.org/cs/groups/sg_owla/documents/document/y250/mdmx/~edisp/cnt031540.pdf

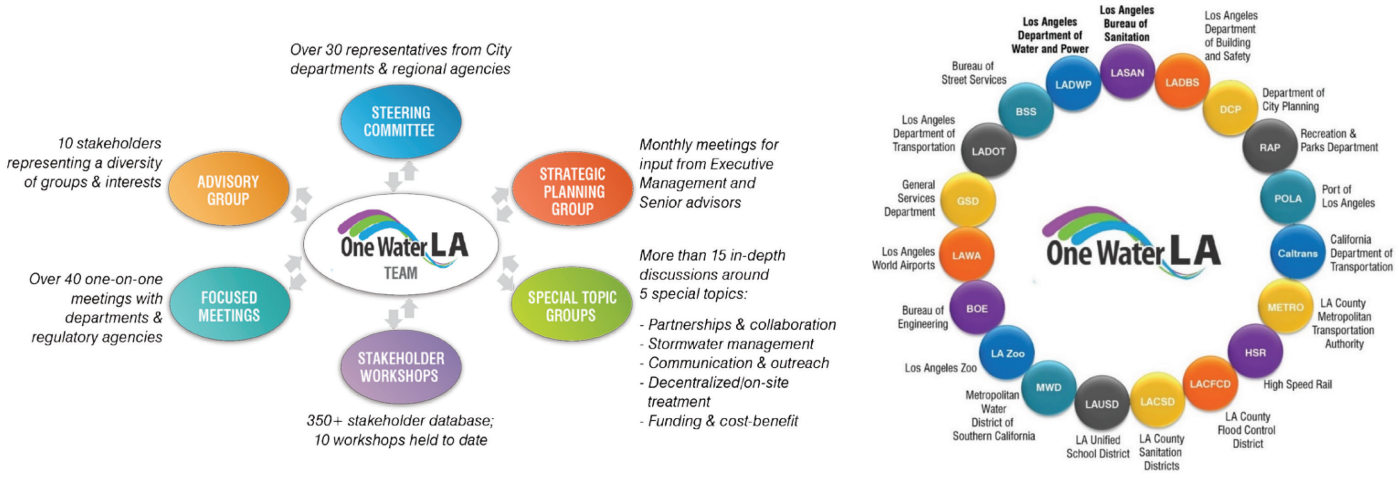


FIGURE 20: Structure of the Working Groups and Stakeholders of One Water LA.[257]

to identify opportunities and projects to leverage multiple benefits through engaging multiple stakeholders.

A regional effort can better address the needs, challenges, and opportunities of the region allowing for a holistic approach and greater consideration of multiple benefits. This regional coalition can take the lead responsibility of developing and implementing One Water SD in full, or it can inform, develop and possibly implement key aspects of a One Water approach. These key aspects may include the economic analyses presented in the previous recommendation, the development of unified best practices, the integration of water strategies into climate action plans, the formulation of policies and practices to address specific state legislative requirements, or the development and implementation of feedback loops that would support all jurisdictions in their effort to advance non-potable water reuse, as described in the following chapters. Research and case studies are provided by various organizations such as the US Water Alliance, WRF or the William J. Worthen Foundation. The latter organization has published a report (*Onsite Non-Potable Water Reuse Practice Guide*) on decentralized non-potable water reuse that discusses the technical and regulatory aspects of non-potable systems and explains how to begin a conversation about water reuse to get buy-in from various stakeholders, including the building owner or developer, design team, builder, end user, and facility manager, as well as regulators, water and sewer utilities, and financial institutions.[258]

EXAMPLE: King County, Washington, and the cities within King County have a shared goal to reduce county-wide greenhouse gas emissions. They created the King County-Cities Climate Collaboration (K4C) to develop planning policies that address the entire region.[259,260,261] This example illustrates how a collaborative effort can support an entire region and all jurisdictions contained therein, and elevate the benefits and value of their local work.

258 https://static1.squarespace.com/static/5c73f31eb10f25809eb82de2/t/5d62f94154372300016bf9bb/1566767439639/WaterReuseGuide_FINAL.pdf

259 https://livingfuture2019.sched.com/event/Ijdu/building-a-community-of-practice-king-county-living-building-challenge-accelerator

260 http://soundcities.org/wp-content/uploads/pdfs/pic-agendas/Climate%20Change%20One%20Page%20Background%20Paper%20for%20PIC.pdf

261 ttps://www.kingcounty.gov/services/environment/climate/actions-strategies/climate-strategies/partnerships-collaborations/k4c.aspx

5. Outline a regional communication plan

One Water SD is a transformative approach for the San Diego region and will need to be efficiently and effectively communicated. We strongly recommend creating a regional communication plan and campaign that will help educate people across the entire region and unify them around a common message. A communication plan formally defines who should be given specific information, when that information should be delivered, and what communication channels will be used to deliver the information.[262]

Communicating the value of water and how One Water SD integrates this across the region is critical to ensuring its success.[263] One Water SD goes beyond conservation by supporting water and climate resilience. It also supports healthy communities and expands efforts that are tailored to disadvantaged communities. It brings new perspectives in a world where water is usually invisible. A successful One Water SD will be achieved only if the entire region fully embraces and shares the One Water SD vision. This level of transformation requires an intentional effort of communication.

The common vision and messaging of One Water SD can be communicated through a marketing campaign that leverages arts, as discussed in the chapter Leverage Art for Community-driven Water Projects. A common brand can be created at the regional level and used by local jurisdictions who can embed it into their marketing plans. We envision a communication plan that is co-brandable.

EXAMPLE: The San Diego Storm Water Program benefits from a "Regional Education and Outreach Workgroup" to increase knowledge and awareness about water quality and stormwater. The activities and structure of this workgroup can inform the One Water SD communication plan and provide an example on how stakeholders can organize at a regional scale.

6. Create an evaluation strategy for One Water San Diego that ensures its success and relevance in the future.

Inclusion of built-in evaluation mechanisms ensure that strategies unfold based on lessons learned, and the evolution of technologies and regulatory requirements. Each jurisdiction and organization involved in the process of developing and implementing One Water SD should monitor what works and what does not, and report to the convening body or regional coalition. This step will allow policies and practices to be reassessed and adjusted, if needed, on a regular basis. This will help improve plans envisioned for implementation at the regional scale.

The importance of this feedback process is emphasized in the Water Research Foundation's One Water Roadmap, discussed at the beginning of this chapter, and is emphasized throughout each main recommendation in this document. Integrating a feedback loop into every level of policy implementation is key to the development of a robust program that can evolve and endure. Creating accurate data measurement is an essential part of assessment (as discussed in the Data-Driven Decision-Making chapter).

By establishing guidelines and recommendations for evaluation strategies in One Water SD, jurisdictions will be empowered to incorporate lessons learned into their local policies and programs. Climate Action Plans (CAPs) and Storm Water Programs, through the publication of the WQIPs, require monitoring and annual reports on progress and achievements, which lead to regularly updated plans and enable jurisdictions to assess the success of their programs. This process will be enhanced with greater integration and alignment to support the improvement of all programs for the entire region.

262 https://whatis.techtarget.com/definition/communication-plan

263 https://waterfm.com/communicating-the-value-of-water-the-abcs-of-water-communication/

7. Advocate for additional resources that will support a regional effort at the state level.

We recommend continuing to work with partners at the state level, reaching out to organizations such as the Department of Water Resources (DWR) or the State Water Resources Control Board (SWRCB) to gain exposure and seek possible solutions. Providing comments to the Water Resilience Portfolio Initiative,[264] started by the Governor's office in April 2019, is a great example of organizations coming together to advocate for additional resources and authority for the region.

The state-wide IRWM and regional IRWM programs (such as San Diego IRWM) are responsible for distribution of bond funding provided by the California Department of Water Resources (DWR). However, as of December 2019 no additional bonds have been planned for the near future and without regulatory authority, IRWM has no ability to help manage the region's water resources and water planning activities. Furthermore, IRWM is currently managed by three main entities: the San Diego County Water Authority, the City of San Diego, and the County of San Diego. The Regional Advisory Committee (RAC), which acts in an advisory capacity for the IRWM in regard to management of proposition funding, is a powerful collection of a diverse group of water interests throughout the region. The RAC has the authority to readjust its composition to enhance the representation of the region and advise IRWM Program management in the direction it should pursue for the greater good of the region. To date, the IRWM has submitted comments to the effect of using the Water Resilience Portfolio (initiated by California Governor Gavin Newsom's Executive Order in April 2019) to designate state funding giving IRWM more regulatory authority.[265]

Additionally, as described in the Data-Driven Decision-Making chapter, feedback loops informed by ongoing data are key to improving best practices for on-site non-potable water use, identifying lessons learned, and adapting policies and guidance more easily. Data collection also provides a better understanding the effectiveness of water reuse systems, which can be used to educate stakeholders and decision makers. Funding is required for ongoing data collection, analyses, and application of the results. Currently, the state mandates the collection of data but does not provide funding to continuously support such efforts. In the context of a regional approach, the development of a sustained funding structure is recommended. This will help improve outcomes of on-site capture and reuse, ensure public health is maintained, and help assess regional benefits, including local water supply conservation. A systematic approach to data collection across projects will create continuity in improving regulatory structures. Various entities such as academic institutions and research centers, regional organizations, and water quality and watershed protection agencies and organizations can provide capacity, knowledge, and expertise to collect and analyze data that will expound the benefits of on-site non-potable water systems.

EXAMPLE: Recommendation 1 of the Data-Driven Decision-Making chapter showcases the example of the extensive research done for the San Diego Basin Study, which is now relatively static. The IRWM which sponsored the San Diego Basin Study has no funding for maintenance of the data sets and further data collection. One possible solution is to ask that all jurisdictions contribute to a fund to continue the project, ensuring that all parties can learn and benefit from future projects and better project outcomes for the region's water supply.

264 https://www.gov.ca.gov/wp-content/uploads/2019/04/4.29.19-EO-N-10-19-Attested.pdf

265 http://waterresilience.ca.gov/

8. Advocate for a regional effort at the local level.

Local organizations can start building regional water management capacity by reaching out to regional organizations or local jurisdictions. As described in the Waterways for Successful Decentralized Non-Potable Water Systems Section, developing best practices for the region will benefit all agencies by providing a cohesiveness that generates momentum to further advance the use of on-site non-potable water systems. A local and consistent effort to promote this approach is needed to show the interest of the community and inform the decision-makers.

We recommend that local organizations or entities push for regional level regulations for decentralized non-potable reuse systems, and that these regulations be drafted in consultation with the IRWM, Copermittees, and city and county departments, which are part of regulating and permitting on-site systems (e.g., stormwater, building, development, and conservation departments).

The goal is to encourage local jurisdictions and regional organizations to allocate funds and resources to:

- the development of cohesive and uniform best practices throughout the region,
- the use of a shared database for on-going data collection, and
- the development and implementation of a widespread and consistent education and promotion strategy across the region to advance on-site non-potable water use.

EXAMPLE: As part of the Storm Water Program, Orange County has developed a stormwater tracking tool that can be used by the Copermittees of the San Diego region to further collect data on stormwater. We encourage Copermittees to seek approval and allocation of funds from their respective jurisdiction to enable the use of a similar tracking tool.[266]

Additionally, the Metropolitan Water District (MWD) recently launched a pilot program to assess the potential benefits of stormwater capture for local water resources management. This $5 million pilot program is intended to support the construction of new stormwater capture systems, installation of monitoring equipment, and retrofitting of existing projects. This program "is aimed at direct-use projects, like cisterns and permeable pavement with underground collection systems, that capture rainfall and stormwater and use it on-site for non-potable needs such as irrigation (not for recharge)."[267,268] This program provided an excellent opportunity to gather data and will garner valuable information for the entire region. We encourage local organizations and jurisdictions take advantage of this pilot program to test best practices and share outcomes.

9. Identify decision-makers that can champion decentralized non-potable water use.

City and county staff can identify internal decision-makers that can potentially champion on-site non-potable water use at the regional level. As the knowledge related to these systems can vary considerably, it is important to understand decision-makers' leverage points and educate them about these systems.

As the third phase of the Project is the development of a communication and outreach strategy, identifying key decision-makers will be critical (see Table 15).

266 https://www.ocstormwatertools.org/

267 http://www.mwdh2o.com/PDF_NewsRoom/Stormwater_Capture_Pilot.pdf

268 https://mwdh2o.granicus.com/MetaViewer.php?view_id=12&event_id=5189&meta_id=203154

TABLE 15: Key Stakeholders

KEY STAKEHOLDERS
San Diego Integrated Regional Water Management
San Diego Regional Water Quality Control Board
Policymakers and regulators of all local jurisdictions (cities and county)
San Diego Housing Commission
San Diego Green Building Council
Community organizations (e.g., environmental and social justice organizations, community garden associations, etc.)

Conclusion

One Water SD is an ambitious goal that will benefit the San Diego region through the utilization of both centralized and decentralized water systems. San Diego County may not currently have leadership that is willing to take on the development of this approach, however regional efforts can be envisioned through an examination of existing programs. Comprehensive stakeholder and public outreach will help engage key partners and generate a common message around water for the entire region. In order to advance a regional approach, a number of administrative and legislative supports must be identified. At the state level, pinpointing financial resources and a means for continuation of regional data collection will be paramount. As with most legislative fixes, broader efforts that target multiple levels of government tend to be more effective and have the power to unify disparate and competing policies, therefore local jurisdictions should press for legislative solutions that are enacted at the state level. In order to do so, the identification and recruitment of individuals and organizations that can champion these efforts will be a critical next step. Ultimately, the goal of One Water SD is to enhance water conservation, water resilience, improve health and equity, and reduce the impact of the built environment on regional ecosystems.

ADVOCATE FOR EQUITABLE WATER RATES

"Thousands have lived without love, not one without water."

– W.H. Auden, The Global Goals for Sustainable Development

Overview

One possible legislative solution to increase equity in the water sector is a fundamental restructuring of how water rates are determined. Currently, lower income households often spend a larger proportion of their earnings on utilities than higher income households. As described in the State of the Water in San Diego chapter of the Discovery Document (p.7), water rates have increased considerably during the past decade, placing a higher burden on low-income households who already live on a tight budget. Those households have seen their water bills account for a higher percentage of their income, even while their consumption remains the same. Higher water rates also impact community gardens, which are an important source of fresh and culturally appropriate produce for our under-resourced communities.[269] Our Public Health Advisory Committee member shared that a community garden in one of these ESJ communities in San Diego has seen their water bill increase from $300 to $900 per month while their consumption remained the same.[270] Alleviating this financial burden will help households and community gardens better support the health and well-being of communities as explained by the US Water Alliance's *An Equitable Water Future* report, "equitable water management can foster opportunity for all people and communities."[271]

As explained by the US Water Alliance, the disproportionate increase in utility rates places a burden on ESJ communities that effectively increases services costs for water agencies because of the associated activity and budget spent on water bill collection, in lieu of improving water infrastructure.[272] There are ways to address inequity while ensuring that water agency funds can be most effectively put to use. For example, due to legislative changes implemented by the Philadelphia City Council, the Philadelphia Water Department (PWD) was able to develop payment plans to support more water equity throughout the city.[273,274] Their strategy aims to reduce shutoffs, foreclosures due to unpaid bills, and displacement of low-income households and communities. In the long-run, these types of solutions benefit the economy of the city and help all communities thrive.

Despite the advantages of implementing water rate restructures and equity programs, this topic remains unresolved in the State of California, due to legislative barriers that prevent public water

269 p.10 of https://scholarworks.uvm.edu/cgi/viewcontent.cgi?article=1032&context=hcoltheses

270 Public Health Advisory Committee meeting 4, on July 26th 2019.

271 http://uswateralliance.org/sites/uswateralliance.org/files/publications/uswa_waterequity_FINAL.pdf

272 p.30 of http://uswateralliance.org/sites/uswateralliance.org/files/publications/uswa_waterequity_FINAL.pdf

273 https://nextcity.org/daily/entry/philadelphia-water-bills-low-income-payment-plans

274 https://www.phila.gov/press-releases/mayor/philadelphia-launches-new-income-based-tiered-assistance-program/

agencies from providing low-income water rates. Under Proposition 218 (1996), publicly-owned water systems are required to apply water rates that reflect the actual cost of delivering the water and wastewater services, as highlighted in the Current Regulatory Framework chapter of the Discovery Document (p.15). As a consequence, they can only fund low-income assistance programs through non-rate revenue, unlike investor-owned water and sewer utilities. Interestingly, there is no such provision for privately-owned utilities. They are regulated by the California Public Utilities Commission (PUC) and provide water services to about 16 percent of California residents. Privately-owned water and wastewater utilities can more easily implement low-income rate assistance programs as they have less constraints on how fees and charges are used.

