

CREATING A LANDSCAPE OF OPPORTUNITY

# SANTA BARBARA COUNTY CONSERVATION BLUEPRINT



WATER RESOURCES



FLORA AND FAUNA



AG AND RANCLANDS



COMMUNITY AND THE LAND



*"The Blueprint is the first impartial, complete, up-to-date source of data that has been fully vetted and verified and made available to everyone, not just a single interest group. From urban areas to watersheds, public lands, rangelands, and agriculture, the Blueprint describes in understandable terms the resources of Santa Barbara County — fully descriptive and not prescriptive. It is my hope that when future decisions are made that affect all of us in Santa Barbara County, we will make sound, informed evaluations based on this common information."*

*- Pamela Doiron, Rancher, The Spanish Ranch*



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## TABLE OF CONTENTS

Executive Summary	1
Introduction	4
Water Resources	15
Flora and Fauna	33
Agricultural and Ranch Lands	51
Community and the Land	65
Conclusion	83
Appendices	88

The purpose of the Blueprint is to provide a common language and platform for publicly available data to support in-depth conversations and informed decisions about the Santa Barbara County landscape.

The Blueprint report production was managed by **Ag Innovations**, with technical leadership and online Atlas production from the **Conservation Biology Institute**. Design by Josh Woodlander, **1stWave Interactive**

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## SANTA BARBARA CONSERVATION BLUEPRINT PARTNERS

The **Cachuma Resource Conservation District** was founded in 1944 – one of the first RCDs in California. Their mission is to promote land stewardship ethics that result in long-term, sustainable use of natural resources while protecting and enhancing the environment. The Conservation Blueprint helps the CRCD identify areas for voluntary conservation efforts and ascertain community needs. For more information, visit:

► [www.rcdsantabarbara.org](http://www.rcdsantabarbara.org)



The **Santa Barbara Foundation** is committed to building philanthropy, strengthening the nonprofit sector and addressing community problems. The Santa Barbara Foundation LEAF Initiative supports strategies to improve and protect landscapes, ecosystems, agriculture and food systems and works to connect people, ideas and resources for collaborative problem-solving. The Conservation Blueprint is a key element of LEAF as a platform for dialogue and robust conversations about conservation, resource protection and future growth and development in the County. For more information, visit:

► [www.sbfoundation.org/leaf](http://www.sbfoundation.org/leaf)



The **Land Trust for Santa Barbara County** works to preserve and enhance our county's natural open spaces and agricultural heritage for present and future generations. Since its inception in 1985 the Land Trust has helped to preserve over 25,000 acres of natural resource and agricultural land. The Conservation Blueprint presents an opportunity to incorporate sound science and community opinion into the Land Trust's strategic efforts, allowing it to be more focused and effective on behalf of the community and landowners it serves. For more information, visit:

► [www.sblandtrust.org](http://www.sblandtrust.org)





# MOVING TOWARD A LANDSCAPE OF OPPORTUNITY

At its heart, the Santa Barbara County Conservation Blueprint is a first step to creating what we, the project partners, like to call a landscape of opportunity – a healthy and resilient landscape where residents and visitors can enjoy both the economic and environmental benefits that our County is capable of providing.

Over the course of the two years spent developing the Blueprint report and Atlas, we have identified at least four overriding themes for creating this landscape of opportunity:

**Emphasizing landscape connectivity.** Habitat fragmentation is a significant threat to the long-term viability of both local agriculture and habitat for flora and fauna. The impact of habitat loss on plants, animals, and other resources and land uses is significantly greater when it leads to fragmentation and isolated patches of habitat. A focus on preserving the economic and biological integrity of land by avoiding parcelization of wildlands and farmlands is a critical aspect of creating a landscape of opportunity.

**A multi-benefit mindset.** Opportunities are amplified when we seek and support projects and activities on the landscape that provide multiple beneficial uses to people, flora and fauna, shared water resources, and long-term environmental health. With relatively small adjustments in our practices, we can maintain high economic production on working landscapes and support healthy environments for the animals and plants that share this county. The following pages highlight many examples of these kinds of win-win approaches, and we hope that the Blueprint is a catalyst for more multi-benefit actions in the County.

**Valuing ecosystem services.** For most of modern history, humans have taken for granted the abundance of what nature provides. Yet these 'ecosystem services' are the very stuff of life – the capacity of the landscape to provide drinkable water, clean air, shade, flora and fauna habitat, fertile soils, etc. Today, a deeper understanding of the value of nature's goods and services has emerged, and with it, a new way of thinking about our relationship with the land. Protecting and enhancing the quality and quantity of the services Santa Barbara County's ecosystems provide will become more and more important in the years to come.

**Community commitment.** Perhaps the single most essential element we recognize in our landscape of opportunity is genuine community commitment to conserving the long-term viability and integrity of working and natural lands in the County. Practically, this may include a commitment to higher density development to keep larger swaths of working lands intact, or support for the adaptability of agricultural operations so they may remain economically resilient. We need to be vigilantly visionary: our efforts today to conserve a healthy landscape for generations to come will help create the ongoing resiliency needed to respond to challenges in an increasingly uncertain world.

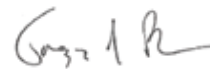
We believe that conservation is not about putting lands into stasis, but about creating conditions that support resilient landscapes that can evolve as both economic and natural conditions change. We view conservation as an active pursuit, and the Blueprint report and Atlas as tools to better understand our interactions with the local landscape, and what they may mean for the shared future of all County inhabitants. The Blueprint is not intended to be a compendium of all the natural resource or land condition knowledge in the County but it does offer a broad introduction. The references cited within this report will allow interested readers to delve deeper into any aspect of the Blueprint that interests them. It is our deepest hope that these tools be used throughout the County for years to come to support more informed dialogue and problem-solving on how to simultaneously meet the pressing needs of today and tomorrow, while preserving the integrity of working and natural lands in the County well into the future.



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# EXECUTIVE SUMMARY

In an era of population growth, global markets, and climate change, Santa Barbara County’s citizens must together address the question of how to conserve the landscapes and biodiversity that make this County special, while also making it an economically feasible and livable place for local residents. Ensuring the ongoing viability of these landscapes and the benefits they provide requires shared tools, language, and dialogue. This is why the Land Trust for Santa Barbara County, the Santa Barbara Foundation LEAF (Landscapes, Ecosystems, Agriculture, and Food Systems) Initiative, and the Cachuma Resource Conservation District came together to develop the Santa Barbara County Conservation Blueprint (Blueprint).

Nearly two years of design, research, data collection, interviews, focus groups, and public input meetings went into the creation of this report and its companion interactive online Atlas and web resources. The Blueprint report focuses exclusively on the land base and terrestrial natural resources, and is broken into four main chapters (summarized on the following pages). Each chapter focuses on a major land conservation theme but also addresses climate impacts, interconnections to other themes, community values, elements of resilience and stories of multi-benefit solutions to resource challenges. The report contains dozens of maps on these themes and points readers to explore more of the nearly 300 publicly available, science-based datasets in the online Atlas.

**Together, the Blueprint report and online Atlas offer a first step toward a common understanding of Santa Barbara County’s current environmental conditions, the impacts of human interaction with the land, and the conscious tradeoffs required to create a landscape of opportunity for generations to come.**

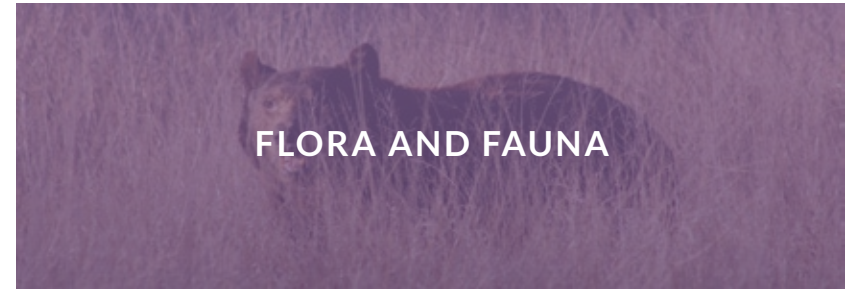




## WATER RESOURCES

In Santa Barbara County, as in most of California, fresh water supply, land use, and population are intimately tied. County leaders have worked hard to ensure adequate supplies of water through infrastructure development, advances in efficiency, and changes in patterns of water use. Today, the pressing question is how to ensure water reliability for urban, agricultural, and environmental needs under conditions of increasing variability of precipitation. Historically groundwater served as a buffer when surface water supplies were limited. This has led, in places, to aquifers becoming overdrawn. California's Sustainable Groundwater Management Act requires the region to find ways to bring its use of groundwater into balance, bringing new attention to the role of working and natural lands in recharging precious local water supplies.

Often, the connection between reliable water and conservation is complex and unfolds over many years. Take the case of drought and ranch land conversion: In long droughts like the one Santa Barbara has just experienced, rangelands, which are reliant on precipitation for grasses as animal feed, cannot support as many cattle; ranchers are often forced to sell livestock or convert land to other crops in order to make ends meet. The loss of ranch lands is a significant trend in the County, and troublesome for both the ranching community and for conservation minded residents concerned about the effect of fragmenting these large rangelands. Water is life for people and all the plants and animals who call the County home; understanding the region's water resources is critical to a positive future for Santa Barbara County.



## FLORA AND FAUNA

Santa Barbara County is home to an incredible array of species, sensitive and threatened habitats, and ecological transition zones. The County sits at a unique confluence of four different ecoregions: Southern California Coast, Southern California Mountains and Valleys, Central California Coast, and Central Valley Coast Ranges. These diverse landscapes support an equally diverse range of plants and animals, making the County part of one of 35 global biodiversity hotspots. Habitat types range from lush coastal wetlands to dry interior grasslands and saltbush scrub in Cuyama Valley, to foothill oak woodlands and savannas, to hill slopes covered by coastal scrub and chaparral, to mountain tops of mixed oak and pine forests.


Even with half of County lands under public ownership or other designations that limit future development, land use change and habitat loss continue to impact wildlife, particularly near the coast and interior valleys and foothills. Climate change, invasive species, residential development, and changing agricultural land use patterns threaten Santa Barbara County's native species and ecosystems. Maintaining habitat connectivity for plants and wildlife will allow them to adjust to shifting climatic conditions across these habitats and between valleys and mountain ranges. This will be vital to maintaining biodiversity and the ecosystem services that support the quality of life and economic, cultural, health, and spiritual benefits that residents and visitors enjoy. Innovative and nuanced approaches to conserve and restore productive and diverse ecosystem while accommodating additional human settlement in the County will become more essential as competition for space increases.



## AGRICULTURAL AND RANGLANDS

Working farms and ranch lands are iconic elements of Santa Barbara County's landscape. Residents and visitors alike marvel at the beauty and productivity of the County's vineyards, orchards, rangeland, and croplands. But these lands produce so much more than food and fiber. They help recharge groundwater, protect from floods, provide habitat for native plants and animals, provide connection to historic culture, help drive a thriving tourist industry, provide important recreation opportunities, and assure adequate food supplies in times of need.

Yet the future of working lands has never been more uncertain. Population pressures from growing cities and communities create an almost insatiable demand for land for development. This drives up the value of working lands, often pushing them to the tipping point where it is uneconomical to continue to farm and ranch. Social pressures on farms and ranches in the form of increased regulations and expectations from large commodity crop buyers can raise the cost of operation to the point where smaller farmers can no longer compete, and pressure to sell increases. Uncertain or declining water supplies can make farming and ranching increasingly challenging in some parts of the County. Understanding these and the many other pressures on the economic viability of working lands is a critical step to finding ways to support farmers and ranchers in their desire to continue working the land. One new and promising approach is to find ways for farmers and ranchers to be rewarded for the multiple benefits they provide, several examples of which are highlighted throughout the report.



## COMMUNITY AND THE LAND

How we live, work, and play influence and are influenced by changes in the local landscape, demography, culture, and economy. Like many places in California, Santa Barbara County is experiencing a demographic shift and an expected population boom in the next 25 years that could bring 75,000 additional residents to the County, the vast majority of whom are predicted to move to the northern parts of the County due to job growth, available land, and affordable housing opportunities.

Between agriculture, tourism, recreation, and habitat restoration efforts, Santa Barbara County has an active economy based on its natural resources that can be a support to this growing population if resources are well managed. The County hosts an incredible network of parks and trails that offer recreation and ecosystem service benefits to all who live and play here, but access to these benefits is a challenge for many of the County's citizens. In addition, local and county-level development decisions have far-ranging impacts (some unintended) on key quality of life factors such as housing costs, commute time, transition zones between land use designations, and access to nature. Understanding these interconnected impacts is essential to working toward a future that all Santa Barbara County citizens would continue to find desirable. Despite strong regional cultures and mindsets, many issues must be addressed collectively to support the many shared interests in the County.



# INTRODUCTION

Santa Barbara County is a special place with unmatched scenery, a remarkable diversity of plants and animals, and productive ranching and agricultural lands – all of which contribute to Santa Barbara’s economy and quality of life. With a Mediterranean climate, a wide range of soil types and geography, the County is home to a wide diversity of species and landscapes as well as a growing human population competing for space. This combination makes Santa Barbara County part of a top 35 global **biodiversity hotspot**.<sup>1</sup>

Historic water limitations, a strong agricultural and ranching tradition, and strong **conservation** values have contributed to the preservation of more open landscape than many other California counties. Over half of the land area in the County is under government ownership or otherwise protected, with the majority of the upper **watershed** area in the Los Padres National Forest, including the Dick Smith and San Rafael Wilderness Areas. Despite this strong history of land protection, threats to the **open spaces** and **wildlands** that make Santa Barbara unique are on the rise. A warming climate and associated rising sea level, increasing rainfall variability, population growth, and conversion of **working lands** to subdivisions and rural development all raise questions about the future of the working and public landscapes that residents and visitors enjoy today.

To ensure the ongoing viability of Santa Barbara’s landscapes, economy, and quality of life for current and future generations, tools to better understand the terrestrial landscape will be needed. In addition, the **community** must begin to think, talk, and work together on how to address pressures facing the County to create a more **resilient** and adaptable future for all. This is why the Land Trust for Santa Barbara County, the Santa Barbara Foundation LEAF (Landscapes, Ecosystems, Agriculture, and Food Systems) Initiative, and the Cachuma Resource Conservation District came together to develop the Santa Barbara County Conservation Blueprint (Blueprint).

The purpose of the Blueprint is to provide a common language and platform for publicly available data to support in-depth conversations and informed decisions about the Santa Barbara County landscape.

Nearly two years of design, research, data collection, interviews, focus groups, and public input meetings went into the creation of this report and its companion online interactive Atlas and web resources. In this process, two striking trends across the County stood out:

- Open space and agricultural and rangelands are under increasing pressure for development and fragmentation.
- People born and raised here are struggling to continue to live and work here.

See **page 10** for additional key learnings and trends. In an era of population growth, global markets, and **climate change**, Santa Barbara County’s citizens must together grapple with the question of how to manage the landscapes and biodiversity that make Santa Barbara County special, while also making it an economically viable and livable place for local residents. **The Blueprint offers a first step toward a common understanding of current environmental and social conditions in Santa Barbara County and the conscious tradeoffs required to create a landscape of opportunity for generations to come.**

## Defining Terms

In this report, terms are used that may have different meanings in other contexts. To clarify specific meanings within this report, see Appendix A: Glossary. The first time a **glossary term** appears in the text, it is highlighted in bold blue font. Examples include:

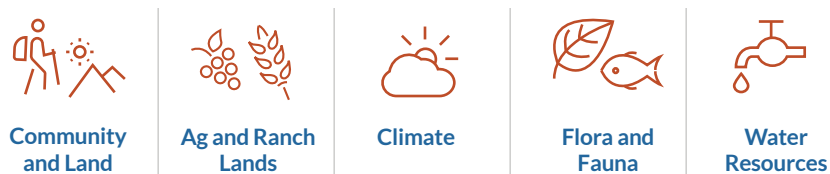
**Open Space:** Land that is largely undeveloped and accessible to the public for recreation and outdoor activities.

**Wildlands:** Lands not actively managed or cultivated by humans in any way.

**Working Lands:** Lands managed by humans for the production of commodities (food, fiber, and other materials), including farmland, rangeland, and timberlands.

The Blueprint focuses exclusively on the land base and terrestrial natural resources. Ocean resources, though equally significant in this County, are only covered in the context of shoreline access and climate impacts. This report is broken into four main chapters. The first two chapters focus on the physical and biological features of the landscape with chapters on **Water Resources** and **Flora and Fauna** in Santa Barbara County. Unlike conservation assessments that focus only on the value of landscapes for plants and animal species, the Blueprint is founded on the belief that human interaction with the land is an essential component to understand and include in effective conservation. To this end, the third chapter focuses on **Agricultural and Ranch Lands**, and the final **Community and the Land** chapter delves into how the community lives, works, and plays on the land. Each chapter also addresses **Climate Impacts**, interconnections with other theme areas, common values around each theme, and stories of win-win, or **multi-benefit** solutions to shared resource challenges. The Blueprint ends with a conclusion and appendices for more information.

Finally, there are invitations throughout the report to visit the online Atlas (<http://sbcblueprint.databasin.org>), a mapping portal comprised of nearly 300 publicly available, science-based datasets distilled into a few dozen interactive maps based on five theme areas:



Through the Blueprint, users can view, retrieve, and analyze additional information about land use and resources in Santa Barbara County. Data for the Blueprint comes from many different sources including federal, state, and local agencies, universities, non-governmental organizations, and other credible public data sources throughout California. **This is a tool to understand general land use patterns. Detail that might disclose sensitive information on individual parcels has been removed.** The Atlas is designed to provide a transparent, accessible, interactive community resource to explore the status and trends of County natural resources and land use.

## Project Partners and Origin

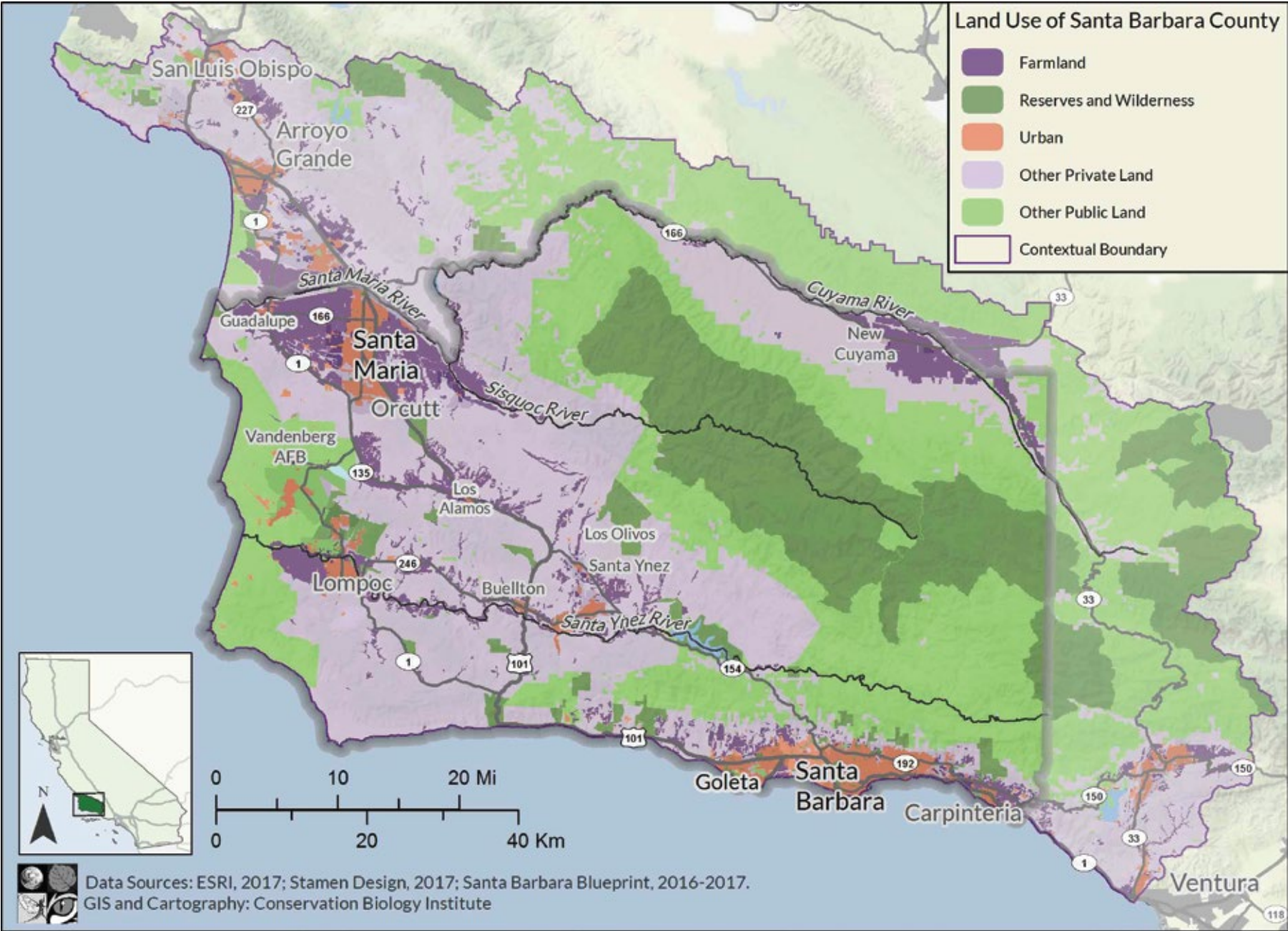
The Blueprint has been developed through a partnership between the Land Trust for Santa Barbara County, the Santa Barbara Foundation LEAF Initiative, and the Cachuma Resource Conservation District. These partners came together to explore their shared interest in having a tool to support their strategic planning needs. Land Trust for Santa Barbara aims to use the Blueprint and Atlas data to identify and develop conservation priorities in its upcoming strategic plan. The Cachuma Resource Conservation District will also use the Blueprint to inform its strategic plan and voluntary habitat **restoration** priority areas. For Santa Barbara Foundation, the project will inform priorities and dialogue for the LEAF Initiative and serve as a platform for cross-sector dialogue and problem solving for a range of issues – conservation, housing, economic development, and equity.

The partners recognized early on that by pooling resources and collaborating with a broader set of stakeholders in the development of the tool, they could not only enhance their individual planning processes, but also provide a valuable public resource that could build shared understanding of the landscape and accelerate the pace of voluntary conservation of Santa Barbara County’s farmlands and natural resources. From this recognition, six core project goals emerged:

- Create a compilation of the County's resources, conservation opportunities, and a range of community values.
- Provide a shared public platform (website, maps, reports, tools) to inform conversations about the future of the landscape.
- Understand what a diverse cross section of community members truly believe is important to conserve.
- Inspire greater collaboration, trust, and improved working relationships among conservation practitioners, farmers, ranchers, landowners, housing advocates and conservation funders.
- Attract sufficient funding to accelerate the pace of voluntary conservation with landowners and managers who want to protect, restore, and steward their properties.
- Inform the Santa Barbara Foundation's LEAF Initiative, and new strategic plans for Cachuma Resource Conservation District (RCD) and the Land Trust for Santa Barbara County.



Land Use in Santa Barbara County (Figure 1)



## The Blueprint Development Process

The Blueprint development process was guided by a 12-member Steering Committee representing agriculture, conservation, resource management, and the natural sciences. Its executive team consisted of leaders from the sponsoring organizations. Project delivery and community engagement were managed by Ag Innovations, a nonprofit organization focused on promoting collaboration and public engagement around issues of agriculture and natural resources. Geographic Information Systems (GIS) data development and management were provided by the Conservation Biology Institute, a nonprofit research group specializing in providing GIS and remote sensing data, research, and scientific expertise to support conservation. The content for the Atlas and the Blueprint report was developed with the support of community leaders and topic experts and vetted with the support of local stakeholders. Input was provided via one-on-one interviews with experts and thought leaders within the County on each theme, as well as small group meetings, focus groups, an online survey, and public input meetings. More information on public engagement and data collection methodology can be found in the Appendices.

## Climate Change

Climate change is a unifying threat to every species and resident of Santa Barbara County. With population centers spread along the 135 mile coastline, broad economic dependence on agriculture and a reliance on highly variable and local water resources, the region's human population will be tested in its ability to adapt to changing climate and sea level rise. With changes in the climate likely happening at faster rates than historical trends, natural communities and wildlife are expected to become more stressed and may be unable to adapt or move to suitable habitat.

Climate change, as defined in this report, is the expected departure from normal variability in climate factors such as precipitation and temperature. Since the early 1900s there has been a marked increase in annual maximum and minimum temperatures across the western United States, and in California.<sup>2,3</sup> This increase has been shown to be true as well for the southern coast of California and for Santa Barbara County.<sup>4,5</sup> Depending on the geographic scale, studies of historic

### What the Blueprint is

The Blueprint **is** meant to be a catalyst for more informed conversation about the community's future. It includes

- a written report,
- an online mapping tool, and
- publicly available data about resources and land uses in Santa Barbara County.

The Blueprint **is** a resource for voluntary conservation and management throughout the County, focused on five major resource themes: Water Resources, Flora and Fauna, Agricultural and Ranch Lands, Community and the Land, and Climate.

The Blueprint **is** community informed: It entails a community input process to understand what members of the public value within the County.

### What the Blueprint is not

The Blueprint is **not** a prioritization map that identifies individual properties for conservation. The Blueprint is **not** intended to be a compendium of natural history or agricultural information. It is only an introduction to the broad issues of land management for the interested public.

The Blueprint is **not** a government-led process.

- It is **not** a regulatory effort.
- The Blueprint is **not** a tool for mandatory conservation, management, or regulation.

The Blueprint is **not** an advocacy process.

- It is not about persuading public opinion on a particular topic.

It is **not** a closed-door process.

- Data will be accessible to everyone and community input is part of its development.



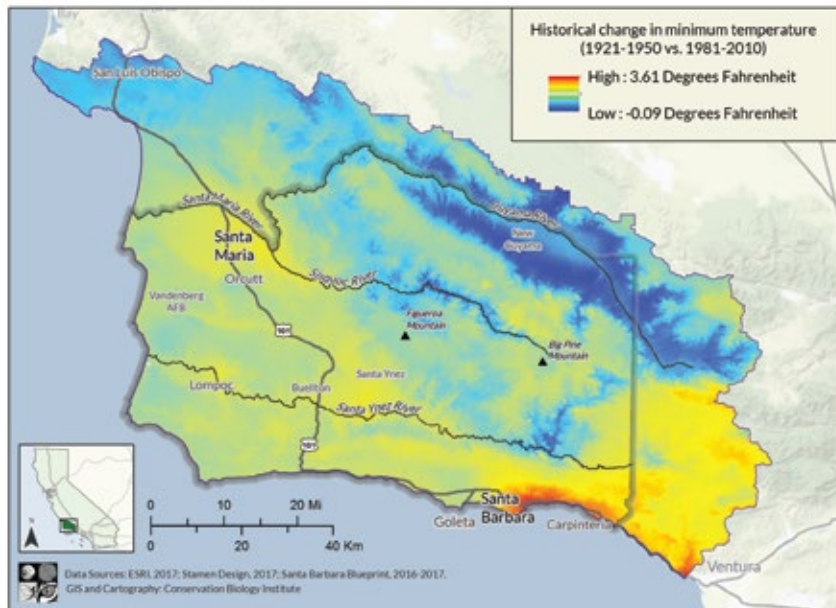
climate change show an increase in annual maximum temperature of approximately 0.2 degrees Fahrenheit per decade.

