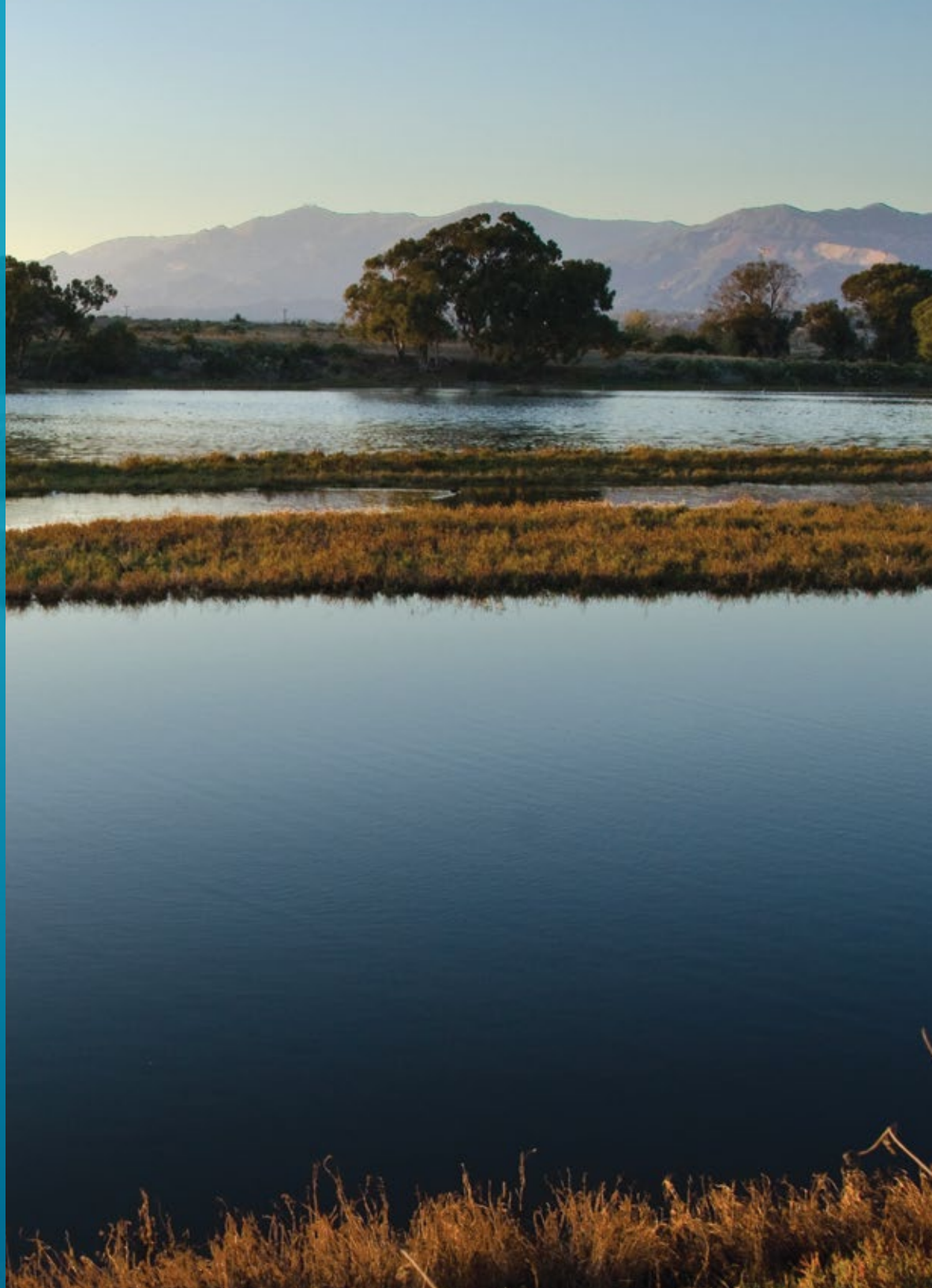
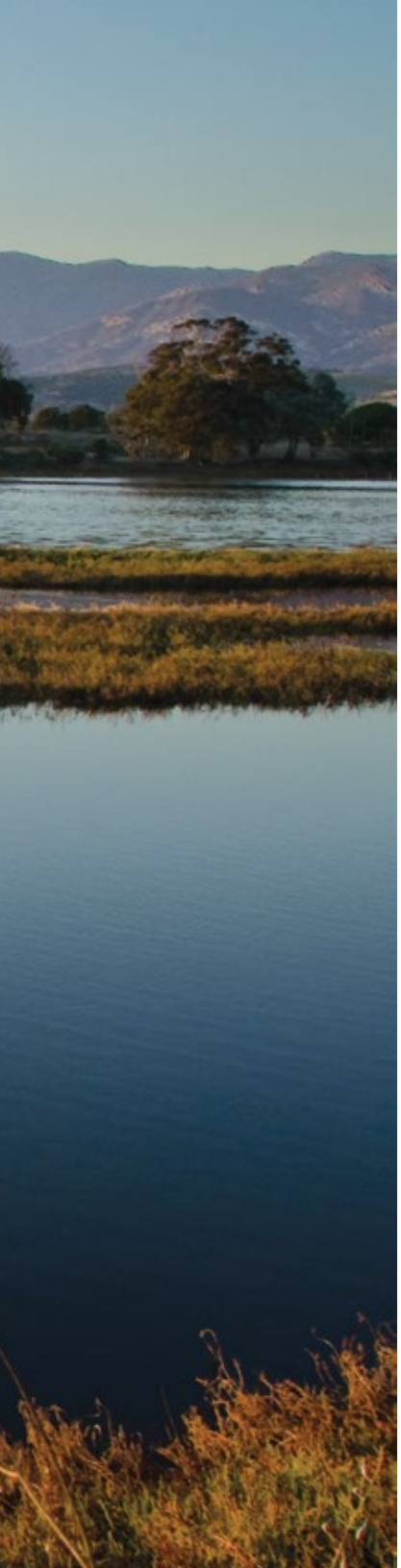
WATER

Water is life – when our water is threatened, our way of life and the viability of the landscapes and ecosystems are threatened as well.





A BRIEF HISTORY OF WATER USE IN SANTA BARBARA COUNTY

Water and population growth have been interconnected as long as humans have inhabited the Santa Barbara landscape. The earliest Santa Barbara census, from 1788, reported about 4000 Chumash and a few hundred 'whites' [original census term] living in the area. The Chumash lived in small villages with populations in the hundreds, and practiced simple water management techniques such as the building of simple ponds and shallow wells. As missionaries settled into the area, the need for more intensive water management followed, and in 1807 the Indian Dam was built above the mission in Santa Barbara to support growing local populations.[1]

Other small dams followed over time, and water assets were managed by local water companies. In the late 1800s it became clear that local supply was not sufficient to meet water demands, and that local government management, more sophisticated storage and diversion projects, and water imports would be needed. In 1911 the Santa Barbara Water Company sold its rights and assets to the City of Santa Barbara, and a series of new developments began that forever altered water management in the County (See Figure 5).