Despite this critical and unresolved barrier, the state is enacting other types of equity-based solutions. In 2012, the State of California recognized that "Water is a human right" through passage of Assembly Bill 685 (2012),[275] which declared that "every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes." The State of California initiated a process to encourage affordability and safe access to all Californians. This led to the enactment of Assembly Bill 401 in 2015 that established the Low-Income Water Rate Assistance Act[276] and required the development of a strategy to provide and fund a low-income water rate assistance program. The recent Senate Bill 200 (2019), signed by Governor Newsom, established the Safe and Affordable Drinking Water Fund to support projects to clean up contaminated water and provide solutions for low-income communities.[277] This includes the use of existing funds such as the General Funds, and the Greenhouse Gas Reduction Funds to subsidize water equity programs.[278] State legislation is evolving as this report is being written. Thus, the following recommendations discuss potential actions and reinforce the need for a long-term solution through a legislative change.

SUPPORTING CORE VALUES

Enhance Health and Equity

Prioritize a Positive Community Experience

ADDRESSING BARRIERS

Regulatory Barriers

Competing Economics

1. Secure a legislative solution that creates equitable rates for low-income communities.

Proposition 218 has created a challenge that only a state-level legislative solution can overcome. It has a direct impact on how funds are raised, thus limiting public water utilities' range of actions to support low-income households through low income water rates programs. Moreover, Proposition 218, along with a subsequent related court decision ruled that fees can only be imposed on stormwater via a voter approval process, limiting access to new funds to support stormwater projects.[279] Senate Bill 231, passed in 2017, which expands the power of local governments to impose taxes on stormwater, should help address this issue, but the potential for legal challenges deters jurisdictions to try.[280] This demonstrates that there is growing interest from many different constituents to address the barriers imposed by Proposition 218, albeit from different interests.

The recent Senate Bill (SB) 200 establishing a Safe and Affordable Drinking Water Fund secured funds

275 http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201120120AB685

276 http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB401

277 https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200SB200

278 https://www.waternewsnetwork.com/california-legislature-passes-safe-drinking-water-fund/

279 https://casqa.org/resources/funding-resources/creating-stormwater-utility/proposition-218-proceeding

280 https://meadhunt.com/ca-sb231/

to help water agencies in California provide safe and healthy drinking water, and ensure its affordability for all communities. However, this fund supports water infrastructure and does not provide direct assistance to low-income households.[281]

We encourage local policy makers, water agencies, and water utilities to partner with economic and social justice organizations advocating for water equity to further describe barriers and seek out solutions that can be implemented by the State Legislature. Non-profit organizations such as the American Water Works Association (AWWA), which advocates for safe and affordable water, are excellent resources.[282,283] AWWA provides scientific, technical, and educational support to advance legislative issues related to water.[284] AWWA recommends the adoption of policies and procedures by utilities, regulators, and governmental entities that address the affordability challenges experienced by residential customers and provide low-income households with access to utility services, while maintaining the fiscal sustainability of utilities.[285]

Through this advocacy process, partners can more easily study options, run feasibility and economic analyses, and offer up workable solutions. This will help to overcome legislative hurdles, prevent lawsuits, and ensure that the economic viability of water utilities is taken into account. Securing funds will allow the implementation of an action plan developed by the State Water Resources Control Board (State Water Board).

STATE-WIDE FEASIBILITY STUDY

The State Water Board, which is committed to achievement of the Human Right to Water in full, studied the challenges and potential strategies for implementation of a state-wide low-income water rate assistance program in California.[286,287] The State Water Board's draft report can serve as a guideline to advocate for low-income assistance programs and a precursor for additional feasibility studies.

The primary challenges of developing the kind of state-level program addressed in the report are summarized below:

- Raising adequate funds remains one of the biggest challenges.
- Water systems can vary considerably in size and not all water systems can absorb the cost of a low-income assistance program. It is easier to balance the overall revenue for large systems.
- Some water systems are located in areas where a large proportion of customers are low-income households, making it difficult for the water agency to adequately fund an assistance program.

The report recommended raising funds through taxes, namely through personal income taxes and a sales tax on bottled water. However, a water tax was rejected early 2019. This challenge will need to be further explored to fully develop a sustainable plan for low-income households.

FEASIBILITY STUDY INFORMED BY OUT-OF-STATE EXAMPLES

Feasibility studies can also be informed by programs that have been implemented in other states and jurisdictions. For example, the City of Tucson, Arizona, which does not face the hurdle imposed by California's Proposition 218, has imposed a conservation fee to fund rebate programs, including a low-income rebate program. This conservation fee, currently $0.10 per 100 cubic feet of water, is used to fund the rainwater harvesting system

281 https://www.acwa.com/news/state-water-board-authorizes-nearly-quarter-billion-dollars-to-provide-safe-and-affordable-drinking-water/

282 https://www.awwa.org/Policy-Advocacy/Advocacy-Priorities

283 https://www.ca-nv-awwa.org/canv/CNS/Advocacy/Gov_Affairs/CNS/Advocacy/Government%20Affairs.aspx?hkey=e-ab840f7-92e0-4b39-b98e-d9690d289bcc

284 https://www.awwa.org/Policy-Advocacy/AWWA-Policy-Statements

285 https://www.awwa.org/Policy-Advocacy/AWWA-Policy-Statements/Affordability

286 https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/assistance/docs/2019/draft_report_ab401.pdf

287 https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/assistance/

rebate program as well as their greywater system rebate program. They have approved over 2,000 requests since the inception of the program in 2008. Through this fund, people can apply for rebates when installing a cistern of 800 gallons or more and receive $1 rebate per gallon up to $2,000 (per site). This is the most popular incentive program for the City. This example highlights how revenue fees can be used to incentivize non-potable water reuse technologies and make them more affordable all communities. It also provides an example of the actual (and minimal) cost of a conservation fee passed on to customers.

BUILD MOMENTUM ON PRE-EXISTING LOCAL EFFORTS

A recent report by University of California Los Angeles (UCLA) Luskin Center for Innovation investigated proposed and implemented strategies in Southern California to mitigate the impact of water rate increases resulting from rising water supply costs.[288] These examples illustrate how local jurisdictions are looking for ways to address challenges and find sustainable solutions. Below are two strategies highlighted in the report that have been used by some water utilities in San Diego County.

Strategy 1: Rate Stabilization Funds

Some utilities can use rate stabilization funds (RSFs), which are financial reserves maintained by some water agencies. They can be used to lessen rate increases over time and to cover unanticipated utility costs. However, these funds depend ultimately on rate revenue and are not a long-term, sustainable solution.

The City of San Diego used their RSFs to mitigate rate increases in 2012 and 2013 but could not continue in 2014 due to financial infeasibility. Further strategies would need to be explored.

Strategy 2: Limit the Impact of Water Rate Increase

Publicly-owned water systems constitute the vast majority of water systems in the San Diego region, and as a result, the option of using low-income rate assistance programs is limited by Proposition 218, as discussed previously. However, water utilities have developed strategies to limit the impact of water rate increases. Most developed a tiered water rate structure, qualified as a more progressive model than a fixed rate. This structure, based on water consumption, allows water utilities to apply a lower rate to low-consumption customers. Although this type of structure provides some relief to low consumers, it does not create a sustainable and equitable solution that would positively impact low-income households. The rate increases observed during the past decade are mostly due to an increase of the water supply costs established by the San Diego County Water Authority (SDCWA). The Luskin Center for Innovation's study described the impact of water portfolio diversification on the water rate increases, and more specifically, the impact of desalinated water supply in Orange County and in the San Diego region. It concluded, similarly to other reports, that the augmentation of water supply using desalinated water will likely make drinking water for under-resourced households moderately to severely less affordable. In the San Diego region, where some water agencies rely 100 percent on SDCWA water supply, water rate increases have been passed on to customers. As described in the Discovery Document in the Competing Economics chapter, the expense of infrastructure investments is a barrier to supporting low-income households.[289]

The efforts made at the jurisdictional and state levels show how critical it is to advocate for an equitable fee structure and find appropriate solutions. Active collaboration can support innovative thinking to develop strategies that will support low-income households.

288 Analyzing Southern California Supply Investments from a Human Right to Water Perspective, UCLA, Luskin Center for Innovation, April 2019, https://innovation.luskin.ucla.edu/wp-content/uploads/2019/04/Analyzing_Southern_CA_Supply_Investments_from_a_Human_Right_to_Water_Perspective.pdf

289 Discovery Document, p. 66

INNOVATIVE SOLUTIONS THROUGH COLLABORATION

As suggested in recommendation 3 of the One Water San Diego chapter, the Special Topic Group dedicated to analyze the economics of a regional One Water SD can be a key asset in developing an equitable water rate structure. Their effort can be informed by these examples of innovative solutions.

2. Create water programs for community gardens to enhance food and equity in communities.

Community gardens and urban farming play a central role in improving community health, especially in under-resourced communities who are also impacted by a lack of access to fresh, affordable produce, as described in Data-Driven Decision-Making chapter recommendation 2. However, as discussed in the State of the Water in San Diego chapter of the Discovery Document,[290] water affordability is key in the creation and maintenance of community gardens. Community gardens are often paying top residential rates since their water consumption puts them into higher-usage tiers. Some water agencies have a rate structure that will provide specific rates for irrigation or commercial use. However, this depends on the location of the community gardens, and this structure does not prioritize food production. By developing a rate structure to include a water rate specifically for public/non-profit entities that are growing food, this could help to promote the adoption of community gardens over grass lawns, creating benefits for the entire community. Currently, the City of San Diego has created an Urban Agriculture Incentive Zone Program,[291] which allows property taxes to be lowered for qualifying parcels. Creating a bridge between these zoning policies and the water rate structure could be a key starting point.

Based on a conversation with the Executive Director of San Diego Food System Alliance (SDFSA), another challenge faced by community gardens is that the cost of installing new water meters at the outset of a project is extremely high. For this reason, SDFSA does not promote programs like Urban Agriculture Incentive Zones on land that does not already have a water meter for this purpose.[291] In order to overcome this burden, it is important to reduce fees and create financial incentives that encourage the establishment of community gardens. We recommend collaborative work between city agencies, water utilities and non-profit organizations to address the issue. The International Rescue Committee suggests making "water accessible and affordable through water meter tap waivers or grants."[292] Another model, the Community Garden Irrigation Meter Grant Program developed by SFPUC, encourages the implementation of new community gardens by waiving the fees for the installation of a new dedicated water service and meter.[293]

TABLE 16: Key Stakeholders

KEY STAKEHOLDERS
Policymakers of all local jurisdictions (cities and county)
San Diego Housing Commission
Organizations advocating for water equity, economic and social justice groups (e.g., the Environmental Health Coalition)
Policy advocacy groups (e.g., AWWA, WateRuse, etc.)

Conclusion

State requirements under Proposition 218 present an obstacle to making progress on enacting more equitable water rates. The advancement of affordable and safe water access for all requires coordinated efforts between our local jurisdictions and the State Legislature. It also necessitates cooperation and collaboration between jurisdictions and water utilities to support and advocate for equitable water rates that provide a long-term, sustainable solution to communities in need.

290 Discovery Document, p.8-9, State of the Water in San Diego" chapter

291 https://www.sandiego.gov/economic-development/business/starting/urban-agriculture

292 https://static1.squarespace.com/static/54b30bbae4b0fc-4c2291385e/t/57a7d97fb3db2b8908f90daa/1470617994160/CAP-P+White+Paper_Establishing+Community+Gardens_72816_FINAL.pdf

293 https://sfwater.org/index.aspx?page=469

SUMMARY

The Blueprint for Advancing Decentralized Non-Potable Water Use in the San Diego region compiled and discussed the key actions and efforts that will foster the wider use of on-site non-potable water systems. The water challenges we face as a region will necessitate nothing short of a transformation in how we value and use this precious resource. As we look to the future, new and innovative approaches, and a willingness to work collectively will be required. We must seek inclusive solutions that value creativity and cooperation in order to secure a water future that assures health, equity, and environmental justice for all.

The next phase of the Project consists of developing a communication and outreach strategy to disseminate the recommendations of the Blueprint to our partners across the region.

APPENDICES

APPENDIX A

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APPENDIX B

DEFINITIONS & ACRONYMS

DEFINITIONS

Action Plan: A sequence of steps that must be taken, or activities that must be performed well, for a strategy to succeed. An action plan has three major elements: 1) specific tasks - what will be done and by whom, 2) time horizon - when will it be done, and 3) resource allocation - what specific funds are available for activities.

Active rainwater harvesting: Diverting rainwater from roofs into rainwater tanks.

Air Conditioning (A/C) condensate: Water that condensates on air conditioning system pipes when cooling air.

Alliance: Public Health Alliance of Southern California.

Blackwater: Wastewater originating from toilets and/or kitchen sources (e.g., kitchen sinks and dishwashers).

Blueprint for Advancing On-Site Non-Potable Water Use: Second work product of the Project describing recommendations to advance on-site non-potable water use.

California Conference of Directors of Environmental Health: Professional trade organization for Environmental Health directors.

Carbon sequestration: Process of capturing and storing atmospheric carbon dioxide. It is one method of reducing the amount of carbon dioxide in the atmosphere with the goal of reducing global climate change.

Centralized recycled water: Water that has been treated at the highest level required by the California Department of Health Services for water not intended for human consumption as defined by California Code of Regulation, Title 22. "Recycled water" is sometimes referred to as "reclaimed water" or "purple pipe water." It is provided by a regulated recycled water agency via a centralized reclamation facility.

Centralized treatment facility: A facility that collects water and wastewater coming from various locations and areas, and treats it to standards appropriate for non-potable reuse (recycling facility compliant with California Code of Regulation, Title 22), potable use (such as the Pure Water San Diego facility), or discharge to the ocean. It requires the appropriate infrastructure to transport water several miles in and out of the facility.

Cistern: A container that can store 200 gallons of water or more.

Co-benefits: Multiple, ancillary positive impacts achieved by implementing a program, policy or intervention.

Copermittees: Municipal and county governments and special district entities organized by watershed under the Storm Water Program, which is a regulatory obligation under the Municipal Storm Water Permit.

Creative placemaking: A collaborative process of place-based community planning and development projects in which art or artists play an intentional and integrated role.

Creative placekeeping: A collaborative process to ensure communities do not suffer from being displaced as a result of new or redevelopments.

Critical path: The sequence of stages to design and implement a project. It provides standardization and requirements and guides the project milestones.

Decentralized water approach: Collection and harvest of water in a localized area, and use, storage, and possible treatment where water is captured or generated.

Decentralized or on-site non-potable water systems: Systems that use and reuse water on-site; namely, rainwater tanks, greywater systems, A/C condensate systems, green infrastructure, etc.

Discovery Document: First report of the Project describing the barriers to onsite nonpotable water use.

District: A defined service area for a decentralized non-potable water system that covers multiple properties and may cross public right-of-way.

Earthwork: Construction made of earth. In the context of this Project, water-harvesting earthworks refer to berms, basins, and swales that are contoured in the landscape to capture water flowing through a property (stormwater, greywater, A/C condensate, rainwater overflow) and store it in the soil, reducing irrigation needs, and enhancing ecosystem resilience.

Ecosystem: A dynamic complex of a community of organisms (plants, animals, micro-organisms and human beings) and its non-living environment (air, water, mineral soil) interacting as a functional unit.

Ecosystem services (also called ecological services): Benefits human beings obtain from ecosystems. They are grouped into four broad categories: provisioning, such as the production of food and water; regulating, such as the control of climate and disease; supporting, such as nutrient cycles and oxygen production; and cultural, such as spiritual and recreational benefits.

Educators: Professionals educating the public and disseminating information. It includes professionals working for public utilities, water agencies, water conservation department, outreach organizations (Tijuana River National Estuarine Research Reserve, The Global ARC).

End users: People who will install, operate and/or use nonpotable water systems including homeowners, residential building managers (multi-family buildings), professionals (gutters, contractors, plumbers, landscape designers, landscape architects, landscape installers, architects, civil engineers, wastewater engineers).

Environmental and social justice community: A group of people who are and have been historically underserved and encounter a disproportionate burden of negative environmental impacts.

Ethic of place: A set of principles that respects and values the uniqueness of our region, both in terms of the environment and the cultural diversity.

Externalities: Positive or negative impacts that cannot be priced in market, and thus, that are not taken into account when assessing financial viability of projects.

Foundation water: Shallow groundwater collected from the drainage around building foundations or sumps.

Fit-for-purpose concept: The concept of matching the quality of a particular water source to an end-use for which that water quality is sufficient.