As a community, citizens of Santa Barbara County need to plan for this coming change. In the coastal urban areas of the County this may mean infrastructure improvements, levees, sea walls, causeways, or regulations on bluff-top construction or building in low-lying areas. Or it may mean strategic retreat from areas where climate impacts may be the largest and infrastructure improvements are not suitable. In many cases, existing development lies close to areas vulnerable to coastal hazards such as sea level rise, coastal erosion, flooding, and storms. Coastal habitats such as beaches, bluffs, and wetlands will increasingly be caught in the coastal squeeze where they are constrained from migrating inland, putting both infrastructure and natural resources at risk. All of the south coast communities are actively planning at multiple scales to deal with the effects of rising sea level and changing climate. The County has many active studies and/or plans in place, including the County's Sea Level Rise and Coastal Hazards Vulnerability Assessment, the Santa Barbara Area Coastal Ecosystem Vulnerability Assessment report, the City of Goleta

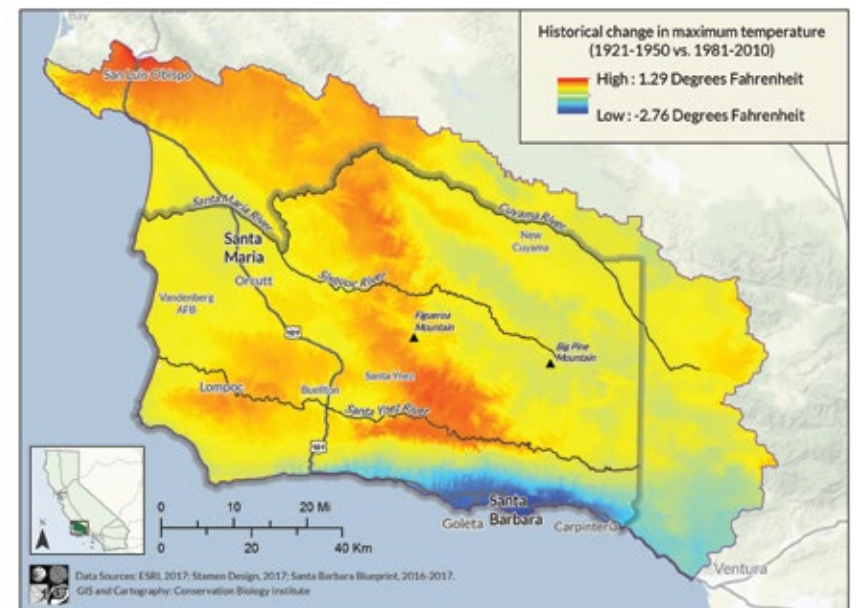
Draft Coastal Hazards Vulnerability and Fiscal Impact Report, and the 2015 Goleta Slough Area Sea Level Rise and Management Plan.<sup>6</sup>

Climate change is not just a coastal or infrastructure issue. The County's natural resources and services like soil, agricultural productivity, water filtration, pollination, and many others will be impacted. In many ways Santa Barbara County is fortunate because our natural and working lands still have the ability to adjust to changes in climate. The County's unique topography, proximity to the ocean, and the huge range of aspects and elevations associated with the region's mountain ranges mean that the County will have varied impacts as the climate shifts. Some areas of the County will experience increases in temperature, while others may see no change or even decreases in temperature. Across the globe, communities with a more homogeneous landscapes or without the proximity to the ocean can expect a much more uniform change across the landscape, which may devastate natural communities and agricultural economies. Planning for a shifting climate in Santa Barbara County means we need consider those areas that will be most resilient to changes in precipitation or temperature as refuge for flora, fauna, and agricultural uses.

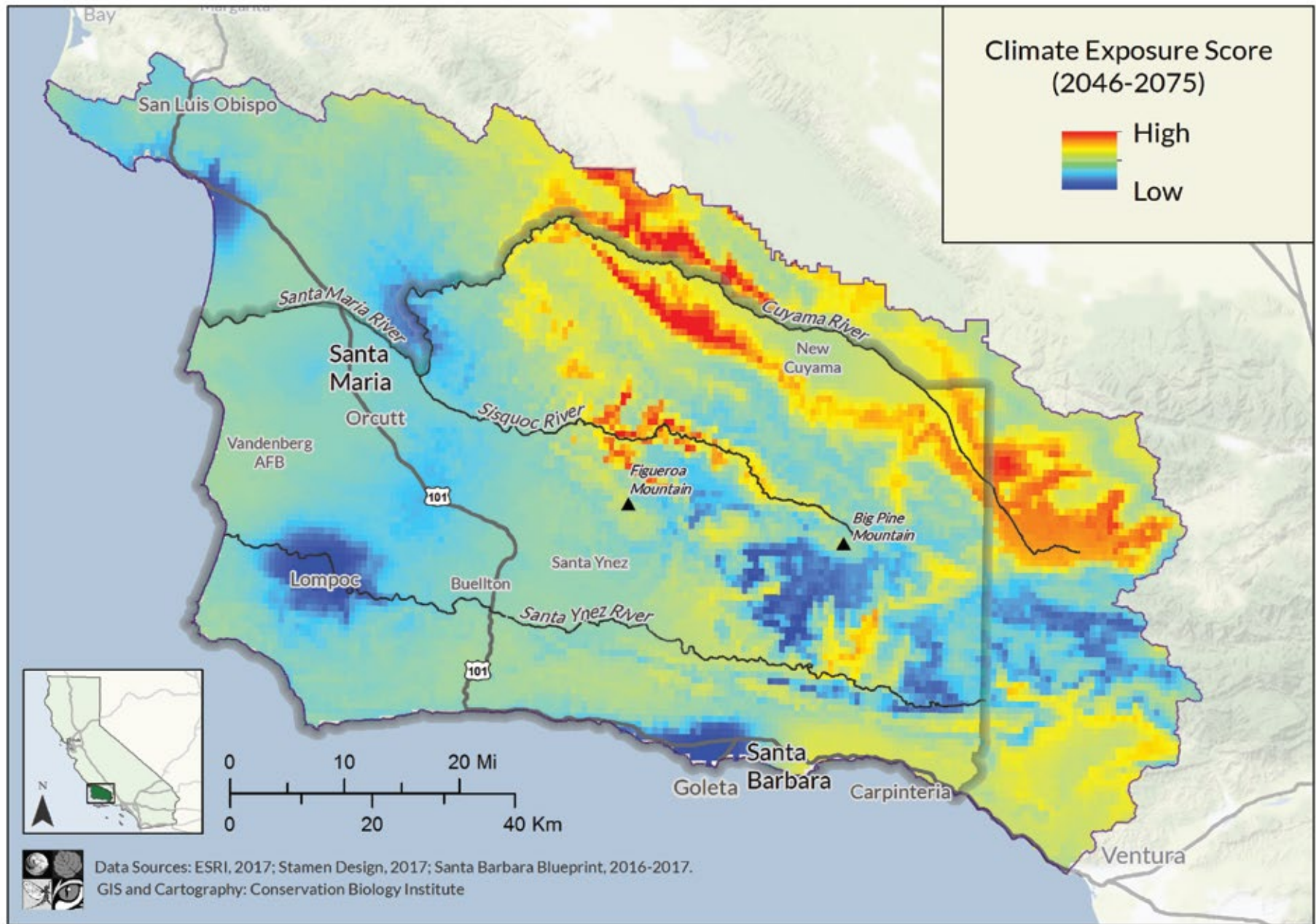
### Historic Changes in Minimum Temperature (Figure 2a)



### Historic Changes in Maximum Temperature (Figure 2b)



## Projected Climate Exposure Score (Figure 2c)



This map shows climate exposure across the region. Climate exposure is based on the difference between the projected future climate compared to the variability in climate over a reference historical period of 1971-2000. The higher the climate exposure, the greater the difference the projected climate is from what the area experienced in the past.



Recognizing that movement corridors for plants and animals will become critical as precipitation and temperatures change and that areas for water storage and groundwater recharge will become vital for our community, we should develop ways to reward landowners for maintaining resilient landscapes and adaptation processes that benefit the community.

Managing the risks of climate change involves understanding potential future conditions. This report will provide short-term projections of climate changes into mid-century, mostly at a county level. Impacts specific to water, flora and fauna, agriculture, and community interests are discussed in more detail in their respective chapters.

At this time, under all climate change scenarios currently being used by the state of California for resource planning, Santa Barbara County is likely to expect: a doubling of extremely hot days<sup>7</sup>; an increase in average maximum temperatures of 1.6 - 3.1 degrees Fahrenheit by 2045<sup>4</sup>; sea level rise of 0.7-1.2 feet by 2050<sup>5</sup>; and higher variability in precipitation patterns ranging from an increase in precipitation of 20.8% to a decrease in precipitation of 18% by 2045.<sup>4</sup>

The ranges of potential temperature increases, evaporative demand, precipitation fluctuations, and sea level rise reflect the differences in the outputs of multiple predictive models. Longer term projections can be explored online at the Climate Console website (<http://climateconsole.org/>) and on the Cal-Adapt website (<http://cal-adapt.org/>).

**Potential impacts specific to water, species, agriculture, and community interests are discussed in upcoming chapters.**

## KEY LEARNINGS & TRENDS

After synthesizing map, interview, and public input data across theme areas, a few key insights rise to the surface:

**Keeping agricultural lands and rangelands in production is one of the most effective long-term conservation measures.** Rangelands are among the most threatened landscapes in the County and across

California. They are also among the most beloved and important for species conservation, **ecosystem service** benefits, and open space views for residents and visitors alike. Working with those who work the land to understand their needs, finding ways to support their operations, and incentivizing habitat creation as part of sustaining these working landscapes will be key to more effective and collaborative conservation of agricultural and natural heritage in the County. This is a core challenge for the community to work through together.

**There is a need for thinking beyond single species in conservation priorities.** While the species-by-species approach to conservation has been the predominant methodology for protecting **threatened and endangered species**, many on-the-ground conservation efforts show unintended impacts that can actually hinder conservation goals. For example, landowners who may be interested in conservation and engage in practices that help restore native habitat may be incentivized by regulatory burden to avoid those beneficial practices. Local input suggests a pathway for broadening the focus of conservation efforts to regional-level strategy and partnerships that focus on financial incentives (rather than penalties) for the protection of intact and connected habitat across the entire county.

**The conservation economy is a central part of the Santa Barbara economy.** At least 12% (likely higher) of local jobs are held in restoration, conservation, recreation, and tourism.<sup>8</sup> Another 10% of jobs are connected with local agriculture, which helps to preserve natural and working

## ECOSYSTEM SERVICE BENEFITS

The direct and indirect benefits from services naturally provided by the environment from which both human beings and all other organisms benefit. Examples include provisioning of water, food and fiber, clean air, and tourism benefits.



landscapes with many ecosystem service benefits. The land itself contributes tremendous economic benefit when the value of these parts of the economy and of ecosystem services are taken into account. Preserving the health and beauty of the County's landscapes is an economic imperative.

**Reconciling development and conservation needs will be critical moving forward.** This report summarizes current development pressures in the County for agricultural and urban lands, key impacts (both intentional and unintentional) of regulations and zoning restrictions, and interconnections between these trends. For example, restrictions placed in one part of the County impact commuting and housing patterns in other parts of the County. A common quip in the County is that “people hate two things: density and sprawl,” yet the County must address a projected influx of new residents. Such tradeoffs are an important part of the story, and starting points for the tough discussions ahead.

**Preparing and managing for climate change will build resiliency.** Even the more conservative climate change models suggest wide-ranging impacts caused by changes in season timing and temperatures, precipitation, and potential sea level rise. For example, preparing the landscapes to offer refuge to **native species** migrating in response to climate change is a new ecological management challenge for the County. **See Pages 7-10** for more on expected climate change impacts.

**Details and references for these summary statements can be found in the body of the report.**

## Synthesizing multiple maps and data sets with the Environmental Evaluation Modeling System (EEMS)

One of the core challenges for the Blueprint project was to synthesize and integrate the hundreds of individual maps we collected to 1) help clarify and communicate the conservation trends and challenges in the County and 2) assist with the development of strategies to support a landscape of opportunity. Comparing or overlaying two or three resource maps is relatively simple using the online Atlas. But to get a

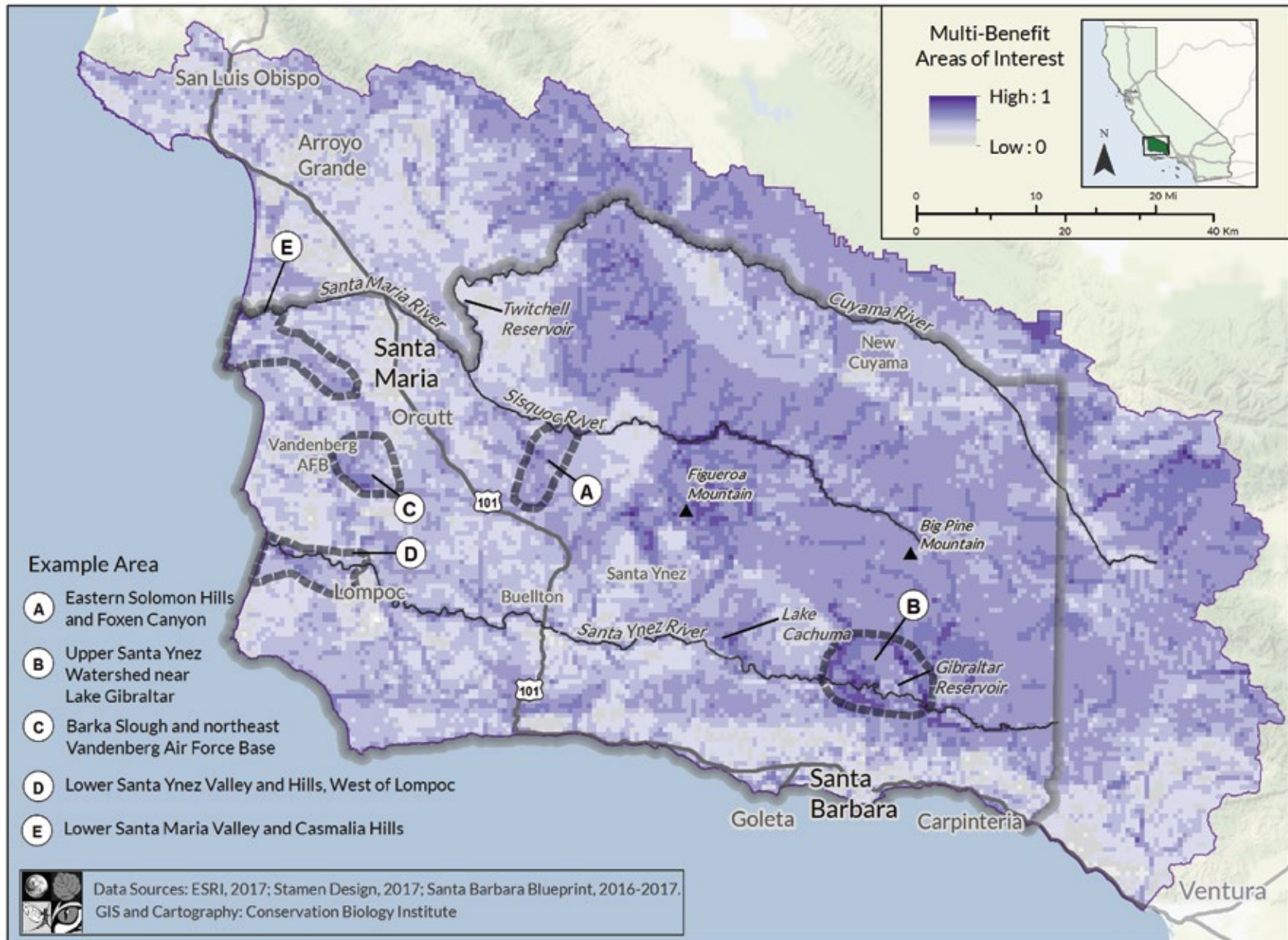
full sense of the spatial distribution of all the information that might characterize a thematic area like agriculture, one would need to overlay a half dozen or more resource maps. As an example, if one wanted to understand the water resources of the County it would be relatively easy to view a map of the streams, rivers reservoirs, and wetlands. But that would not be the whole story. Understanding the issues around water in this County requires knowledge of groundwater aquifers, recharge rates, precipitation patterns and trends, watershed health, and water quality. Overlapping all of these data layers could create a very confusing map. The EEMS approach offers a solution.

EEMS is a tool that allows a user to combine multiple layers of spatial data into useful synthesis maps. The models draw on priorities gleaned from the Blueprint expert and community input processes, and includes transparent data sources and descriptive (not prescriptive) multi-benefit maps. These multi-benefit maps compare different types of data in a logical and transparent way (i.e., users can “look under the hood” to see how the data were processed). See **Appendix C** for more information about the creation of these maps, the EEMS system, and how to use the interactive viewer.

This EEMS approach was used to create a synthesis map for each theme in this report (featured in each chapter). The four theme-based EEMS maps were then combined to create the high-level “multi-benefit map” featured here (**Figure 3**). This ‘meta-map’ offers a quick snapshot of places in the county where **areas of interest** overlap from two or more of the major themes (agriculture, water, flora and fauna and community). These maps, together with the additional topical maps featured throughout the report, are meant to support meaningful visual insights about resources in the Santa Barbara County landscape, and to stimulate conversations about key issues. Visit the online Atlas to interact with these maps by zooming, panning, clicking other layers on and off, and using the swiper tool to quickly compare data for a place. Users can also create their own map with the hundreds of additional datasets housed there. Watch a brief video tutorial here: [https://youtu.be/dIB\\_r-2Pngo](https://youtu.be/dIB_r-2Pngo), and explore more in the ‘About’ section of the online *Atlas*.

► *The Atlas:* <https://sbcbblueprint.databasin.org>

Multi-benefit Areas of Interest (with Example Areas) (Figure 3)



This synthesis EEMS map highlights multi-benefit areas of interest by overlaying the EEMS maps from the Water, Flora and Fauna, Agriculture and Ranchland, and Community and the Land themes. This and other maps featured throughout the report are meant to support meaningful visual insights about the Santa Barbara County landscape, and to stimulate conversations about key issues. You can explore this map further on the Atlas and use the interactive EEMS Explorer (See Appendix C, page 100 for a more detailed description of EEMS methodology and tips for using the EEMS Explorer.)

## Example Multi-benefit Areas of Santa Barbara County

Built on individual data layers, the Atlas allows users to explore overlaps in different resources of importance across the County. (This is done here using the EEMS approach described on the previous page.) The resulting 'multi-benefit' areas shown in this map can become opportunities to break down siloed approaches to land use thinking in the County. They highlight examples of how land in Santa Barbara County can serve multiple uses and deliver many benefits to landowners and community members alike.

It is important to note though that multi-benefit areas do not necessarily indicate conservation priorities. Rather, they are places for us to look at how the themes in this report interrelate, and help us understand the complexities of how we interact with the local landscapes.

### Example Area A: Eastern Solomon Hills and Foxen Canyon

This area of the County was recognized for significant features across three of the four major Blueprint themes. It has high agriculture and rangeland values (driven by healthy rangeland, good soil, and decent rainfall), as well as importance for flora and fauna (driven by its role as an important wildlife linkage between the eastern and western parts of the County). It was also found to be moderately important for water (driven by its location at the edge of an important groundwater basin and the relative health of its sub-watersheds).

### Example Area B: Upper Santa Ynez Watershed near Gibraltar Reservoir

This remote area of the County also has significant value in three of the Blueprint themes: water, flora and fauna, and community uses of the land. The importance of this area from a water perspective comes from its upper watershed location and role in storage of a significant portion of the precipitation that falls in the County. Its intact watersheds also provide high quality habitat for flora and fauna as well as an abundance of trails, camping, and recreation opportunities for the public.

### Example Area C: Barka Slough, Harris Grade and northeast Vandenberg Air Force Base

This area of the County was recognized for high quality habitat for flora and fauna. It is home to many reptiles and mammals, and contains large and intact coastal oak woodlands that have been protected by the Air Force Base for decades. The presence of Barka Slough and the San Antonio Creek watershed further its value for both habitat and water resources. The area also supports an increasing amount of agriculture and ranching due to soil quality and viable grazing areas.

### Example Area D: Lower Santa Ynez Valley and Hills, West of Lompoc

Thanks to deep top soils and abundant water resources, this region around Lompoc has long been one of the most important and valuable agricultural landscapes in the state and Country. The Santa Ynez River and Vandenberg Air Force Base lands also provide great wetland habitat for mammals, birds, and fish (including the endangered steelhead trout). Coastal access, parks, and bike trails also provide recreational value in this region.

### Example Area E: Lower Santa Maria Valley and Casmalia Hills

This region too is renowned for its agricultural productivity, and has become one of the largest producers of commercial grown berries in the nation. It overlays a high quality but much depleted groundwater basin and adjacent hills provide high quality rangelands for grazing as well as habitat for many species (including a handful of endangered species). Coastal access, parks, and bike trails provide recreational value as well.

To explore these places and values, you can interact with the map linked from [page 12](#). You can zoom, pan, click other layers on and off, use the identify tool to see attributes about the points and shapes on the map, and use the swiper tool to quickly compare data for a place. The EEMS Explorer shows what data went into the map, and you can explore for yourself how various locations got their respective interest scores (i.e. shades of purple) on the map. Learn how to use your favorite layers to make your own map and more on the SBC Atlas Videos page (<https://sbcblueprint.databasin.org/videos>).



## ENDNOTES

<sup>1</sup> For more on global hotspots, see <http://www.conservation.org/How/Pages/Hotspots.aspx>.

<sup>2</sup> Garfin, G., Jardine, A., Merideth, R., Black, M. & LeRoy, S., eds. 2013. Assessment of Climate Change in the Southwest United States: A Report Prepared for the National Climate Assessment. A report by the Southwest Climate Alliance. Washington, DC, Island Press. Accessed May 2017: <https://tinyurl.com/y9vtyvw2>

<sup>3</sup> He, M. & Gautam, M. 2016. Variability and Trends in Precipitation. 2016. Temperature and Drought Indices in the State of California. Hydrology. 3(2), 14. DOI:10.3390/hydrology3020014. Accessed May 2017.

<sup>4</sup> California Climate Console. Data on expected changes are in comparison with a 1971-2000 average. Downscaled climate projections from the NASA Earth Exchange (NEX) U.S. Downscaled Climate Projections (NEX US-DCP30) dataset (Thrasher, B., Xiong, J., Wang, W., Melton, F., Michaelis, A. & Nemani, R. (2013). Downscaled Climate Projections Suitable for Resource Management. Eos, Transactions American Geophysical Union, 94, 321-323.) for the entire state of California was compared to historical period (1971- 2000) corresponding to the LT71m PRISM (Parameter-elevation Relationships on Independent Slopes Model) 30 arc-second spatial climate dataset for the Conterminous United States. Accessed May 2017: <http://climateconsole.org/>.

<sup>5</sup> Griggs, G., Árvai, J., Cayan, D., DeConto, R., Fox, J., Fricker, H.A., Kopp, R.E., Tebaldi, C., Whiteman, E.A. (California Ocean Protection Council Science Advisory Team Working Group). 2017. Data on expected changes are in comparison with 2000-2009 levels, using La Jolla as a comparison based on the recent Ocean Protection Council Report 2017. Rising Seas in California: An Update on Sea-Level Rise Science. Oakland, California Ocean Science Trust. Accessed May 2017: <https://tinyurl.com/yafbrhwn>

<sup>6</sup> The County of Santa Barbara Division of Long Range Planning maintains a Coastal Resiliency Project website that features many of these reports and other resources: <https://tinyurl.com/y7smsks2>. See specifically The Santa Barbara Area Coastal Ecosystem Vulnerability Assessment report (<https://tinyurl.com/y78py2bh>), the City of Goleta Draft Coastal Hazards Vulnerability and Fiscal Impact Report (<https://tinyurl.com/yblz5u99>) , and the 2015 Goleta Slough Area Sea Level Rise and Management Plan (<https://tinyurl.com/ydxbhr4v>).

<sup>7</sup> Pierce et al. Journal of Hydrometeorology <http://dx.doi.org/10.1175/JHM-D-14-0082.1>. 2014. Downloaded from Cal-Adapt. Climate Tools -Extreme Heat. LOCA Downscaled Climate Projections for Temperature and Precipitation. Accessed May 2017. <http://cal-adapt.org/>.

<sup>8</sup> Williams, J. & Lehmann, S. 2015. Industry, Employment, & Skills: A Workforce Analysis for Santa Barbara County. Prepared for the Santa Barbara County Workforce Investment Board. Carlsbad, CA, B.W. Research Partnership. Accessed May 2017: <https://tinyurl.com/y995yj8k> Data on jobs relating to restoration, conservation, recreation and tourism were pulled from the following industry groups: Energy & Environment, Tourism and Hospitality. Data on agricultural jobs were from the Agriculture, Food, and Beverage industry group.