Santa Barbara County population growth, industry, and export agriculture are closely correlated with the building of dams and electric wells over the last century to support intensified water use. In the 1970s, an anti-growth effort gathered steam, with a focus on lobbying against participation in the State Water Project (SWP) as a way to slow urban sprawl. Those in favor of State Water Project imports argued that limiting growth would increase local costs of living and stall economic development.

Water Infrastructure and Districts (Figure 4)

This map depicts the water infrastructure and water districts crucial to Santa Barbara County. You can explore this map further on the Atlas: Water Resources - Infrastructure/District Inset Map.

Around this time the impact of dams and growth on local habitat and species viability also became apparent, and a strengthened anti-growth and environmental coalition successfully staved off use of SWP water for a few decades. The 1987-1992 drought brought unprecedented water pressures to the existing population and created political will to build the infrastructure to bring in SWP water. SWP water imports began in 1998, and tend to provide higher proportions of the County's water supply in drought years. In drought-year 2015, for example, state water accounted for 17% of Santa Barbara's water supply, and jumped to 34% in 2016 (see Figure 5 and Figure 6).

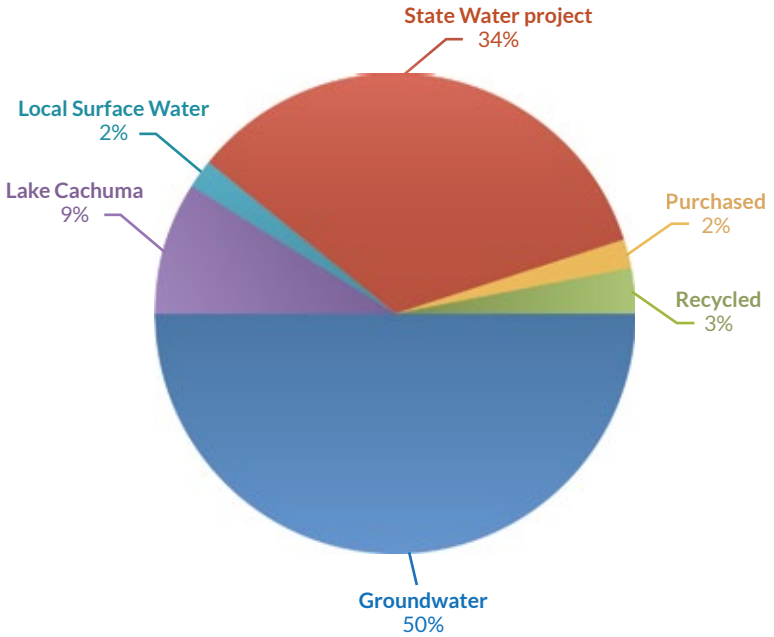
These historic tensions carry over into today's water landscape. As population growth, industry, and extended droughts continue to put pressure on the unique ecological landscapes of the County, citizens are faced with the challenge of maintaining the Santa Barbara landscapes and

way of life for future generations with limited water supplies and a sensitive ecological heritage. Many water-saving incentives, innovations, and regulations have been put in place in the last few decades in attempts to alleviate increasing pressure on the local watersheds, with mixed results. Many questions and decision points remain as to the future of Santa Barbara's water supply.

This chapter explores the state and science of Santa Barbara's watersheds through detailed maps, a discussion of key trends, values, and debates affecting our watersheds, and promising innovations and strategies for addressing the County's water challenges.

2015 Water Providers Combined Production[2] (Figure 6)

Note that the County water portfolio varies from year to year and region to region based on State Water Project allocations, drought conditions, and other factors. See Figure 12 for a two-year comparison by regions within the County.



Santa Barbara Water Infrastructure: Major Milestones (Figure 5)

1912 Mission Tunnel is built to bring water to Santa Barbara from the Santa Ynez mountains

1920 Gibraltar Reservoir is completed on the Santa Ynez River north of Santa Barbara City

1928 Juncal Dam opens (Jameson Lake), Montecito

1949 Gibraltar Dam raised to restore original capacity lost to sedimentation

1953 Completion of Bradbury Dam (Lake Cachuma)

1958 Completion of Twitchell Reservoir on the Cuyama River in northern Santa Barbara

1964 Santa Barbara City's 1st water treatment plant opens

1992 Santa Barbara's 1st desalination plant opens (for four months before being put on standby)

1998 State Water Project imports begin

2017 Santa Barbara City retrofits & re-activates desalination plant

Three major drought periods between 1912 and 2017 (four or more consecutive dry years): **1946-1950**, **1987-1991** and **2012-2016**.

COMMON WATER VALUES

In the process of developing the Blueprint – through research, stakeholder interviews, focus groups, and surveys – some common values about water in the County emerged. These value statements offer dynamic starting points for the ongoing dialogue needed to build a shared viable water future in which all the species of Santa Barbara County can thrive. They are also helpful reminders that though opinion can vary greatly on the **means**, there is also great agreement on the desired **ends**:

Based on input to date, the common values include:

- Intact headwaters lands that allow for water filtration, storage, and minimize soil erosion.
- Healthy groundwater basins that continue to provide reliable supply for environmental, agricultural, and urban users.
- Sustainable and quality water supplies that are managed with the whole water system in mind.*
- Greater resiliency to drought with flexibility to manage water supply and demand.
- All water users (environmental, agricultural, urban) benefit from win-win institutional incentives, planning, and infrastructure support.

* Nearly all water leaders interviewed spoke of the need for education and a more 'holistic,' 'systemic,' or 'ecosystem' lens on our water supply, rather than a linear 'plumbers' view.' This will require building a deeper shared understanding of how the local watersheds work, and how water moves through the system: local recharge and percolation rates, the best areas for ground and surface water storage, means of improving groundwater recharge and stormwater capture. It will also require exploring a variety of water management solutions, and choosing a portfolio of approaches that best meet the community's needs.

WATER TRENDS OVERVIEW

In the face of the extreme state-wide drought conditions of 2012-2016, parts of Santa Barbara County's water supply were hard-hit: water storage in all four of the County's major reservoirs reached historic lows in 2016,[3] and the State Water Project has not been able to provide full allocations, providing no water in early 2014, and between 5% and 60% allocations to Santa Barbara County from 2014-2016.[4] (See 'Ongoing Dialogues' later in this chapter for more on alternative water sources.)

- **As of 2012, the demand for water in the county was ~280,000 acre-feet per year. 75% of that was used for agricultural and ranch uses, 25% for municipal and industrial uses.[5] (About 29% of the county landscape was in ag production in 2012.)[6]**
- **From the period of 2000 to 2015 the population in Santa Barbara County increased 11% while it saw a reduction in water use of 35%.[7]**
- **All basins within the County have shown declines in groundwater supply levels due to the drought, even those that have been well managed and resilient in past droughts.[8]**

Most rangeland and dry farming operations use little water other than seasonal precipitation. More intensive agriculture tends to use additional water resources, largely derived from groundwater with some input from local reservoirs and streams. Residential water use varies by density, type, and the extent of landscaping, and draws from a mix of groundwater, local reservoirs and streams, and imported surface supply.