Green infrastructure: An adaptable term used to describe an array of products, technologies, and practices that use natural systems—or engineered systems that mimic natural processes—to enhance overall environmental quality and provide utility services including capturing, cleaning, and infiltrating stormwater; creating wildlife habitat; shading and cooling streets and buildings; and calming traffic. As a general principle, GI techniques use soils and vegetation to infiltrate, evapotranspirate, and/or recycle stormwater runoff. Green infrastructure elements are for example downspout disconnection, rainwater harvesting, rain gardens, planter boxes, bioswales, permeable pavements, green streets, green parking lots, green roofs, urban tree canopy, land conservation, etc.

Greywater: Untreated wastewater which has not come into contact with toilet waste. It includes used water from bathroom sinks, bathtubs, showers and clothes washers but does not include wastewater from toilets, kitchen sinks, dishwashers or laundry water from soiled diapers due to potential health issues.

Groundwater: Water beneath the surface of the ground. This Project specifically addresses groundwater caused by an underground spring unexpectedly surfacing on a property.

Hundred cubic feet: A unit used by water suppliers that represents 748.05 gallons.

In sight, in mind concept: Concept of making water infrastructures and services visible to the public. Opposite concept of "out-of-sight, out-of-mind."

Laundry to landscape system: System discharging greywater of a laundry machine to a mulch basin area for irrigation purposes. Discharge of water is lower than 250 gallons a day.

Low impact development: A storm water management and land development strategy that emphasizes conservation and the use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely reflect pre-development hydrologic functions.

Non-potable water strategies: Strategies include the use of `stormwater, rainwater, and groundwater (springs) and the reuse of greywater and A/C condensate. This is defined as such for the purposes of the Project.

One Water: A transformative approach to view, value, and manage water resources in an integrated, inclusive, and sustainable manner. One Water San Diego uniquely addresses the issues around water supply and water cycle in the San Diego region.

On-site or decentralized non-potable Water Systems: Systems that use and reuse water on-site; namely, rainwater tanks, greywater systems, A/C condensate systems, green infrastructure, etc.

Passive rainwater harvesting: The practice of slowing water down and storing it in soil and biomass.

Performance-based framework: Framework with appropriate performance criteria for on-site non-potable water reuse systems, ensuring the water quality is adequate to its use, and safeguarding the health of the users.

Pure Water San Diego: Program recycling and purifying wastewater to produce potable water, using a centralized water system. The City of San Diego's phased, multi-year program will provide one-third of San Diego's water supply locally by 2035.

Policy makers: Professionals tasked with creating new policy including State and local legislature, Governor, City Council, and Board of Supervisors.

Project: "Advancing Safe, Healthy Non-Potable Water Use" led by Public Health Alliance of Southern California, comprised of three phases: 1) study of the barriers to mainstreaming, 2) investigation of recommendations to overcome these barriers, and 3) development of a communication strategy. The Project is part of a larger planning grant "Alternative Non-Potable Water Supplies, Xeriscape Design, and Flood Prevention for Disadvantaged Communities," led by the University of California San Diego and the San Diego Housing Commission.

Public health risk-based approach: A framework that sets appropriate performance criteria and develops an appropriate structure to manage, monitor, and permit on-site water reuse systems.

Rainwater: Precipitation from rain events that is collected directly from a roof surface not subject to frequent public access. It does not include stormwater, dry weather runoff, and recycled water.

Rainwater harvesting: The capture of rainwater for reuse. Two types of methods can be distinguished: 1) active rainwater harvesting, and 2) passive rainwater harvesting.

Recycled water: Water that has been treated at the highest level required by the California Department of Health Services for water not intended for human consumption as defined by California Code of Regulation, Title 22. "Recycled water" is sometimes referred to as "reclaimed water" or "purple pipe water." It is provided by a regulated recycled water agency via a centralized reclamation facility.

Regulators: Professionals who enforce existing codes and write new codes. It includes building inspectors, engineers and professionals who work in building departments, departments of land and water quality, and department of environmental health.

Researchers: Professionals who search data and evaluate impacts of water use on the environment and the population. Organizations such as Equinox Center, San Diego Foundation, Universities are referred as research centers.

Scale jumping: Going outside the limits of the site boundary where a project is implemented to leverage better solutions.

Shallow groundwater: Groundwater located near the ground surface in an unconfined aquifer and subject to contamination from the infiltration of surface sources.

Stormwater: Precipitation runoff from rain events that flows over land and/or impervious surfaces (e.g., streets, parking lots) rather than infiltrating or being taken up by natural processes. Stormwater includes runoff from surfaces located at or below grade surface.

Trade professionals: Professionals who design irrigation, water capture systems, and landscapes. They include greywater system installers, plumbers, gutter professionals, landscape architects, and designers.

Wastewater: Water produced by human activities. It includes both greywater and blackwater.

Water budget (also called water balance): An accounting of all the water that flows into and out of a project area. This term is used in this document to represent the inputs of non-potable water (rainwater, greywater, stormwater, and A/C condensate) available on a site over a specified period of time, and the landscape or indoor needs of a site.

Water footprint: The amount of fresh water utilized in the production or supply of the goods and services used by a particular person or group.

Water literacy: knowledge about water sources, water management, and water-related issues.

Watershed: Geographical area that drains to a specified point on a water course, usually a confluence of streams or rivers, can also be known as drainage area, catchments, or a river basin.

ACRONYMS

AFY: Acre-feet per year

AWWA: American Water Works Association

BMPs: Best Management Practices

CalEPA: California Environmental Protection Agency

CalEnvironScreen: California Communities Environmental Health Screening Tool

CAP: Climate Action Plan

CASQA: California Stormwater Quality Association

CCDEH: California Conference of Directors of Environmental Health

CCI: California Climate Investments

CCR: California Code of Regulation

CES: CalEnviroScreen

CPC, Chapter 15: Alternate Water Sources for Nonpotable Applications of California Plumbing Code

CPC, Chapter 16: Nonpotable Rainwater Catchment System of California Plumbing Code

CPC: California Plumbing Code

CPUC: California Public Utilities Commission

CRIS: Climate Registry Information System

DNW: Decentralized non-potable water

DWR: Department of Water Resources

EHC: Environmental Health Coalition

EJSE: Environmental Justice and Service Equity

EMDI: Equity Metrics Data Initiative

ESJ: Environmental and social justice

FPL: Federal Poverty Level

GHG: Greenhouse gas

GI: Green Infrastructure

Global ARC: The Global Action Resource Center

gpcd: Gallons per capita per day

H&E: Health & equity

HCF: Hundred cubic feet

HPI: Healthy Places Index

IRWM: Integrated Regional Water Management

ILFI: International Living Future Institute

JRMP: Jurisdictional Runoff Management Plan

LAA: Los Angeles Aqueduct

LA County DEH: Los Angeles County Department of Public Health

LADWP: Los Angeles Department of Water & Power

LASAN: Los Angeles Sanitation

LEED: Leadership in Energy and Environmental Design

LGBT: Lesbian, gay, bisexual and transgender

LID: Low Impact Development

MDH: Minnesota Department of Health

MS4: Municipal Separate Storm Sewer System

MWD: Metropolitan Water District

MWELO: Model Water Efficient Landscape Ordinance

NBRC: National Blue Ribbon Commission

NGCIP: National Green Infrastructure Certification Program

NGO: Non-governmental organization

NPDES: National Pollutant Discharge Elimination System

NSF: National Sanitation Foundation

OEHHA: Office of Environmental Health Hazard Assessment

PPS: Program Planning Subcommittee

PRADU: Permit-Ready Accessory Dwelling Units

RGPCD: Residential gallons per capita day

RMC: Regional Stormwater Management Committee

RSF: Rate stabilization funds

RSJI: Race and Social Justice Initiative

RWQCB: Regional Water Quality Control Board

SB966: Senate Bill 966 relative to Onsite Treated Nonpotable Water Systems

SDCWA: San Diego County Water Authority

SDFSA: San Diego Food System Alliance

SDGBC: San Diego Green Building Council

SDHC: San Diego Housing Commission

SDSLI: San Diego Sustainable Living Institute

SDSU: San Diego State University

SFDBI: San Francisco Department of Building Inspection

SFDPH-EH: San Francisco Department of Public Health and Environmental Health

SFPUC: San Francisco Public Utilities Commission

SFPW: San Francisco Public Works

SGMA: Sustainable Groundwater Management Act

SPU: Seattle Public Utilities

SWRCB: California State Water Resources Control Board, often named State Water Board

TRC: The Climate Registry

TRNERR: Tijuana River National Estuarine Research Reserve

UCLA: University of California Los Angeles

UCSD: University of California San Diego

US EPA: United States Environmental Protection Agency

WEN: Water Energy Nexus (Registry)

WERF: The Water Environment & Reuse Foundation

WMA: Watershed Management Area

WMG: Watershed Management Group

WRF: The Water Research Foundation

WQIP: Water Quality Improvement Plan

APPENDIX C

REGIONAL AND LOCAL ASSETS

SELECT REGIONAL ASSETS

This table represents a compilation of regional and local assets that can play an important role in implementing the recommendations laid out in this Blueprint. This list is not exhaustive and represents just some of the potential local and regional partners. There are many other organizations that can and should be involved in a project of this scale.

ORGANIZATION	INFORMATION
San Diego Regional Water Quality Control Board (SDRWQCB) waterboards.ca.gov/sandiego/	Part of the California Environmental Protection Agency (Cal EPA). SDRWQCB is one of the nine regional water boards that comprised the California State Water Resources Control Board. SDRWQCB protects water quality and beneficial uses under the State of California Porter-Cologne Water Quality Control Act and the federal Clean Water Act. The Water Board regulates discharges of wastes into waters and to land for the protection of water resources in eleven hydrologic units (watersheds) from Laguna Beach to Imperial Beach. California Regional Water Quality Control Board Members are appointed by the Governor and confirmed by the State Senate. Board Members are appointed in Irrigated Agriculture, Industrial Water Use, Water Supply, Undesignated (Public), Water Quality, Recreation/Wildlife, Municipal Government, and County Government categories. There are currently six serving Board Members.
San Diego Integrated Regional Water Management (IRWM) waterboards.ca.gov/sandiego/	An interdisciplinary effort implemented and administered by the Regional Water Management Group (RWMG) that includes the San Diego County Water Authority, City of San Diego and County of San Diego, and is advised by the Regional Advisory Committee (RAC) that includes water retailers, wastewater agencies, stormwater and flood managers, watershed groups, the business community, tribes, agriculture, and non-profit stakeholders. The RWMG and RAC developed a vision to guide the San Diego IRWM planning approach: "An integrated, balanced, and consensus-based approach to ensuring the long-term sustainability of San Diego's water supply, water quality, and natural resources," and aimed at addressing the interrelationships and possible synergies among three individual water-related planning programs - water resource management planning, water quality and stormwater management planning, and habitat conservation planning. The IRWM encourages the integration of centralized and decentralized systems, the diversification of water resources, their efficient use and the development of local water supplies, the reliability and resilience of infrastructure systems, the enhancement of natural hydrologic processes, the protection, restoration and maintenance of habitat and open space, and the reduction of pollution to protect and enhance human health, safety, and the environment. The San Diego IRWM Program is supported by bond funding provided by the California Department of Water Resources (DWR) from Proposition 50, Proposition 84, and Proposition 1. The first IRWM Plan was published in 2007 and in total, the Region has received approximately $96 million from DWR. This has funded 67 priority projects, and the successive plan updates, including the 2019 IRWM Plan update. The San Diego IRWM goals are as follows, and apply to existing and future conditions, including climate change: 1) Improve the reliability and sustainability of regional water supplies, 2) Protect and enhance water quality, 3) Protect and enhance watersheds and natural resources, 4) Enhance resiliency to climate change for local water resources through adaptation and climate mitigation, and 5) Promote and support sustainable integrated water resource management.
San Diego Association of Governments (SANDAG) sandag.org	Association of the 18 cities and county governments. This is the region's primary public agency that serves as a public forum for regional policy decisions about growth, transportation planning and construction, environmental management, housing, open space, energy, public safety, and binational topics. SANDAG is governed by a Board of Directors composed of mayors, council members, and county supervisors from each of the 19 local governments, and is supported by an advisory committee made of representatives from Imperial County, the U.S. Department of Defense, Caltrans, San Diego Unified Port District, Metropolitan Transit System, North County Transit District, San Diego County Water Authority, Southern California Tribal Chairmen's Association, and Mexico. The Board of Directors also benefits also from the help of a professional staff of planners, engineers, and research specialists.
San Diego County Water Authority (SDCWA) sdcwa.org	Public agency that delivers wholesale water supply to retail water agencies, including cities, special districts, and a military base.
Public Health Alliance of Southern California (Alliance) PHASoCal.org	Coalition of the executive leadership in local health departments in Southern California. The Alliance builds healthy, equitable communities through upstream multi-sector policy, systems, and environmental change; and mobilizes and amplifies the Southern California local health departments' regional voice in three Priority Initiatives: Healthy Neighborhoods,; Healthy Food & Water Systems,; and Data in Action.

LOCAL ASSETS

Local Agencies	All eighteen (18) cities and county water departments and agencies (including Pure Water San Diego), and departments that work at the interface of water (bilding departments, development departments, Office of Sustainability, County Department of Environmental Health, etc.), and policy makers.
	San Diego Housing Commission
	Port of San Diego
	San Diego County Regional Airport Authority
	Water utilities and water purveyors
City Officials	City Council members, mayors, Board of Supervisors
Tradespeople	Building industry associations and developer associations
	Greywater and rainwater system installers
	Landscape design companies
Non-profit Organizations (Education and Advocacy)	Tijuana River National Estuarine Research Reserve: a local center that focuses on protection and restoration of the Tijuana River through science, research, and community outreach and education.
	San Diego Green Building Council (SDGBC): a community of building industry professionals and sustainability advocates with expertise in areas such as architecture, construction, design, urban planning, and policy. SDGCB is a locally-aligned chapter of the US Green Building Council (USGBC), as well as a partner to the International Living Future Institute (ILFI).
	San Diego Regional Climate Collaborative: a network for public agencies that serve the San Diego region. They focus on climate change planning and one of their focus areas is stormwater management. Their mission is to build capacity among the members of the network.
	The San Diego Foundation
	Global Action Research Center (Global ARC)
	San Diego Food System Alliance (SDFSA)
	San Diego Sustainable Living Institute (SDSLI)
	Solana Center for Environmental Innovation
	Community organizations (e.g., Mid-City CAN, Second Chance)
	Water-related NGOs (e.g., San Diego Coastkeeper, Surfrider Foundation San Diego County)
	Climate Change advocacy NGOs (e.g., Climate Action Campaign)
Universities	University of California San Diego (UCSD)
	San Diego State University (SDSU)
	University of San Diego (USD)

LOCAL NON-PROFIT ORGANIZATIONS

The following table compiles a list of non-profit organizations located in the San Diego region. This list is not exhaustive. It provides an overview of the landscape of the different organizations that can potentially play a role and support the development and implementation of the recommendations discussed in the Blueprint.