# 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.<sup>1</sup>

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

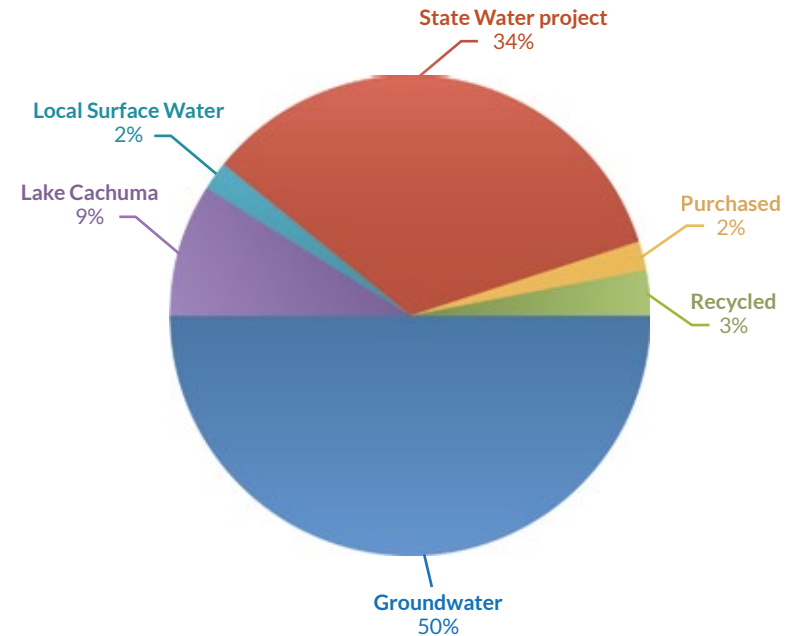


way of life for future generations with limited water supplies and a sensitive ecological heritage. Many water-saving incentives, innovations, and regulations have been put in place in the last few decades in attempts to alleviate increasing pressure on the local watersheds, with mixed results. Many 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<sup>2</sup> (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)

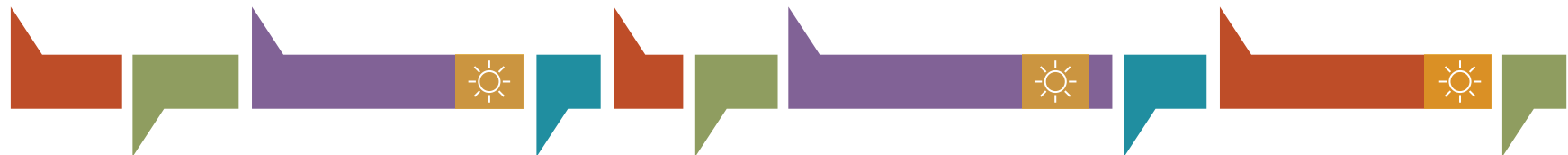
**1912** Mission Tunnel is built to bring water to Santa Barbara from the Santa Ynez mountains

**1928** Juncal Dam opens (Jameson Lake), Montecito

**1953** Completion of Bradbury Dam (Lake Cachuma)

**1964** Santa Barbara City's 1<sup>st</sup> water treatment plant opens

**1998** State Water Project imports begin



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

**1949** Gibraltar Dam raised to restore original capacity lost to sedimentation

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

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

**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,<sup>3</sup> 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.<sup>4</sup> (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.<sup>5</sup> (About 29% of the county landscape was in ag production in 2012.)<sup>6</sup>
- 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%.<sup>7</sup>
- 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.<sup>8</sup>

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/>.

**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.**



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

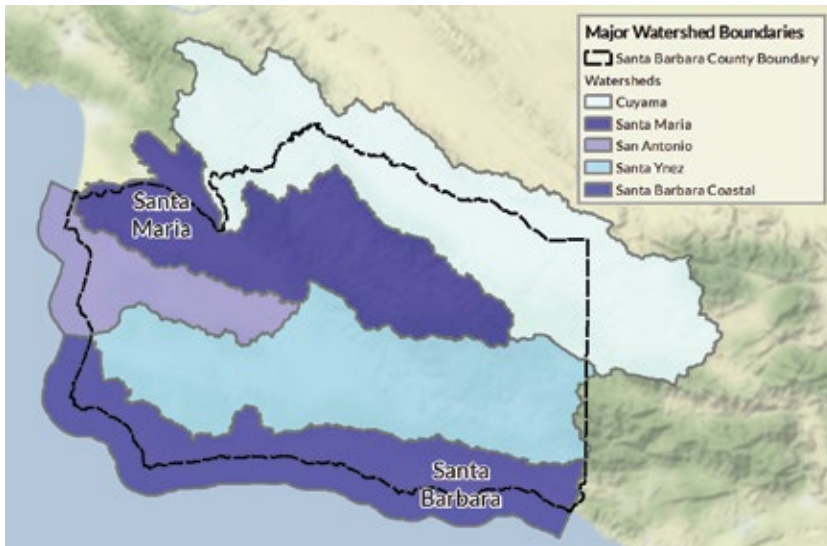
Consistent groundwater level and quality monitoring and reporting will be required for sustainable management.

## 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

### 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.

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.

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.

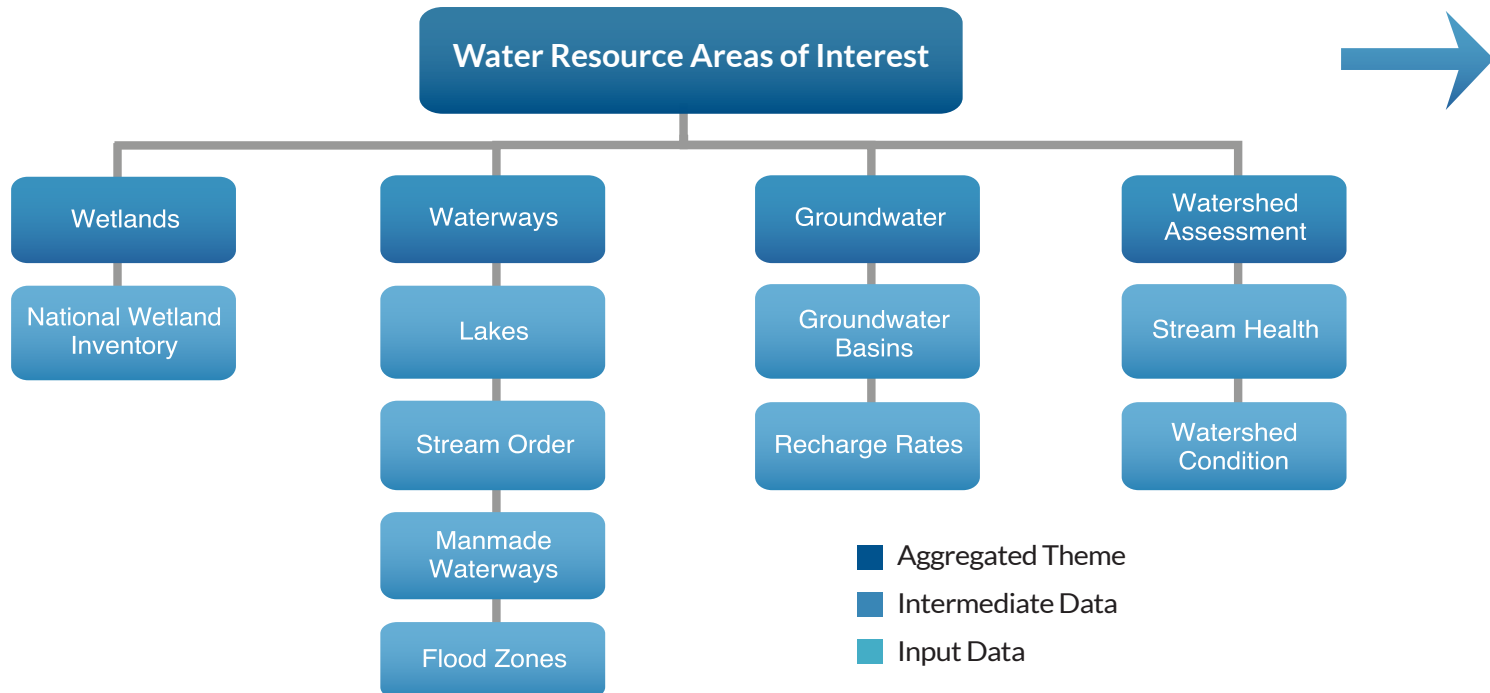


## IT'S ALL CONNECTED

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.

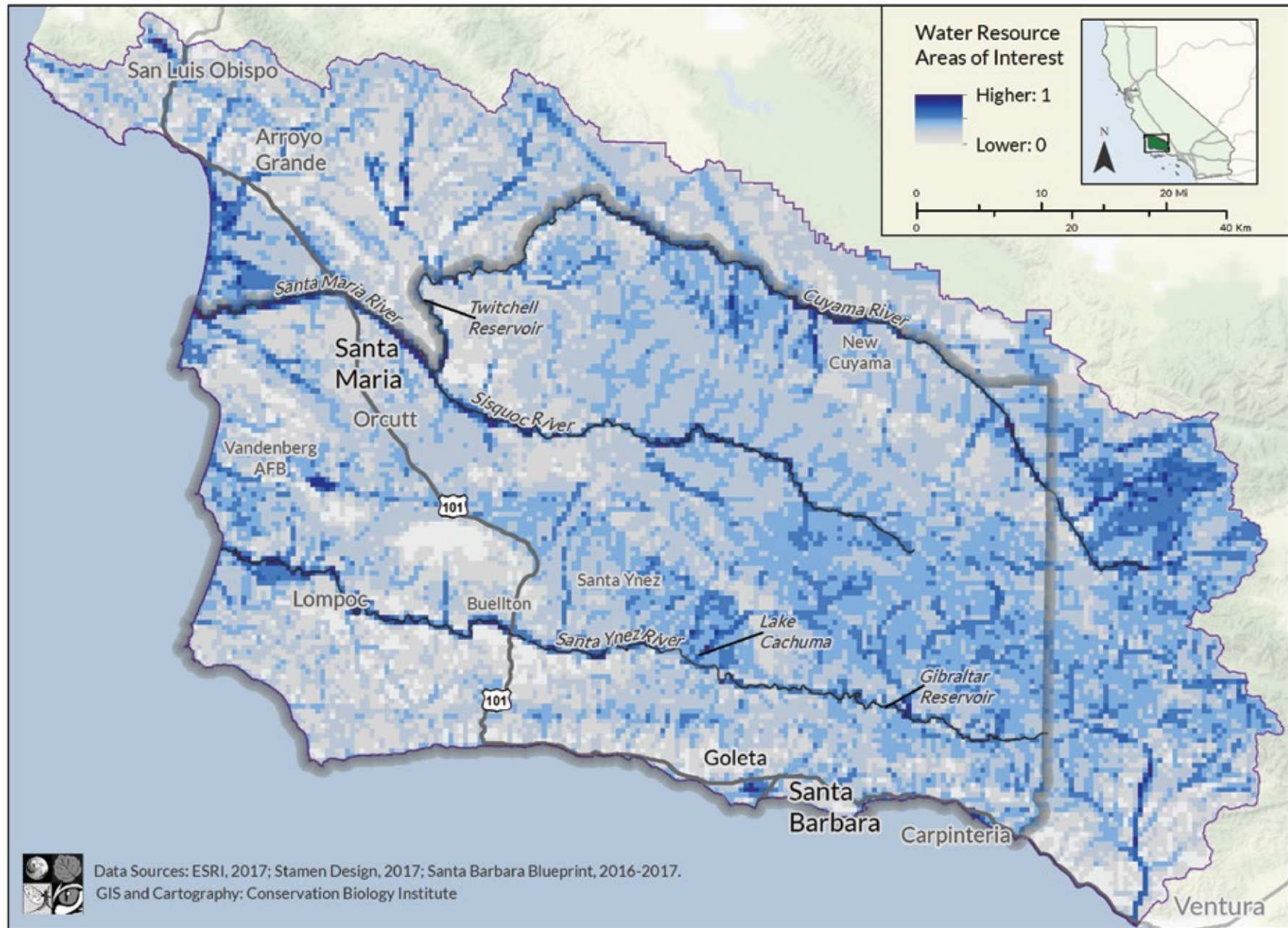
**We heard over and over in our community interviews, the importance of increasing public understanding of the connection between the viability of our water sources and all other aspects of our way of life in Santa Barbara. Water is life - when our water is threatened, our way of life and the viability 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.](#)

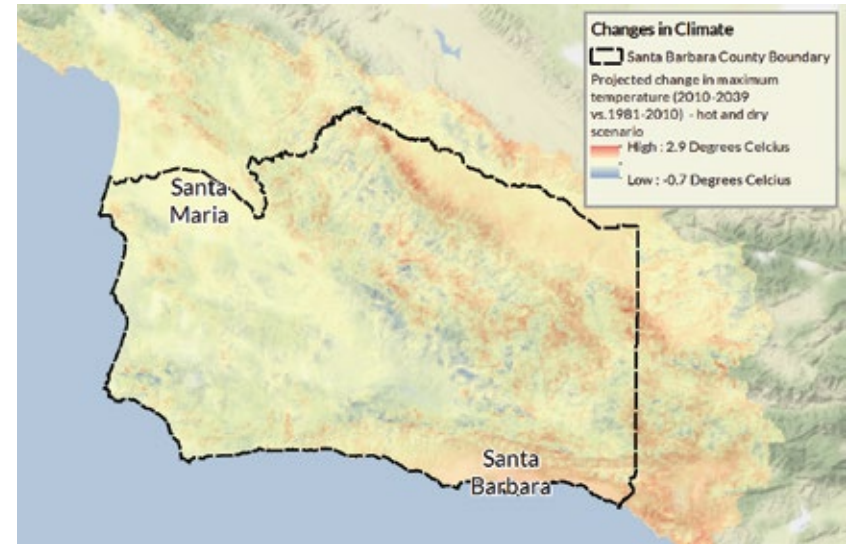
## WATER AND CLIMATE CHANGE

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.<sup>9</sup> 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.<sup>10</sup>

### 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.<sup>11</sup> 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](http://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?



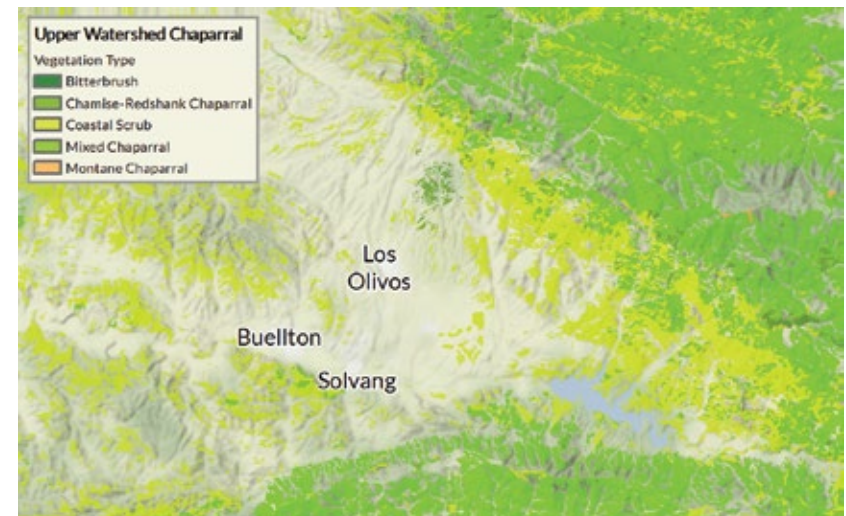
Thinning in Sierra Nevada forests (upper watersheds) has been shown to increase runoff and snow storage allowing more water to flow to lower watersheds.<sup>12</sup> Thinning may also decrease the likelihood of large intense forest fires, and the sedimentation resulting from forest fires.

⊕ 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.<sup>5</sup>

⊖ 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,<sup>13</sup> 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.<sup>14</sup> 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.<sup>15</sup>

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.<sup>16,17</sup> 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.<sup>18</sup> 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 Carpinteria 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.<sup>19</sup>

## ONGOING DIALOGUES

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:

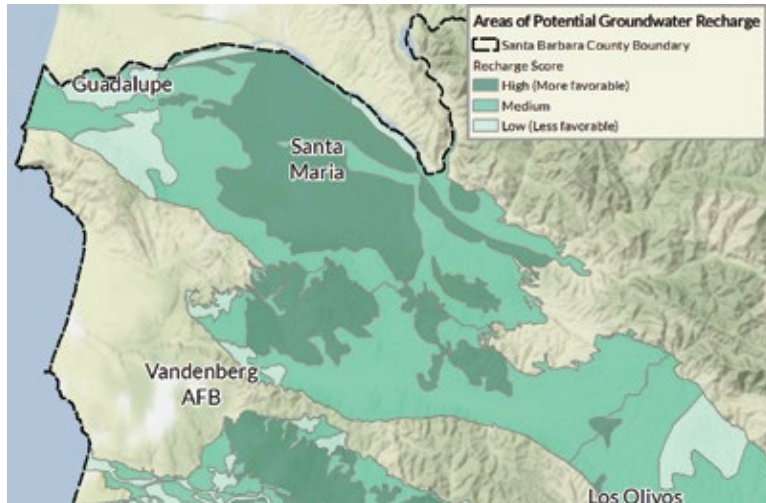
**Steelhead and Recharge:** Through removal of invasive eucalyptus trees, road crossings and a small dam, a collaborative project of the Cachuma Resource Conservation District and partners will restore 2.25 miles of critical steelhead habitat on the San Jose Creek in Goleta. The project will create valuable pool habitat for steelhead that should also support groundwater recharge.<sup>20</sup> 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<sup>5</sup> 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.<sup>21</sup> Agricultural produc-

tion, 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.<sup>22</sup> 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](http://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:

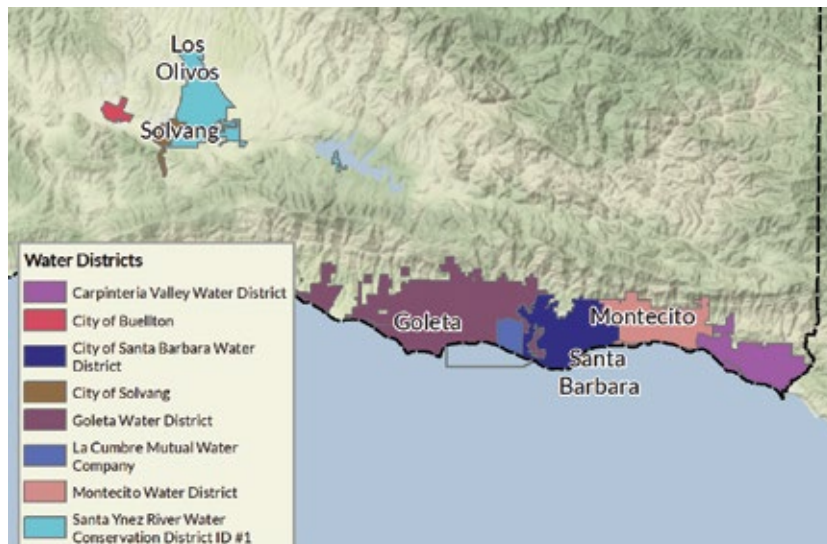
- Energy industry impacts – Oil and gas development is active in nearly every major watershed in the County – attention to risks of leaks and spills will be important for managing the quality of our water supplies into the future.
- Scale of water management - Some community members want to see more 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

- <sup>1</sup> 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](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.
- <sup>2</sup> Santa Barbara County Water Agency. Water Wise in Santa Barbara County. 2015, 2016. Accessed online October 2016 and August 2017: <http://waterwisesb.org/where.wwsb>.
- <sup>3</sup> Public Works Department, Water Resources Division, 2016. County of Santa Barbara Hydrology Report: Precipitation, Rivers/Streams, & Reservoirs Water-Year 2016. October, 2016. Accessed online January 2017. <https://tinyurl.com/y8q9qyyw>
- <sup>4</sup> Department of Water Resources. Notice to State Water Project Contractors. Accessed online. January 2014: <http://www.water.ca.gov/swpao/docs/notices/14-02.pdf> through April 2016 <http://www.water.ca.gov/swpao/docs/notices/16-06.pdf>.
- <sup>5</sup> RMC Water and Environment, 2015. Long Term Supplemental Water Supply Alternatives Report. Prepared for Santa Barbara County Water Agency. December 2015. Accessed online October 2016. <https://tinyurl.com/yb6fzjhj>
- <sup>6</sup> The 2012 USDA Census for Agriculture for the County reports 701,039 acres in farmland. United States Department of Agriculture. 2012 Census of Agriculture for Santa Barbara County. Accessed online October 2016: <https://tinyurl.com/y73763rz>
- <sup>7</sup> Public Works Department, Water Resources Division Water Agency, 2000-2015. County of Santa Barbara Groundwater Water Purveyor Water Use Reports.
- <sup>8</sup> Public Works Department, Water Resources Division Water Agency, 2014. County of Santa Barbara Groundwater Basins Status Report. October 2014. Accessed online October 2016. <https://tinyurl.com/ybjcodk4>
- <sup>9</sup> Griggs, G., Árvai, J., Cayan, D., DeConto, R., Fox, J., Fricker, H.A., Kopp, R.E., Tebaldi, C., Whitman, E.A. (California Ocean Protection Council Science Advisory Team Working Group). 2017. Rising Seas in California: An Update on Sea-Level Rise Science. Oakland, California Ocean Science Trust. Accessed May 2017: <https://tinyurl.com/yalc6qkw>
- <sup>10</sup> County of Santa Barbara, Planning and Development, Long Range Planning Division. 2017. Sea Level Rise & Coastal Hazards Vulnerability Assessment. Accessed online September 2017: <https://tinyurl.com/y7xl2nlt>



- 11** USDA Natural Resources Conservation Science. 1996. RCA Issue Brief #11. Riparian Areas Environmental Uniqueness, Functions, and Values. Accessed May 2017: <https://tinyurl.com/y7uap4cf>
- 12** Bales R.C., Battles, J.J., Chen, Yihsu C., Conklin M.H., Holst E., O'Hara K.L., Saksa P., and Stewart W., 2011. Forests and Water in the Sierra Nevada: Sierra Nevada Watershed Ecosystem Enhancement Project. UC Merced – Sierra Nevada Research Institute, UC Berkeley – Center for Forestry, and Environmental Defense Fund. November 29, 2011. Accessed online November 2016. <http://ucanr.edu/sites/cff/files/146199.pdf>
- 13** Keeley, J.E. Zedler, P.H. 2009. Large, high-intensity fire events in southern California shrublands: debunking the fine-grain age patch model. *Ecological Applications*.
- 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.
- 19** Personal Communication with Shannon Sweeney, Anne Coates, 2016. Learn more at <http://jimmaparkbiofilter.org/>
- 20** Coastal Conservancy. Staff Recommendation: San Jose Creek Fish Passage Improvements Project. 2016. Accessed online January 2017. <https://tinyurl.com/yd4k2pta>
- 21** Lake Cachuma - Protecting a Valuable Resource. 2014-2015 Santa Barbara Grand Jury Report. Santa Barbara: Santa Barbara County Courthouse, 2015. 51-70.
- 22** Bresolyn, B. 2012. Santa Barbara County Regional Growth Forecast 2010-2040. Santa Barbara, SBCAG. Accessed May 2017: <https://tinyurl.com/ybpn65gh>; projects a population of 520,000 in 2040. Most recent Census results showed a population of 446,170 in July 2016. (More at <https://factfinder.census.gov/>).







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



# FLORA AND FAUNA



Creative approaches to support the thriving of ecosystems, biodiversity, and human settlement in the County will be more and more essential as competition for space increases in the years to come.





## THE LAY OF THE LAND

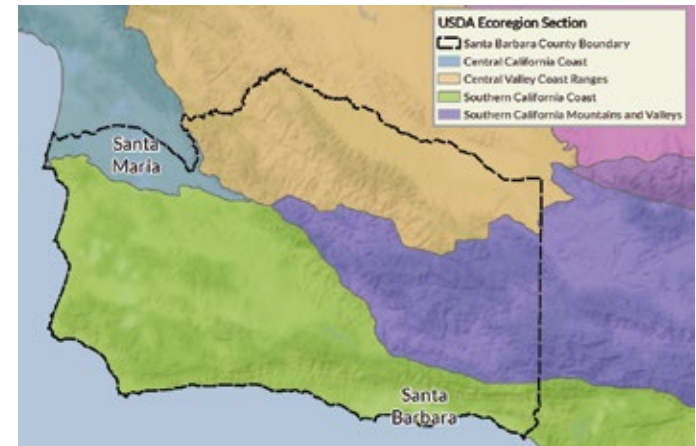
As part of one of the top 35 global biodiversity hotspots, Santa Barbara County is home to a remarkable array of species, habitats and **transition zones** which stem from the regions unique mix of **topography** and climate.<sup>1</sup> The County is unique within the California Floristic Province (the biodiversity hotspot the County is in) as it has fewer developed or altered natural landscapes than other parts of the hotspot; this adds to the value for conservation within Santa Barbara County.

Vegetation communities and species from California's Central Coast and South Coast, the Sierra Nevada, and the San Joaquin Valley can all be found locally due to convergence of four ecoregions within the County: Southern California Coast, Southern California Mountains and Valleys, Central California Coast, and Central Valley Coast Ranges. The Santa Ynez front range along the South Coast of Santa Barbara County marks a regionally significant divide in climate and species range, commonly referred to as the northern limit for many southern species and the southern limit for many northern species. This mixing of regions creates a diverse array of habitats in the County: dry interior grasslands and saltbush scrub in Cuyama Valley, sky islands of conifers in Los Padres National Forest, and chaparral and scenic oak woodland valleys that open into lush coastal wetland complexes at the mouth of its major rivers and streams.

### Convergence of Ecoregions

The County's flora and fauna flourish in an environment shaped by plate tectonics and major fault lines that formed the prominent east to west valleys of the County. This unusual geography is unique along the west coast of the United States, and has continued to shape these large valleys and ranges through somewhat volatile hydrology

### Converging Ecoregions (Figure 13)



This map shows the convergence of four ecoregions that are found within Santa Barbara County, adding to its role as a transition zone for habitats and species: Southern California Coast, Southern California Mountains and Valleys, Central California Coast, and Central Valley Coast Ranges. You can explore this further on the Atlas: Flora and Fauna - Ecoregions Inset Map.

and fragile substrates that promote landslides, erosion, and debris flows throughout much of the County. Coupled with this complex topography are microclimates that can change dramatically as they move from the coast to inland highlands and valleys. While the average summer high for Cuyama Valley can be 90 degrees Fahrenheit, Lompoc has an average summer high of only 74 degrees Fahrenheit. Precipitation varies from 8 inches annually in Cuyama Valley to 34 inches along the Santa Ynez Mountains on the South Coast. These extreme differences create a region defined by diversity and complex interactions of vegetation, topography, hydrology, and climate.

These unique and varied elements of climate, geology, soil, and topography together contribute to tremendous species diversity. Santa Barbara County is home to over 1,300 plant species, more than 500 bird species, 138 terrestrial and marine mammals and 43 reptiles, 17 amphibians, and over 20 (non-oceanic) fish species.<sup>2,3,4,5</sup> This impressive array also

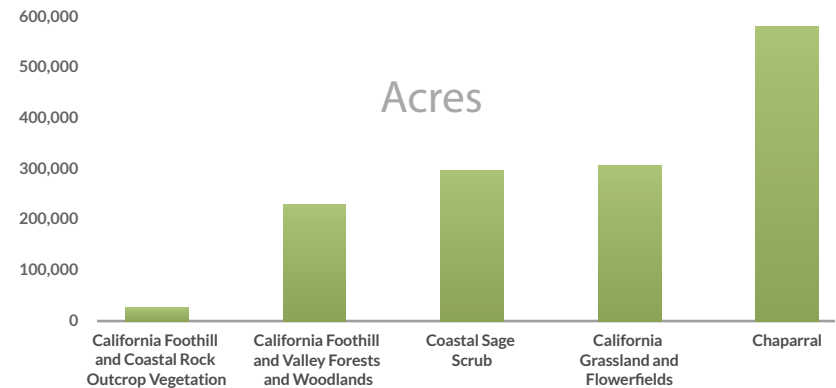
includes many **endemic species** – those species found nowhere else in the world except for within one specific region. Roughly 30 endemic animal species and 35 endemic plant species are found in the Santa Barbara region.<sup>6</sup> Many have evolved in this area of California because of geographic isolation, rare soil substrates, and limited mobility. Examples of endemic species in the County include the Lompoc kangaroo rat, kinsel oak, and the Santa Barbara jewel flower. Many other species are endemic to our region of California but are found outside the County including the Mount Pinos chipmunk, black bellied slender salamander and Cristina’s timema.