SGMA AND SANTA BARBARA GROUNDWATER

In 2014, the State of California instituted a historic new law requiring management of groundwater at the level of hydrological subbasins (i.e. local watersheds).

The Sustainable Groundwater Management Act (**SGMA**) recognizes that management is most effective when done at the local level by local agencies with adequate information, tools, resources, and authorities. It asks agencies covering medium and high priority subbasins to work together to develop a new governance structure (Groundwater Sustainability Agency - **GSA**) by June 2017. The GSA will develop a Groundwater Sustainability Plan by 2020 (or 2022 if not critically overdrafted). All subbasins will have their basins managed sustainably by 2040-2042. Medium and high priority basins are determined by the Department of Water Resources based on factors including population, number of public and private wells, irrigated acreage, and reliance on groundwater as a primary source, and existing groundwater impacts such as overdraft and other undesirable results (see full list on right), land subsidence, or water quality degradation.

Santa Barbara County has three basins subject to SGMA management: The Cuyama Valley, the San Antonio, and the Santa Ynez Valley Groundwater Basins. There will be five GSAs developed in Santa Barbara County for SGMA: one each for Cuyama Valley and San Antonio basins, and one for each of the three subbasins in the Santa Ynez Valley basin. Low priority subbasins in Santa Barbara County are also taking action in response to SGMA. Groundwater recharge has already become a hot topic in the County as a result of SGMA planning. To track the latest developments, visit http://www.water.ca.gov/groundwater/sgm/.

Groundwater Sustainability Plans must manage for the avoidance of "undesirable results" including:

- Chronic lowering of groundwater levels
- Significant and unreasonable reduction in groundwater storage
- Significant and unreasonable degradation of water quality
- Land subsidence due to collapsing of aquifers
- Surface water depletions that have significant and unreasonable impacts on beneficial uses

Consistent groundwater level and quality monitoring and reporting will be required for sustainable management.

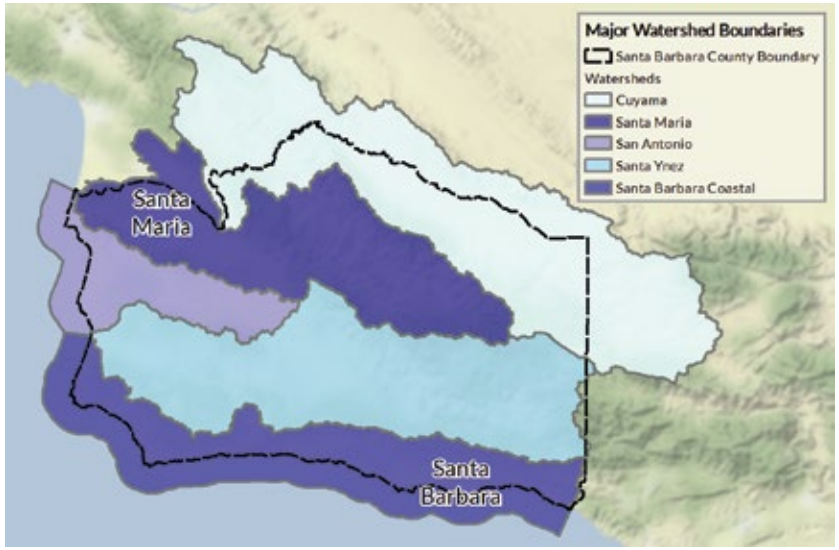
One benefit of the new state Sustainable Groundwater Management Act is that the law requires monitoring and cooperative data sharing across watersheds and water users to ensure long-term sustainable management of groundwater resources. Through the implementation of SGMA, Santa Barbara groundwater resources will be protected and enhanced into the future.

SANTA BARBARA WATERSHEDS

Santa Barbara County is a geographically and hydrologically diverse County where water conditions and concerns vary tremendously by region. The County's unique topography features east to west mountain ranges with headwaters that do not hold water in stable basins, but force water to move quickly to the sea throughout its diverse watersheds. Understanding how water flows through these watersheds is an essential step to effectively protecting and maximizing healthy water flows and storage capacities.

The County has five major watersheds – the Santa Maria and Cuyama, San Antonio, Santa Ynez, and Santa Barbara Coastal watersheds. These range in size from the combined Santa Maria and Cuyama watersheds size of ~1800 square miles to the ~400 square mile Santa Barbara Coastal watershed, which includes 50 short, steep watersheds that feed directly into the Pacific Ocean. Elevations in the County range from sea level to the highest peak of Big Pine Mountain at 6,828 feet. Even with diverse water resources and intact headwaters across much of the County, water has been imported into Santa Barbara County to meet local demands since the 1990s.

Major Watersheds (Figure 7)



This map depicts the five major watersheds in Santa Barbara County. ▶ You can explore this map further on the Atlas: Water Resources - Major Watersheds Inset Map.

Santa Barbara County, like much of California, is defined by a Mediterranean climate with cool wet winters and hot dry summers. Average rainfall can run from 8 inches near Cuyama Valley to 36 inches in the Santa Ynez Mountains. The diverse topography of the Santa Barbara County landscape, with eastwest running mountain ranges and steep gradients create a diverse array of microclimates that can capture and store water from the wet winters in seeps, springs, and groundwater basins.

High rainfall variability across Santa Barbara County contributes to intensive drought and flooding cycles and a heavy reliance on groundwater. In the Santa Ynez, San Antonio, Santa Maria and Cuyama watersheds, large groundwater basins satisfy much of the needs for the residents and agricultural users within them. The Santa Maria, Cuyama, and San Antonio basins (**Figure 7**) are subject to the new state requirements for sustainable groundwater management (**see page 19**) to ensure that extraction does not outpace recharge. SGMA will help protect beneficial water uses both for local populations and the many groundwater-dependent ecosystems and species that thrive in these areas.