NAME	LOCATION	GOALS	TEAMS/PARTNERS	ACTIONS	FIELD OF ACTION
San Diego Coastkeeper sdcoastkeeper.org	San Diego	Protect and restore fishable, swimmable and drinkable waters in SD County	Scientists, activists, educators and lawyers	Community Outreach and Engagement, Education and Advocacy	Water and wastewater
Climate Science Alliance climatescienceallliance.org	San Diego	Safeguard natural and human communities in the face of a changing climate.	Scientists, educators, artists, government representatives	Community Outreach and Engagement, Education, Climate Change Research,	Climate Change, Work with Tribal Communities and Kids
San Diego Surfriders sandiego.surfrider.org	San Diego	Protect the coastline, Beach Protection	Activists, Educators, Policy Advocators	Community Outreach and Engagement, Education and Advocacy	Beach Access, Clean Water, Plastic Pollution, Ocean Preservation, Coastal Preservation
Climate Action Campaign climateactioncampaign.org	San Diego	Stop Climate Change, Advocacy for Solutions to Climate Change	Activists, Policy Advocators, Educators,	Community Outreach and Engagement, Advocacy, and Eduction	Clean Energy, Community Choice Energy, Transit, Walk and Bike, Social Equity, Urban Trees, Zero Waste, San Diego Green New Deal
Sierra Club San Diego sandiegosierraclub.org	San Diego and greater area not covered by subchapters	Explore, Enjoy and Protect the Planet	Policy Advocators, Lawyers, Educators, Activists, Scientists	Education, Outdoor activities, Advocacy	Political Endorsement, Environmental Advocacy
Subchapter: North County Coastal Group sandiegosierraclub.org/get-involved/coastal/	Coast from Del Mar to Oceanside	Explore, Enjoy and Protect the Planet	Policy Advocators, Lawyers, Educators, Activists, Scientists	Education, Outdoor activities, Advocacy	Political Endorsement, Environmental Advocacy. Act within the geographical boundaries of the subchapter
SubchapterNorth County Group (Inland) sierraclubncg.org	Inland: San Marcos, Vista and Escondido	Explore, Enjoy and Protect the Planet	Policy Advocators, Lawyers, Educators, Activists, Scientists	Education, Outdoor activities, Advocacy	Political Endorsement, Environmental Advocacy. Act within the geographical boundaries of the subchapter
San Diego Green Building Council usgbc-sd.org	San Diego	Promote sustainability in building design, construction, and operation	Engineers, Architects, Builders, Developers, Policy Advocators, Educators	Education, Advocacy, Audits, Certification, Training	Green Buildings

NAME	LOCATION	GOALS	TEAMS/PARTNERS	ACTIONS	FIELD OF ACTION
SD Environmental Health Coalition environmentalhealth.org	San Diego Chapter (State and National organization)	Achieve environmental and social justice	Community leaders, Educators, Scientists, University and school members	Education, Advocacy, Community outreach and engagement, research, community training, building knowledge, skills and solidarity	Justice, health, environment, Prevention, Public Policy Advocacy, Corporate Accountability,
Mid-City CAN midcitycan.org	San Diego, City Heights	The people of City Heights who want to make a lasting impact in this community. They gather around the top issues residents care about, forming teams of volunteers. Mid-City CAN helps organize these teams to accomplish their goals.	Residents of the Mid-City neighborhood	Civic engagement, Community outreach, education and empowerement	Food Justice, Improving Transportation, Peace Promotion, Youth Council, Leadership Development
Imperial Beach Arts Bureau facebook.com/IBArtsBureau/ imperialbeachca.gov/art	Imperial Beach	Empower artists and create community in Imperial Beach	Artists	Community engagement	Arts
Tijuana River National Estuarine Research Reserve trnerr.org	Imperial Beach	Preserve, protect, and manage the natural and cultural resources of the Tijuana River Estuary by focusing on research and education with compatible recreation and resource use	Scientists, Educators, Community Outreach	Research, Education and community outreach, Land management, Coastal Training Certification, Stewardship, Watershed Improvement,	Nature conservation, Wetlands, Watersheds
San Diego County Parks sdparks.org	San Diego County	Enhance the quality of life in San Diego County by providing exceptional parks and recreation experiences and preserving significant natural resources.	Park Rangers, Educators,	Environmental Education	Land, Plants, Nature Conservation, Kids education, Recreation
Center on Policy Initiatives (CPI) cpisandiego.org	San Diego	Create economic prosperity, sustainable communities, and a healthy environment for all	Research/Policy Analyses, Experts in economic and social justice, Community Outreach and communication, Educators	Provide the analysis, policy solutions, education, and alliances that advance social and economic justice for working people and diverse communities. Advocacy for public policy change, education, research, leadership development, communication	Economic Justice, Governing for the Common Good, Leadership & Training, Social justice
San Diego 350 sandiego350.org	San Diego	Movement to prevent the worst impacts of climate change and climate injustice	Activists, Educators, Policy Advocators	Education and outreach, public policy advocacy, and mobilizing people to take action.	Climate Change and Environmental Justice: Community Choice Energy, Advocating for strong Climate Action Plans, Community Outreach and Education, Fighting the Keystone Pipeline, Building support for a ban on fracking in California

NAME	LOCATION	GOALS	TEAMS/PARTNERS	ACTIONS	FIELD OF ACTION
Alliance of Californians for Community Empowerment (ACCE) acceaction.org/san_diego	State-wide and local chapter in SD. Local chapter based in Chula Vista	Grassroots, member-led, statewide community organization working with more than 10,000 members across California. ACCE is dedicated to raising the voices of everyday Californians, neighborhood by neighborhood, to fight for the policies and programs we need to improve our communities and create a brighter future.	Activists. Active chapters in the 4th and 8th Districts in the city of San Diego, on the west side of Chula Vista, and in National City. We continue to organize in new areas of both San Diego and South County.	Education, Public Policy Advocacy	Housing, Neighborhoods Investment, Budget Advocacy, Immigration, Worker Justice, Growing Latino voting base, Equity
The San Diego Foundation sdfoundation.org	San Diego	Provide leadership for effective philanthropy and promote community solutions through research, convenings and actions that advance the common good.	Philanthropic and local community experts	Education, Grant funding, Scholarships, Regional Disaster Recovery, Campaign for a greater San Diego Vision, Climate Research and tool development, etc.	Arts, Culture & Humanity; Civil Society and Social Innovation; Disaster Preparedness & Relief; Education, Including STEM; Environment; Food, Agriculture & Nutrition; Health & Human Services; Housing & Shelter; Public Safety Science & Technology; Youth Development
WateReuse watereuse.org/ watereuse.org/sections/ watereuse-california/chapters/ san-diego-chapter/	National organization. Based in Virginia. California Section and Chapter in SD	Trade association that focuses solely on advancing laws, policy and funding to increase water reuse. Our niche strategy sets us apart from other organizations in the water industry.	Water utilities, businesses, industrial and commercial enterprises, not-for-profit organizations and associations	Public Policy Advocacy, Education	Recycled Water, Water Reuse, Potable and Non-Potable Water
WildCoast wildcoast.org	North America and Chapter in SD	Community-based organization committed to conserving and sustaining coastal and marine ecosystems and wildlife	Educators, Scientists	Education, Conservation, Research, Outreach	Climate Change, Coastal Wetlands, Coral Reefs, Mangroves, Oceans, Sea Turtles, Whales, Wildlands
North County Climate Change Alliance	Vista	A volunteer-driven, grassroots, non-partisan, non-profit organization working to empower people and organizations in North San Diego County to take action on climate change through education, collaboration and mobilization	Scientists, climatologists, renewable energy experts and project planners, community activists and leaders, Educators, Activists	Education, Community outreach and engagement,	Climate Change
Alliance San Diego alliancesd.org	San Diego	A community empowerment organization doing local work of national significance in the fields of civic engagement, human rights, educational equity, and tax and fiscal policy.	Community leaders and builders, Educators, Scientists, Lawyers,	Leadership Development, Policy Advocacy, Communication Strategies, Civic Engagement	Human rights, Inclusive democracy, Educational equity, Tax reform

NAME	LOCATION	GOALS	TEAMS/PARTNERS	ACTIONS	FIELD OF ACTION
Citizen's Climate Lobby citizensclimatelobby.org	International Org. with several Chapters in the San Diego region	Grassroots advocacy organization focused on national policies to address climate change.	Activists (non-partisans), Community leaders, educators	Public Policy Advocacy, Education	Climate Change, Carbon Pollution
San Diego Food System Alliance sdfsa.org	San Diego	Develop and maintain an equitable, healthy and sustainable food system for the benefit of all people in San Diego County.	Food and Agriculture Experts, Scientists, Educators. Representatives of the food system including: distribution, health, food security, philanthropy, production, education and government.	Advocacy, Educational campaigns, Community events and Special initiatives.	Environment, Equity, Economics, Education. Healthy Food Access, Reducing Barriers to Farming, Food Recovery, Urban Agriculture, Sustainable and Local Seafood and Good Food Procurement.
UCSD Student Sustainability Collective studentsustainability.ucsd.edu	San Diego	Community, collaboration, and empowerment to foster a culture of responsibility and to ensure a sustainable future	Students	Education	Sustainability
Food and Water Watch foodandwaterwatch.org	National (with regional chapters in California)	Champion healthy food and clean water for all.	Leaders in activism with a focus on social justice and sustainability	Public Policy Advocacy, Education, Legal action, Organizing for change, Research & Policy analysis	Food and Water, Sustainability
I Love A Clean San Diego ilacsd.org	San Diego region	Lead and inspire our community to actively conserve and enhance the environment through example, outreach, and local involvement. A zero waste, litter-free, and environmentally engaged San Diego region	Educators, Scientists	Education, wokshops, community events, education and training for businesses, classroom presentations, fieldtrips, waste audits,	(Zero) waste, clean-up events, clean water, clean land
San Diego Regional Climate Collaborative sdclimatecollaborative.org	San Diego region	A network for public agencies that serves the San Diego region to share expertise, leverage resources, and advance comprehensive solutions to facilitate climate change planning. Members inspire leadership on climate action planning to ensure a vibrant economy, healthy environment and resilient communities in the San Diego region.	Local jurisdictions, public agencies (NCTD, Port of San Diego, SD Regional Airpot Authority, Center of Sustainable Energy...), universities	Communicating on climate science, working on regional solutions, building capacity within San Diego regional public agencies through networking, training and partnerships with academic institutions, businesses, and non-profits.	Enegry Efficiency, Coastal Resilience, Climate-Samrt Water, Climate-Action Planning
SWPP Internship swpppinternship.com	San Diego region	The SWPPP Internship™ Program is designed to be confidently delivered by a classroom teacher as part of an environmentally-focused STEM program that meets both Common Core and Next Generation Science Standards.	Educators, scientists, environmental leaders	Educate teachers and youth	Stormwater, water quality, pollution

APPENDIX D

HEALTH & EQUITY CHECKLIST

INWARD (ORGANIZATIONAL) FACING STRATEGIES

Develop explicit organizational commitments and actions to integrate health and equity (H&E) objectives into the organization's structure:

- ☐ Include H&E objectives in mission and vision statements
- ☐ Conduct assessments that evaluate allocation of resources and
- ☐ Make financial investments in low-income communities
- ☐ Train and create a dedicated in-house H&E team
- ☐ Create H&E action plans
- ☐ Develop and implement H&E programs
- ☐ Conduct a systematic assessment of organizational programs, services, and policies to evaluate how they address H&E issues

Assess the make-up of the organization's workforce and leadership:

- ☐ Evaluate if the workforce reflects the community
- ☐ Assess whether leadership reflects the local community (the executive team, and the elected or appointed board)
- ☐ Revise recruitment and selection procedures to place an emphasis on equity in hiring decisions
- ☐ Challenge leadership to assure H&E issues are addressed
- ☐ Develop an emerging leader program to create a strong pipeline of future leaders
- ☐ Train the workforce on H&E issues (unconscious bias, racial injustice, cultural humility, historic imbalances of power and health inequities, etc.)
- ☐ Provide staff with the appropriate tools to achieve equity goals
- ☐ Convene a committee on community H&E

OUTWARD (COMMUNITY) FACING STRATEGIES

Engage community members:

- ☐ Create a Community Advisory Board
- ☐ Seek input from the community when designing programs
- ☐ Ensure community involvement in organizational decision-making processes before, during, and after program implementation
- ☐ Improve organizational outreach to underrepresented communities through tailored messaging and education
- ☐ Create goals for achieving a certain level of community participation

Engage in practices that promote H&E in the community:

- ☐ Ensure public transparency in the decision-making process
- ☐ Encourage the community to hold the organization accountable
- ☐ Develop or embrace programs which enhance community equity in contracting processes
- ☐ Use data and grant scoring criteria to elevate and award H&E considerations in project and partner selection

APPENDIX E

LIST OF CO-BENEFITS

The following table summarizes some co-benefits that can be achieved when addressing various aspects related to water or climate change.

CATEGORY	BENEFITS	COMMENTS	LINK
Water	Climate	Water: The Missing Link for Solving Climate Change	huffpost.com/entry/water-climate-change_b_8689890
Parks and Openspace	Cooling effect Recreation/tourism/economy/biodiversity	Researchers have found that on baking days, the ambient temperature in a green, shady park can be 17 degrees cooler than in surrounding city neighborhoods. This cooling effect can extend for a half-mile beyond the park's borders. And it's more than shade trees that are helping fight climate change. The trust says parks can help mitigate coastal flooding, capture carbon, and foster a sense of community among those that will be affected by extreme weather.	smartcitiesdive.com/news/parks-and-greenspace-must-be-part-of-any-climate-solution/556324/ nationalgeographic.com/environment/2019/05/climate-crisis-cities-turn-to-parks/
Tree Canopy	Health Climate Biodiversity		tree canopy link
Urban Forestry	Increase the ability to retain water		modbee.com/opinion/opn-columns-blogs/community-columns/article231321328.html
Community food forest	Reduce mud slides		
Small food forest farm	Increase food production Clean water Extra benefits for under-resourced communities	Increase environmental awareness, water resilience, food resilience	

CATEGORY	BENEFITS	COMMENTS	LINK
Rainwater tanks	Reduce wildfire (impact on home insurance) Increase emergency preparedness Reduce flood impact and events	Strategy used in Australia, too.	calmatters.org/articles/commentary/disaster-preparedness/
Irrigated drought tolerant landscape	Fire safety Participate to soil regeneration Support natural habitat		The Drought-defying California Garden, by Greg Rubin and Lucy Warren
Water supply diversification	Resiliency in case of droughts, exemplified by climate change Better support agricultural need Local source to reduce energy need Health: access to drinking water/hygiene and washing/cleaning (objects,things)	Based on Equinox Dashboard - Quality of Life Dashboard Take climate change impacts into account when developing long-term city and county water supply and land use plans. Find ways to reduce the energy used and cost associated with water recycling and seawater desalination as part of the effort to diversify and increase our water supply.	sandiego.edu/2050/water/regional-leaders.php
Green infrastructure, green space	Limit flooding Reduce heat islands Improve mental health/ people in street scape, slowing vehicles	Many references that link effect of climate change on increase of flood Same link to many references about the increase of temperature due to climate change The importance of greenspace for mental health Replacing Vacant Lots With Green Spaces Can Ease Depression In Urban Communities	sandiego.edu/2050/temperature/references.php ncbi.nlm.nih.gov/pmc/articles/PMC5663018/ npr.org/sections/health-shots/2018/07/20/630615148/replacing-vacant-lots-with-green-spaces-can-ease-depression-in-urban-communities
Natural habitat in urban setting	Cooling effect and shade for added health benefits Food pollination	From Equinox Dashboard: "Manage and restore natural areas in urban neighborhoods to increase shade; this can help cool buildings and paved pedestrian routes, as well as improve air and water quality."	sandiego.edu/2050/health/regional-leaders.php

CATEGORY	BENEFITS	COMMENTS	LINK
Nature protection/wetland protection	Wetland protection: sequestering carbon swimmable coastal waters	Equinox dashboard: "Protect and preserve the health of our coastal wetlands and river habitats that filter polluted runoff, keep our coastal waters swimmable and are home to thousands of plants and animals."	sandiego.edu/2050/nature/regional-leaders.php
	Health and clean water (water purification)	Equinox dashboard: "Continue developing an interconnected network of nature preserves across a variety of landscapes in our bi-national region to enhance nature's resilience to climate change and protect nature's essential benefits of clean water, clean air, high-quality food and a healthy lifestyle.	
Ecosystem and watershed protection	Water/ health/ human well-being	Equinox Dashboard: reference to: Millennium Ecosystem Assessment Board, 2005: Ecosystems and Human Well-Being: Synthesis. 137 pp, Washington D.C.: Island Press.	millenniumassessment.org/en/index.html
	Wetland, purifying the water		
	Flood protection		
Coastal ecosystem protection	Economic value	Equinox Dashboard: reference: Raheem, N., J. Talberth, S. Colt, E. Fleishman, P. Swedeen, K.J. Boyle, M. Rudd, R.D. Lopez, T. O'Higgins, C. Willer, and R.M. Boumans, 2009: The Economic Value of Coastal Ecosystems in California. 43 pp, United States Environmental Protection Agency.	cfpub.epa.gov/si/si_public_file_download.cfm?p_download_id=493286&Lab=NERL
	Buffer zones to protect the cost (insurance cost, homes built on the shoreline)		
Stormwater management, through GI, through capture and harvest	Beach water quality	Impacted by rainfall	sandiego.edu/soles/hub-nonprofit/initiatives/dashboard/water-quality.php
Restoration of vacant urban land	Reduce violence, crime and fear	Citywide cluster randomized trial to restore blighted vacant land and its effects on violence, crime, and fear	pnas.org/content/115/12/2946

APPENDIX F

LIST OF RESOURCES

The following are the resources compiled during the preparation of the Blueprint. They have been organized by chapter for ease of use, and can be shared as hand-outs.

SECTION 1

Charting 5 Waterways for Successful Decentralized Non-Potable Water Systems

Chapter 1: Elevate Decentralized Non-Potable Systems

ON-SITE NON-POTABLE WATER SYSTEMS

San Francisco Public Utilities Commission, *Blueprint for Onsite Water Systems, A Step-by-Step Guide for Developing a Local Program to Manage Onsite Water Systems,* 2014
This report details the step process to develop a local program for on-site water systems.