Vegetation provides habitat and home for the many unique and common animal species in the County, and varies greatly from north to south, east to west, and often from valley to valley. Of the 31 vegetation macrogroups found in California, 19 are found within Santa Barbara County.<sup>9</sup> Chaparral is the most common vegetation type in the County and covers much of the upland watersheds where it also serves as a natural buffer against erosion. In Santa Barbara County, chaparral hosts 400 different vegetative species across many different types of chaparral communities.<sup>10</sup> Other dominant and iconic vegetation types in the region include coastal sage scrub, California grasslands and flowerfields, and California foothill and valley forests and woodlands.

## Benefits of Biodiversity

Natural and man-made systems are intricately linked, with many benefits that are all too often overlooked. Large intact systems that support high levels of biodiversity tend to be more resistant to disease, and confer higher rates of ecosystem services. In southern California, for example, maintaining natural areas with western fence lizard and southern alligator lizard populations is one contributing factor that helps maintain a lower level of Lyme disease in the area (compared to areas in the eastern United States). Ticks carrying Lyme disease that bite a western fence lizard or southern alligator lizard are cleansed of the pathogen from proteins in the lizard's blood.<sup>7,8</sup> Apex predators also help by checking the populations of tick-carrying wildlife (deer and rodents). Conservation of biodiverse landscapes can offer surprising benefits!

## Acres for the Top Five Classes of Vegetation in the County. (Figure 14)

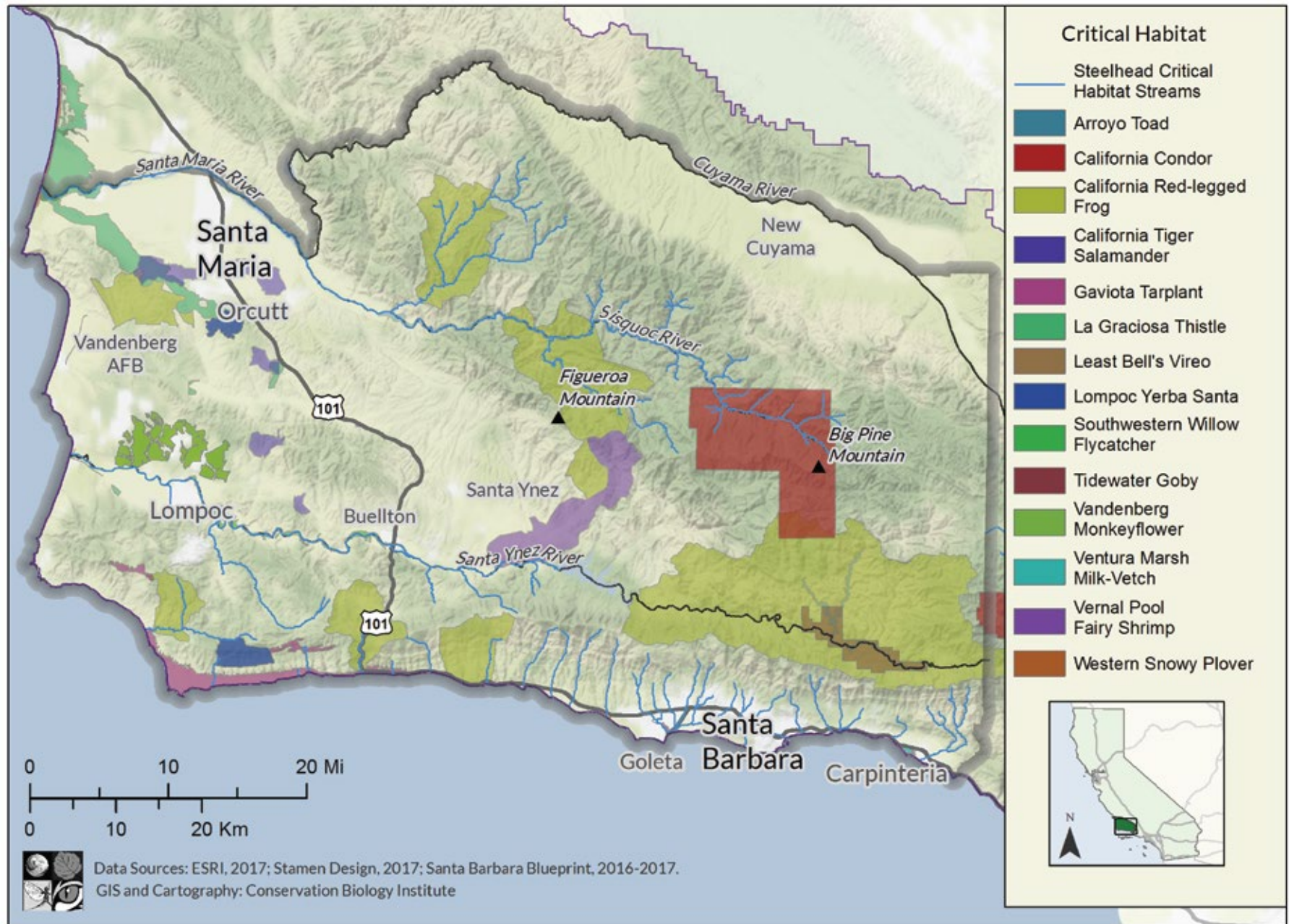


Central Coast riverine, riparian ecosystems, and wetlands provide some of the most diverse and important areas for local wildlife. Wetland systems naturally create **ecotones** (places where edges of different habitats mix) and act as natural attractors for wildlife of all kinds. Abundant insects and algae attract waterfowl like ducks and grebes; fish stocks provide prey for raptors like ospreys and bald eagles; amphibians such as salamanders, newts, toads, and frogs breed in the seasonal waters of many wetlands, and move to surrounding upland habitat to hibernate or live out the rest of the year. Riparian areas also act as natural movement corridors for terrestrial species and aquatic species such as steelhead trout. They provide fresh water, food, and refuge for migratory and large-ranging species.

Santa Barbara County has over 6,982 miles of streams and rivers and 37,802 acres of wetlands, many of which are seasonal systems.<sup>11</sup> Maintaining the year-round riparian systems (fed by groundwater and springs) is vital for species resilience, especially in drought years. While abundant and productive when water is plentiful, natural wetland systems in Santa Barbara County have been heavily impacted from historical land conversion, lowered water tables, and surface water extraction from streams and rivers for other uses. This loss of riparian habitat and associated surface flows has contributed to the listing of many species as threatened or endangered.



Critical Habitat and Sensitive Species (Figure 15)



This map shows critical habitat lands and streams identified within Santa Barbara County that highlight many areas across the County as crucial for threatened and endangered species.

► You can explore this further on the Atlas: Flora and Fauna -Critical Habitat and Sensitive Species Inset Map.



## Critical Habitat

Even with half of County land in National Forest, wilderness, or other protected designations, much of the important biological diversity exists in the places where humans and other species share and compete for resources. Near the coast, along each of its interior valleys, and more recently into the foothills, residential and agricultural development, **invasive species**, and climate change threaten the health of native habitat and ecosystems. The combination of significant diversity and substantial human pressures results in high levels of threatened and endangered species in the County: 70 of the 298 species listed as threatened or endangered statewide exist in Santa Barbara County.<sup>11,12</sup> Creative approaches to support the thriving of ecosystems and biodiversity, as well human settlement in the County will be more and more essential as competition for space increases in the years to come. Some of these ideas are explored later in this chapter and throughout the Blueprint report.

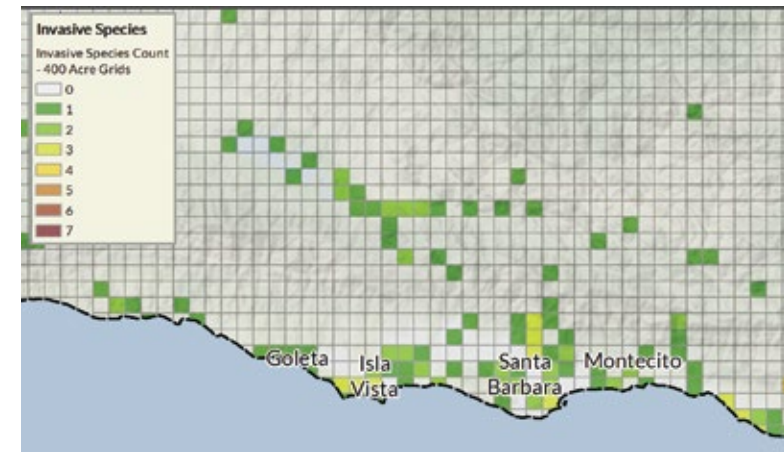
## COMMON FLORA AND FAUNA VALUES

Understanding the conservation challenge and opportunity around Santa Barbara County's flora and fauna requires information on both critical habitat (**Figure 15 critical habitat map**), and how experts and the community view these resources. In the process of developing the Blueprint (through research, stakeholder interviews, focus groups, and surveys), the community was asked to help clarify values and attitudes regarding the future of wildlife species and vegetative communities in the County. Each value statement offers only a high level summary statement on topics that are often quite nuanced (and covered in more depth throughout this report). Yet they are also helpful reminders that though opinion can vary greatly on the means by which flora and fauna should be conserved, there is also great agreement on the desired ends.

## Based on input to date, the community values:

- Protecting the native local biodiversity and unique array of habitats and species.
- Ecosystem-based approaches to flora and fauna conservation that recognize the natural boundaries and movement patterns in the County.
- Restoring natural processes, habitats, and keystone species that help maintain biodiversity and create refugia for future generations of wildlife.
- Providing local wildlife and vegetative communities with the ability to move/adapt in response to climate change.
- Agricultural spaces and practices that support local flora and fauna.

## Invasive Species Locations (Figure 16)



This map shows documented locations of invasive species within the South Coast region of Santa Barbara County. In addition to often taking over native species habitat, invasive species can increase fire risk, reduce overall biodiversity, and harm wildlife and cattle. For example, Mexican feather grass is an emerging invasive species that can overtake pasture lands, and forms indigestible balls in cattle's stomachs, with adverse health impacts on the cattle. The plant is a popular ornamental and landscaping plant, and its spread can be controlled in the County through working with gardens and nurseries. To find out more about how you can help control this invasive species visit: [Invasive Plant Spotlight](#). To learn more about invasive species in the County visit: [Invasive Plants of Santa Barbara County Guide and Case Study](#). You can explore this data further on the [Atlas: Flora and Fauna-Invasive Species Inset Map](#).

## BURTON MESA - BALANCING FIRE, DEVELOPMENT, RECREATION, AND UNIQUE NATURAL RESOURCES

Burton Mesa is a special place in Santa Barbara County just north of Lompoc that highlights issues related to how natural resources are managed in balance with needs for development, recreation, and open space. The unique suite of maritime chaparral species known as Burton Mesa chaparral is found only on sand formations north of the City of Lompoc where its habitat once covered over 22,000 acres.<sup>13</sup>

**Habitat loss to development:** Today only ~8,000 acres of habitat remain due to land conversion and residential development and the impact of invasive species. Burton Mesa chaparral today can be found on federal land on Vandenberg Air Force Base, across state land on the Burton Mesa Ecological Reserve and La Purisima Mission State Park and on private lands in the area known as Lompoc Wye. The area is also a prime target for residential development due to its proximity to Vandenberg Air Force Base, low housing costs, and easy commuter roadway access.

**Tensions over trail access:** Burton Mesa also hosts a network of over 50 miles of trails and access points for local recreational enjoyment of the landscape. These trails are central nature access points in a part of the County with less nature access than areas closer to Los Padres National Forest or the extensive trails and open space along the South Coast. The recreational popularity of the area has created tension between the public and the California Department of Fish and Wildlife. Bikes were banned from trails in 2007 and over half of the existing trails are slated to be closed, reducing historic access to some areas on the reserve in order to protect the native species and natural resources on the property.<sup>14</sup>



**Challenges with ecological versus resident-focused fire management:** Fires on Burton Mesa are part of the natural ecosystem, as they are in the rest of Santa Barbara County and many ecosystems throughout California. Fire in the Burton Mesa area appears to have occurred naturally in 100 year intervals, with some stands of the Burton Mesa Chaparral likely 80 years older or more. With many homes directly adjacent to Burton Mesa chaparral, the challenge of balancing fire safety for homeowners with the need for periodic fire to maintain this unique and endemic suite of plants is constant. The most important strategies for protection of homeowners' lives and property come through fire proofing residences, removing flammable residential vegetation (pines, palm trees, pampas grass), and being prepared for fires that will continue to burn through the area.

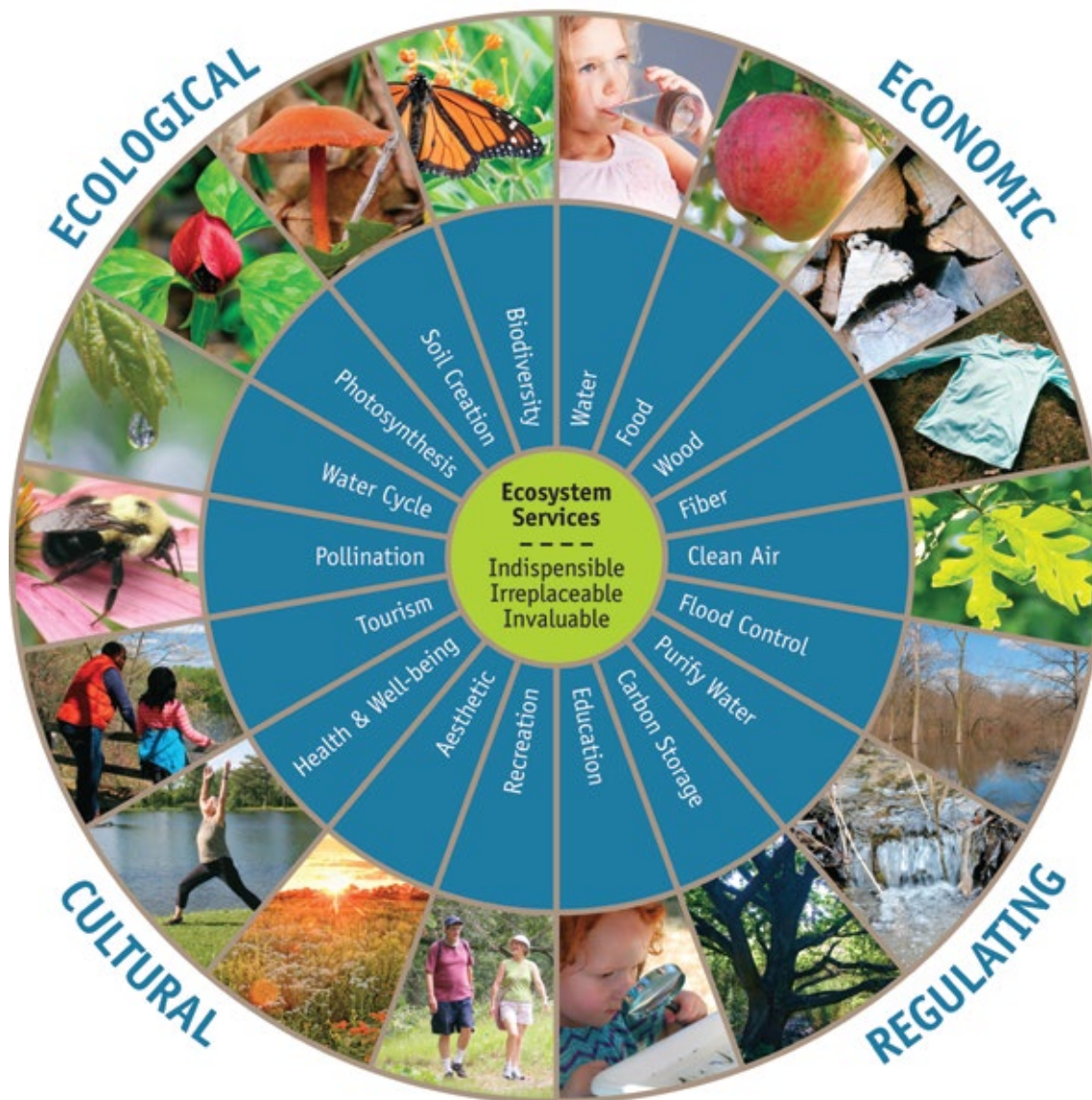
For the species, residents, and landowners that call Burton Mesa home, managing the area for its precious natural resources requires a balancing act between conservation, fire, development, and recreation. For more on human-wildland interface challenges, see the chapter on Community and the Land.



## ECOSYSTEM SERVICES

In addition to the intrinsic value of nature and wild spaces, the County's diverse ecosystems provide important services that support the quality of life residents and visitors enjoy. These 'ecosystem services' are most simply the benefits people derive from healthy and intact natural and working lands – economic, cultural, health, spiritual, and more. Common examples are listed in **Figure 17** on the next page.

From the Millennium Ecosystem Assessment effort of the early 2000s to natural capital valuation assessments, researchers and economists have been working for decades on methods for measuring and financially valuing ecosystem services, or 'natural capital' to help support better resource management. Projects measuring natural capital are being used to help make the case for land conservation: For example, the natural capital assessment done by the Santa Clara Valley Open Space Authority helped pass an open space ballot measure in 2014,<sup>15</sup> and is now being used to reward willing landowners for their stewardship of the land. Markets for certain ecosystem services such as atmospheric carbon sequestration, species habitat, and groundwater recharge are actively being explored around California (see **page 60** for example).



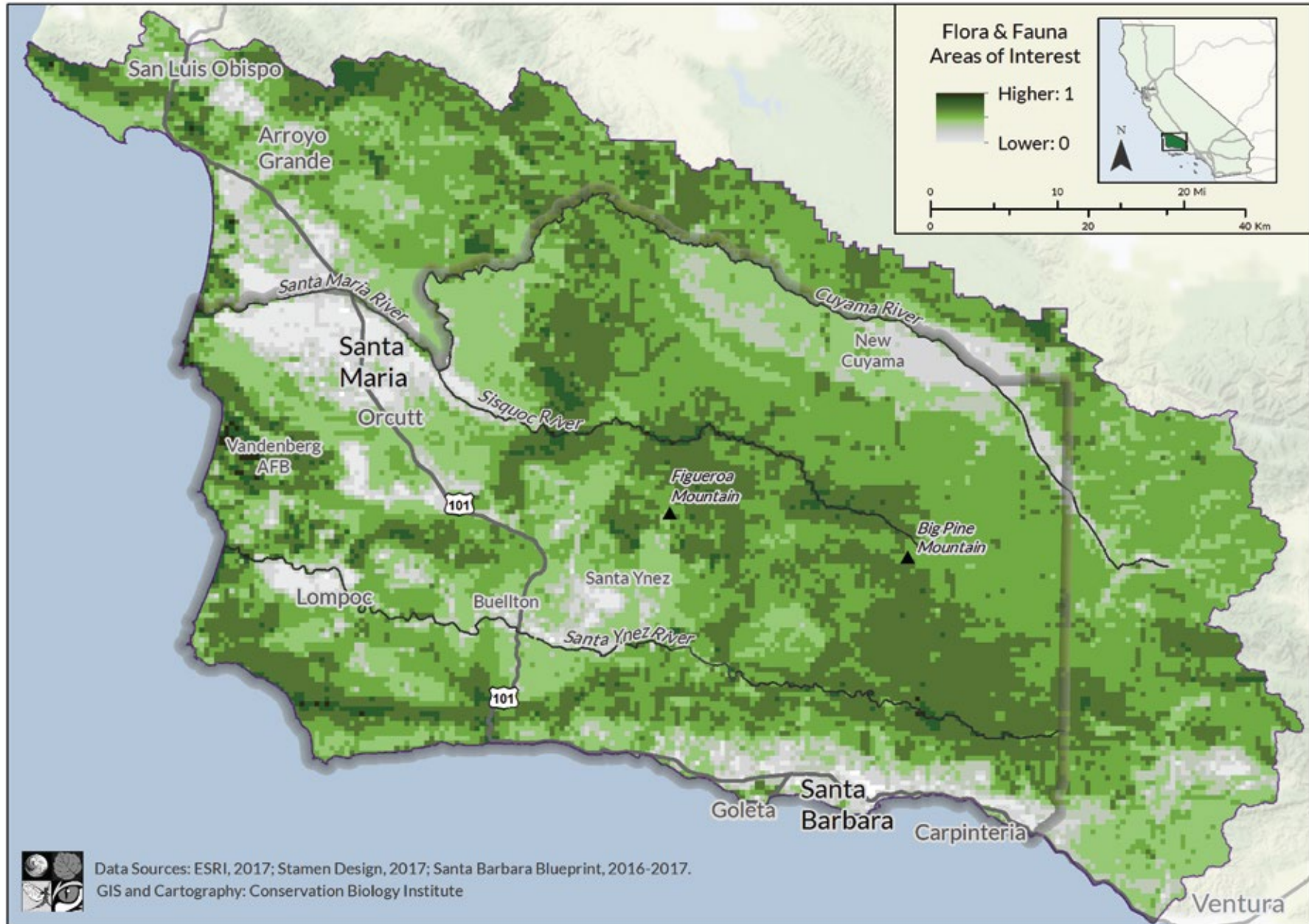
► Visit <http://www.millenniumassessment.org/> for details on this project.



## Ecosystem Services: Common Economic and Regulating Services and Sample Benefits.<sup>16</sup> (Figure 17)

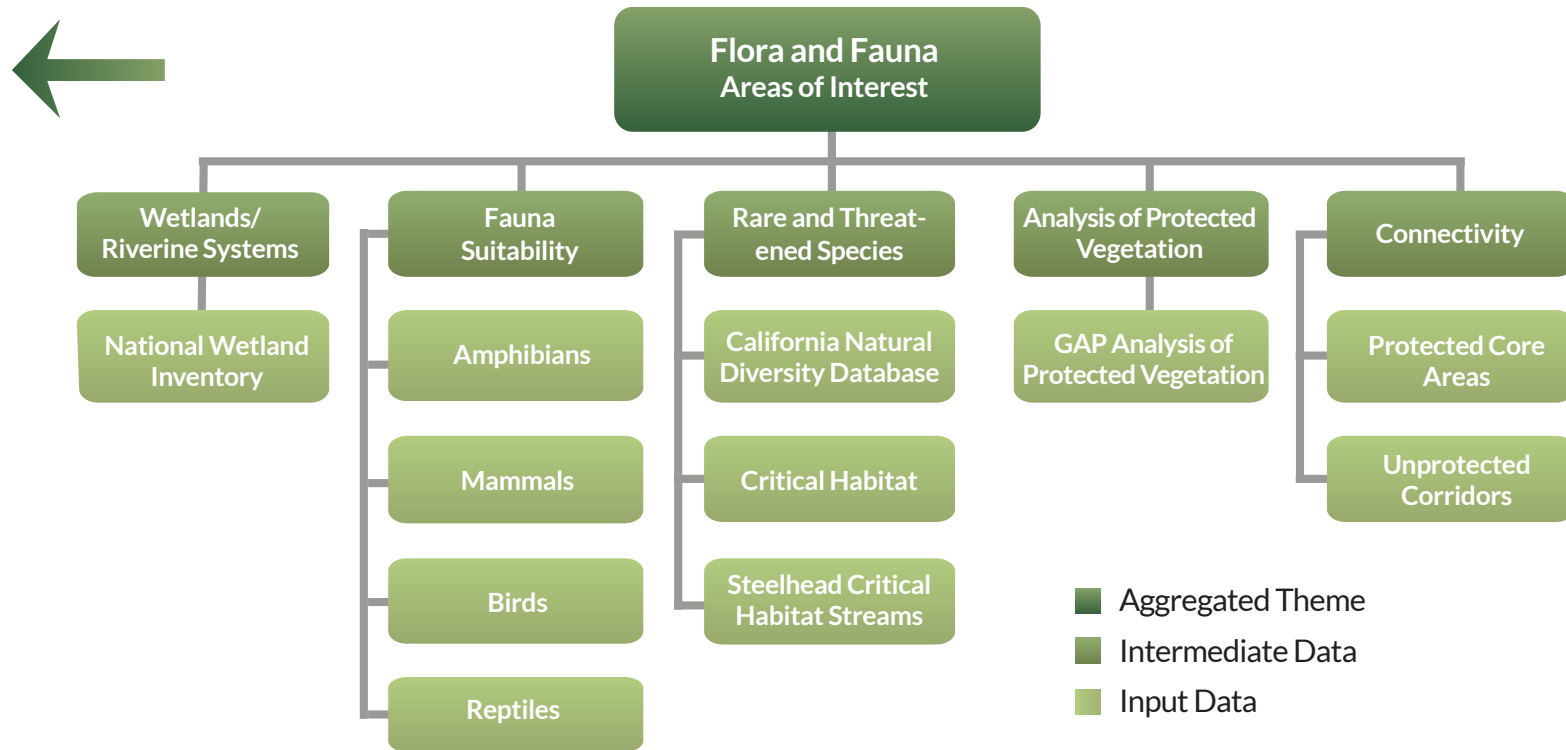
Services	General Ecological Functions	Ag & Ranch Land Benefits
Food	Producing crops, fish, game, and fruits	Ag lands provide nutrients and energy to sustain a growing global population
Medicinal Resources	Providing traditional medicines, pharmaceuticals, and assay organisms	
Ornamental Resources	Providing resources for clothing, jewelry, handicraft, worship, and decoration	Flower production
Energy and Raw Materials	Providing fuel, fiber, fertilizer, minerals, and energy	Ag lands produce renewable energy such as solar, wind, and biofuels, and provide host ground for mineral, oil, and gas extraction, as well as wood fibers such as timber, and non-wood fibers such as wool
Water Supply	Provisioning of surface and groundwater for drinking water, irrigation, and industrial use	Ag lands provide groundwater recharge and filtration services
Biological Control	Providing pest and disease control	With integrated pest management approaches, agricultural lands support beneficial insects and wildlife that can help control pests and disease
Climate Stability	Supporting a stable climate at global and local levels through carbon sequestration and other processes	Soil, crops, and surrounding vegetation affect local temperatures and precipitation while sequestering greenhouse gases
Air Quality	Providing clean, breathable air	Hedgerows and windbreaks can enhance air quality by reducing the movement of wind-borne dust and pathogens
Moderation of Extreme Events	Preventing and mitigating natural hazards such as floods, hurricanes, fires, and droughts	Ag lands can also contribute to fire suppression by providing natural breaks that keep wildfires from reaching urban areas
Pollination	Pollination of wild and domestic plant species	Ag lands provide nesting habitat and floral resources for wild pollinators such as bees, bats, and birds
Soil Formation/ Soil Retention	Creating soils for agricultural and ecosystems integrity; maintenance of soil fertility; retaining arable land, slope stability, and coastal integrity	Well managed soils can sequester carbon, reduce erosion, prevent landslides, purify water, and support nutrient cycling
Waste Treatment	Improving soil, water, and air quality by decomposing human and animal waste and removing pollutants	Well managed ag lands can reduce salinity and organic/inorganic constituents in surface and groundwater
Water Regulation	Providing natural irrigation, drainage, groundwater recharge, river flows, and navigation	Unlike pavement, agricultural vegetation maintains soil moisture, enhances water storage, and reduces runoff

## Flora and Fauna Areas of Interest (Figure 18)



This synthesis EEMS map highlights areas of interest for ecological resources by overlaying a variety of inputs from the Flora & Fauna theme. This and other maps featured throughout the report are meant to support meaningful visual insights about flora and fauna 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 Atlas: Flora and Fauna Areas of Interest \(EEMS\) - Santa Barbara County.](#)





## CONNECTING A MOSAIC OF LANDSCAPES

The landscapes in and around Santa Barbara County create a mosaic that has certainly been impacted by agriculture and urban development, but remains relatively intact compared to much of California's southern coast. Spectacular examples of this include uninterrupted expanses of natural vegetation seen along the Gaviota coast, the foothills and oak woodland valleys sweeping the interior of the County, and the large dune systems found near Guadalupe. Keeping these areas intact, unfragmented, and interconnected is essential for Santa Barbara County's species, and has implications for human well-being.