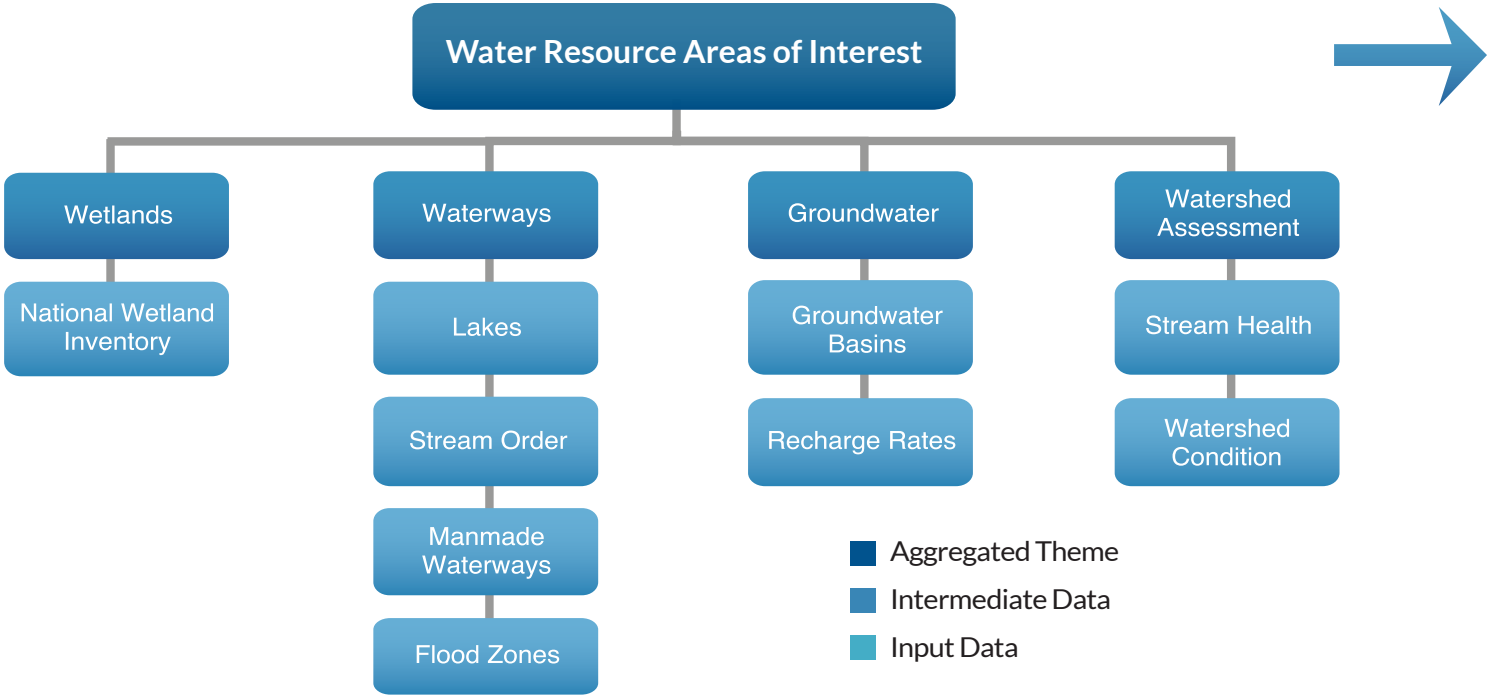
Across the County, surface water and imported water are also used, when available, in addition to groundwater. Groundwater basins in the coastal watersheds have a more limited capacity to supply the large populations along the South Coast. This, combined with low surface water, prompted the damming of the Santa Ynez River with the Jameson, Gibraltar, and Cachuma reservoirs in the mid 1900s, and state water project imports near the end of the century (**see Figure 5**). These surface water augmentations help store water for coastal and urban users.

IT'S ALL CONNECTED

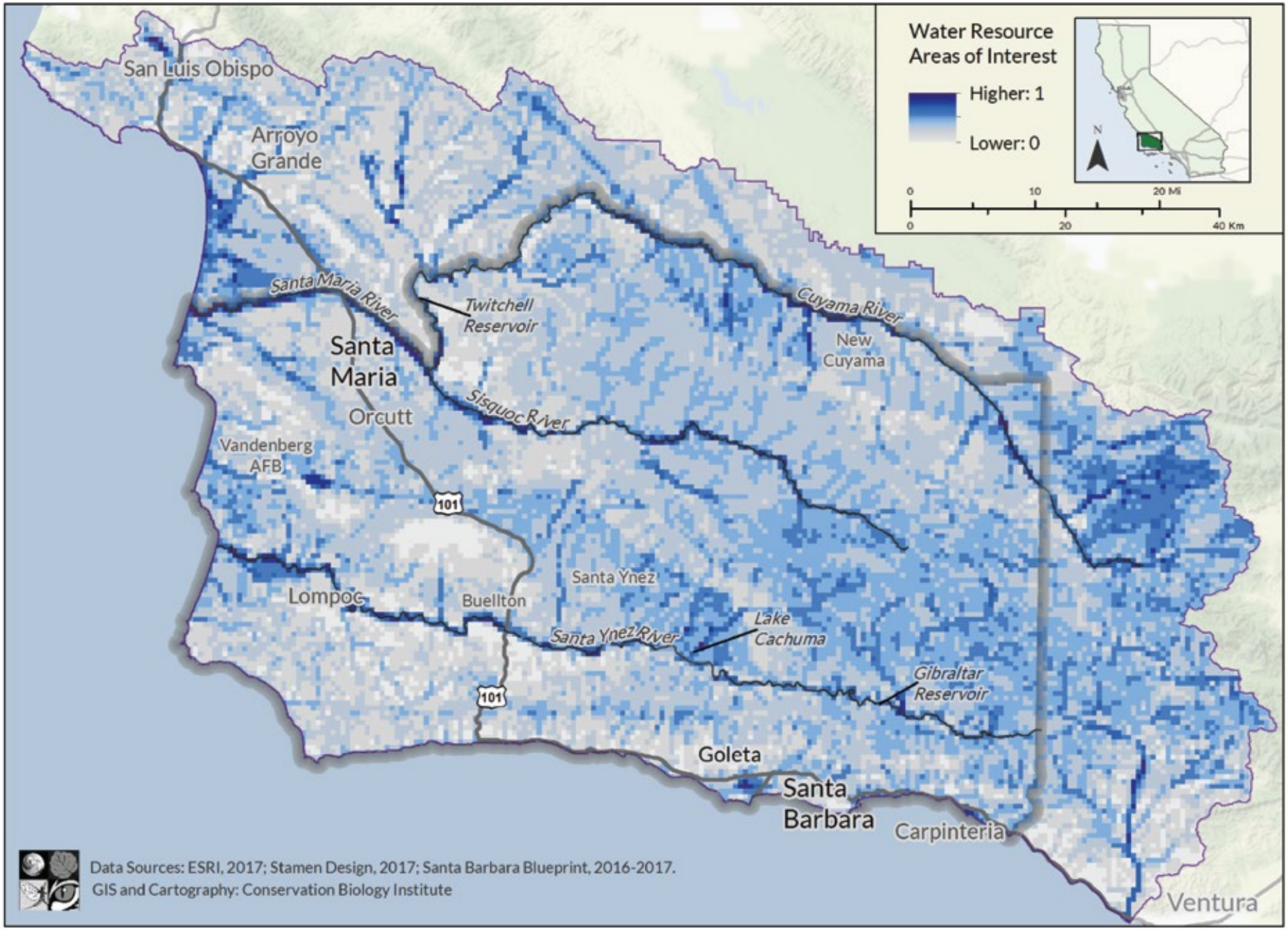
Water resource status, climate, and land use and development trends are highly interlinked. Water demand is a function primarily of agricultural uses, (which is a function of climate to some extent), and of development, and population growth. Water availability directly impacts local ecosystems as well.