It includes 10 steps with implementation details:

1. Convene a working group,
2. Select the types of alternate water sources,
3. Identify end uses,
4. Establish water quality standards,
5. Identify and supplement local building practices,
6. Establish monitoring and reporting requirements,
7. Prepare an operating permit process,
8. Implement guidelines and the program,
9. Evaluate the program,
10. Grow the program.

https://www.sfwater.org/modules/showdocument.aspx?documentid=6057

San Francisco Public Utilities Commission, *Using Water Wisely: The Non-Potable Water Program,* 2012
https://www.sfdph.org/dph/hc/HCCommPublHlth/Agendas/2012/June%2019/non%20potable%20h20%20fact%20sheet.pdf

William J Worthen Foundation, *Onsite Nonpotable Water Reuse, Practice Guide,* 2018
Practice Guide: Report for developers, building owners and designers and engineers. It is a roadmap from design to operation and maintenance of water reuse systems.

This report is a key resource to explain and provide examples of the following aspects:

- Fit-for-purpose,
- Flowcharts to handle water supply and wastewater in a building,
- Water balance (Chart sorting out water sources by water quality and paths to treatment and reuse),
- Key points about "how to talk about water reuse" depending on the audience,
- Description of the implementation process for designers and developers,
- Description of treatment process per water sources (how treatment systems function and what type of water they can treat).

https://static1.squarespace.com/static/5c73f31eb10f25809eb82de2/t/5d62f94154372300016bf9bb/1566767439639/WaterReuseGuide_FINAL.pdf

International Living Future Institute (ILFI)
Third party organization that provide building, community and material certifications, respectively Living Building Challenge, Living Community Certification, and Living Product Certification.

One of their imperative of the Living Building Challenge is mimicking nature and promoting ecosystem regeneration.

"The Living Building Challenge (LBC) calls for the creation of building projects that operate as cleanly, beautifully, and efficiently as nature's architecture. The LBC is the built environment's most rigorous performance standard. As a standard, it provides a holistic approach to high-performance building that aims to address health, community, equity, energy, water, and beyond."

https://living-future.org/

International Living Future Institute (ILFI), *Advocating a Living Future, Advocacy Resources: Water Regulation for Resiliency,* 2015
Overview of water regulation in the US and introduction to Net Positive Water (one of the goal required by the Living Building Challenge). It describes various policy related to on-site non-potable water systems with examples of existing policies.

https://living-future.org/wp-content/uploads/2016/10/Advocating_A_Living_Future.pdf

International Living Future Institute (ILFI), *Toolkit for Policy Leadership,* 2015
This report provides two tools:

1. A model incentive ordinance and how to develop one with policymakers, and
2. A model municipal commitment template (guide to begin the process of developing a municipal commitment with local jurisdiction)

It provides a list of different incentives that can advance green buildings and can potentially be adapted to water challenges. Incentives come with a list of examples (jurisdictions where it has been used) and case studies. The report provides also an actual model ordinance that can be applied.

Model Municipal Commitment Template: Municipalities can demonstrate leadership by committing to certify their own projects under the Living Building Challenge and/or the Living Community Challenge.

Programs for the city's residents and industries as well as within a City's organization. Examples are Santa Monica, CA and King County, WA.

Having a third party organization/ certification can hold a jurisdiction accountable. This can be applied within the concept of Community Benefit Programs (interdependency).

https://living-future.org/wp-content/uploads/2018/04/Policy-Leadership-Toolkit-v-1.0.pdf

ILFI + Recode + EOC, *Opportunities for achieving Next generation water infrastructure in CA, OR, WA,* 2018
- Research articles are included in this report
- ILFI vision of "next generation water" to lessen the impacts of the built environment on watersheds.
- List of solutions to pass barriers and their impact on sustainability, social equity, replicability/transferability, return on investment, timeline for change to occur.

https://living-future.org/wp-content/uploads/2018/01/ILFI_WaterPolicyGuide.pdf

Arch Nexus, *Mapping Water Re-use in California,* 2017
https://living-future.org/wp-content/uploads/2019/01/CALIFORNIA-WATER-RE-USE-MAP.pdf

Center for Sustainable Infrastructure, *A Northwest vision for 2040 Water Infrastructure,* 2017
This report studies the challenges of the northwest region and provides solutions: Smart Technology, Green Infrastructure and Micro-infrastructure (decentralized solutions).

They discuss a new model and investment strategy with tools such as Value Planning, Asset Management 2.0 and considering the triple bottom line, using a rate-based financing approach for utilities to plan their financial structure and take into account affordability.

The report provides the top 5 things for water, wastewater and stormwater utilities and agencies to do (p.43):

1. Implement the New Investment Discipline

2. Get on a Glide Path to Rate-Based Financing
3. Bridge Silos and Forge Creative Cost-Share Partnerships
4. Commit to Capacity and Innovation
5. Tap Private Innovation

and the top 5 things for water policymakers to do (p.48):

1. Align on Principles
2. Set Goals, Get Lean
3. Regulate to Performance, Manage for Outcomes
4. Support Local Capacity Building
5. Strategically Invest in Infrastructure Jobs

https://www.evergreen.edu/sites/default/files/CSI-2040-Water-Report.pdf

United State Green Building Council
https://new.usgbc.org/

NON-POTABLE WATER REUSE

Georgia, Department of Natural Resources, *Guidelines for Water Reclamation and Urban Water Reuse,* 2012
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1. Quantify the volume of SW that can be captured and stored on public lands and used in the SD Region.
2. Identify constraints and opportunities for a range of SW capture and use alternatives to provide a management tool in the development and planning of similar projects.
3. Assess the feasibility of implementing the potential use alternatives on a near-, mid-, and long-term basis.

The study is done based on the observation of the current situation: need to address flooding issue, public safety concerns, and water flow and quality requirements.

Alternatives suggested by the study:

A. Injection or infiltration to designated groundwater basins for water supply.
B. Infiltration to groundwater to restore natural hydrology and, by extension, to restore biological beneficial uses.
C. Irrigation to be used on site or at nearby parks, golf courses, or recreational areas on public parcels (irrigation by sprinklers is part of this option).
D. Small scale on-site use for irrigation and other private use on private parcels (it is about rain barrels).
E. Flow-through to sustain vegetation in natural treatment system (wetland treatment) and/or restoration sites (natural treatment systems). Brook may provide additional information to point out the discrepancies in vision/perspective.
F. Controlled discharge to waste water treatment plants for solids management during low flows (Dry weather flow diversion to wastewater treatment plants).
G. Controlled discharge to wastewater treatment plants for indirect potable use.
H. Controlled discharge to waste water treatment plants for recycled water use.

The report emphasizes the need for storage to address large quantity of water captured during rain events, the need for treatment for potential re-distribution. The setup of the framework does not provide a vision for restoring water cycle. However the conclusions are presenting on-site reuse with projects that implement treatment wetlands (flow-through, on-site capture, nature-based solution), small scale private use of RW, injection to groundwater and infiltration for hydrology (GI) as near- and mid-term feasible projects. The projects with large infrastructure for indirect potable use, recycled water use, irrigation of large parcels via sprinkler systems (need treatment) are overall long-term projects.

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This book has become a reference in the field of rainwater harvesting. It teaches how to holistically integrate this concept at the scale of a single-family home. This book provides the know-how to install systems, and design the appropriate landscape. The author re-thinks entirely how we use water and provide knowledge for a mindset shift around water. It is also a good introduction to stormwater capture in a neighborhood.

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Generating community benefits from infrastructure projects is gaining recognition as good business practices.

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Chapter 2: Address Upcoming State Requirements for On-Site Treated Non-Potable Water Systems at a Regional Level

US Water Alliance, *National Blue Ribbon Commission*

The National Blue Ribbon Commission (NBRC) has been created by the US Water Alliance and is comprised of experts from water agencies and departments in the USA.

"The National Blue Ribbon Commission advances best management practices to support the use of onsite non-potable water systems within individual buildings or at the local scale. They are committed to protecting public health and the environment, and sustainably managing water—now and for future generations."

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This report frames guidance for regulating and designing decentralized non-potable water (DNW) systems for stormwater, rainwater, greywater, blackwater, domestic wastewater, foundation drainage water, and condensate reuse. These systems are considered at four different scales: multi-residential, commercial, mixed-use buildings and district scales - a district is a defined service area for a DNW system that covers multiple properties and may cross the public right-of-way. Only non-potable end-uses are addressed and include toilet flushing, clothes washing, unrestricted-access irrigation, dust suppression, and cooling towers.

The NBRC presents an evaluation of the risk for water contamination and human exposure to contaminants, as well as their suggestion for a risk management structure, a methodology to develop and implement water quality performance criteria, and the role and responsibilities of the regulatory authorities. This risk management structure is suggesting a shift in addressing health protection, moving away from a prescriptive code-based approach to a structure that aims at reducing the risk of exposure and contamination considering the size and type of the systems, the water quality and health criteria.

» **Risk management structure**

This framework established a structure to assess public health risks of exposure to pathogens and determine the appropriate management needs; this structure aims at being flexible enough to be adapted to regulatory, risk assessment methodologies, and technology advances. Four factors are considered to define the management categories: 1) the number of people served by a DNW system; 2) the complexity of the treatment system; 3) the likelihood of human exposure; and 4) the concentration of pathogens in the water sources. The NBRC used these management categories to define and detail the risk control requirements, the accountability and oversight needs.

» **Water quality and treatment systems**

A major component of this framework is the concept of Pathogen Log10 Reduction Targets (LRTs). Although this approach is new for DNW systems, it is widely accepted for centralized recycled water and potable water reuse. LRTs are performance criteria that need to be achieved by water treatment chains to limit the risk of infection. A 1-log reduction means the number of pathogens is 10 times smaller. A system that performs to reach a 5-log reduction will reduce the number of pathogens contained in water by 100,000-fold."

The report studied that the risk of exposure to pathogens is a probability that depends on volume of water ingested, frequency of the exposure, and the number of pathogens. This risk of exposure leads to a risk of infection that roughly corresponds to the tolerable level of infection per person per year (ppy) established by the World Health Organization (WHO). The LRTs recommended by the NBRC report are based on a range of tolerable risk used by the U.S. Environmental Protection Agency (U.S. EPA) for both voluntary and involuntary exposures, that corresponds respectively to a risk of infection of 10-2 ppy and 10-4 ppy. LRTs are established for specific pathogens (i.e. enteric viruses, parasitic protozoa, and enteric bacteria) for each source of water. The higher the water contamination, the higher the target. For example, it is recommended to achieve a target of 6-log reduction of enteric viruses for indoor use of greywater in order to keep the risk of infection by involuntary exposure below 10-4 ppy. The report established the LRTs for indoor and outdoor use of blackwater, greywater, stormwater, and roof runoff water.

A commonly used approach to reach the adequate LRTs is to design a system with multiple barriers. A non-potable water system can use a number of unit processes and each process acts a barrier to accomplish a treatment. This multiple barrier approach is known to improve the reliability of the treatment system through process redundancy, robustness and resilience. Each barrier has a cumulative effect that will improve the overall performance. In the event of a reduction in performance of a unit, the other units will mitigate this reduction and help ensure the treatment train keeps performing as required.

» **Regulatory oversight, permitting and responsibilities**

Through this study, the NBRC developed a framework establishing a risk management structure that helps determine the level of regulatory oversight and requirements. Roles and responsibilities of various entities are discussed based on the risk management structure and requirements to minimize the public health risks. The report also addressed the needs for permitting, monitoring and reporting and how the role and responsibilities of local entities can be identified to fit the characteristics of the region. They extensively discussed the different processes of permitting, validating and evaluating, suggesting recommendations to implement this framework. This work helps create or restructure the adequate organizational flow of the different agencies that are involved in the permitting and regulating process. Lastly, the NBRC developed model ordinances, rules and programs that can ease this implementation by local jurisdictions.

This extensive work can serve as a model for public agencies of the San Diego region to develop and implement a public health risk-based framework for on-site non-potable water systems and address the new state requirements.

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This guidebook establishes water quality criteria and standards for ONWS and presents pathways for implementation and management of these water systems at the local and/or state level.

http://uswateralliance.org/sites/uswateralliance.org/files/NBRC%20GUIDEBOOK%20FOR%20DEVELOPING%20ONWS%20REGULATIONS.pdf

US Water Alliance, National Blue Ribbon Commission, *Model State Regulation for Onsite Non-potable Water Programs*

Template state legislation for establishing regulatory programs for on-site non-potable water systems. This document is intended to be used in conjunction with A Guidebook for Developing and Implementing Regulations for Onsite Non-potable Water Systems and the model program rules.

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US Water Alliance, National Blue Ribbon Commission, *Model Local Ordinance for Onsite Non-potable Water Programs*

Template local ordinance for establishing regulatory programs for onsite non-potable water systems. This document is intended to be used in conjunction with A Guidebook for Developing and Implementing Regulations for Onsite Non-potable Water Systems and the model program rules.

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Model program rules should be established alongside state or local legislation, and regulators should modify them to meet the needs of their communities. These model program rules provide specific details on implementation of an ONWS, including system design criteria, permitting, cross-connection control, reporting, notification, and enforcement. Reference A Guidebook for Developing and Implementing Regulations for Onsite Non-potable Water Systems for additional information.

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Chapter 3: Ensure Data-driven Decision-Making

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https://www.waterboards.ca.gov/lahontan/water_issues/programs/climate_change_adaptation/

San Diego Food System Alliance, *Catalyzing Carbon Farming in San Diego County*
http://www.sdfsa.org/carbon-farming
https://static1.squarespace.com/static/54b30bbae4b0fc4c2291385e/t/5b05d8f4758d4649fa910904/1527109930713/Climate_Friendly_San_Diego.May2018.web.notsearchable.pdf
https://static1.squarespace.com/static/54b30bbae4b0fc4c2291385e/t/5b05db881ae6cfd11f6ffe66/1527110540840/Opportunity_of_Carbon_Farming_in_San_Diego_County.pdf

Huffpost, *Water: The Missing Link for Solving Climate Change,* 2016
https://www.huffpost.com/entry/water-climate-change_b_8689890

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https://www.latimes.com/local/california/la-me-ln-mega-storm-dam-failure-20190218-story.html

U.S. Climate Resilience Toolkit
https://toolkit.climate.gov/

San Diego Climate Collaborative, *Challenges and Opportunities for Climate-Smart Stormwater Management in San Diego,* 2017
https://digital.sandiego.edu/cgi/viewcontent.cgi?article=1008&context=npi-sdclimate

Climate Science Alliance, *San Diego County Ecosystems: The Ecological Impacts of Climate Change on a Biodiversity Hotspot*
https://www.climatesciencealliance.org/sdc-ecosystems-assessment

Climate Action Campaign, *Climate Action Plans 101*
https://www.climateactioncampaign.org/climate-action-plans-101/

U.S. Global Change Research Program, *Fourth National Climate Assessment,* 2018
https://nca2018.globalchange.gov/

ICLEI, USA, Local Governments for Sustainability, *Greenhouse Gas Protocols*
http://icleiusa.org/ghg-protocols/

Fast Company, *Cities Should Think About Trees As Public Health Infrastructure,* 2017
https://www.fastcompany.com/40474204/cities-should-think-about-trees-as-public-health-infrastructure

United States Environmental Protection Agency, *Using Trees and Vegetation to Reduce Heat Islands*
https://www.epa.gov/heat-islands/using-trees-and-vegetation-reduce-heat-islands#1

Chapter 5: Leverage Art for Community-driven Water Projects

STUDIES OF IMPACT OF USING ART IN WATER- AND ENVIRONMENT- RELATED PROJECTS

US Water Alliance, *Advancing One Water through Arts and Culture: a Blueprint for Action,* 2018
http://uswateralliance.org/sites/uswateralliance.org/files/publications/uswa_artsculture_FINAL_PAGES_RGB_0.PDF

Helicon Collaborative, ArtPlace America, *Farther, Faster, Together. How Arts and Culture Can Accelerate Environmental Progress,* 2018
Report studying how arts can help support environmental progress

Creative Placemaking refers to "a collaborative process by which we can shape our public realm in order to maximize shared value." It is a process to create an ethic of place.