## Chaparral and Fire

Chaparral is the most dominant vegetation type in the County, especially in the upper watersheds. It has a closed canopy that protects against invasive species, dense coverage that protects against erosion, and is well-adapted to infrequent fire. Though chaparral shrubs regenerate quickly after fire from resprouting and from buried seeds, short-lived wildflowers like the coastal lotus and fire poppy thrive for a time as the chaparral regains its dense coverage. For centuries this process occurred in multi-decadal cycles, but chaparral fires recently have become more frequent due to human causes.<sup>19, 20</sup> These fires not only impact human structures and safety, but their increased frequency also leads to increased erosion in headwaters after fires, and potentially to conversion from chaparral to annual grasslands.

## Learning from Outside the County: Creating Markets for Habitat and Ecosystem Services

Sometimes referred to as mitigation banking, there are a number of experiments happening around California to pay landowners for the ecosystem service benefits provided by their land. The Central Valley Habitat Exchange is a cross-sector collaborative program that compensates landowners for sustainable management and restoration activities that show measurable enhancement of the ecosystem services, notably watershed health and species habitat. Practices include on-field flooding for bird habitat, managing row crops to benefit hawk habitat, or planting milkweed for monarch butterfly habitat.<sup>17</sup>

The California Department of Food and Agriculture and the United States Fish and Wildlife Service (USFWS) have begun conservation bank approval programs in California. The approach is growing in popularity as a private industry and conservation nonprofit strategy for effective engagement of private landowners in conservation activities. La Purisima Conservation Bank, focused on California tiger salamander habitat protection, is the only active endangered species conservation bank in Santa Barbara County.<sup>18</sup> This bank has allowed one landowner to capitalize on the presence of an endangered species, while also expediting the mitigation process for other landowners whose use of land will unintentionally harm the species. Carbon banking is another trend to watch: The carbon farming pilot featured on [page 60](#) may provide data to support carbon banking markets in the County in the years to come. These new approaches to conservation are promising, but not without challenges. Technical and financial barriers to quantifying ecosystem services remain, and designing sustainable financing mechanisms for providing payment for ecosystem service benefits will be important for applying these kinds of approaches in the County.

## Connectivity Corridors and Riparian Systems

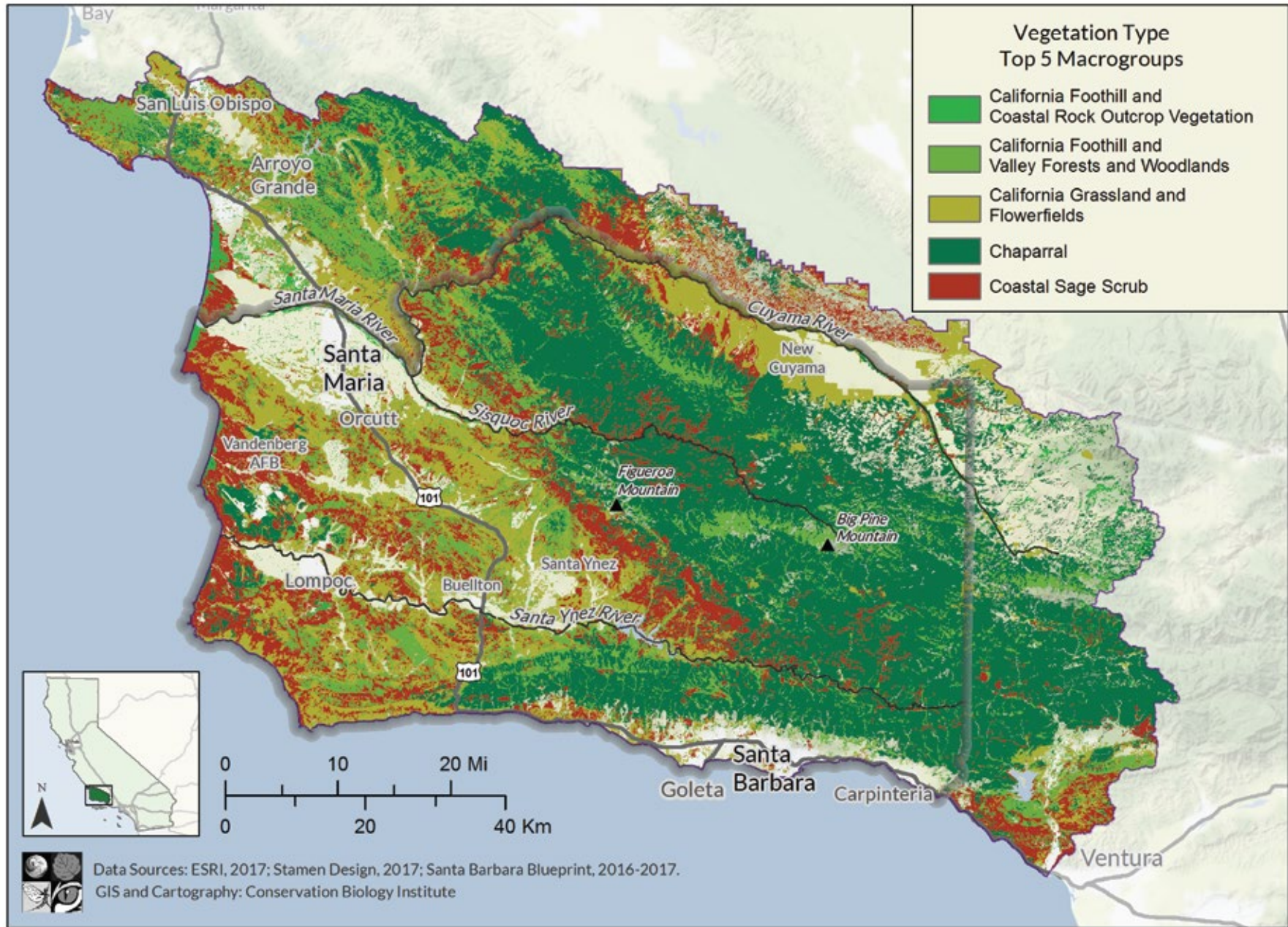
All wildlife species need the ability to move across the landscape to find food, shelter, and to reproduce. With human development of urban areas, houses, and roads, connectivity across the landscape can be lost. Impermeable fencing and the presence of pets or even road noise can represent barriers for many species that constrain their ability or willingness to travel across landscapes. The resulting fragmentation of the landscape can effectively create habitat islands. If these islands become too small or isolated, plants and animals that cannot disperse to other suitable habitat areas will eventually be lost. Many of these impacts on wildlife can be avoided with careful planning and strategic conservation. The online Atlas may assist in helping organizations and developers identify the connectivity corridors to avoid. Impacts can also be mitigated with creative solutions such as: enhancement of natural riparian corridors along rivers and streams; by providing safe passage culverts under major highways and road barriers; and through use of wildlife fencing to deter animals from crossing paths with vehicles.<sup>21</sup> The importance of maintaining habitat connectivity will only increase as the warming climate increases pressure on plants and animals to migrate across the landscape and adapt to the continued change in environmental conditions.

## Groundwater Recharge and Species Protection

Species protection is not often thought of as compatible with augmenting urban or agricultural water supplies, but in some instances these two issues can be mutually beneficial. Deliveries from Lake Cachuma to downstream fish and human water users along the Santa Ynez River offer a good example of mutual benefits: This practice helps species within the river while also recharging groundwater basins around the river and delivering water for municipal and agricultural uses.<sup>22</sup> With local species increasingly vulnerable to many pressures in addition to water shortage, water management focused on win-win solutions that protect natural resources and the people who rely on them is a sound strategy for resilience.



## Largest Regional Vegetation Types (Figure 19)



This map shows vegetation across Santa Barbara County, while dominated by chaparral many other diverse vegetation types are also present.

■ You can explore this further on the Atlas: Flora and Fauna - Vegetation Inset Map.



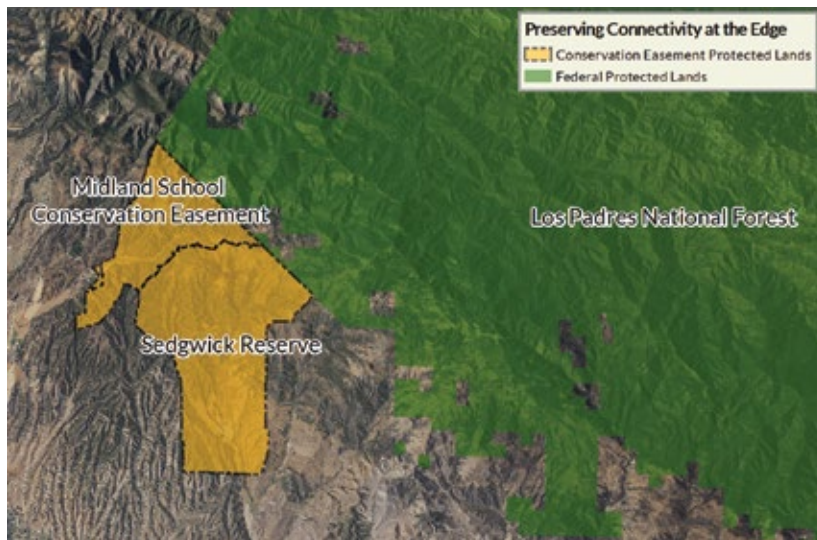
## ONGOING DIALOGUES

### FLORA AND FAUNA DISCUSSIONS

As population increases in the County, so do the tough decisions residents face about the future of shared landscapes. There are many ways to meet human development needs without severe impact to species habitat. Below are a few examples of innovative approaches to managing the difficult tradeoffs between conservation and development.

The Sedgwick Reserve, part of the UC Natural Reserve System and the adjacent Midland School collectively encompass over 8,500 acres of oak woodland and grassland habitat in the Santa Ynez Valley. Both properties share a boundary with the Los Padres National Forest. Conservation of properties of this size in close proximity to one another and to the large connected landscape of the national forest maximizes the habitat benefits of the conservation effort. In some cases

#### Connectivity at the Edge (Figure 20)



This map highlights an example of the habitat connectivity benefits of protecting neighboring properties adjacent to extant protected areas (such as the Los Padres National Forest). You can explore this map further on the Atlas: Flora and Fauna - Connected Lands Inset Map.

conservation of properties with lower habitat value may be considered if they are contiguous with existing conservation and their condition is able to be restored.

### Habitat Restoration

Restoration or repurposing of open space to provide better habitat can be a valuable alternative when preservation of pristine habitat is impossible. The Ocean Meadows Golf Course was bought in 2013 by the Trust for Public Land. The Trust gifted the land to University of California, Santa Barbara (UCSB), which worked with the USFWS and the State Coastal Conservancy to collaboratively develop high density student/faculty housing and restore 136 acres of estuarine and mesa habitat in Goleta. The land includes 64 acres of public open space, trails, and coastal access and will increase landscape connectivity by connecting several existing preserved properties, including UCSB's South Parcel, Coal Oil Point Reserve, and the City of Goleta's Sperling Preserve at Ellwood Mesa.<sup>25</sup>



Voluntary conservation comes in a number of forms, including conservation easements, grants, and other incentives for conservation and restoration on private lands. These partnerships are increasingly crucial for maintaining a healthy and vibrant landscape that supports ecosystems, agriculture and ranch lands, and sense of place in the County.



**Las Flores Property – Los Alamos:** The Land Trust for Santa Barbara County and ranch owner Steve Lyons developed a conservation easement across 653 acres of diverse landscape including Burton Mesa chaparral, coastal sage scrub, oak woodland, and intact riparian corridors and wetland habitat for California Tiger Salamander. The landowner was able to use the development value he gave up as a charitable deduction against his income taxes. He also reduced his potential estate taxes by decreasing the value of the property and permanently reduced his property taxes and the costs for maintaining 100 acres of active agricultural lands.<sup>26</sup>

**Hanson Ranch – Gaviota:** The California Rangeland Trust and landowner Louise Hanson protected 14,032 acres of land that can be seen from Highway 101 to Highway 1 near Gaviota. This large easement helps a landowner maintain a working cattle ranch, and also conserves 6-8 streams that are tributaries to the Santa Ynez River and Gaviota Creek, thereby ensuring habitat for the California Red Legged frog and many other coastal species forever.<sup>27</sup>

**Hibbits Farm – Lompoc:** Four generations of the Hibbits family have farmed the Lompoc Valley, building a diverse, successful farming operation run today by Art and Sherry Hibbits. Their 400-acre ranch features prime topsoil over 30 feet deep in places, and has supported a wide array of nuts, vegetables, and seed crops for over a century. The family decided to protect the enduring scenic and agricultural value of their land through a voluntary conservation agreement with the Land Trust for Santa Barbara County. The Land Trust was able to identify and attract funding to partially compensate the Hibbits through the United States Department of Agriculture's (USDA) Farm and Ranch Land Protection Program (FRPP). Here is the Hibbits' perspective on the value of the easement:

***“Our family’s goals in pursuing this conservation easement are to protect and encourage the continued agricultural uses on the ranch in a long-term sustainable manner, whereby productivity and economic viability are maintained and enhanced. We want future generations to have the maximum flexibility in future choices of crops, equipment, agricultural-related facilities, and farming practices. Our agreement with the Land Trust will clearly state these objectives.”***

**- Art Hibbits**

## Fostering a Sense of Place



Santa Barbara County is blessed with many outdoor recreation opportunities and a range of ways to interact with the local landscape. Having wild country so close is a privilege that many in the County hold dear, while others have limited awareness of and/or access to local resources (see page 77). Nature-based education helps foster deeper connection with place among residents, which can then support further engagement in protecting the landscapes and species that are part of the local community. Many nonprofits in the County such as the Guadalupe-Nipomo Dunes Center, Wilderness Youth Project, Nature Track, Sprout Up at UCSB, the Land Trust for Santa Barbara County, and others serve this role of nature-based education (with a strong focus on serving local youth). Supporting these programs helps people and our environment. The more we learn about and experience the benefits of the local landscape, the more we can come to appreciate and understand our place in it.

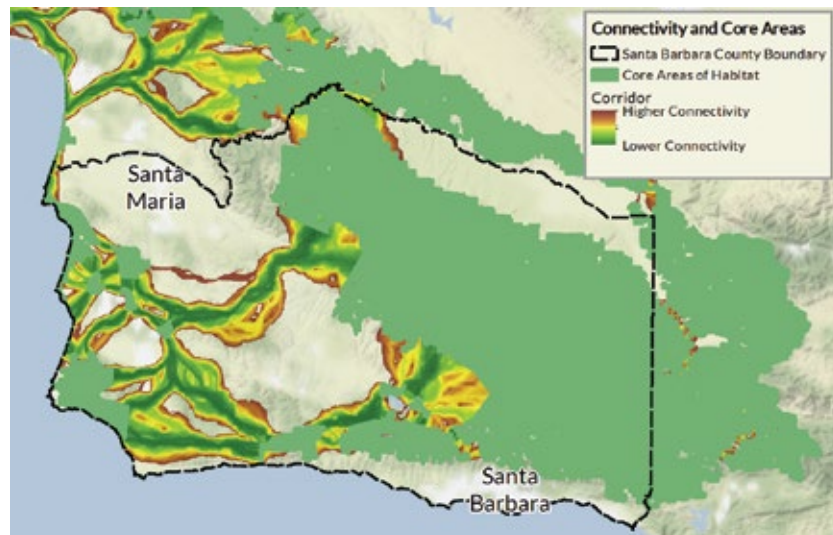
***“We simply need wild country available to us, even if we never do more than drive to its edge and look in. For it can be...a part of the geography of hope.”***

**- Wallace Stegner**

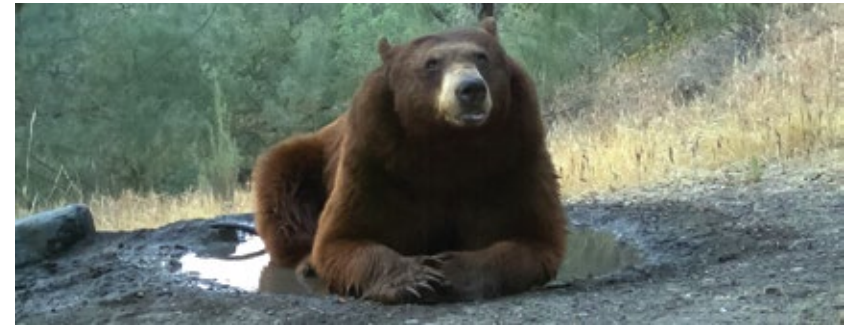
## FLORA, FAUNA, AND CLIMATE CHANGE

Climate change in Santa Barbara County creates an uncertain future for all flora and fauna, but the projections for local future climate generally indicate increased variability in precipitation and warming temperatures that increase evaporation and plant water demand (see Introduction). Species distributions and abundances will shift with changes in climate. Localized plant communities such as those associated with serpentine rock outcrops or cool mountaintop locations will be severely affected as they are on isolated islands of habitat. Uphill shifts in plant distributions have been documented in some areas of Southern California, pointing to a response from warming over the past few decades.<sup>23</sup> Species distributions are expected to shift northward, and new species may appear in the County from more southerly locations. The key to building resiliency and protecting against an unknown future is understanding which species are at greatest risk and maintaining "stepping-stone" connectivity for their natural movement to new habitat whenever possible.

### Connectivity and Core Areas (Figure 21)



(This map shows broad connectivity corridors across Santa Barbara County highlighting the need to connect cores of habitat throughout the region. You can explore this map further on the Atlas: Flora and Fauna - Connectivity Inset Map.



Climate microrefugia are local areas where climate change may be buffered by local topographic and soil conditions that promote cooler and wetter conditions, such as stream canyons and riparian zones. Riparian and riverine corridors provide paths for species movement and will likely become even more important in the future.<sup>24</sup> Maintaining and restoring riparian vegetation and tree canopies can be facilitated by avoiding introduction and dispersal of invasive plants and pests, maintaining freshwater input, and avoiding conversion and degradation of these areas.

### Coal Oil Point - A Glimpse Into the Past

Dogs on the beach at Coal Oil Point aren't a new occurrence for Cristina Sandoval, Director at UCSB's Coal Oil Point Reserve. One morning when she saw what she initially thought was a large black dog playing on the beach, Cristina realized she was instead watching a juvenile black bear playing in the waves early in the morning near the local surfing spot called 'Sands'. While coyotes and bobcats are often seen on this 138-acre reserve surrounded by Goleta, Isla Vista, and Ellwood, a bear was a new sighting. The bear did not stay for long after playing in the waves and jaunted back up Devereux Slough.

The journey of this bear likely involved using the existing culverts and riparian corridors that connect the Santa Ynez Range's watersheds to the ocean through the heavily urbanized Goleta area. That this bear was able to make the historically common journey in such a constrained urban environment highlights the importance of these landscape linkages. Connectivity not only provides a thoroughfare for species and natural processes to move across the landscape, but it can also provide special glimpses into the past.



## KEY TAKEAWAYS OF FLORA & FAUNA RESILIENCE

Potential resilience strategies for flora and fauna resources include embracing actions and processes that will support long term health for flora, fauna, and ecosystems in the County, such as:

- Maintaining connectivity at the ecosystem scale, with an emphasis on protection of riparian areas and unfragmented lands as wildlife corridors
  - Supporting incentive-based water and habitat conservation that produces mutually beneficial solutions
  - Improving knowledge of climate change impacts on species within the region and preparing for plant and animal species migration
  - Supporting conservation focused on broader ecosystems and species communities (i.e. mutual benefits for multiple species)
  - Supporting strategic and realistic approaches to invasive species management
- Visit [www.sbcblueprint.net](http://www.sbcblueprint.net) for more resources, project highlights, or to share your ideas!



## ENDNOTES

- <sup>1</sup> Critical Ecosystem Partnership Fund. California Floristic Province Overview. Accessed May 2017: <https://tinyurl.com/y9gvrldhm>
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- <sup>3</sup> eBird Data on Santa Barbara County. Accessed May 2017: <https://tinyurl.com/yaoj8h5k>
- <sup>4</sup> Data source: Paul Collins on Amphibians, Mammals, and Reptile Species in the region. Pers comms. Late 2016.
- <sup>5</sup> Santos, N.R., Katz, J.V.E., Moyle, P.B., Viers, J.H. 2014. PISCES. Environmental Modelling & Software. Data accessed May 2017: <https://pisc.es.ucdavis.edu/>.

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- <sup>11</sup> Data Processed to Santa Barbara County - Downloaded from the U.S. Fish and Wildlife, National Wetland Inventory. Accessed May 2017: <https://tinyurl.com/y92h8ccb>. And from the USGS, National Hydrography Dataset (Rivers and Streams Extracted). Accessed May 2017: <https://nhd.usgs.gov/data.html>.
- <sup>12</sup> In addition to formally listed species, others have been biologically recognized as threatened. California Native Plant Society maintains a list of plant species considered threatened or rare regardless of listing status: <https://tinyurl.com/yd6tam12>
- <sup>13</sup> Gevitz, E., Carroll, M., Burton, K., Collins, P., Holmgren, M., Spaine, L., & Nelson, A. 2007. California Department of Fish and Game - Final Land Management Plan Burton Mesa Ecological Reserve. Santa Barbara, Condor Environmental Planning Services, Inc. Accessed May 2017: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=84926&inline>.
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- <sup>15</sup> Batker, D., Schwartz, A., Schmidt, R., Mackenzie, A., Smith, J., & Robins, J. 2014. Nature's Value in Santa Clara County. Earth Economics, Tacoma, WA & the Santa Clara Valley Open Space Authority, San Jose, CA.
- <sup>16</sup> Category listing adapted from de Groot, R.S., Wilson, M.A., & Boumans, R.M.J. 2002. A typology for the classification, description, and valuation of ecosystem functions, goods, and services. *Ecological Economics* 41, 393-408, as presented in Batker, D., Schwartz, A., Schmidt, R., Mackenzie, A., Smith, J., & Robins, J. 2014. Nature's Value in Santa Clara County. Earth Economics, Tacoma, WA & the Santa Clara Valley Open Space Authority, San Jose, CA. Accessed May 2017: <https://tinyurl.com/y9z6v6ej>. The Ag and Ranch land column information is adapted from the 2013 Crop Report PLUS: Langholz, J. & DePaolis, F. 2014. Economic Contributions of Santa Barbara County Agriculture. Agricultural Impact Associates LLC and the Santa Barbara County Office of the Agricultural Commissioner. Accessed May 2017: <https://tinyurl.com/yctg8zaa> threatened or rare regardless of listing status: <http://www.cnps.org/cnps/rareplants/ranking.php>.
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- <sup>18</sup> This bank is run by the Conservation Land Group: <https://conserveland.com/portfolio-items/la-purissima-conservation-bank/>. Other private banks that work in California include Wildlands Inc, Headwaters Economics, EcoTrust, Westervelt Ecological Services to name a few. This is a growing industry to keep an eye on in the coming decades, and many private companies take on the financial risk of landowner mitigation, including regulatory risk.
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<sup>25</sup> See <http://www.openspace.vcadmin.ucsb.edu/overview> for more information on this project.

<sup>26</sup> See <http://www.sblandtrust.org/portfolio-item/las-flores-hunt-property/> for information on this conservation easement.

<sup>27</sup> See <https://tinyurl.com/ybe2hjmz> for more information on this conservation easement.





# AGRICULTURAL AND RANCH LANDS



Keeping large unfragmented agricultural and ranch lands in operation supports economic vitality as well as wildlife habitat and tourism in Santa Barbara County.







## A BRIEF HISTORY OF AGRICULTURAL AND RANCH LANDS OF SANTA BARBARA COUNTY

Santa Barbara County's agricultural heritage is a foundational part of the local history and economy. The County's loamy soils, varied topography and microclimates can and have produced an incredible array of fruits, vegetables, and animal crops as the ever-dynamic agricultural economy adapts to changes in technology, consumer tastes, and market demands.<sup>1,2,3,4</sup>

From the lens of the top agricultural products produced in the County, there are several distinct production 'eras' where one or a few commodities were predominant on the landscape:

- At the turn of the 20th century, livestock (cattle, dairy cows, pigs, and sheep) dominated as the County continued to build on its Vaquero history.
- In the depression and war years, beans became a top commodity crop in the 1930s along with carrots, lettuce, lemons, cauliflower, beef, and dairy.
- The post-war years saw dairy and sugar beets as important commodities, and the County began in earnest a transition to producing vegetable and orchard crops (citrus, walnut, avocado), which soon would surpass most animals and field crops.
- The 1960 and 70s saw the growth of cut flowers, alfalfa, grain, and broccoli. Strawberries, which had begun to be important in the post-war years, continued to grow in acreage.



An old Santa Barbara County hog farm (Credit: 2013 Santa Barbara County Crop Report PLUS)

- In the 1980s, the shift from citrus production to strawberries and wine grapes took hold.
- By 1990, Santa Barbara County had 39 crops with over a million dollar gross value.
- In the 2000s, wine grapes joined the top ranked crops.
- By 2010 agriculture had been a billion-dollar industry in the County for five years. The 2016 County Crop Report showed strawberries as the top commodity crop in the County.