We heard over and over in our community interviews, the importance of increasing public understanding of the connection between the viability of our water sources and all other aspects of our way of life in Santa Barbara. Water is life - when our water is threatened, our way of life and the viability of our landscapes and ecosystems are threatened as well.

Example: Three-fourths of threatened and endangered species in Santa Barbara occur in creeks and wetlands. Water scarcity contributes to these biodiversity threats, whose protection through the Endangered Species Act in turn increases restrictions on land and water management and recreational activities such as boating and fishing. The listing of the steelhead trout as an endangered species in the Santa Ynez River, for example, has introduced a new set of minimum-flow requirements downstream of Cachuma Lake. The red-legged frog's listing poses limitations to the diversion of water from tributary streams, and the listing of the Least Bell's Vireo (a bird) limits options for further raising dams in the Santa Ynez River. From this view, protecting water resources is intimately connected to protecting recreation, conservation, and agricultural interests in the County.



Water Resource Areas of Interest EEMS Map (Figure 8)



This synthesis EEMS map highlights areas of interest for water resources by overlaying a variety of inputs from the Water Resources theme (above). This map and other maps featured throughout the report are meant to support meaningful visual insights about water resources in the Santa Barbara County landscape, and to stimulate conversations about key issues. (See Appendix C for a more detailed description of the EEMS methodology.) ▶ You can explore this map further and use the interactive EEMS Explorer on the Santa Barbara Blueprint Atlas.

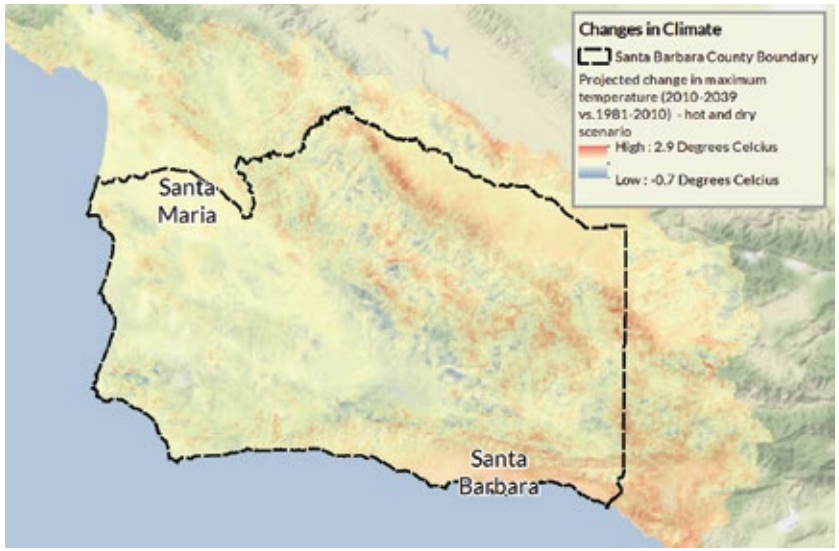
WATER AND CLIMATE CHANGE

Water resources in Santa Barbara County have traditionally been driven by the local wet and dry seasons and longer episodic cycles typical of the local Mediterranean climate. The volatility of these cycles (including floods and droughts) will likely become more frequent under the effects of climate change. While drought and heavy rainfall events are not uncommon occurrences in Santa Barbara County's history, the water supplies for agricultural, residential, recreational, and flora and fauna uses may become stretched year to year as a result of these increases in variability, as well as the additional stresses of increased temperature and sea level rise. Statewide, precipitation trends point toward a reduction in rainfall across California, with an increasing likelihood of multi-year droughts. Sea level rise is predicted to increase 0.7-1.2 feet by 2050 in Southern California.[9] Recent studies of the impacts from climate change on Santa Barbara County in particular show that many low lying areas are extremely susceptible to storm surges, cliff erosion, dune erosion, and tidal inundation.[10]

Aquatic Ecosystems

Riparian systems (streambanks and the streams or rivers within them) are crucial for flora, fauna, and human well-being. Intact, vegetated riparian systems provide nutrient cycling and water filtration, slow river flows (allowing for more groundwater percolation), help prevent flooding, control streamside erosion, and provide habitat and food for fish and aquatic species that are themselves food for others. Less than 1% of the total land areas in the southwestern United States are riparian, but these lands support at least some portion of the lifecycle of nearly all of the terrestrial wildlife.[11] Locally, for example, more bird species nest in the County's riparian corridors than in any other vegetation type. In Santa Barbara County, many of these riparian systems run off the Santa Ynez Range with nearly 60 streams across the South Coast front range and along the Santa Ynez River and Santa Maria Rivers and their tributaries as water moves from the mountains to the Pacific Ocean.

Project Changes in Climate (Figure 9)



This map depicts some of the projected changes to Santa Barbara County's climate. Projected increases in temperature and decreases in precipitation will have major impacts to water availability for both the biota of the County and its human residents.

You can explore this further on the Atlas: Water Resources - Projected Climate Inset Map.

Seasonal wetlands and freshwater marshes are also prevalent in the County, and provide many of the same benefits as riparian systems. Seasonal wetlands such as vernal pools provide habitat for many species, including many of the County's amphibians. Wetland areas such as Oso Flaco Lake north of Guadalupe or Lake Los Carneros in Goleta provide valuable habitat for birds like American coots in winter, and red-winged blackbirds and black phoebes in summer. The loss of these habitats due to development and drought has contributed to a decline in species and other beneficial **ecosystem services** (for more on ecosystem services, **see page 39**)

GOING WITH THE FLOW - TILLING THE SOIL FOR WATER BENEFITS

Randy Sharer of Sharer Brothers Farm has worked the soils of the Santa Maria Valley with his brother for over 25 years. His family has farmed in the area for many generations, and Randy has a keen on-the-ground perspective on how the local watershed has changed over time:

"After the last two fires (the La Brea Fire of 2009 and Zaca fire of 2007), we have a soil infiltration issue on the main recharge artery of the Santa Maria River. The fires burned so hot they sterilized the soils, and nothing has grown with the recent lack of rainfall. Without seeding to slow water down on the surface, we are not getting the groundwater infiltration we used to. In addition, the clay soils in the upper hills running down into the Santa Maria river are creating a 1-3 inch clay layer at the conflux of the rivers. This silt layer is covering about three-quarters of the low stream flow. There's river sand underneath, but when it gets wet it seals up. We've been trying to disturb that."