Cultural ethics in creating environmentally-oriented creative placemaking: they vary with projects and communities but basic guidelines include being aware of potential power dynamics, ensuring trauma is safely and responsibly addressed when uncovered, equitably recognizing and compensating community members for their contribution, and building the capacity of the community to sustain the changes over time. (P.14)

5 priorities:

1. Arts and Culture can make environmental issues personal, emotional and salient. It can show what sustainability can actually look and feel like
2. Building community cohesion, identity, power and leadership/ Creating inclusive processes for dialogue and co-creation
3. Bridge scales: Arts can help connect local and personal experiences with the larger contexts
4. Enrich and activate the built environment - beautification of buildings through arts and cultivation of understanding why it matters to have sustainable buildings, and practices. What is not seen is forgotten and not valued by people. If a place does not flood anymore due to improvement, people will forget this issue and not value the improvement. Arts can support the true value of sustainable changes. Arts can help solve issues and provide economic and social benefits, improving quality of life. It can support the creative process of reimagine places that have been damaged and communities that have been disengaged. (see below water bar example)
5. Arts and Culture can help create new economic value or reveal latent value. Example that is given: a farm on a lot that developers couldn't get a viable return on investment. Value was raised by the creation of a farm, that was "enhanced" with murals, sculptures, performances + creation of new jobs for local residents

Priorities to address specific environmental issues: Climate Adaptation and Resilience; Energy; Water; Land; Waste; and Toxic pollution

Examples: The Fargo Project, and the Water Bar

https://www.artplaceamerica.org/view/pdf?f=/sites/default/files/public/pictures/environment.pdf

National Endowment for the Arts, *How to do Creative Placemaking. An Action-Oriented Guide to Arts in Community Development,* 2016
Explanation about community displacement: large development projects were implemented without regard to the displacement of people and business. That is now recognized as an inequitable approach and cities and planners now look for ways to implement planning that encourages development without displacement. Implementation of Community Benefits Agreements

"At its broadest sense, equitable development must balance the ideas of change as an inevitable process (placemaking) and community resiliency as a necessary condition (placekeeping). Creativity as manifested through the arts can leverage culture as a resource to make placemaking and placekeeping more effective and equitable. This duality is the equity opportunity."

Report describing how arts is critical is creating creative placemaking, helping cities, planners and community members find common ground. It support the creation of a shared identity, sense of belonging. It helps also prevent displacement of communities when neighborhoods are being invested in for development or redevelopment

https://www.arts.gov/sites/default/files/How-to-do-Creative-Placemaking_Jan2017.pdf

Helicon Collaborative, ArtPlace America, *Farther, Faster, Together: How Arts and Culture Can Accelerate Environmental Progress,* 2018
A report discussing the importance of art in supporting environmental progress. Notably, it describes the need for new thinking to create a new and more sustainable socio-economic system. Leaders in this movement include the Democracy Collaborative, Natural Capital Solutions, the New Economy Coalition, the Business Alliance for Local Living Economies (BALLE), the Ellen MacArthur Foundation, Movement Generation, and Green for All.

https://www.artplaceamerica.org/view/pdf?f=/sites/default/files/public/pictures/environment.pdf

Ann Markusen, Anne Gadwa, *Creative Placemaking, National Endowment for the Arts,* 2010
https://www.arts.gov/sites/default/files/CreativePlacemaking-Paper.pdf

Helicon Collaborative, *Not Just Money: Equity Issues in Cultural Philanthropy,* 2017
http://notjustmoney.us/docs/NotJustMoney_Full_Report_July2017.pdf

POLICIES, INITIATIVES AND PROGRAMS

San Francisco Art Enrichment Ordinance
Ordinance stated that 2 percent of construction cost shall be used for art enrichment in public buildings, parks and transportation improvement projects

Downtown plan has requirements for developers to provide publicly accessible open space; the goal is to provide sufficient open space in quantity and variety in a dense area. Also SF has a 1 percent art program for projects involving new building or the addition of 25,000 sqft in the Downtown and nearby neighborhood; it requires to allocate 1 percent of construction cost to arts.

Example of what SFPUC do to comply with the art enrichment ordinance

https://www.sfartscommission.org/content/art-enrichment-ordinance
https://sfplanning.org/privately-owned-public-open-space-and-public-art
https://sfwater.org/index.aspx?page=655

City of San Diego, San Diego Municipal Code, Chap. 2, Art. 6, Div. 7 *Commission for Arts and Culture*
https://docs.sandiego.gov/municode/MuniCodeChapter02/Ch02Art06Division07.pdf

Philadelphia Water Department, *Philly Water Art*
Examples of what Philadelphia Water Department does to promote art and water, through their Philly Water Art program.

http://www.phillywatersheds.org/phillywaterart

Metropolitan Water Reclamation District of Greater Chicago, *Chicago Artists Month Art Installation Celebrates Phosphorus Recovery,* Press Release, 2015
Example of an artwork celebrating the treatment process of Phosphorus recovery done at the Stickney Water Reclamation Plant in Chicago

https://www.mwrd.org/irj/go/km/docs/documents/MWRD/internet/News&Media/Newsroom/Media/Press_Releases/2015/15_1029_Art_Phosphorus_Cycle_P152.pdf

Minneapolis, *Water Bar*
A collaborative leadership that is creating a network of people and projects around water. A bar where they serve water and host public event.

It is an art project that engages people in sharing personal stories around water. The place is a "bar" where they serve water from different sources around the state

Goals: promote human connections, engage people with water issues across geographical, social and political divides, engage conversation and share personal stories and experiences, support diversity.

A place where people such as public officials, ecologists, activists, artists, and community members, serve water from various sites

around the state are "Water Tenders" and encourage to "serve water" and discuss with the general public in a way that is informal, fun, playful, and that allows diverse people to talk together

This idea is now sought after by other environmental organizations to create bridges between stakeholders.

"Water Bar is now a sought after resource and creative partner for civic and governmental organizations including the State Governor's office, the City of Minneapolis Office of Sustainability, environmental organizations, watershed districts, and others statewide as they look to raise public awareness and solve complex water challenges by working across sectors. Water Bar has also become a community hub for artists and community activists looking to form collaborations, and to develop new opportunities to work within broader water systems."

https://www.water-bar.org/
https://www.artplaceamerica.org/view/pdf?f=/sites/default/files/public/pictures/environment.pdf

Rachel Asleson, Anna Cunningham, Mrill Ingram, *Integrating Artists and City Planning. THE FARGO PROJECT Lessons Learned,* 2015

Example of An artist-led community based approach to design and rethink infrastructure and city building projects and eventually the entire watershed.

"1. Work with an artist early, and give them leadership authority, prior to problem identification and definition, to lead to a more dynamic project."
2. The typical hierarchical organization model needs to change to a predominant horizontal structure with leaders integrated within to allow for easier access to bottom up communication.
3. The role of staff and that of volunteer can overlap. Sometimes it is hard to determine if interest for the project comes out of career motivation, or community shaping motivation or both. Whether volunteer, expert or consultant, passion has to connect to the project for success.
4. Dedicate vision keepers to defend and maintain the public engagement process. Vision keepers as leaders of the project help communicate and translate the vision as members come and go within the project. An element of the vision keeper also needs to be pragmatic in order to understand the constraints involved; there is a balance of logic and imagination.
5. The City provided an honorarium for local artists engaged in the public project. There was an intentional decision to set the example the City is willing to pay artists for their time and ideas.
6. Cultivate relationships. In community planning, it is important to focus on relationships first and outcomes second. Meet people where they are and meet their needs.
7. Practice deep listening and compassion for good relationship building. Listen for opportunities to connect partnerships and bridge needs to foster more allies. Partnerships that are multipurposed and multi-serving will grow the project and help sustain it.
8. Develop activities integrated into existing programs or build on the shoulders of existing partners. This provides a depth and sustainability to the project.
9. The project management style has to be adaptive and reiterative, focused on context-sensitive solutions appropriate and customized for the surroundings.
10. Design with, not for.
11. Provide an activity with an educational component for learning when trying to encourage participation and engagement in order to shape and influence the community values. This connection could replicate in the community.
12. Listen for opportunities to connect partnerships and bridge needs to foster more allies. Partnerships that are multipurposed and multi-serving will grow the project and help sustain it.
13. Build in project-wide experimentation to allow for flexibility, adaptability, and uncertainty. For budgetary purposes, it includes bringing in contingency for failure.
14. A public communication specialist is needed to keep the communication active to build community interest and capacity. Building outreach and community awareness takes time, energy and clear messaging.
15. Integrate the project's approach into existing government structure and the parameters that come with typical project management such as time and resources."

http://www.thefargoproject.com/wp-content/uploads/2017/08/IntegratingArtistsCityPlanningTheFargoProjectLessonsLearned.pdf

The Port of San Diego, *Waterfront Arts & Activation*
https://www.portofsandiego.org/experiences/waterfront-arts-activation

San Diego International Airport, *The Arts Program*
http://arts.san.org/

Climate Science Alliance, *Climate Kids Travelling Trunk program*
https://www.climatekids.org/traveling-trunk

City of San Diego, Public Art, *Public Art Transforms the Built Environment of San Diego and Enhances Public Spaces*
https://www.sandiego.gov/arts-culture/publicart/

Voice of San Diego, *Every Piece of Public Art in San Diego, Mapped,* 2016
https://www.voiceofsandiego.org/topics/arts/every-piece-of-public-art-in-san-diego-mapped/

City of Carlsbad, Municipal Code, *Appropriation for arts*
http://www.qcode.us/codes/carlsbad/?view=desktop&topic=2-2_18-2_18_110

Encinitas Advocate, *Encinitas exploring city funds for public art,* 2015
https://www.delmartimes.net/encinitas-advocate/art/sdea-encinitas-public-funds-art-2015nov19-story.html

Port of San Diego, *Waterfront Arts & Activation*
https://www.portofsandiego.org/experiences/waterfront-arts-activation

San Diego International Airport Authority, *The Art Program*
http://arts.san.org/

AN ETHIC OF PLACE

Occidental Arts Ecology Center, *At the Occidental Arts & Ecology Center, art and ecology are two aspects of the same whole*
https://oaec.org/about-us/art-and-ecology/

Ingrid Leman Stefanovic, *Negotiating an Ethic of Place in a Globalizing Society,* Ekistics, Globalization and Local identity, 2006, Vol. 73, No. 436/441, pp. 57-61
https://www.jstor.org/stable/43623722?seq=1#page_scan_tab_contents

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https://link.springer.com/content/pdf/10.1057%2Fpb.2011.23.pdf

Mick Smith, *An Ethics of Place, Radical Ecology, Postmodernity, and Social Theory,* 2001
http://www.sunypress.edu/p-3342-an-ethics-of-place.aspx

Project For Public Space, *What Is Placemaking?*
https://www.pps.org/article/what-is-placemaking

Israel Story, *Sacred Plants,* Webcast, Ep. 13, 2016
https://beta.prx.org/stories/269763

Pop/Arch, *Urban Placemaking Laboratory*
http://www.pop-arch.com/

In These Times, ***Street Art Used To Be the Voice of the People. Now It's the Voice of Advertisers,*** **2019**
http://inthesetimes.com/article/21732/street-art-murals-corporations-advertising-los-angeles-muralism-graffiti

ADDITIONAL RESOURCES

Helicon Collaborative, ***Mapping the Landscape of Socially Engaged Artistic Practice***
http://artmakingchange.org/wp-content/uploads/2017/09/Mapping_the_Landscape_of_Socially_Engaged_Artistic_Practice_Sept2017.pdf

Western Washington University, ***Curriculum for the bioregion on Fostering an Ethic of Place***
https://wp.wwu.edu/c4b/

Rueben H. Fleet Science Center, ***Water Exhibit***
https://www.rhfleet.org/press-room/exhibit-fleet-science-center-provides-new-look-world-water

San Diego County Water Authority, ***Education Program***
https://www.sdcwa.org/education

Cuyamaca College, Conservation Garden, ***Demonstration Site***
https://thegarden.org/

SECTION 2

Catalyzing an Equitable Water Future

Chapter1: Integrate Organizational Health and Equity Frameworks

TRANSFORMATIONAL STRATEGIES IMPLEMENTED BY JURISDICTIONS AND GOVERNMENTAL AGENCIES

City of Seattle, Public Utilities, *Equity Planning and Analysis*

Seattle Public Utilities (SPU) provides a specific program to encompass equity in their planning. One of their key points is to include Equity in the earliest stage of planning.

http://www.seattle.gov/utilities/about-us/spu-and-the-community/environmental-justice-and-service-equity/equity-planning-and-analysis-

A practical guide that provides a step-by-step process on how to develop outreach and public engagement programs is available on their website. This guide is tailored for City staff and provides a basis for Citywide training. It contains detailed questionnaires to take into account all aspects of equity.

http://www.seattle.gov/documents/departments/rsji/gre/iopeguide01-11-12.pdf

City of Seattle provides examples of projects built using the Equity Planning and Analysis developed by SPU. A list of questions that must be asked when approaching projects with an equity lens is provided. The examples showcase two types of projects: rain gardens, and toilet rebates.

http://www.seattle.gov/Util/AboutUs/SPUandtheCommunity/ServiceEquity/PlanningAnalysis/RainGardens/index.htm
http://www.seattle.gov/Util/AboutUs/SPUandtheCommunity/ServiceEquity/PlanningAnalysis/ToiletRebates/index.htm

City of Madison, *Racial Equity and Social Justice Initiative*

This program has been implemented by the City of Madison to further advance its commitment to livability and sustainability.

https://www.cityofmadison.com/civil-rights/programs/racial-equity-social-justice-initiative

The City of Madison has developed many tools that support more equity and social justice:

- An equitable hiring tool
- A process guide to identify, scope and analyze best practices
- A fast track tool to assess equity in City's departments and programs
- A comprehensive equity tool: comprehensive version of the fast track tool

The City of Madison developed and support training and learning programs to provide opportunities to employees and all community members. Tools include conferences, workshops, training centers, a database of resources, and various programs.

https://www.cityofmadison.com/civil-rights/programs/racial-equity-social-justice-initiative/tools-resources

Checklist and guide developed by the City of Madison to ensure each hiring decision is as equitable as possible. It provides templates and explanation that can be easily applied.

https://www.cityofmadison.com/employeenet/documents/human-resources/RESJequitableHiringTool.pdf

City of San Francisco, Public Utilities Commission, *Community Benefits Program: Creating Sustainable and Equitable Communities,* 2013
An Environmental Justice Policy was adopted in 2009, soon followed by a Community Benefits Policy in 2011. SFPUC partners with professional services firms that include community benefits commitments as part of their contract with SFPUC. It has enable SFPUC to leverage about $5 million of private sector funds in the form of direct financial contributions, volunteer hours, and in-kind donation to local nonprofits, small businesses and schools.

Guiding principles to define Community benefits in a Public Utility:

- Ensure Leadership at Commission and Senior Management Levels
- Develop Administrative Policies that define outcome and Guide Staff Implementation
- Embed Community Benefits in Contracting mechanisms
- Implement Innovative Programs
- Invest in Targeted Placebased Strategies in Impacted Neighborhoods
- Leverage Public/Private Partnerships

https://sfwater.org/modules/showdocument.aspx?documentid=3678

METRICS AND INDEX

City of Los Angeles, *Equity Metrics: Equity Metrics Data Initiative*
Los Angeles Department of Water and Power established metrics to track, measure, and report on how their programs are provided to all customers and residents of Los Angeles.

www.ladwp.com/equitymetrics

Public Health Alliance of Southern California, *Healthy Places Index*
Database of indicators to measure the community (health and equity) conditions throughout California. Metrics encompass environmental and social justice communities and are based on census tracts. The tool is comprised of indicators for quality of life.

https://healthyplacesindex.org/

California Office of Environmental Health Hazard Assessment, *SB 535 Disadvantaged Communities*
It provides a definition of Disadvantaged Communities according to Senate Bill 535

https://oehha.ca.gov/calenviroscreen/sb535

California Environmental Justice Alliance, *CalEnviroScreen 3.0: A Critical Tool for Achieving Environmental Justice In California,* 2018
https://caleja.org/wp-content/uploads/2018/08/CEJA-CES-Report-2018_web.pdf

GAINING A GREATER UNDERSTANDING OF ENVIRONMENTAL AND SOCIAL JUSTICE, COMMUNITY BENEFITS, AND EQUITY RESILIENCE AROUND WATER.

US Water Alliance, *An Equitable Water Future, A National Briefing Paper, 2017*
The US Water Alliance connects diverse interests to secure a sustainable water future. Through a robust program of campaigns, national dialogues, policy development, and reports they are accelerating the adoption of one water management in America. Water shapes economic growth, the environment, and the very social fabric of our communities. Ensuring that all people have access to safe, reliable, and affordable water and wastewater systems is the cornerstone of a sustainable and prosperous nation. Through this initiative, the US Water Alliance is lifting up and advancing promising practices and policies that foster equitable water management.

After discussing the challenges related to water in the US, the US Water Alliance identified three pillars for water equity, including specific issues and strategies to overcome these issues

1. Ensure all people have access to clean, safe, affordable water service

Issues encountered are affordability, access to infrastructure, and water quality.