**As of 2016, the County ranks 13th in total crop value among California agricultural counties.<sup>5</sup>**

Agriculture has been and will continue to be a 'restless' part of our landscape as it continually adapts to changing conditions. New 'eras' of production are likely to continue in 10-20 year intervals. Current entrepreneurial trends in local farming include explorations into new crops such as coffee, dragon fruit, passion fruit, and cherimoyas. Today's core challenge is in protecting local agriculture's economic viability in an era of globalization, high land prices, and a changing workforce.

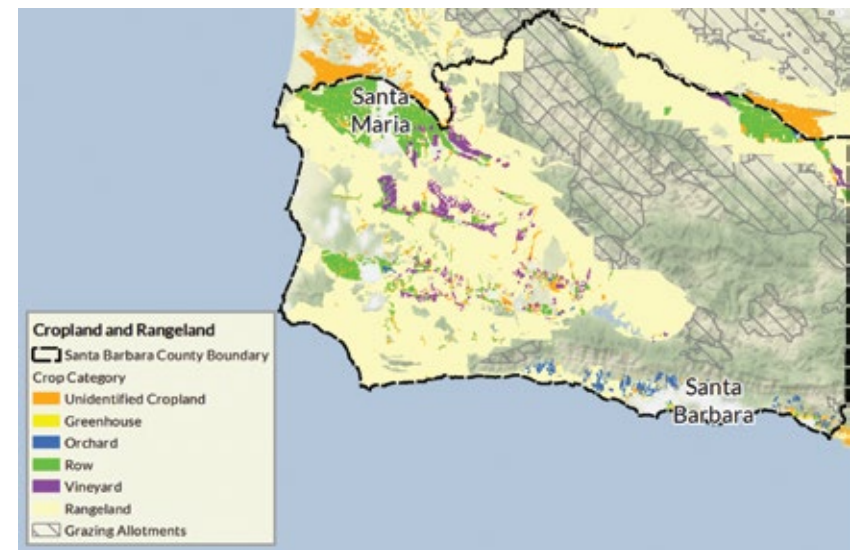
These trends have been discussed at a county-wide level for brevity. But microclimates, soils, and historical conditions also impact the local geography of farming trends. For example, cut flower operations and strawberries are centralized near Carpinteria and Santa Maria, respectively. Ranching is more prevalent in the inland hills, and orchards are found primarily along the South Coast or in Cuyama Valley, with wine grown on the slopes and upland land areas throughout the central and northern portions of the County.

## RECENT TRENDS AND THREATS TO SANTA BARBARA FARM AND RANCH LANDS

This brief history highlights the diversity of crops that can thrive in the County, the significant contribution of local agriculture operations to the global food system, and the adaptability of local farmers to changing external conditions. The recent installation of large food-safety coolers in Lompoc, for example, opened new markets for large-scale berry sales. The number of organic farms in the County nearly tripled in the last decade with increasing consumer demand, from 58 in 2006 to 159 in 2016 (with strawberries, spinach, and cauliflower as the top organic crops). Hoop houses are on the rise for berry production, and marijuana greenhouse production is another trend to watch in the coming decades.

Agricultural land use is highly sensitive to changes in market demand and production costs – particularly land, water, labor, and production inputs such as fertilizer, fuel, and seed. In Santa Barbara County and across California, there has been a steady shift to higher value crops.

### Cropland Types (Figure 22)



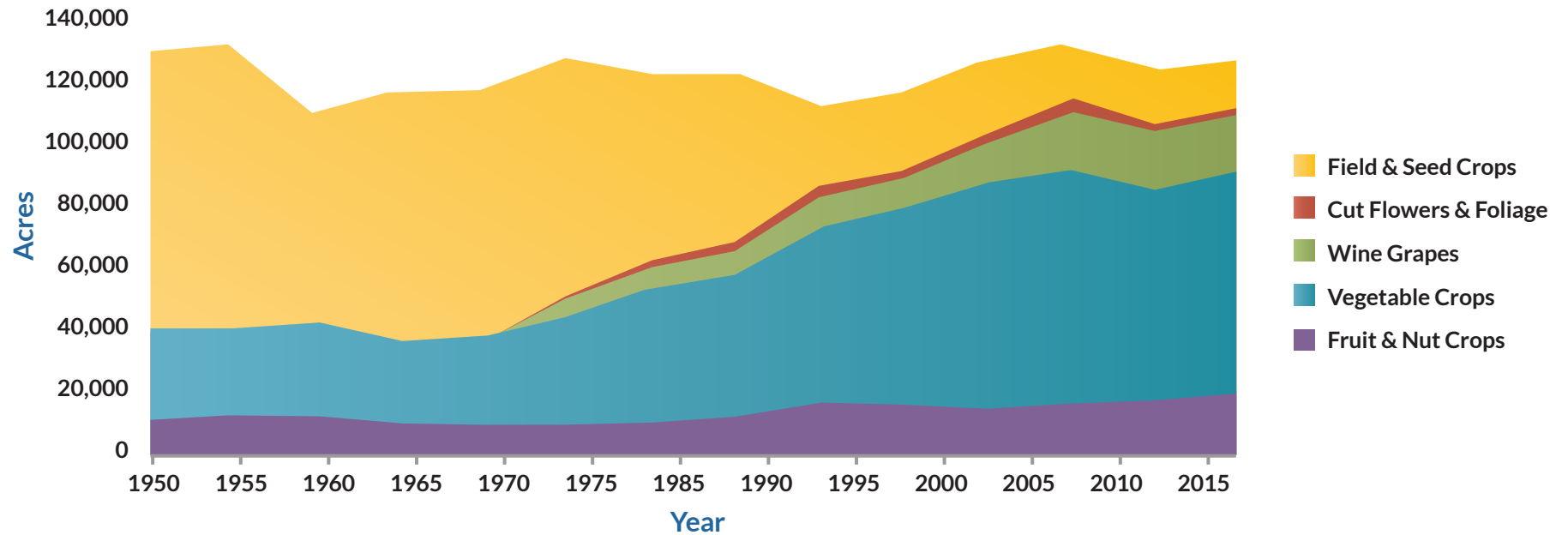
This map shows broad categories of cropland across Santa Barbara County, with trends like orchard prevalence in South County, vineyards in much of the central county, and large expanses of row crops in the Lompoc and Santa Maria Valleys. You can explore this further on the Atlas: Ag and Ranch Lands - Cropland Type Inset Map.

Partly in response to national attention on migrant labor, labor shortages, and other factors affecting profit margins, there has been a shift toward mechanization and lower-labor crops. Increasingly, producers employ a variety of high-tech growing solutions ranging from laser-guided leveling of fields to vast greenhouses for the year-round production of greens. These shifts are expensive and often out of reach for smaller, diversified producers, adding to the business pressures faced on **small farms**.

Agricultural land use and crop mix will always be dynamic, but there are no guarantees that agriculture itself will remain profitable in the County. The foremost conservation challenge around agricultural land use is ensuring farming and ranching remain profitable enterprises so that land remains in production.



Acresage Crop Trends Since 1950 in Santa Barbara County (Figure 23)



Top Three Grossing Crops in Santa Barbara County (Figure 24)

TOP GROSSING	1935	1945	1955	1965	1975	1985	1995	2005	2015
1	Beef Cattle	Beef Cattle	Cattle & Calves	Cattle & Calves	Cattle & Calves	Strawberries	Strawberries	Strawberries	Strawberries
2	Citrus	Lemons	Lemons	Lemons	Lettuce	Broccoli	Broccoli	Wine Grapes	Broccoli
3	Beans	Lettuce	Strawberries	Milk	Broccoli	Lettuce	Lettuce	Broccoli	Wine Grapes

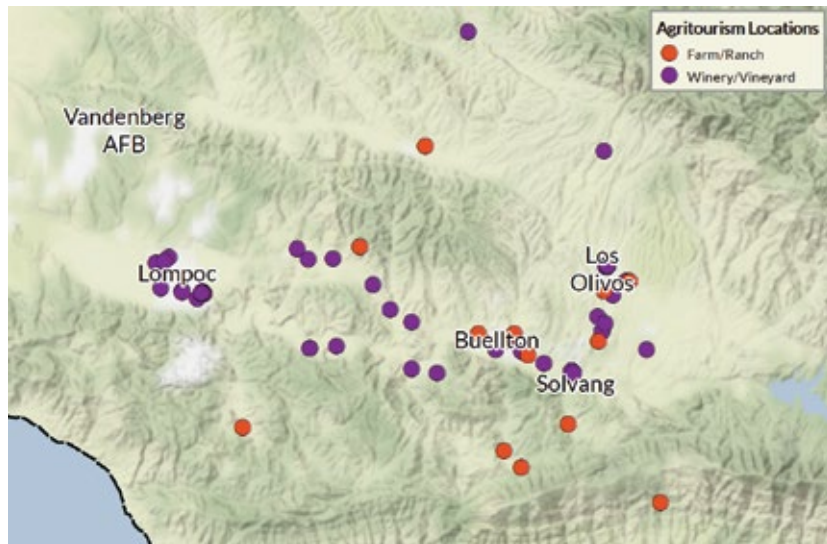
Source: County of Santa Barbara Crop Report Archive. <http://cosb.countyofsb.org/agcomm/agcomm.aspx?id=11562>

## A Brief Note on Local Food

A 2011 study of the Santa Barbara food system showed that over 99% of produce grown in the County is exported, and over 95% of produce consumed in the County is imported.<sup>6</sup> While this same study also showed that local consumption alone would not necessarily reduce greenhouse gas production or increase nutrition, it recognized the complexity of benefits and barriers to a more localized food system. Visiting one of Santa Barbara County's 16 farmers markets offers one way to support the local food economy. For a deeper exploration of this topic, see the 2016 Santa Barbara County Food Action Plan<sup>7</sup> – a strategy-based community driven plan for an accessible, thriving, and healthy local food system.

► visit [www.sbcfoodaction.org](http://www.sbcfoodaction.org) for details.

## Mapping the Local Food System (Figure 25)



This map shows locations of farms, ranches, and wineries where local produce or services are served direct to customers in the Santa Ynez Valley. ► You can explore this further on the Atlas: Ag and Ranch Lands - Local Food Source Inset Map.

Addressing this challenge necessitates first understanding the full range of benefits farms and ranches provide (Figure 17, Page 40), and then finding creative ways to compensate producers for these public benefits. Direct benefits include groundwater recharge, flood mitigation, and food and habitat for pollinators and other species. Indirect benefits include the value of the rural landscape to the local community and tourism industry and the value of cultural history in agriculture. Increasingly farmers and ranchers are exploring ways to deliver multi-benefit projects that demonstrate the value of the extra services land managers can provide. These new revenue streams – wind and solar installations on ranches, for example, future mitigation funding, or State Cap and Trade payments for ecosystem service provisions such as carbon farming (Page 60) point the way to a new and growing economic model for conserving working lands. **Keeping a diversity of agricultural and ranch lands in operation is one of the best ways to support conservation, tourism, and economic vitality in Santa Barbara County.** Farming and ranching will always be complex and risky businesses. Deepening public understanding of the challenges faced by farm and ranch operators and looking for ways to support the ongoing adaptability, diversity, and financial viability of 'working lands' are crucial steps toward protecting these landscapes and the livelihoods of those who steward them.

## AGRICULTURAL AND RANCH LAND STATS/TRENDS OVERVIEW

Agriculture and ranching in Santa Barbara County is continually evolving due to changes in market forces, labor, economic drivers, and competition for other land uses. Over the period of 1950 to 2016:

- The footprint of urban land grew by 54,000 acres, largely through conversion of farmland throughout the South Coast and near urban centers such as Lompoc and Santa Maria.<sup>8</sup> Acreage dedicated to vegetables, fruits, nuts, and vineyards has grown, while acreage for field and seed crops has fallen dramatically:<sup>9</sup>
  - Vegetables grew by more than 41,000 acres
  - Fruit and Nut Crops grew by more than 8,000 acres
  - Vineyards were nonexistent in 1950 and now cover more than 21,000 acres
  - Field and Seed Crops shrank more than 76,000 acres



See [Figure 23](#) for a visualization of these data highlights. From 1997 to 2012 when the last census data was published, average farm size has decreased slightly. The number of farms decreased in this same period from 1771 farms to 1597 farms, though small operations (under 50 acres) still accounted for over 60% of the farms in the County.

Ranching and cattle operations have declined significantly due to economic competition in land uses from rural residential development, cropland expansion, and drought impacts:

- Cattle numbers in the County have ranged from 62,000 in 1950 to over 100,000 between 1960 and 1970, and down to 23,000 in 2015.<sup>9</sup>
- From 1984 to 2008, ~24,000 acres of rangeland were converted to vineyards, row crops, and commercial and residential development in Santa Barbara County. This represents one of the largest losses of rangeland in any county recorded in California over this time period. An additional 2,800 acres of rangeland have been converted to other urban or intensive agricultural uses since 2008.<sup>10,11</sup>

## COMMON AGRICULTURAL AND RANCH LAND VALUES

To understand the conservation challenge and opportunity around local agricultural and ranch lands, it is essential to understand key data and objective trends (as captured above), as well as how experts and the

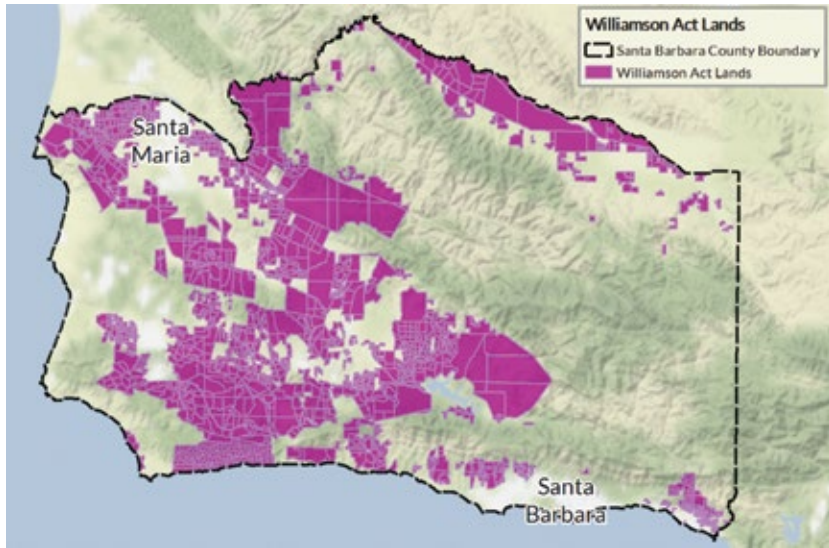
community view these resources. In the process of developing the Blueprint – through stakeholder interviews, focus groups, and surveys – community members were asked to help clarify values and attitudes for each theme area. As with the values listed for other theme areas, the following statements are intended as high-level starting points for a more nuanced ongoing dialogue on the future of these lands in the County. They also serve as reminders that though opinions can vary substantially on the means, there is also agreement on the desired ends.

### Based on input to date, the community values:

- Support for farmers, ranchers, and the benefits they provide the public.
- Maintaining production on prime farm and ranch lands as a vital part of the local community, economy, and ecosystem service provision.
- Access to best practices that support the continued evolution of agriculture.
- Flexible and environmentally responsible land management.
- Incentive-based on-farm conservation opportunities.
- Access to high-quality, locally-grown food.

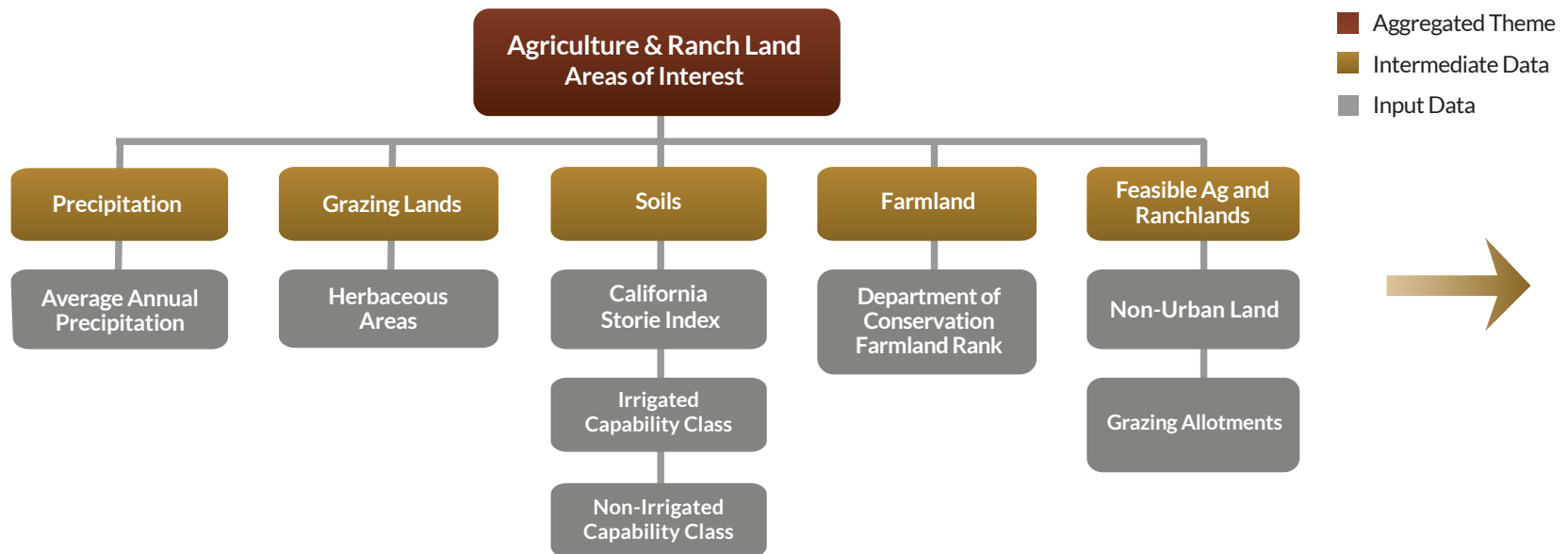


## Williamson Act Lands (Figure 26)



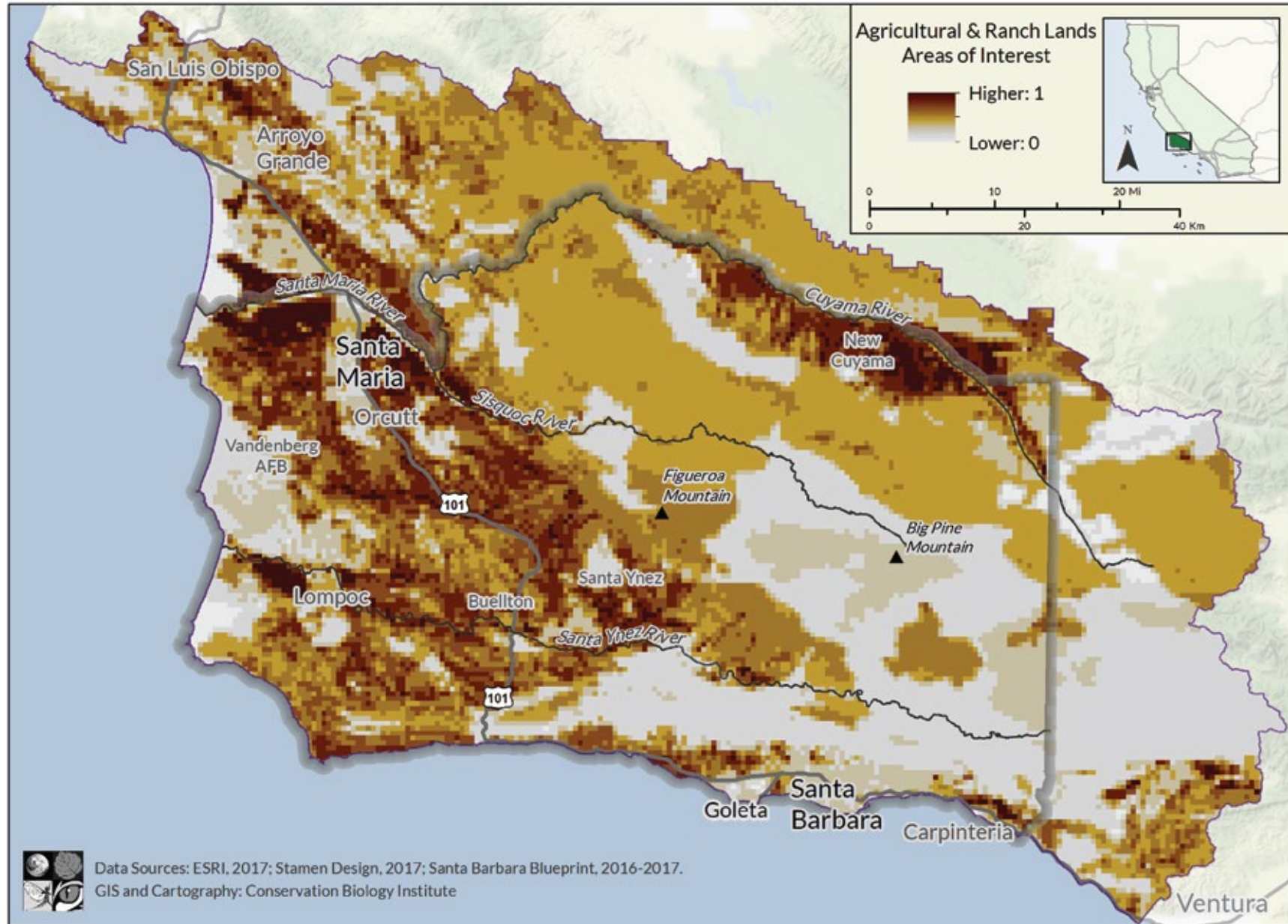
This map shows Williamson Act lands within Santa Barbara County showcasing lands protected from development throughout the County. You can explore this further on the Atlas: Ag and Ranch Lands - Williamson Act Inset Map

The Williamson Act (California Land Conservation Act of 1965) reduces landowners' property taxes in exchange for a ten-year agreement to keep lands in agricultural, open space, or recreational use. This act has been a great support to Santa Barbara County farm lands over the years. The County has approximately 1,275 agricultural preserve contracts, covering about 75% of agricultural lands in private ownership.<sup>12</sup> Without this property tax break, more crop and ranch lands already under tremendous economic pressure would be forced to sell for development or forced to convert to higher value production such as grapes & berries, further decreasing the diversity of crops grown in the County and eliminating ranching as a profitable option. However, the property tax benefits of the Act have also attracted investment in agricultural and ranch lands as wealth management strategies for many outsiders. The low taxes and strong real estate market make buying a ranch or farm in Santa Barbara County a relatively good investment. The Williamson Act comes under scrutiny whenever redistricting comes up in the County electoral process. Since it allows lands to be taxed as agricultural lands and not at their (ever increasing) potential development value, the perceived loss of revenue to the County keeps the Act on the radar of local officials. However, the law is highly supported locally, with over 80% of residents in the County in favor and only 5% clearly opposed.<sup>13</sup>





## Agricultural and Ranch Lands Areas of Interest (Figure 27)



This synthesis EEMS map highlights areas of interest for farming and ranching by overlaying a variety of inputs from the Agricultural and Ranch Lands theme (see model, left). This and other maps featured throughout the report are meant to support meaningful visual insights about agricultural and ranch lands 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 Atlas: Agricultural and Ranch Lands Areas of Interest \(EEMS\) - Santa Barbara County.](#)



## AGRICULTURE AND CLIMATE CHANGE

Santa Barbara County's highly dynamic and productive agriculture is supported greatly by local climate conditions: Mild temperatures and a variety of microclimates allow for year-round production of fruit and vegetable crops. These same microclimates and coastal climates could protect many agricultural areas from drastic climate change impacts, but agriculture will still be challenged by disruptions to water supply and groundwater recharge, increases in pests and invasive species, and the potential for reduction in pollinators.<sup>14</sup>

In order to develop resilience to potential future changes in climate, early indicators of those changes need to be measured and reported. Particularly important will be tracking changes in local pest populations and production levels of staple crops, especially those most vulnerable to change in climate, and perennial crops that are least able to be quickly swapped out for other crops (e.g. avocados, grapes, citrus, berries). Adaptation strategies identified

by the California Department of Food and Agriculture include: switching to low chill varieties, providing shade structures for sensitive crops, reducing erosion caused by flood events with cover crops, maintaining riparian vegetation, developing hedgerows and habitat for native pollinators, and protecting against the conversion of agricultural lands.<sup>15</sup>

Ultimately, farmers and ranchers may have to adjust crop varieties and cropping strategies, and continue to safeguard resources with practices like erosion control and nutrient and water management. New management practices may come into play as well. The carbon sequestration value of agricultural and rangelands will increase in the years ahead, and partnerships to support these practices offer a significant climate mitigation opportunity for the County. Greenhouse gas emissions are 58 times lower on agricultural croplands than urban areas (per acre per year). Rangeland carbon sequestration projects (such as the one featured on page 60) can help the County sequester more carbon, store more water, bring additional income sources to farmers and ranchers.<sup>16</sup>





## CARBON FARMING COMES TO THE COUNTY

The Cachuma Resource Conservation District and the Community Environmental Council (in partnership with the Ted Chamberlain Ranch, LegacyWorks, Natural Resources Conservation Service, The Santa Barbara Foundation, Santa Barbara County Air Pollution Control District, Carbon Cycle Institute, UCSB Schimel Climate Lab, and UC Cooperative Extension) have been working to explore the benefits of carbon farming for soil quality on Santa Barbara ranches. Researchers from UC Davis, UC Berkeley, and Cal Poly are also involved in the project. This project is a great example of collaboration for agricultural and environmental benefit and also asks a bold and possibly game-changing question for Santa Barbara: **Can the agricultural sector emissions in the County be offset through carbon farming within five years?** The group has scientific proof of concept; early results from other test sites around the state show promising multi-benefit results.<sup>17,18</sup> Carbon farming has been shown to support ranchers through improved forage production, soil health, and water retention (an essential benefit in times of drought). It also supports climate resilience with a new way to mitigate carbon emissions and benefit the local working lands economy.<sup>19</sup>

The Chamberlin Ranch is hosting a Santa Barbara County pilot study, with strong initial results. The project research team estimates 270,000 acres in the County – much of which is active rangeland – could support at least one carbon farming practice; compost application on grazed grassland (eligible land was estimated to require less than a 25% slope and be at least 100 feet from wetlands or streams, though spray methods have since proven viable for steeper slope applications).<sup>20</sup> This same study estimates that only 15% of that land would need a one-time quarter inch compost application to meet the 5-year ag sector emissions offset goal for the County. Scaling the



**Ranch grass after compost application (Figure 28)**

pilot project will require funding for training and outreach, as well as for enhancement of local compost supply and distribution systems. Modifications to local permitting may also be required for long-term success of carbon farming as a central part of the Santa Barbara County climate resilience story, but many carbon farming practices are traditional USDA-NRCS conservation practices that can be implemented without permitting requirements.<sup>21</sup>

► You can learn more about this project at: [www.sbcblueprint.net/resources](http://www.sbcblueprint.net/resources).