Based on his observations about how the fires affected water flow through the landscape, Randy had the idea to till these impacted riverbed soils to increase infiltration again. Tireless in his pursuit of obtaining the permits and research required to till river habitat, Randy has been working with the Counties of Santa Barbara and San Luis Obispo, with US Fish and Wildlife, the Army Corps of Engineers, and the Region 3 Water Quality Board to conduct the studies needed to get permits to till these areas of silted river bottom.

The project, now approved, will increase infiltration along the river bottom, allowing for normal operations and releases from the Twitchell Reservoir and reducing evaporative losses that would occur without restored infiltration into the groundwater basin.

You can learn more about this project on our resources page: www.sbcblueprint.net/resources.

SHOULD VEGETATION BE MANAGED FOR WATER, FIRE, AND CONSERVATION BENEFITS?

With the Sustainable Groundwater Management Act (see page 19) and increased drought and fire risk a new reality for Santa Barbara County, understanding the relationship between vegetation, water, fire, and wildlife management becomes increasingly important. But debate abounds on best multi-benefit practices for Santa Barbara's local hydrology and landscape, and more research is needed. Here are some highlights:

Chaparral: To Thin or Not to Thin?

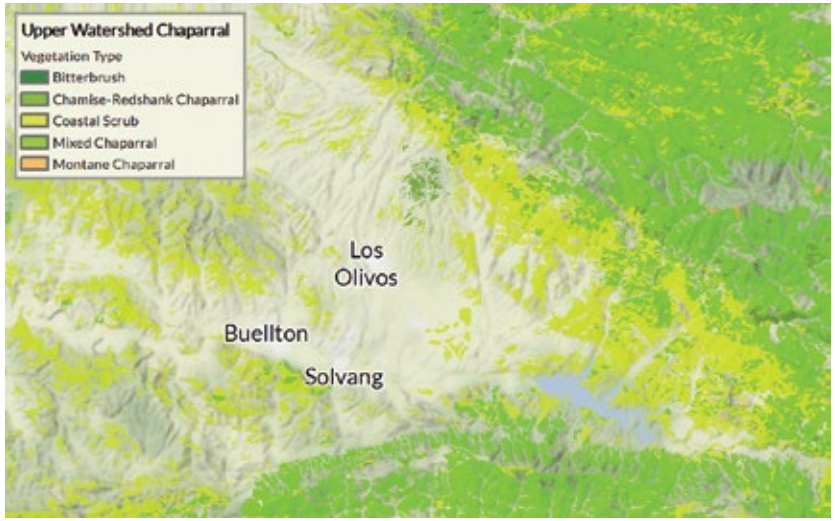
Thinning in Sierra Nevada forests (upper watersheds) has been shown to increase runoff and snow storage allowing more water to flow to lower watersheds.[12] Thinning may also decrease the likelihood of large intense forest fires, and the sedimentation resulting from forest fires.

This Northern California case study has many residents of the County interested in exploring a similar strategy with chaparral in Los Padres National Forest. Assuming the Sierra Nevada approach would work for the chaparral-dominated vegetation in Santa Barbara County, a recent county water study done by RMC estimated roughly 1,800 acre-feet of additional annual supply if thinning occurred for the Lake Cachuma watersheds.[5]

However, research focused on chaparral communities in Southern California has found that local fires are more driven by weather and human ignition than by vegetation fuel loads,[13] that chaparral is adapted to infrequent, high intensity fires, and that it may not yield the same runoff benefits shown in the Sierra Nevada forests.[14] In addition, chaparral provides habitat for native wildlife and migratory birds, some of which are drawn to the area especially in the few years after a fire event.[15]

In the end, the most sound strategy for our local upper watershed ecosystem remains an active research question, and one to pay attention to in the coming years.

Chaparral Coverage (Figure 10)



This map shows how prevalent chaparral is throughout Santa Barbara County's headwaters. The choice to thin or not to thin would have lasting effects on much of the County. ▶ You can explore this map further on the Atlas: Water Resources - Chaparral Coverage Inset Map.

ONGOING DIALOGUES

Outreach to local stakeholders and topic experts reveals innovative approaches for managing and conserving shared resources, as well as a range of views on which approaches will be most effective. Each chapter features some of these key areas where ongoing dialogue and research will be needed to build greater alignment on the best pathways forward. The following pages feature some key trends and discussion points on Santa Barbara County's water resources.

WHAT ROLE SHOULD WATER REUSE PLAY IN SANTA BARBARA COUNTY'S WATER FUTURE?

With population, agricultural production, and drought trends all on the rise, Santa Barbara's water needs will continue to risk exceeding supply without more innovative sourcing. These sources can be costly, but with creative grant funding, the County is starting to see more water re-use innovation projects:

Tertiary Water Treatment

The City of Santa Barbara began distributing **recycled water** from the tertiary treatment facility in October 2015, supplying 700,000 gallons per day on average with over 4 million gallon per day processing capability.[16,17] Current law allows for several uses of tertiary treated recycled water including irrigation, supply for impoundment of lakes and ponds, supply for cooling and air conditioning, and a variety of industrial uses. Most experts view recycled water as a substantial growth area for the years to come.

Desalination

Santa Barbara City has re-invested in desalination and opened an upgraded plant in 2017. The plant uses advanced technology to reduce electrical demand and environmental impacts, while processing ~3 million gallons (9.2 acre-feet) of water per day and meeting approximately 30% of the City's water demands. If drought conditions continue, the City has the option to expand the capacity up to three times current production.[18] Desalination infrastructure also brings additional opportunities to further enhance the quality of recycled water for potable reuse in the County, adding additional value to the infrastructure. Other cities such as Carpentaria are looking into the costs and benefits of desalination and increasing recycled water supplies as well.

Biofilters

The City of Santa Maria, in collaboration with the Cachuma RCD and the State Water Board, opened the Jim May Park Biofilter in 2017. The technology uses anaerobic bacteria cultivated in woodchips to remove nitrogen from agricultural and urban runoff; there are 5,700 acres of agricultural land and 972 acres of urban land runoff in the Santa Maria area. Water with reduced nitrogen content will be fed into the Santa Maria River to help recharge the groundwater basin.[19]

Currently, low-nitrogen requirements for irrigation water motivates the drilling of deeper wells, more fertilizer applications, and impacts drinking water supplies. The biofilter innovation helps address these unintended consequences, and opens conversation about shifting regulatory requirements to allow higher-nitrogen groundwater for irrigation purposes and better overall groundwater quality.

'Reuse" for Fish

With innovations in water supply, some environmentalists have expressed concern that a more stable supply might only further drive population and/or industry growth, rather than remaining available for flora, fauna, and stream flows. In an effort to help protect water conservation and reuse gains for aquatic habitat, the Central Coast Salmon Enhancement is driving a collaborative study to better assess the locations and types of water reduction projects that will best benefit steelhead populations. The ultimate aim of the early-stage project will be to create non-regulatory drivers to reduce diversions and increase stream flows for steelhead habitat. The model, if successful, could be adapted to other species and help incentivize water conservation practices in the County.