2. Maximize the community and economic benefits of water infrastructure investment

Issues discussed are workforce development, contracting and procurement, and neighborhood revitalization.

3. Foster community resilience in the face of a changing climate

Topics addresses are planning and assessment, funding, and project delivery.

In addition of several strategies suggested to overcome the challenges, the report is supported by case studies.

http://uswateralliance.org/sites/uswateralliance.org/files/publications/uswa_waterequity_FINAL.pdf

Environmental Health Coalition, *Start Here, Start Now: An environmental justice assessment of the City of SD Climate Action Plan,* 2018

This report is a baseline to assess the efforts done to support Environmental Justice communities within the City of San Diego. Environmental Justice Communities (EJC) is the preferred term in this report to replace "Disadvantaged Communities". The City of San Diego's Climate Action Plan (CAP) recognizes "disadvantaged communities," or what is referred to herein as "EJ communities," as those ranking in the top 30 percent of the California Office of Environmental Health Hazard Assessment (OEHHA) CalEnviroScreen tool, ranked regionally, plus areas eligible for Community Development Block Grant funding (CDBG).

Equity is not equality: Effective equity policy recognizes that a larger proportion of resources need to be invested in low-income communities of color in order to remedy the damages caused by historically discriminatory policies.

Major Findings related to the Projects:

1. CAP lacks of public data on how much funding has been allocated to EJC, since its adoption.

Recommendations provided by the report: Improve Data collection, reporting and transparency; hire staff dedicated to EJC, and have support of a committee of EJ specialists.

2. EJC have less tree-canopy coverage (Climate resilience).

Recommendations provided by the report: Budget sufficient funding for Urban Forestry Program and prioritize implementation in EJC; Track tree-canopy coverage in EJC vs non-EJC; Create economic incentives to increase food gardens in EJC. ---13 percent of the City of SD has tree-canopy, while EJC average is only 10.6 percent in 2014.

3. Lack of energy and water efficiency in EJC, which means they do not benefit from co-benefits like lower costs and immediate health improvements.

Recommendations: Create a Task Force for program alignment between energy, water, resilience, housing and low emission transportation program for EJC.

The report concludes with a recommendation to include equity in the Climate Action Plan, and asks for an Equity Commitment from the City.

https://www.environmentalhealth.org/images/FINAL-Full-Doc---Web---An-EJ-Assessment-of-the-CAP.pdf

California Public Utilities Commission, *Environmental and Social Justice Action Plan,* 2019

The report encompasses several aspects of actions that can be taken by the California Public Utilities Commission (CPUC), including services related to energy and water. Water is described in their Goal 3: Strive to improve access to high-quality water, communications, and transportation services for ESJ communities.

Objectives for Water Industry:

- Consolidate small water systems and consider extending regulated water service to communities and homes reliant on failing domestic wells, to ensure safe and reliable water service where the consolidations are fair and reasonable for existing customers.
- Develop standardized tariff discounts for low-income programs.
- Expand low-income programs across all classes of water utilities.
- Develop and/or adopt a water affordability standard.
- Complete lead testing at schools in utility service territories.

Other goals are indirectly related. It includes improve outreach, promote economic development, and improve monitoring and reporting

https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/UtilitiesIndustries/Energy/EnergyPrograms/Infrastructure/DC/Env%20and%20Social%20Justice%20ActionPlan_%202019-02-21.docx.pdf

California Public Utilities Commission, *Disadvantaged Communities*
Definition of disadvantaged communities and identification with CalEnviroScreen.

List of initiatives in energy for low-income households.

Resources and information about the environmental and social justice plan.

https://www.cpuc.ca.gov/discom/

Helicon Collaborative, ArtPlace America, *Farther, Faster, Together: How Arts and Culture Can Accelerate Environmental Progress,* 2018
A report discussing the importance of art in supporting environmental progress. Notably, it describes the need for new thinking to create a new and more sustainable socio-economic system. Leaders in this movement include the Democracy Collaborative, Natural Capital Solutions, the New Economy Coalition, the Business Alliance for Local Living Economies (BALLE), the Ellen MacArthur Foundation, Movement Generation, and Green for All.

https://www.artplaceamerica.org/view/pdf?f=/sites/default/files/public/pictures/environment.pdf

National Endowment for the Arts, *How to do Creative Placemaking. An Action-Oriented Guide to Arts in Community Development,* 2016
Definition provided: "A Community Benefits Agreement (CBA) is a legally binding contract (or set of related contracts), setting forth a range of community benefits regarding a development project, and resulting from substantial community involvement." Julian Gross, CBAs: Definitions, Values, and Legal Enforceability (The Partnership for Working Families, January 2008)."

Report on how arts can support community development and how it helps build a community identity and belonging. The report provides examples of success stories.

https://www.arts.gov/sites/default/files/How-to-do-Creative-Placemaking_Jan2017.pdf

California Environmental Protection Agency and Office of Environmental Health Hazard Assessment, *Cumulative Impacts: Building a Scientific Foundation,* 2010
https://oehha.ca.gov/media/downloads/calenviroscreen/report/cireport123110.pdf

EQUITY AND OUTREACH

California Department of Water Resources, and Council for Watershed Health, Disadvantaged Community Outreach Evaluation Study: An Analysis of Technical Assistance and Outreach Methods
This report discusses how to correctly assess equity criteria and look at data from the right perspective, avoid bias and misinterpretation. It reports on outreach and community engagement strategies.

It provides a list of recommendations

- Expand the criteria used to identify disadvantaged communities.
- Improve and ease the funding process of disadvantaged communities engagement: Have small up-front funding and expedite reimbursement to ease the process.
- Coordinate DWR and IRWM efforts with CA Department of Conservation (watershed coordinators)
- Each community is unique and criteria to identify critical needs may vary. It is recommended to broaden the DWR guidance on "critical needs."

A regional needs assessment framework is defined as a mix of qualitative and quantitative methods for assessing community boundaries, and a multi-indicator assessment framework for understanding the challenges faced by each individual community (including disadvantaged communities committee and watershed health).

Lessons learned:

- The scale of engagement matters (size of the community that is reached out). It is more difficult and less successful to engage large communities than small communities.
- The vocabulary matters: terms used to designate disadvantaged communities are very important. It is recommended to work with social professionals to address this point. People do not relate easily with the wording "Integrated Water Management" and the concept can be difficult to explain or be confusing for people. It has been noted that meetings titled "Education on water" drew little attendance of general public.
- Key problems are identified by needs (see p.12-16).

https://dpw.lacounty.gov/wmd/irwmp/Docs/Prop1/DAC_Outreach%20Evaluation%20Study.pdf

The Global Action Research Center, Transformational Facilitation
http://www.theglobalarc.org/what-we-do/transformational-facilitation

Woodard & Curran, Climate Science Alliance, and Rural Communities Assistance Corporation for the Tri-County Funding Area Coordinating Committee, San Diego Funding Area Water Needs Assessment, May 2019
http://sdirwmp.org/pdf/SDIRWM_Appendix_7E_FINAL_2019.pdf

INITIATIVE TO ENHANCE EQUITY AND PROVIDE SOLUTIONS TO CLIMATE CHANGE

H. Res. 109: The Green New Deal submitted by Congresswoman Ocasio-Cortez on February 7th, 2019, 116th Congress, 1st Session
Full text of the resolution submitted to the US House of Representatives in 2019.

Green New Deal Goals:

(1) it is the duty of the Federal Government to create a Green New Deal—

(A) to achieve net-zero greenhouse gas emissions through a fair and just transition for all communities and workers;

(B) to create millions of good, high-wage jobs and ensure prosperity and economic security for all people of the United States;

(C) to invest in the infrastructure and industry of the United States to sustainably meet the challenges of the 21st century;

(D) to secure for all people of the United States for generations to come—

(i) clean air and water;

(ii) climate and community resiliency;

(iii) healthy food;

(iv) access to nature; and

(v) a sustainable environment; and

(E) to promote justice and equity by stopping current, preventing future, and repairing historic oppression of indigenous peoples, communities of color, migrant communities, de-industrialized communities, depopulated rural communities, the poor, low-income workers, women, the elderly, the unhoused, people with disabilities, and youth (referred to in this resolution as "frontline and vulnerable communities");

https://www.congress.gov/bill/116th-congress/house-resolution/109/text

New Consensus, *The Green New Deal: Mobilizing for a Just, Prosperous, and Sustainable Economy,* 2019
This report elaborates the case for an economic mobilization, providing an understanding of the reasons for a Green New Deal, and describing the potential outcomes for the communities. Equity is central to the design and goals of the Green New Deal as it is addressing the existential threat of climate change.

https://s3.us-east-2.amazonaws.com/ncsite/new_conesnsus_gnd_14_pager.pdf

ADDITIONAL RESOURCES

California Public Utilities Commission, *Environmental and Social Justice Action Plan,* 2018
http://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/UtilitiesIndustries/Energy/EnergyPrograms/Infrastructure/DC/Env%20and%20Social%20Justice%20ActionPlan_%202019-02-21.docx.pdf

California American Water Supplier Diversity Report, *Working Together, Increased Innovation & Stronger Solutions,* 2018
https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/About_Us/BusinessCommunityOutreach/GO156ProcurementPlans/2018/Supplier%20Diversity%20-%20CA_2018SupplierDiversityReport_FINAL-rev%204.22.19.pdf

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http://www.cbanw.org/cba-in-action/

Policy Link, *Getting Equity Advocacy Results: Build the Base for Equity Advocacy - Equitable Development Toolkit*
https://www.policylink.org/resources-tools/gear-build-the-base

California Environmental Justice Alliance
www.caleja.org

National Association of Minority Contractors
https://namcnational.org/

San Diego Minority Construction Coalition
http://www.sdminorityconstruction.org/

The Supplier Clearinghouse
http://www.thesupplierclearinghouse.com/

Second Chance
https://www.secondchanceprogram.org/

Grid Alternatives, San Diego
https://gridalternatives.org/sandiego

Women Delivery
https://womendeliver.org/

Women Delivery, ***Invest in Girls and Women to Tackle Climate Change and Conserve the Environment***
https://womendeliver.org/wp-content/uploads/2017/09/Deliver_For_Good_Brief_10_09.17.17.pdf

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Mary Ann Liebert, Inc., ***Disproportionate effects of global warming and pollution on disadvantaged communities,*** **Science Daily, 2009**
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https://www.liebertpub.com/doi/pdf/10.1089/env.2009.2402

Chapter 2: Establish One Water San Diego

UNDERSTANDING THE ONE WATER CONCEPT

San Francisco Public Utilities Commission, *OneWaterSF*
Webpage providing the resources about One Water SF program: vision, initiatives, outreach…

https://sfwater.org/index.aspx?page=1091

San Francisco Public Utilities Commission, *OneWaterSF*
SFPUC's main webpage to find information about OneWaterSF: water calculators, grant applications, step-by-step process, etc.

https://sfwater.org/np

City of San Francisco, *OneWaterSF Vision*
Report provides the vision for OneWaterSF and guiding principles. It describes the different practices in place with examples, how they advance their approach (opportunities, research, partnerships…)

https://joom.ag/kjKQ

City of San Francisco, OneWaterSF, *2018 Initiatives*
A more in depth report with examples of initiatives, such as reuse of non-potable water to match the right water to the right use, programs that create multiple benefits (green infrastructure, green roofs, etc.), and that support innovative businesses and partnerships to continuously improve the reuse of "waste."

https://view.joomag.com/onewatersf-2018-initiatives/0532177001490224577?short

One Water LA, *One Water 2040 Plan*
One Water 2040 pLAn: The Plan is a roadmap, connecting plans, ideas, and people to arrive at better and fiscally-responsible water planning solutions. Collaboration is the foundation of the One Water LA planning process. The Plan identifies projects, programs and policies that will yield sustainable, long-term water supplies for Los Angeles and will provide greater resiliency to drought conditions and climate change.

Key examples to develop a comprehensive stakeholder outreach, engagement and involvement

City of Los Angeles, One Water LA's Guiding Principles:

1. Integrate management of water resources and policies by increasing coordination and cooperation between City departments, partners, and stakeholders.
2. Balance environmental, economic, and societal goals by implementing affordable and equitable projects and programs that provide multiple benefits to all communities.
3. Improve health of local watersheds by reducing impervious cover, restoring ecosystems, decreasing pollutants in our waterways, and mitigating local flood impacts.
4. Improve local water supply reliability by increasing capture of stormwater, conserving potable water, and expanding water reuse.
5. Implement, monitor, and maintain a reliable wastewater system that safely conveys, treats, and reuses wastewater, while also reducing sewer overflows and odors.
6. Increase climate resilience by planning for climate change mitigation and adaptation strategies in all City actions.
7. Increase community awareness and advocacy for sustainable water by active engagement, public outreach, and education.

Large steering committee to create One Water LA and their vision plan for 2040: 14 city departments and 6 regional agencies. Very large stakeholder committee, over 500 people and 200 organizations. Lead by LA Bureau of Sanitation and LA Department of Water and Power.

Vision for LA: sourcing 50% of the City of LA's water supply locally by 2035.

Collaboration between departments to find overlap between projects. Financial advantage and coordinated effort

https://www.lacitysan.org/san/faces/home/portal/s-lsh-es/s-lsh-es-owla?_adf.ctrl-state=10w8lxrfsj_5&_afrLoop=9041224390032555#!

Water Research Foundation, *Blueprint for One Water*

The report defines One Water, provides critical steps, key elements, and case studies, and what to implement and how to implement it.

Definition of One Water: "One Water is an integrated planning and implementation approach to managing finite water resources for long-term resilience and reliability, meeting both community and ecosystem needs." It provides a framework to implement a One Water approach with case studies, tools, outcomes and challenges, and ideas to develop financing programs.

It presents a One Water cycle graphic with the different sources of water, their use and how it's all linked. The One Water framework can connect Wastewater and Recycled Water Master Plan, Climate Change Adaptation Plan, Stormwater and Green Infrastructure Management Plan, Infrastructure Resilience Plan, and Drinking Water Supply Reliability Plan.

Potential objectives: reliable, secure and clean water supplies; contribute to a livable city; protect human health; provide flood protection; minimize environmental pollution; use and reuse natural resources efficiently; provide resiliency to climate and economic changes; promote long-term sustainability, equity, and economic growth/prosperity.

The report describes the iterative process to implement the framework. The process evolves as follow 1) Setting the foundation, 2) Establishing direction, 3) Developing the framework, 4) Implementation. Each step informs the former one and the iterative process allows for improvement and flexibility along the way. The 5th step "engaging stakeholders" is an on-going step that is taken from beginning to end.

Related examples for this step-by-step process:

1. Setting the foundation
2. Establishing direction: One Water LA
3. Engaging Stakeholders: Seattle Public Utilities (SPU) and the creation of an Environmental Justice and Service Equity Division, LA Matrix and Toolbox that informed the level of stakeholder participation at each step, SF Blueprint for Onsite Water Systems, Pure Water SD Program (The City's approach to involving the Division of Drinking Water has been critical to gaining buy-in), and engaging elected officials (LA's water cabinet consisting of the mayor, a number of key department heads, general managers and outside advisors. See One Water LA Stakeholders)
4. Developing the framework: The City of LA has developed a plan called One Water LA; Denver Water developed an IRP; South Australia (SA) Water developed a One Water framework that utilized a change management approach

   Develop Financing Strategy: ReNUWIt is a useful tool (https://renuwit.org/).
5. Implementation: SF PUC example

https://www.waterrf.org/research/projects/blueprint-one-water

Water Research Foundation, *Pathways to One Water: A Guide to Institutional Innovation*

Key visionary elements that contribute to a One Water approach: Planning and Collaboration; Culture, Knowledge and Capacity; Citizen and Stakeholder Engagement; Economics and Finance; Regulation and Legislation; and Bold Leadership.

A survey has been done to know what key elements have progressed the most. Shifts and progress occurred in 4 elements out of 6: Planning and Collaboration; Culture, Knowledge and Capacity; Citizen and Stakeholder Engagement; and Bold Leadership.

This resource is part of a series with Blueprint for One Water. It details the six elements that contribute to a One Water Approach, with examples.

The end of the report provides a summary of actions that can be adapted at three levels: Initiating Your Own Transition, Influencing Others to Transition, and Supporting the Transition of Others

https://opus.lib.uts.edu.au/bitstream/10453/36477/1/ForEva_water_book_single_FINAL.pdf

US Water Alliance, *One Water Roadmap: The Sustainable Management of Life's Most Essential Resource,* 2016
Similar to the two reports written by WRF (see above). They define 6 arenas of action: Reliable and Resilient Water Utilities; Thriving Cities; Sustainable Agriculture; Competitive Business and Industry; Social and Economic Inclusion; and Healthy Waterways.