## ONGOING DIALOGUES

### IMPEDIMENTS TO CONSERVATION ON FARM AND RANCH LANDS

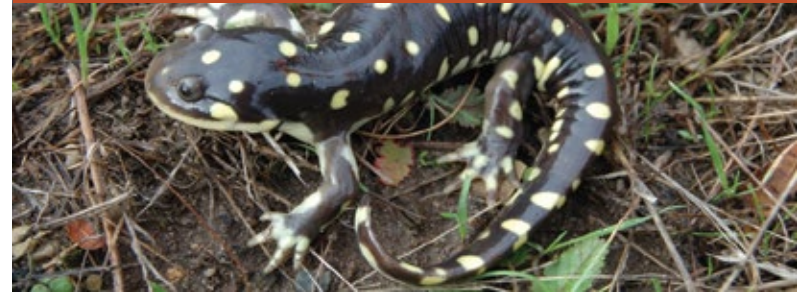
Throughout the community outreach process (which included a diversity of stakeholders from farmers and ranchers to environmental advocates and government), stories were shared of the unintended consequences of the increased interest from the public in how and where their food is grown. This interest shows up in action to support local food systems, and in demand from large commodity crop purchasers for certifications and audits that demonstrate compliance with health, safety, animal welfare, labor, and farming practice standards. It also shows up in public regulation that covers most aspects of farming and ranching. Farmers and ranchers are often interested in conservation and engage in practices that help restore habitat and ecosystems, but many current regulations and requirements unintentionally impede – rather than incentivize – best practices. Here are just a few specific examples:

#### Cattle Grazing to Restore Native Grasses



High intensity, quick-rotation grazing is common on many local ranches: Pastures are managed to maximize the amount of rest each pasture gets and to allow grasses to “go-to-seed” before they are grazed. This strategy maximizes forage, promotes soil health, and reduces weeds. It also enhances native perennial grasses, but the presence of rare natives can lead to increased restrictions on allowable management practices. As local rancher Paul Van Leer notes, this is a frustrating situation for a ranch manager: “I’ve enhanced the native grasses just in the way that I graze. I shouldn’t be penalized for then grazing those native grasses, because my grazing is what made the native grasses thrive here.”<sup>22</sup>

#### Agriculture and Sensitive Species



A similar example of where a ‘save every specimen’ approach can backfire can be seen in ponds on ag and ranch lands. Farmers and ranchers create desirable habitat in on-farm storage ponds for species like tiger salamanders and red-legged frogs, but then the storage systems become burdensome if they are discovered as endangered species habitat. This risk has led some to go so far as to choose other water management options that do not risk creating habitat (and the resulting regulatory scrutiny and paperwork).

#### Agriculture and Pollinator Habitat



Funded by the Santa Barbara Foundation LEAF Initiative, The Santa Barbara Botanic Garden has launched a pilot research project in partnership with five local land managers to explore best practices for enhancing native pollinators on farms. Native pollinators, which can include beetles, flies, bees, and wasps, can be up to 1000 times more efficient pollinators than honey bees on specific crops, and their services are free when conditions are right for them to thrive near commercial crops. This multi-benefit research project might never have gotten off the ground



if it weren't for an agreement with the County that any habitat created from the project will not be designated as 'protected', and can be removed at any time during or at the end of the study. This allows agricultural operations to continue to change their land use over time as needed. Without this type of agreement, the risk of loss of flexible farming practices was too high for many farmers to be able to participate in the pilot.

## COMMON MISUNDERSTANDINGS ABOUT FARM AND RANCH MANAGEMENT

Many imagine a pastoral ideal when they think of a farmer's life. But the business of farming and ranching is rife with complexity and stressors. Understanding the practical realities of farming and ranching is an important step to understanding threats to farm and ranch lands and how those interested in land conservation can better ally with working landowners and managers for mutual benefit. The following statements address common misunderstandings within the community that came up often in the Blueprint development process:

- **Owning farm or ranch land is not a guarantee of being able to make ends meet.** Many assume that those who own land in Santa Barbara County are rich. But when your only income comes from the land itself, with variabilities of weather, market conditions, and operating costs, margins can be very low and the threat of having to close operations, borrow money to stay afloat, and/or sell land can be a constant stressor for land managers. For example, small-scale farms are under the most pressure to sell, consolidate, or shift to intensive high value crops, and inheritance taxes add further challenges to keeping younger generations in farming. Unpredictable groundwater costs may also affect farmland viability in the coming decades (see SGMA story on [page 19](#)).
- **Agricultural land sales are actually quite rare in the County.** Unlike in other areas of California, most farms in Santa Barbara County are still family-run operations, with a strong interest in keeping the land in farming. Large swaths of land rarely open up to outside markets, though families often have outside financing or leases. These leases can impact management practices, as crop rotation associations are common among landowners to help manage larger swaths of land more effectively

through leases and subleases. Though agricultural lands staying in production is good for conservation, these subdivisions of large agricultural and ranch lands (where zoning allows it) can have ecological impacts through increased fencing – which can impede wildlife movement – and infrastructure on the landscape.

- **Agricultural and ranch lands are dynamic, not static landscapes.** As the introduction to this chapter shows, agriculture is an incredibly dynamic industry. Though many may view farms and ranches as a bucolic part of the rural viewscape, the reality is that the ability to evolve how the land is worked and capitalized upon is crucial to farmers' and ranchers' ability to keep working lands in production. For those who would like to see working landscapes stay in production, supporting the ongoing flexibility of farmers and ranchers is key.
- **Agriculture increasingly provides full-time, year-round, skilled jobs.** Many unfamiliar with the agriculture industry assume that most farm jobs go to migrant laborers. However, about 10% of the County's total workforce is employed in agriculture-related work, 56% of which are off-farm jobs in processing, technical, and business positions that support the local agricultural economy.<sup>23</sup> Two-thirds of agricultural jobs in the County are full-time positions.<sup>24</sup>
- **Managed landscapes provide important ecological benefits.** Humans have been managing the land in Santa Barbara County since early Chumash inhabitants engaged in farming, fire, and water management. Local vegetation can benefit from grazing animals, for example, and active support of ecosystems in the wake of fire damage can help ecosystems recover more quickly (see for example the river bottom tilling story on [page 24](#)). Finding ways to compensate ranchers and farmers for the land management practices that provide measurable benefit to local ecosystems could be a helpful strategy for finding multi-benefit approaches to conservation in the County into the future.

## KEY TAKEAWAYS TO AGRICULTURAL AND RANCH LAND RESILIENCE

Potential resilience strategies for agricultural and ranch lands include actions and processes that will support the economic and ecological vitality of agricultural and ranch lands in the County, such as:

- Supporting the ability of farmers and ranchers to maintain economic viability through flexibility in cropping choices and ancillary land uses
- Supporting ways to enhance and preserve habitat and scenery on agricultural and ranch lands through incentives that provide economic benefit to the landowners
- Increasing the community's understanding of the economic and regulatory burdens on the continued viability of agriculture
- Supporting the use of agriculture to enhance ecological conditions, combat harmful invasive species and maintain ecosystem services through incentives for participating landowners
- Visit [www.sbcblueprint.net](http://www.sbcblueprint.net) for more resources, project highlights, or to share your ideas!

## ENDNOTES

- <sup>1</sup> Langholz, J. & DePaolis, F. 2014. Economic Contributions of Santa Barbara County Agriculture. Agricultural Impact Associates LLC and the Santa Barbara County Office of the Agricultural Commissioner. Accessed May 2017: <https://tinyurl.com/yctg8zaa>
- <sup>2</sup> Data was also pulled directly from archival Santa Barbara Crop Reports, accessed online May 2016. <http://cosb.countyofsb.org/agcomm/agcomm.aspx?id=11562>.
- <sup>3</sup> Special thanks to Lisa Bodrogi of Cuvée Connections for curating much of this information in a May 2016 research report for the Cachuma RCD "A Perspective on the History of Agriculture in Santa Barbara County since 1930". Data was also pulled directly from archival Santa Barbara Crop Reports (see endnote 2).
- <sup>4</sup> Santa Barbara County Agricultural Commissioner's Office. 2016. Santa Barbara County Agricultural Production Report 2016. Santa Barbara. Accessed August 2017: <https://tinyurl.com/ybb8yx53>.
- <sup>5</sup> California Department of Food and Agriculture. 2016. California Agricultural Statistics Review, 2015-2016. Accessed May 2017: <https://www.cdfa.ca.gov/statistics/PDFs/2016Report.pdf>.
- <sup>6</sup> Cleveland, D.A., Radka, C.N., Müller, N.M., Watson, T.D., Rekstein, N.J., Van M. Wright, H., & Hollingshead, S.E. 2011. Effect of localizing fruit and vegetable consumption on greenhouse gas emissions and nutrition, Santa Barbara County. Environmental Science & Technology, 45(10), 4555-4562.



- 7** Santa Barbara County Food Action Plan. 2016. Accessed May 2017: <https://tinyurl.com/yda9rk2m>
- 8** Data compared between: Osherenko, G., Onsted, J., Clarke, K., Boucquey, N., Hart, K.N. 2007. Retaining California's Coastal Agricultural Land Through Economic Incentives, Regulation, and Purchase. Los Angeles, University of Southern California Sea Grant. Accessed May 2017: [http://ocpc.msi.ucsb.edu/pdfs/CalRep/hi-res/CalRep\\_all.pdf](http://ocpc.msi.ucsb.edu/pdfs/CalRep/hi-res/CalRep_all.pdf) and California Department of Conservation. Farmland Mapping and Monitoring Program Data 1984-2014. Accessed May 2017: <ftp://ftp.consrv.ca.gov/pub/dlrp/FMMP>.
- 9** Data compared across decades from Santa Barbara County Agricultural Commissioner - Crop Reports 1950-2015. Accessed May 2017: <https://tinyurl.com/yasg47t9>
- 10** Cameron, D.R., Marty, J., & Holland, R.F. 2014. Whither the Rangeland?: Protection and Conversion in California's Rangeland Ecosystems. *PloS ONE*, 9(8), e103468. Estimates of rangeland loss calculated in this paper were adjusted as the original researchers over-estimated rangeland loss of ~10,000 acres to oil and gas development. There was no additional development of oil and gas during the mapping period 1984-2008 and this change from rangeland to oil and gas development was simply a categorization correction made in 2008 by the California Department of Conservation. Please see page 2 under the Unusual Changes header for the correction. <https://doi.org/10.1371/journal.pone.0103468>. Accessed May 2017.
- 11** California Department of Conservation. Farmland Mapping and Monitoring Program Field Reports for 2010, 2012, and 2014. Accessed May 2017: <https://tinyurl.com/y6ucrw3p>
- 12** Langholz, J. & DePaolis, (2014) (the 2013 Crop Report PLUS) suggest 77% for 2011 farmland data. The more recent Cleveland et al. (2016) study suggest 75% of agricultural land in the County is protected by the Act. (2013 Crop Report PLUS: Langholz, J. & DePaolis, F. 2014. Economic Contributions of Santa Barbara County Agriculture. Agricultural Impact Associates LLC and the Santa Barbara County Office of the Agricultural Commissioner.)
- 13** Cleveland, D.A., Copeland, L., Glasgow, G., McGinnis M.V., & Smith, E.R. 2016. The Influence of Environmentalism on Attitudes Toward Local Agriculture and Urban Expansion, *Society & Natural Resources*, 29:1, 88-103. DOI: 10.1080/08941920.2015.1043081. The article draws its data from the 2010 Central Coast Survey.
- 14** A 2016 interview assessment of grower conditions in Goleta and Carpinteria, produced by Ag Innovations for the Cachuma RCD, notes that avocado trees are also suffering from decreases in water quality associated with drought impacts (salts, nitrates, and others minerals build up in the soil with decreased irrigation).
- 15** Cook, C., Levy, M., & Gunasekara, A. 2013. Climate Change Consortium for Specialty Crops: Impacts and Strategies for Resilience. Sacramento, California Department of Food and Agriculture. Accessed May 2017: <https://tinyurl.com/yd4rq6n4>
- 16** Shaffer, S. & Thompson, E. 2015. A New Comparison of Greenhouse Gas Emissions from California Agricultural and Urban Land Uses. Davis, CA, American Farmland Trust. USA. Accessed August 2017: <https://tinyurl.com/yal3ex5z>
- 17** Ryals, R., Hartman, M. D., Parton, W. J., DeLonge, M. S. and Silver, W. L. 2015. Long-term climate change mitigation potential with organic matter management on grasslands. *Ecological Applications*, 25: 531–545.doi:10.1890/13-2126.1
- 18** Ryals, R. & Silver, W.L. 2013. Effects of organic matter amendments on net primary productivity and greenhouse gas emissions in annual grasslands. *Ecological Applications*, 23: 46–59. DOI:10.1890/12-0620.1.
- 19** To learn more about carbon farming and potential benefits, visit <http://www.marincarbonproject.org/carbon-farming>.
- 20** Smith, C. 2016. Potential Acreage in Santa Barbara County for Compost. Prepared by Legacy Works and the Cachuma Resource Conservation District for the National Resources Conservation Service. Personal communication, 2016. <https://tinyurl.com/yajp736y>
- 21** Visit NRCS's carbon and greenhouse gas evaluation tool at [www.comet-planner.com](http://www.comet-planner.com) for more. Natural Resource Conservation Service, United States Department of Agriculture, and Colorado State University.
- 22** Personal communication, 2016. For a great video exploration of Van Leer's intensive grazing practices, watch this video (starting at the 2 minute mark): <https://www.youtube.com/watch?v=WsgJVS5i3JA&t=390s>.
- 23** Calculations based on data from the 2013 Crop Report PLUS: Langholz, J. & DePaolis, F. 2014. Economic Contributions of Santa Barbara County Agriculture. Agricultural Impact Associates LLC and the Santa Barbara County Office of the Agricultural Commissioner. Accessed May 2017: <https://tinyurl.com/yctg8zaa>
- 24** The Economic Forecast Project. Data accessed online May 8, 2017, and updated regularly at <http://www.efp.ucsb.edu/data/employment>.

# COMMUNITY AND THE LAND



Community leaders have the difficult task of embracing a variety of perspectives while also finding common ground across diverse interests on land use in the County.







## COMMUNITY AND THE LAND IN HISTORIC CONTEXT

Santa Barbara residents have always been dependent on the surrounding landscape to support their quality of life. Differing views on how best to use scarce resources is a local theme with a long history.<sup>1</sup> Before Spanish settlers arrived, Chumash inhabited present day Santa Barbara as subsistence fishers, farmers, and hunters. The County's early history is marked by a governance struggle between Chumash, Spanish, and Mexican settlers. In the wake of the Mexican War of Independence, mission lands were distributed to settlers, and the County's cattle ranching and farming tradition began to grow. Expansion continued in the wake of California's statehood, the Gold Rush, and the discovery of fertile soils and oil resources in the County (in 1896, Summerland Oil Field became the site of the world's first offshore oil well). The building of Stearns Wharf in 1887 and a railroad line to San Francisco in 1901 marked the beginning of larger scale commerce and Santa Barbara's role as a vacation destination noted for its rugged coastal beauty.

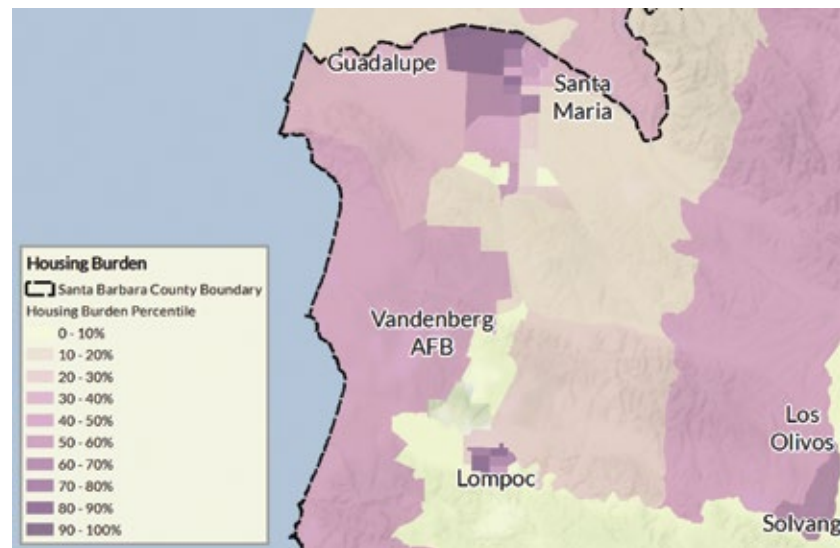
The first decades of the 1900s brought new land uses to the County. A number of national forests were established in the County's inland mountain ranges to protect local watersheds. In 1936 these collectively became part of the Los Padres National Forest, which covers over a third of the County (though many hiking and horse trails were built as early as the 1920s, backpacking and camping did not become popular in the parks until the 1960s).<sup>2</sup> In 1901, the Santa Ynez Reservation was established in the Santa Ynez Valley, where Chumash have lived for over 8000 years.<sup>3</sup> World War II brought military into the County, with lasting influences in what is now Vandenberg Air Force Base and the Santa Barbara Airport, and contributed to a huge population boom in the wake of the war as many who came to the area for the war effort chose to stay. University of California at Santa Barbara was formally established in 1944, covering over 1000 acres near Goleta and serving as a significant part of the local economy.

In the 1950s and 1960s, the development of Bradbury Dam, Lake Cachuma, water treatment and tunnels, and the shift to offshore oil operations all contributed to a population boom: the population of the County more than doubled, surpassing 250,000 by 1970.<sup>4</sup> A major offshore oil spill of 1969 was a significant event for the County, resulting in hundreds of square miles of offshore oil slicks, shoreline contamination, devastating impacts to wildlife and tourism, and national attention. The spill catalyzed the first national Earth Day, and bolstered the growing environmental and anti-development movements in the County, especially on the County's South Coast. Wilderness preservation efforts, led most notably by Dick Smith, resulted in the establishment of the San Rafael Wilderness Area in 1968; when the national Wilderness Act of 1984 passed, the Dick Smith Wilderness was established in his memory.

The history of fire management in the County is also part of the story of community interaction with the land. Since the early 1900s, U.S. fire management focused mainly on suppression. By the 1980s prevailing theory shifted to recognize the benefits of fire for many natural ecosystems. In Santa Barbara, because the headwaters are dominated by chaparral, high intensity wildfires every 20 to 50 years are a natural part of ecosystem health. But with the history of suppression and increasing human-caused fires in wildlands, the second half of the 1900s saw more frequent high intensity fires (**Figure 31**). Many of these fires have caused significant damage to local housing, loss to native vegetation erosion control, and led to increases in invasive species. Houses in the County built in fire-prone areas are now often 'fire-proofed' for added protection, with fire screens, minimal wood construction, and minimal vegetation around the home. (The balance of human and ecological needs around fire management is also discussed in the first two chapters of this report.)

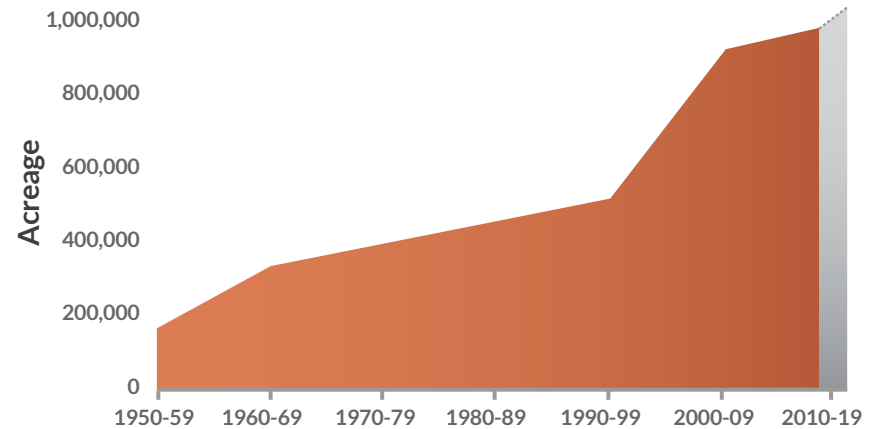
In 1975, Santa Barbara City passed zoning restrictions to limit the City's population, and the cost of housing in the area began to rise as a result. Since this time, with half of County lands under public ownership, and increasing costs and limits to South Coast housing, residents have been steadily moving to more affordable parts of the County and even south into Ventura County. High paying jobs, however, remain most abundant along the South Coast, and more and more residents and workers are now forced to make long commutes part of their daily lives (Figures 34 and 35). **Affordable housing** continues to be a challenge even in North County: A 2016 report showed the Santa Maria-Santa Barbara areas as the 2nd least affordable housing in the nation, given the disparity between median salaries and housing prices.<sup>5</sup> Across the County, shifting demographics will likely create demand for smaller units near urban centers.<sup>6</sup>

### Housing Burden (Figure 29)

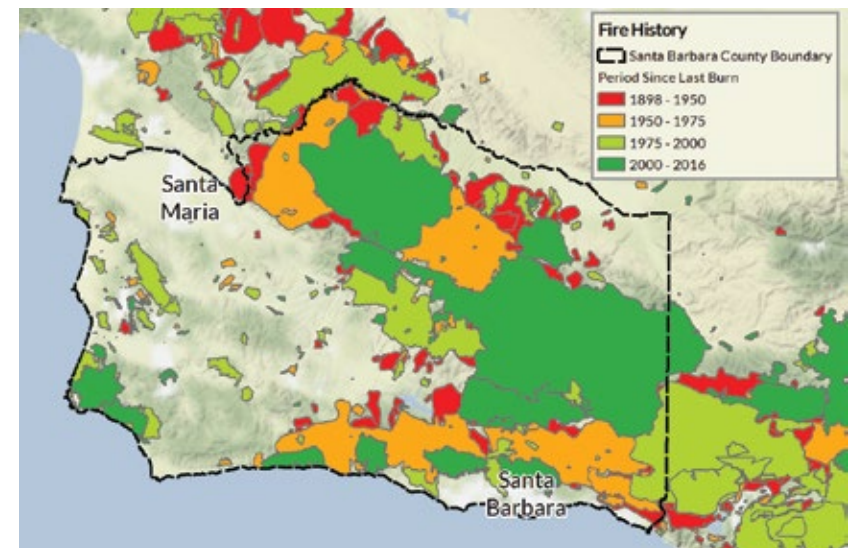


This map shows the census blocks identified as the most disadvantaged by housing burden within the western portion of Santa Barbara County. These rankings are based on a statewide assessment of the percentage of low income households paying more than 50% of their income for housing. You can explore this further on the Atlas: Community and the Land - Housing Burden Inset Map.

### Increased Acreage Burn Rate (Figure 30)



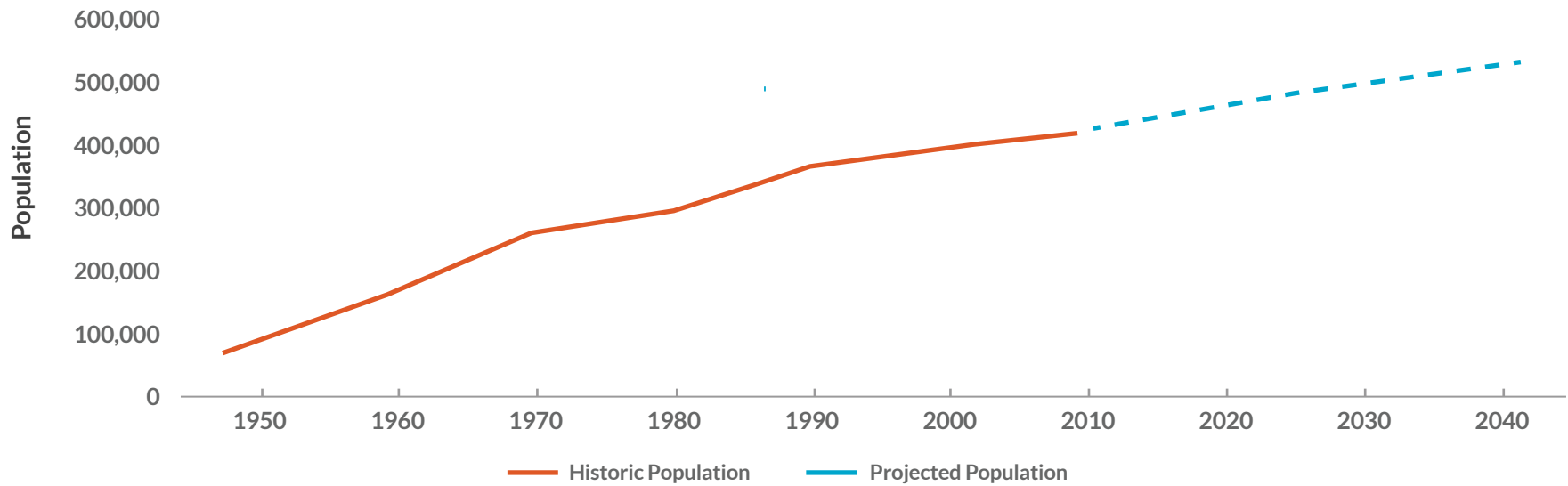
### Santa Barbara Fire History (Figure 31)



Fire has played an ever larger role in people's minds as wildland fires have grown in size and frequency: Over 970,000 acres have burned in Santa Barbara County since 1950, with the majority caused by people (direct ignition/power lines/machinery). Nearly half of the acreage burned since 1950 has occurred within the past two decades (Figure 29).<sup>10</sup> The map above shows the fire burn history across Santa Barbara County broken up by which period areas of the county have burned since 1900. Adjust the purple text to: You can explore this further on the Atlas: Community and the Land - Fire History Inset Map.