Multi-benefit Groundwater Recharge

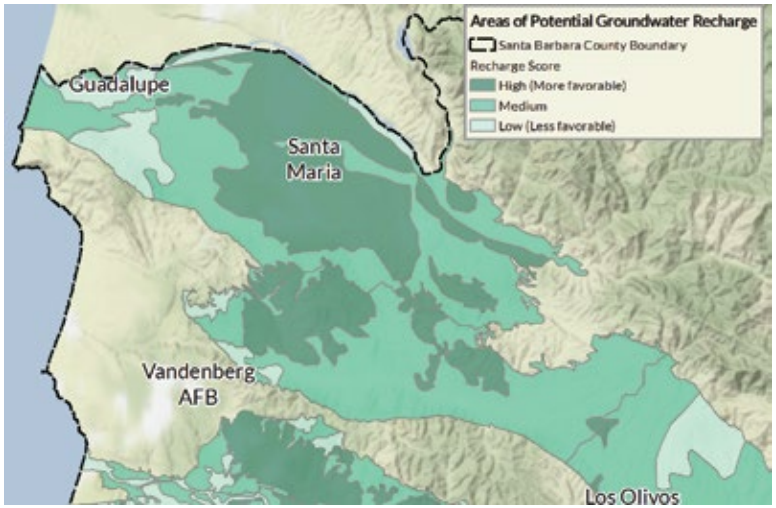
Groundwater recharge will become increasingly important and potentially incentivized through local implementation of SGMA (see page 19). However, it is very difficult to measure, and research and experiments on this topic are picking up around the state. Locally, multi-benefit approaches such as these offer creative ways to ensure win-wins for recharge. Here are a few examples:

Steelhead and Recharge: Through removal of invasive eucalyptus trees, road crossings and a small dam, a collaborative project of the Cachuma Resource Conservation District and partners will restore 2.25 miles of critical steelhead habitat on the San Jose Creek in Goleta. The project will create valuable pool habitat for steelhead that should also support groundwater recharge. [20] Seasonal water releases from dams, such as those in the Santa Ynez Valley to support steelhead during droughts, are also multi-benefit: This water helps recharge groundwater basins which underlie the Santa Ynez River, where the water becomes available for agricultural and urban uses.

Soil and Recharge: Flooding of available lands has often served as a way to increase infiltration of water into the ground and to recharge groundwater basins and aquifers, but identifying available and suitable land for large-scale recharge has been a challenge. However, a recent Santa Barbara County

Water Agency report[5] identifies areas best suited for groundwater recharge based on soil properties for drainage, shown in the map below. The areas identified could be useful for in-stream drainage projects such as small in-stream dams or weirs to slow water flow, percolation ponds, or direct on-farm recharge. The analysis showed that many of the areas in agricultural production have high recharge value, and that maintaining these areas in agriculture will also support natural recharge of groundwater basins.

Groundwater Recharge Areas (Figure 11)



This map depicts areas of groundwater basin recharge potential within the Santa Maria Valley, based primarily on groundwater depth and hydrologic soil type. ▶ **You can explore this map further on the Atlas:Water Resources - Groundwater Recharge Areas Inset Map.**

HOW CAN AGRICULTURAL, RESIDENTIAL, AND ENVIRONMENTAL WATER NEEDS BE BALANCED?

This question represents a central challenge for the County that cuts across every topic in this Blueprint report. Countywide, more water rights are allocated locally than the local watershed can supply.[21] Agricultural production, which uses a large portion of county water supplies, is expanding. Countywide population is also expanding, with an estimated 75,000 additional residents by 2040.[22] Both sectors are getting more efficient in water use, but still, expansion trends put additional pressure on water and habitat resources around the County. *What to do to address these challenges is a difficult but important discussion for the county's future.* Some considerations:

- Many in the County have an interest in preserving local agriculture as a historic, cultural, and economic pillar of Santa Barbara life. One symbol of this is that agricultural water rates are lower than urban water rate in most parts of the County. With relatively low water costs, high value crops such as vineyards, tree crops, and berry production in hoop houses are all on the rise.

- Urban water resources are primarily managed locally by water districts, many of which have profit incentives that can conflict with resource conservation interests.

- Environmental and conservation efforts to protect against these conflicts of interest have historically focused on regulation. Over time, the regulatory landscape has gotten more complex, and in some areas, requirements and authority can overlap and even conflict, creating paperwork headaches and unintended barriers to conservation goals.

Unexpected Drought Impacts

In recent droughts, ranchers were forced to seek additional income sources as rain-starved pastures failed to support large herds. Many sold livestock from their herd at this time. Prolonged droughts and favorable wine-grape markets have led to increased conversion of grazing lands to vineyards.

KEY TAKEAWAYS TO WATER RESOURCE RESILIENCE

Potential resilience strategies for water resources include any processes that will reduce demand or increase supply for both humans and the County's flora and fauna, such as:

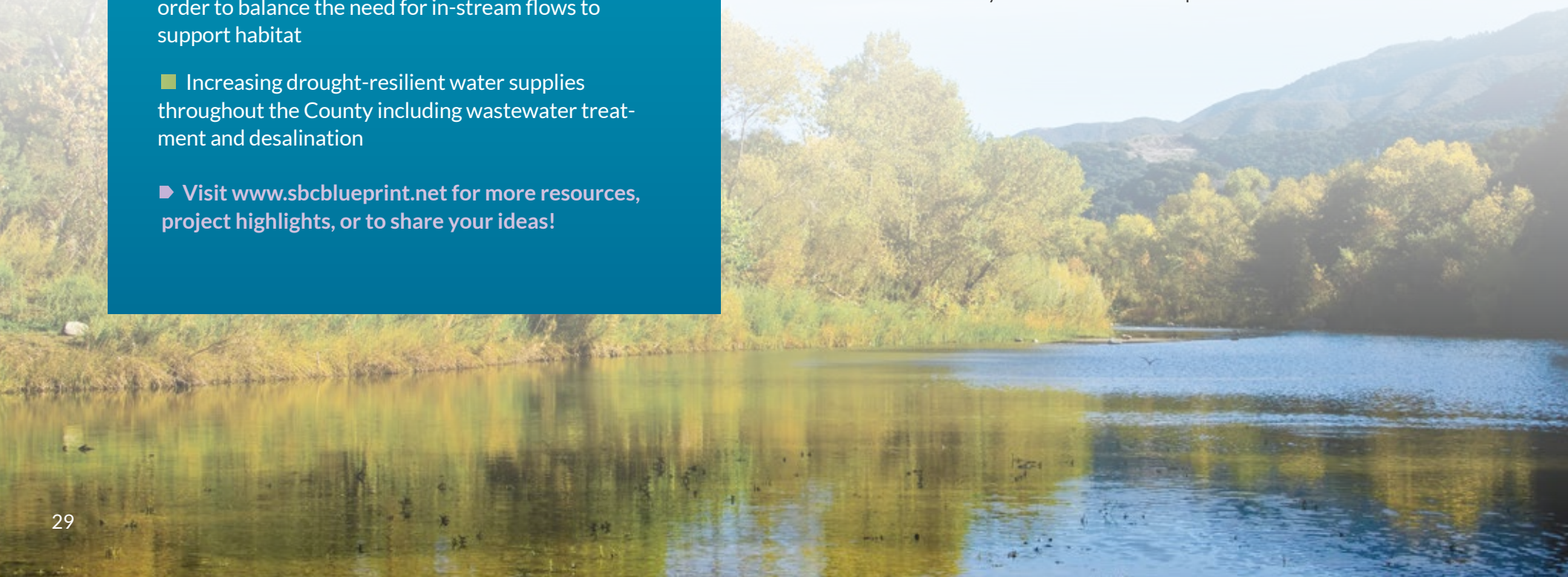
- Increasing water use efficiency for agricultural and urban users
- Increasing ground and surface water storage through storm-water capture, off treatment, percolation/injection, and other locally viable options
- Decreasing in-stream extractive uses of water (where groundwater or other supplies are available) in order to balance the need for in-stream flows to support habitat
- Increasing drought-resilient water supplies throughout the County including wastewater treatment and desalination