Reliable and Resilient Water Utilities: Examples that can address the water and energy nexus (innovation in technology to harness the full potential of water and energy resources), Lack of data (increase collaboration between utilities and share data)

Thriving Cities: This arena includes integrated planning across the water cycle. The use of decentralized systems is described as part (as an option) of the One Water approach. It describes how collaboration between different projects can help do the work once (such as digging a road). The use of innovative technology can help operation, maintenance, reporting, and support decision-making by providing valuable data.

Competitive Business and Industry: Businesses rank water as a top corporate concern and a priority investment for a secure supply chain. Corporate Water Stewardship: integration of water into company-wide risk assessment, strategic plans and sustainability goals. Similar to reducing carbon footprint, reducing water footprint is quickly becoming an important metric. On-site reuse is a component of a holistic approach.

Sustainable Agriculture Systems: This includes the use of techniques to reduce water consumption and better manage nutrients, limiting runoff and pollution of watersheds. It is recommended to create collaboration and partnerships between landowners, producers and cities to manage shared resources, so everyone can benefit.

Social and Economic Inclusion: It includes building a water safety net, and environmental justice concerns.

Healthy Waterways: Restoration of habitat, replenishment of aquifers, protection of water sources from pollution and depletion. Use of "citizen scientists" for ecosystem monitoring and restoration (Network of volunteers, Neighborhood Water Watch groups trained and who are given tools to monitor and educate about water protection and restoration).

Examples:

1. DC Water and its Resource Recovery Program: Technical innovation to balance the energy required by water treatment and the need for treatment that consume a lot of energy.
2. Louisville: Collaboration between utilities joining their information technology and fleet services groups in order to establish a more robust management system.
3. Combine database and projects to address needs of working on roads - A "dig once" approach: If two projects require to dig the same road, collaboration between project can save money in digging that road only once.

http://uswateralliance.org/sites/uswateralliance.org/files/publications/Roadmap%20FINAL.pdf

National Blue Ribbon Commission, *Making the utility case for onsite non-potable water systems*
Report that explains the importance of including non-potable water reuse in a One Water framework, what key elements to consider, and how utilities can play a leadership role, with case studies to illustrate these points.

http://uswateralliance.org/sites/uswateralliance.org/files/publications/NBRC_Utility%20Case%20for%20ONWS_032818.pdf.pdf

EXAMPLES OF WATER-RELATED PLANS

City of Chula Vista, *Water Stewardship Plan*
A City's vision: The community of Chula Vista is a proven steward of water resources, where local residents, businesses, utility providers, and municipal staff are proactive, accountable and engaged in protecting water supplies, eliminating water waste, and embracing the region's natural landscape.

- Important considerations: Accountability, engagement, elimination of waste, equity, community, cultural change, local landscape character, integrated approach

https://www.chulavistaca.gov/Home/ShowDocument?id=14439

City of Chula Vista, *Climate Action Plan*
https://www.chulavistaca.gov/home/showdocument?id=15586
In regard to water, the first of four strategic objectives is dedicated to Water Efficiency and Reuse. This CAP provides an excellent example of integrating water strategies. Objective 1 has three sub-objectives and each has specific strategies.

https://www.chulavistaca.gov/Home/ShowDocument?id=14439

Philadelphia Water Department, *Philly Watersheds*
Development of a 25-year plan (Green City, Clean Waters Program): Saving estimated at $4.8B from investment in green infrastructure compared to traditional gray infrastructure. Multiple mechanism to fund stormwater programs. Grant program to promote green infrastructure implementation. Greened Acre Retrofit Program for stormwater retrofit grants.

http://www.phillywatersheds.org/what_were_doing/documents_and_data/cso_long_term_control_plan

ADDITIONAL RESOURCES

US Water Alliance, *One Water Leadership Insights*
http://uswateralliance.org/one-water/one-water-leadership-insights-ghassan-korban

American Planning Association, *Integrated Water Resource Management*
https://planning.org/knowledgebase/watermanagement/

American Planning Association, *Policy Guide on Water*
https://www.planning.org/policy/guides/adopted/water/

American Planning Association, *Regional Water Planning for Climate Resilience, 2018*
https://barnstablecounty.sharepoint.com/dept/commission/team/Final%20Document%20Library/Forms/AllItems.aspx?id=%2Fdept%2Fcommission%2Fteam%2FFinal%20Document%20Library%2FPlanning%2FAPA%20Water%20and%20Climate%20Final%20Report%2Epdf&parent=%2Fdept%2Fcommission%2Fteam%2FFinal%20Document%20Library%2FPlanning&p=true

California State Water Resource Control Board, *San Diego Region - Water Quality Programs*
https://www.waterboards.ca.gov/sandiego/water_issues/programs

California State Water Resource Control Board, *San Diego Region - Storm Water Programs*
https://www.waterboards.ca.gov/sandiego/water_issues/programs/stormwater/

California State Water Resource Control Board, *Climate Change*
https://www.waterboards.ca.gov/water_issues/programs/climate/

California State Coastal Conservancy
https://scc.ca.gov/

California Urban Water Agencies, *Guiding Regional Reuse Options: A Distributed Systems Approach*
https://static1.squarespace.com/static/5a565e93b07869c78112e2e5/t/5c78646efa0d603f4b2294c8/1551393903065/Distributed+Systems-Slidedoc_FINAL.pdf

American Planning Association, Regional and Intergovernmental Planning Division Policy Handbook, *Regional Water Planning for Climate Resilience,* 2018
https://www.apacalifornia.org/legislation/report-on-regional-water-planning-for-climate-resilience/

California Urban Water Agencies (CUWA)
https://www.cuwa.org/member-agencies

Water Finance & Management, *Communicating the Value of Water: The ABCS of Water Communication,* 2019
https://waterfm.com/communicating-the-value-of-water-the-abcs-of-water-communication/

Chapter 3: Advocate for Equitable Water Rates

RESOURCES RELATED TO LOW-INCOME ASSISTANCE PROGRAMS, INITIATIVES AND ASSESSMENTS

California Office of Environmental Health Hazard Assessment, *Framework and Tool for Evaluating California's Progress in Achieving the Human Right to Water,* 2019

First state-led effort to develop a conceptual framework and method for assessing the status of the state water system in the context of Assembly Bill AB 685. This framework offers a way to see the information over time, at the state or system level.

3 components: water quality, water accessibility, water affordability.

1. This framework defines drinking water quality, indicators and contaminants.
2. In this framework, (p.18) the water accessibility component consists of two subcomponents: 1) the physical vulnerability of a water system to inadequate water supply and provision; and 2) the institutional vulnerability of a water system to inadequate water supply and provision.

   Indicator 1: Physical vulnerability to water outages. It includes the identification of the main source, and how many permanent and back-up sources are available.

   Indicator 2: Institutional capacity of a community water system (it depends on number of service connections and socio-economic status of the customers).

   Indicator 3: managerial constraints (staff, training level).
3. Water affordability: the framework focuses on impact on vulnerable households and impact of water bills on income and essential expenditures. It uses three indicators of affordability.

   Indicator 1: Affordability ratio for the median household income level. This indicator improves upon US EPA approach. It is evaluated using an essential minimum water volume of 6 HCF/month (about 150 gallons per households per day) and it is based on the median household income level of the customers of each water system.

   Indicator 2: Affordability ratio for the County Poverty Threshold. This indicator is used to provide information on the affordability of water for lower-income households. It measures the impact of water bills on households at a specified poverty level.

   Indicator 3: Affordability ratio for the deep poverty threshold.

Challenges: water bills do not capture cost of bottled water (referred to as replacement costs), they do not always include wastewater, and they do not always incorporate long-term infrastructure and maintenance costs. Most of the time renters do not pay their bills directly; what renters use and actually pay is generally not metered nor documented.

The denominator used for Affordability Indicators 2 and 3 reflects cost-of living adjustments. However, the variation in housing costs may also occur intra-county and this is not accounted for in this measure.

https://oehha.ca.gov/media/downloads/water/report/hr2wframeworkpublicreviewdraft010319.pdf

California Office of Environmental Health Hazard Assessment, *The Human Right to Water in California*

https://oehha.ca.gov/water/report/human-right-water-california

California State Water Resources Control Board, *Water Conservation Portal: Low-Income Water Rate Assistance Program*

Low-Income Water Rate Assistance Program: Established through Assembly Bill 401. It must be implemented by Jan 2018. (Human right to Water Act - AB 685, enacted in 2012). W-LIRA = Water - Low-Income Rate Assistance.

https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/assistance/

California State Water Resources Control Board, *Options for Implementation of a Statewide Low-Income Water Rate Assistance Program,* 2019

Draft published in January 2019 (final report will be delivered in 2019). Description of potential program benefit levels: 3 tiers of discount based on water system rates - similar tiers than the California Alternative Rates for Energy (CARE) program.

Reasons for rising cost in California: Increasing supply costs, expanding treatment standards, higher expectations of operators, climate change adaptation, and necessary capital investments.

Among these cost drivers, climate change adaptation will play a significant role in the future of water affordability as both populations and suppliers shift behaviors and practices in response to climatic impacts.

Variation in water rates between water systems.

Three key elements to design a W-LIRA proposed in this draft: Eligibility, Benefits and Total cost of the program

In the context of a statewide water assistance program, there is no administratively feasible way to provide an individual percentage discount on each household level consumption, unless there are verified data on household consumption reported to the program administrator of the assistance program. Therefore, this scenario would provide a benefit based on the cost of consuming 12 CCF (AB401), with 3 tiers. Tier 1: 20 percent discount to all households that have incomes below 200 percent of the federal poverty level (FPL) in water systems where monthly water expenditures (at 12 CCF) are below $90, Tier 2: 35 percent discount to all households that have incomes below 200 percent of the FPL in water systems where monthly water expenditures (at 12 CCF) are between $90 and $120, and Tier 3: 50 percent discount to all households that have incomes below 200 percent of the FPL in water systems where monthly water costs (at 12 CCF) are above $120.

Eligibility criteria: Baseline as 200 percent of FPL.

Benefit: Percentage of total bill benefit. Tiered structure for more equity.

Consumption: 12 HCF monthly (equivalent to 295 gallons a day per household). Estimated allocation with example of a household of 4 people: 220 gallons for indoor use (55 gallons x4) and 75 gallons for outdoor use (per day).

Discount is applied to 12 HCF consumption regardless of the actual consumption. It would be expensive for water systems to invest in "real-time" data systems. Most low-income families do not pay directly their water bill and there is no way to determine their water use. An estimated 72 percent of low-income families do not pay water bill directly (living in multi-housing buildings) and thus cannot benefit from water affordability assistance programs.

https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/assistance/docs/2019/draft_report_ab401.pdf

San Francisco Public Utilities Commission, *2018 Water and Wastewater Cost of Service Study*

Water and Wasterwater enterprises are two separate departments with their own and unique financial structure. This report provide an analysis of cost of service and develop cost allocation to meet requirements of Proposition 218, the City Charter and SFPUC policy. Prop. 218 requires that property-related fees and charges, including water and wastewater rates, do not exceed the proportional cost of providing the service.

Water Enterprise financial Structure:

- 3 commodity components: Base, Peak and Raw water (=non-potable water)
- 4 customer-related costs: customer service, meter charges, public and private fire services

This provides a total of 7 elements referred as functional cost categories & As All Others (AAO) category that cannot be directly allocated to one or more of the 7 functional cat and are reallocated across these functional categories.

The rate structure has two components: a commodity charge (variable) and a monthly service charge (fixed). The commodity component is assessed based on metered water usage per ccf and, by design, is intended to recover the cost incurred for delivering each unit of water. The monthly service charge is intended to recognize that the utility incurs fixed costs to provide the availability of water service, which must be recovered independent of monthly water demands and consumption. Functional Cost Categories (Water Enterprise): Supply (Surface Water); Supply (other: costs associated with pumping, treating, delivering, or monitoring recycled water, groundwater, or any other "alternative" water sources to customers); Natural Resources (watershed protection); Pumping (treated water transportation only); Transmission (large water mains); Treatment; Storage (treated water only); Distribution (small water mains, with service connections, do not serve wholesale cust.); Meters (water meters and service connections); Hydrants/AWSS (providing fire flow); Customer Billing; Laboratory; Water Conservation (conservation incentives program, communication to reduce water usage); General.

7 cost categories for SFPUC. Base (basic level of service to each customer); Peak (cost incurred to meet peak day demands, includes capital costs related to over sizing the system to meet the demand); Private Fire Protection; Customer Service; Meter Charges; Raw Water (Costs associated with water supply and the infrastructure needed to transport it in its natural state, prior to any treatment for consumption. Raw water was isolated as a cost category in order to develop the nonpotable water rate.); Public Fire Protection. (Description of unit cost and customer allocation described p.46).

Additional elements desired in the rate structure: Be clear and understandable; Encourage conservation and water efficiency; Follow cost of service principles; Provide revenue stability; Maintain affordability; Comply with legal and regulatory requirements; Abide by policy objectives

The report describes also the structure of cost and rates associated to wastewater (starts p.68) - Design of the structure is very similar to the one used by the Water Enterprise.

Capacity Charges: Designed to recover a fair and proportional share of the cost to provide capacity to serve future users and is imposed as a condition of service for new usage, an increase in usage, or a change in usage. SFPUC adopted a wastewater capacity charge in 2005 and a water capacity charge in 2007. Based on a buy-In methodology (See chapter 9 p.88).

https://sfwater.org/modules/showdocument.aspx?documentid=12072

Coachella Valley Water District, *Help2Others Customer Assistance Program*
Water assistance program for customers of Coachella Valley Water District. Customers must have a water bill to their name and match their residence address. Qualifying income levels are 200 percent of the U.S. Federal Poverty Guidelines.

http://www.cvwd.org/H2OHelp

California Urban Water Agencies, *Water Accessibility and Affordability Policy Principles,* 2017
CUWA policy principles on water affordability and accessibility (2017). Principles that reflect affordability challenges in CA.

https://static1.squarespace.com/static/5a565e93b07869c78112e2e5/t/5aa2b446e4966bc18ec0a471/1520612422959/Water-Accessibility-and-Affordability-Policy-Principles.pdf

Next City, *Philly City Council Helps With Water Shutoffs and Blight Prevention,* 2015
https://nextcity.org/daily/entry/philadelphia-water-bills-low-income-payment-plans

City of Philadelphia, *Philadelphia Launches New, Income-Based, Tiered Assistance Program,* 2017
https://www.phila.gov/press-releases/mayor/philadelphia-launches-new-income-based-tiered-assistance-program/

Luskin Center for Innovation, *Analyzing Southern California Supply Investments from a Human Right to Water Perspective,* UCLA, April 2019
https://innovation.luskin.ucla.edu/wp-content/uploads/2019/04/Analyzing_Southern_CA_Supply_Investments_from_a_Human_Right_to_Water_Perspective.pdf

POLICIES AND PROGRAMS RELATED TO COMMUNITY GARDENS

San Francisco Public Utilities Commission, *Urban Agriculture & Community Gardens*
https://sfwater.org/index.aspx?page=469

Public Health Law Center, Community Gardening, *Policy Reference Guide,* 2017
https://publichealthlawcenter.org/sites/default/files/resources/Community-Gardening-Guide-2017.pdf

National Conference of State Legislatures, *State Statutes and Programs Concerning Community Gardens,* 2014
http://www.ncsl.org/research/agriculture-and-rural-development/community-gardens-state-statutes-and-programs.aspx

City of Cleveland, Water at Your Service, *Community Garden Permits*
http://www.clevelandwater.com/construction/permits/community-garden-permits

City of San Diego, *Urban Agriculture Incentive Zone Program*
https://www.sandiego.gov/economic-development/business/starting/urban-agriculture

County of San Diego, Health and Human Services Agency, and International Rescue Committee, *Establishing Community Gardens in San Diego County: What Local Governments Can Do,* 2016
https://static1.squarespace.com/static/54b30bbae4b0fc4c2291385e/t/57a7d97fb3db2b8908f90daa/1470617994160/CAPP+White+Paper_Establishing+Community+Gardens_72816_FINAL.pdf

San Francisco Public Utilities Commission, *Urban Agriculture & Community Gardens*
https://sfwater.org/index.aspx?page=469

Rachel A. Aronson, *Eating in Crisis: Culturally Appropriate Food and the Local Food Movement in the Lives of Domestic Violence Survivors,* Department of Anthropology, University of Vermont, 2014
https://scholarworks.uvm.edu/cgi/viewcontent.cgi?article=1032&context=hcoltheses