Visit www.sbcblueprint.net for more resources, project highlights, or to share your ideas!

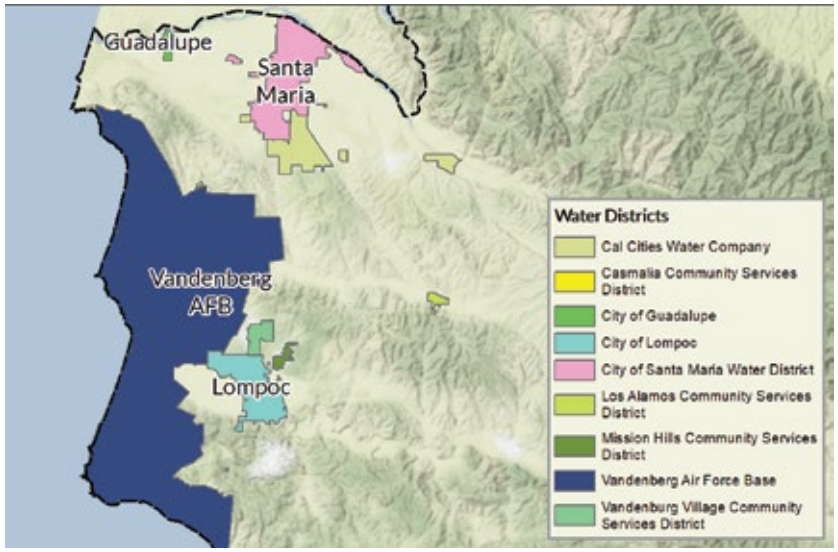
OTHER DISCUSSION POINTS

In addition to the dialogue points raised above, a number of additional considerations came up in the Blueprint interview and research process:

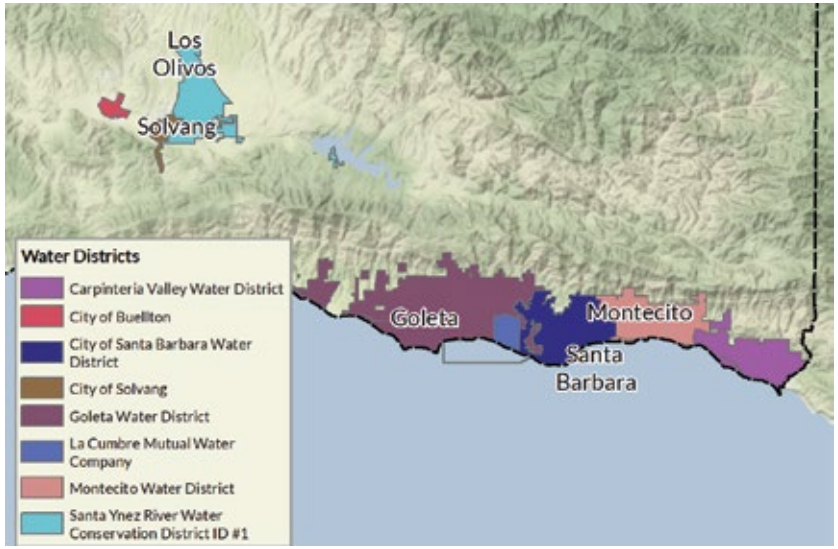
- Energy industry impacts – Oil and gas development is active in nearly every major watershed in the County — attention to risks of leaks and spills will be important for managing the quality of our water supplies into the future.
- Scale of water management - Some community members want to see more self-sufficiency around water in Santa Barbara County. Others believe the solutions to local water problems need a statewide approach (i.e. greater reliance on the State Water Project). Still others advocate a watershed-by-watershed approach.
- How 'natural' are our watersheds? – The old conservation versus preservation debate is alive and well in Santa Barbara County. Some community members call for recognizing that many watersheds are not in a 'natural' state, but have long been managed systems and that managed-use can have positive conservation benefits. Others believe in the importance of preservation – i.e., non-use to protect the remaining 'intact' or untouched riparian areas we have in the County for research and habitat protection benefits.



Northern Santa Barbara County Water Districts (Figure 12a)



Southern Santa Barbara County Water Districts (Figure 12b)



To explore more information on variations in local water sources in the County, visit http://www.waterwisesb.org/where.wwsb.

ENDNOTES

[1] Historical information for this section of the report was pulled from Loáiciga, H.A. 2001. History of Water in Santa Barbara, California. Pacifica, p. 1-13.]. Accessed online October 2016. http://apcgweb.org/sites/default/files/editor_uploads/files/pacificas01.pdf. Census data reported in this section came from the Santa Barbara Historical Society archives. Personal communication, 2001, with Loáiciga.

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[14] Bosch, J.M. Hewlett, J.D. 1982. A review of catchment experiments to determine the effect of vegetation changes on water yield and evapotranspiration. Journal of Hydrology. Review paper.

[15] The California Chaparral Institute. Chaparral Facts. Accessed online January 2017. http://www.californiachaparral.org/chaparralfacts/cplantsanimals.html

[16] City of Santa Barbara. Waste Water Plant webpage. Accessed online January 2017. http://www.santabarbaraca.gov/gov/depts/pw/resources/wastewater/estero.asp.

[17] The project was partially paid for through a grant from the Department of Water Resources Integrated Regional Water Management Drought Grant program. See http://www.waterwisesb.org/wastewater.wwsb for more on wastewater treatment around the County.

[18] The City took out a State Revolving Fund Loan to finance the $61 million capital cost to reactivate the desalination plant. It will cost $4.1 million annually to operate the facility in full production; it can be put in standby mode during rainy periods to reduce the operating costs.

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"Water is the driving force of all nature."
- Leonardo da Vinci