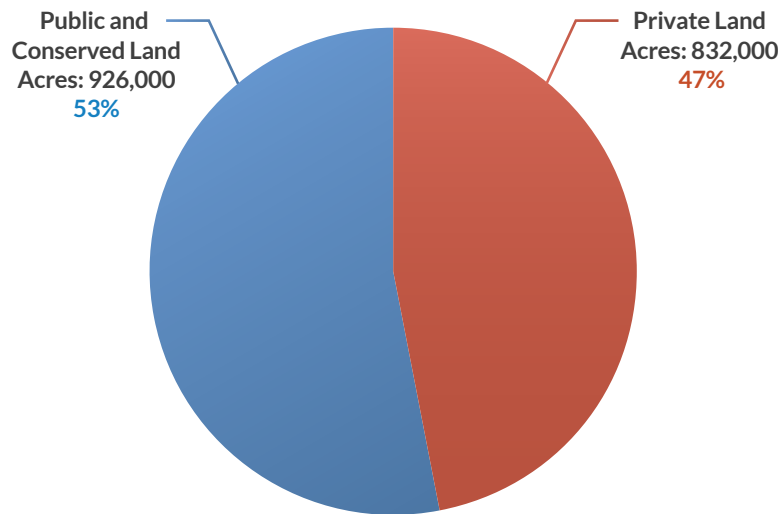


### Population Growth in Santa Barbara County (Figure 32)

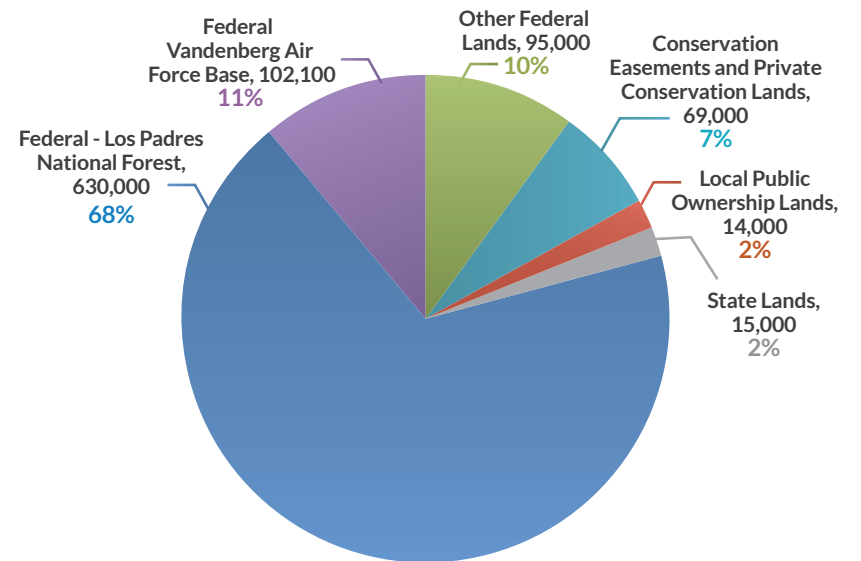


### Land Ownership Within the County (Figure 33)

Santa Barbara County Land Ownership



Acres of Public and Conserved Lands



Santa Barbara County must prepare for another population boom in the next 25 years that is predicted to bring 75,000 additional residents to the County,<sup>7</sup> most notably to North County.<sup>8</sup> (This influx is akin to adding a city almost the size of Santa Barbara.) As pressures over limited landscape and resources intensify, they will bring new opportunities for collaboration. Residents will need to think and work together in creative ways to protect all the things that make Santa Barbara County such a special place to live – nature and wildlife, working landscapes, a healthy economy, clean air and water, tolerable traffic conditions, and access to outdoor recreation.<sup>9</sup>

## COMMON COMMUNITY VALUES ABOUT THE LAND

To understand the conservation challenge and opportunity around common community interactions with the land, an understanding of data, trends, and how experts and the public view these issues is needed. As part of the Blueprint development process, community members were asked to provide input on values and attitudes toward community interactions with the local landscape. Through this research and stakeholder input process, high level value statements were developed to support ongoing dialogue on the future of housing and recreational land uses in the County. These statements are also helpful reminders that while opinion can vary greatly on the means by which lands and access are managed, there is great agreement on the desired ends.

### Based on input to date, the community values:

- Responsible access to outdoor spaces for recreation and exercise across the County and local to each community.
- Interactive education about local resources.
- Maintenance of broad viewsapes and avoidance of undue sprawl into natural and agricultural spaces.
- Safe energy development for local benefit.

## COMMUNITY AND THE LAND STATS/TRENDS OVERVIEW

The communities and landscapes that make up the mosaic of Santa Barbara County have seen large changes over the years in demographics and landscapes. Population has continued to grow dramatically with increasing changes in the demographics that make up the communities of the County.<sup>12</sup>

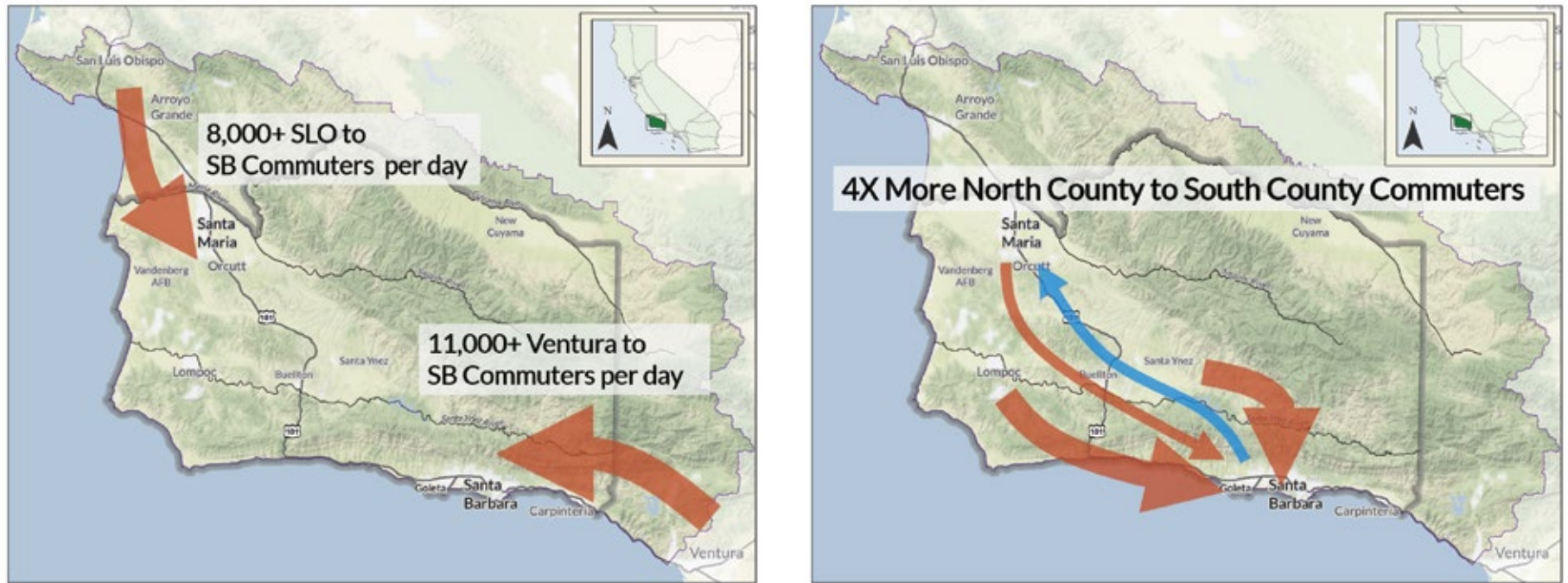
- Santa Barbara County's population has increased by ~350,000 people since 1950, with the largest growth in North County.
- The local Hispanic population has increased from 34% of the County total in 2000 to 45% in 2015, and is expected to grow to 51% by 2040.

As they have in the past, these changes in demographics and land use will impact how the community interacts with the local landscape. In addition, population pressure adds to housing availability and affordability challenges in the County. Significant regional differences in housing costs combined with job availability are forcing many more residents to commute long distances between home and work. Housing costs along the South Coast are 210% higher than in North County (Figure 35), and yet there are more than twice as many jobs available along the South Coast (~115,000) compared to the Santa Maria Region (~50,000).<sup>13</sup> More and more Santa Barbara County residents are spending more of their lives in the car (Figure 34), with significant impacts on traffic congestion and quality of life.

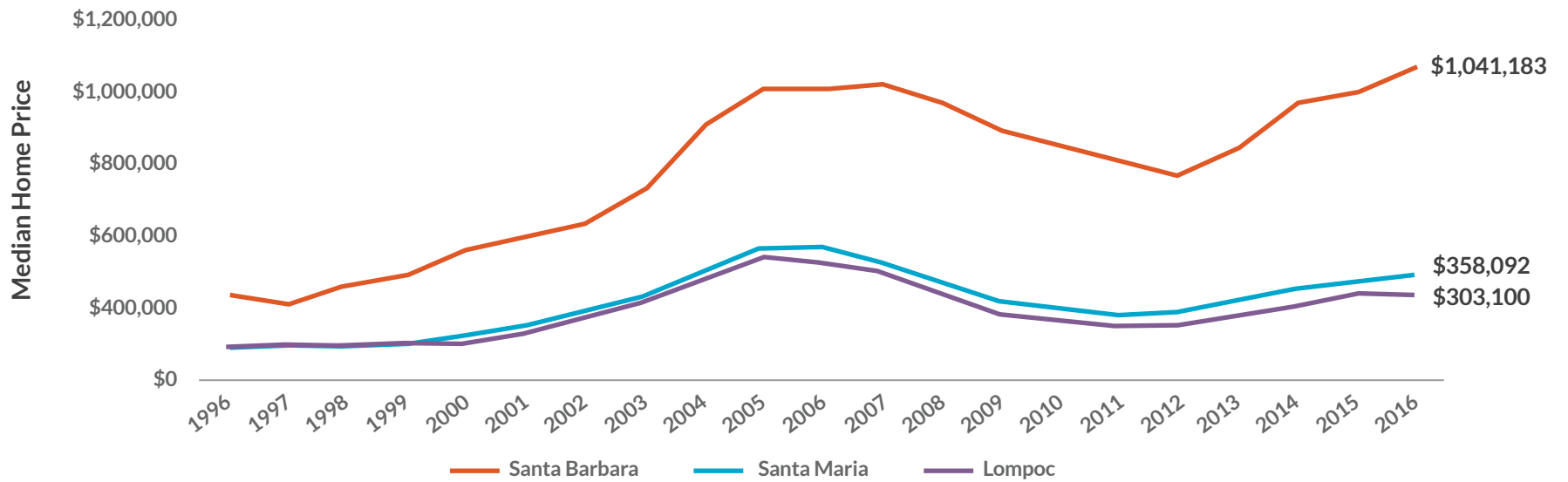
Credit: Santa Maria Valley Open Space



Commuter Traffic Patterns in Santa Barbara County (Figure 34)



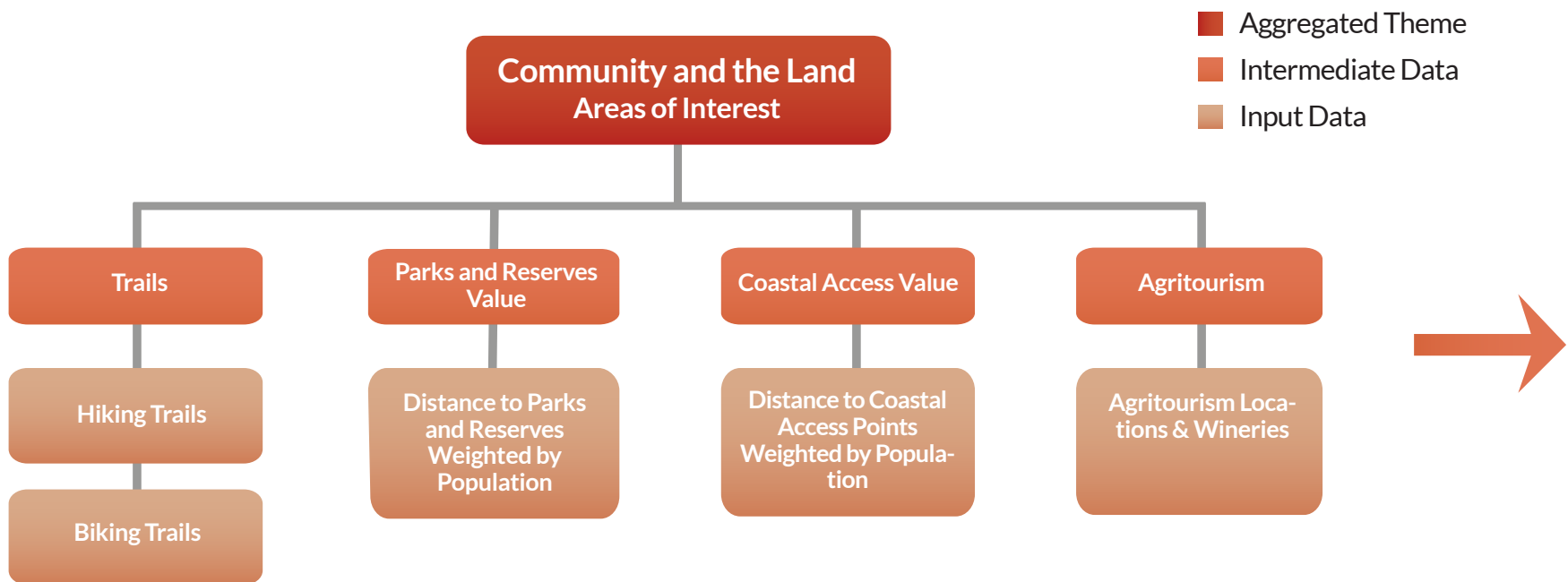
Median Home Price (Figure 35)<sup>14</sup>



## COMMUNITY AND CLIMATE CHANGE

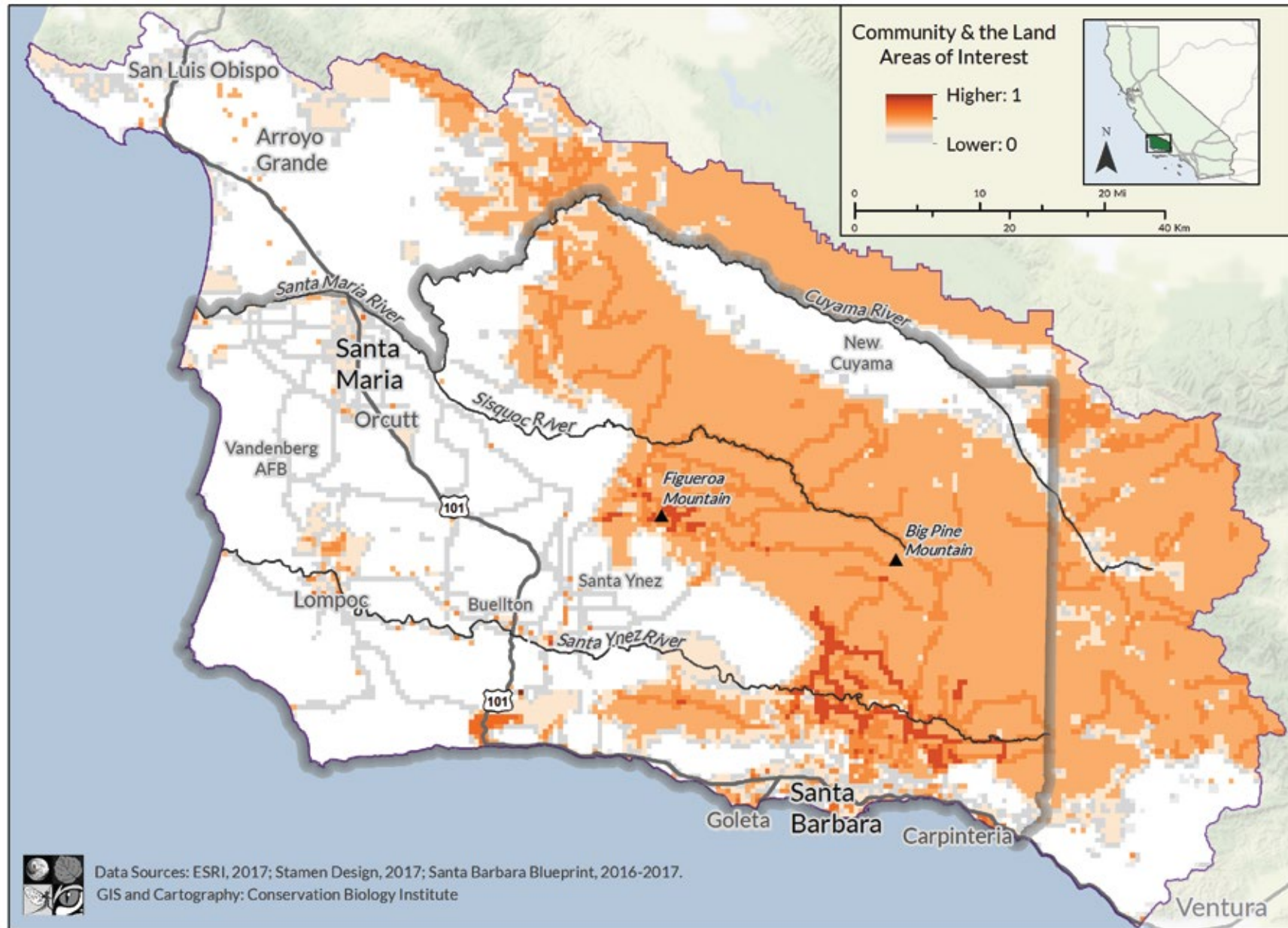
The long-term viability of the local conservation economy (page 73) will be impacted by how the County prepares for and adapts to the realities of climate change. Climate change is expected to result in many alterations to the Santa Barbara landscape and ecosystems that affect human lives. Water supply interruptions and the pressures of growth will require creativity to adapt to and produce new sources of clean water. Increased coastal erosion from storms and sea level rise may result in loss of beaches, coastal lands, and the recreation and habitat opportunities they provide. Many recreation areas may change with increased risk of wildfire, species die offs at lower elevations, and the spread of invasive species. Residents may see an earlier annual poppy bloom on Grass Mountain, changes in the timing of the Monarch butterfly migration, increased public health risks, and/or higher energy costs during drought and summer heat waves.<sup>24</sup>

All of these issues affect how the community interacts with the landscape through outdoor recreation, agritourism, and a changing of the seasons and aesthetics of the land. All too often residents on the front lines of climate impact are those least equipped to recover. Yet the possible and expected impacts of climate change can be mitigated or adapted to with climate-savvy and inclusive resource management. In order to ensure the best shared future for all species in the County, systemic changes in the County's wild and cultivated landscapes must be carefully monitored, and preparations must be made for expected changes (such as increased episodic flows in streams and rivers, increased dry spells and heat waves, and increased risk of wildfire). Community-level adaptability starts with becoming aware of what the likely changes will look like, asking what adaptation and mitigation strategies should be, and then acting early to prevent undue losses to natural resources or residents' quality of life.





Community and the Land Areas of Interest (Figure 36)



This synthesis EEMS map highlights areas of interest for recreation and tourism by overlaying a variety of inputs from the Community and the Land theme (see model at left). This and other maps featured throughout the report are meant to support meaningful visual insights about community interactions with the local landscape in Santa Barbara County, 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 Atlas: Community and the Land Areas of Interest (EEMS) - Santa Barbara County.

## RECOGNIZING SANTA BARBARA COUNTY'S VIBRANT CONSERVATION ECONOMY

Santa Barbara County's unique landscapes and resources contribute directly to a significant portion of jobs in the County. Those jobs that harness the natural benefits of the County total over 50,000 and make up roughly 25% of the workforce within the County.<sup>15</sup> For each farmer, rancher, biologist, tour guide, nature educator, restoration laborer, or advocacy organization staffer, the landscapes of Santa Barbara County offer a livelihood tied directly to the health of the land. The activities of this portion of the workforce benefit not only residents, but also the millions of people that visit Santa Barbara County every year, buy produce grown in the County, and drive through its beautiful landscapes.

When thinking of ways to help a growing population continue to live, work, and play in the County, there is benefit to raising awareness of the local natural resources and the jobs these resources support. More signage indicating National Forest lands, watershed boundaries, or crop types could help increase awareness of local landscape features and help boost tourism. Education around ecosystem services and the role they play in supporting the local economy and quality of life might also help inspire greater interest in supporting conservation as a multi-benefit approach to supporting people, the economy, the land, and wildlife for many generations to come.

### Urban Conservation Economy Example

A wealth of literature shows the benefits of trees and other forms of vegetation for crime reduction, productivity, and physical and mental health.<sup>13</sup> Urban treescapes also help keep temperatures down in cities, which will be increasingly important with the temperature increases predicted by climate change models. Greening urban landscaping is a good example of the conservation economy at work.





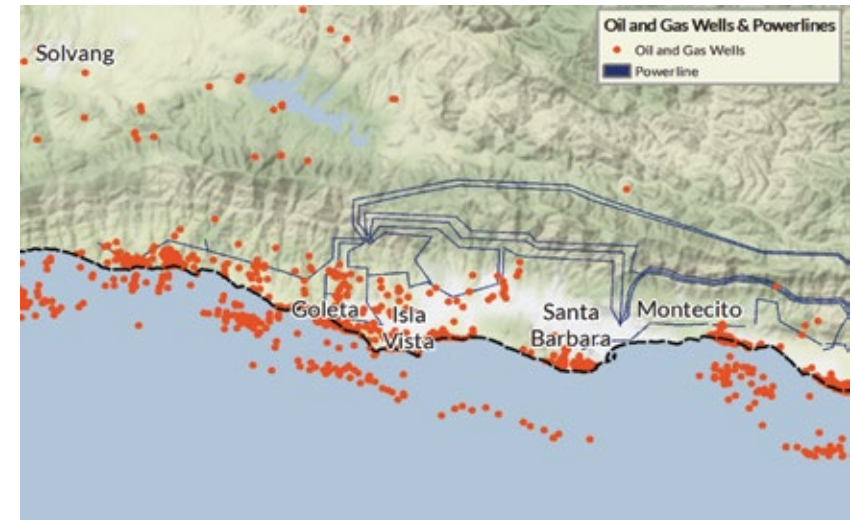
## ENERGY, EXTRACTION, AND CONSERVATION

Santa Barbara County has a long history of energy and resource extraction linked with land conservation. Oil and gas have been developed since the 1890s, and as extraction sites close, they offer large swaths of land for other uses in the County. Between mitigation, donations, and Coastal Resource Enhancement Funds (CREF), active and former energy development sites in the County have long been sources of revenue for conservation acquisition and restoration throughout the County. Funding from oil and gas through CREF has supported the acquisition of many sites cherished by the community including Carpinteria Bluffs, Santa Barbara Shores, Point Sal, and Ellwood Mesa. Whole properties have been donated in other cases such as the Burton Mesa Ecological Reserve and other restored areas, including much of the Nipomo Guadalupe Dunes Complex. Other partnerships with active energy lands support public access to trails, such as with the recent Orcutt Hill trail system.

In addition to oil and gas development, mineral mining has been a part of Santa Barbara County's extractable resource history. Diatomaceous earth has long been mined in the Lompoc area,<sup>11</sup> and sand, gravel, and limestone

are mined around the County as well. Each of these extraction operations, along with recent additions of wind and solar power, have offered local landowners important sources of secondary income to support the maintenance of rangelands, and increase mitigation and restoration potential.

### Energy Infrastructure (Figure 37)



This map shows transmission lines and oil and gas wells along the South Coast of Santa Barbara County. Many wells are shown that are no longer active, which highlights how prevalent oil and gas development has been in the region. You can explore this further on the Atlas: Community and the Land - Oil and Gas Wells, Transmission Inset Map.



## COMMUNITY AND THE LAND, IN YOUR WORDS

When asked, Santa Barbara citizens shared stories of their relationship with the land. Topics included: multi-generation farm families; being a kid raised at the edge of Los Padres; attending Rancho Alegre science camp; bird watching; swimming with sharks and dolphins; golfing with mountain lions; family wine tasting weekends; local and backcountry hikes, horseback ride; and enjoying deer in the yard.

**For some, hosting guests and sharing about the land with others offers a favorite way of engaging with the local landscape:**

*“I have family with small children that come to visit from their home in Los Angeles. They love decompressing at Santa Barbara Botanic Garden or the Butterfly Preserve & surrounding area.”*

*“For me, a favorite aspect of my relationship with the land is hiking the open space trails of both the Los Flores Ranch Park and the Orcutt Open Spaces with my children and grandchildren. I enjoy fostering their values for an ongoing relationship with our special outdoor scenery, flora, fauna, and environment.”*

*“Discovering the local back country has been one of the most special aspects of living here. As a Scoutmaster, I discovered much of the San Rafael Wilderness and have been able to introduce many young people and friends to the local backcountry since. A particularly memorable, hard, wild, and wonderful trip was backpacking the Manzana Creek-Sisquoc River Loop with a few scouts and friends in 2007. No one can ever believe we have such wild and diverse back country so close to home, within an hour’s drive from Santa Maria!”*

**Many Santa Barbara residents are fortunate to have a special multi-generational family connection to the land:**

*“My family arrived here in the 1850s and has ongoing farming and ranching operations in Foxen Canyon and Santa Maria Valley which are diverse, environmentally responsible, and make significant contributions to the economy and employment. I also am particularly proud of our responsible oil production.”*

*“Part of what is so special about Santa Barbara to me has to do with how important the ocean is to our family. Since my children were babies, they have always loved the water. Now that they are older, they still love it - the beach and water recreation, the wildlife, the source of good food. Personally, I need to get in the water as often as possible. I so appreciate the tremendous effort that many in our community have made to keep our channel healthy.”*





For others, the beauty of the local landscape is deeply imbued with a personal sense of meaning and identity:

*“Years ago, after surfing at Devereux, I got out of the water and paused. My car was to the east, but the sun was setting around the point to the west. I decided to walk around the point for a view. I was looking down at the sand as I walked around the point. When I looked up and saw the sky stacked on top of the Gaviota Coast, which was stacked on top of the Santa Barbara Channel, I broke into tears. They were tears of gratitude. I realized then how responsible that stack was for the things I like most about myself.”*

Residents who have had to move to North County for affordable living have found new ways to enjoy outdoor recreation, including heading to neighboring counties with more hiking and camping access:

*“I grew up in the San Roque area of Santa Barbara in the 1970s with the Los Padres Forest almost in my backyard. I spent my youth and adult life enjoying miles of accessible trails and open space. Easy access to creation brought me joy. I firmly believe that the easy accessibility to natural surroundings made me the person I am today. When I moved to Orcutt, with its beautiful hills and open space, I envisioned a similar experience for my children. However, for almost 20 years we were restricted from enjoying God’s beautiful creation because there was no access to the local hills and creeks. Recently, many wonderful people fought to create some accessible open space in Orcutt, and now that space is used like you wouldn’t believe! Every day there are hikers, runners, horse riders, bikers, dogs, kids, nature enthusiasts, old people, young people, toddlers, families, solo hikers using the eight miles of trails. More trails were created by the Santa Maria Valley Open Space group, and now we might have about 15 miles of trails. People are coming from out of town to hike our trails because they are just so pretty. The trail volunteers have*

*done an amazing job. But we still have the smallest amount of trails for the largest population in the County. Opening up the land all the way to the ridge line could help Orcutt rival San Luis Obispo as a hiking and recreation destination.”*



Credit: [www.santamariasun.com](http://www.santamariasun.com)

Credit: Lisa Bodrogi

### ACCESS TO PARKS AND TRAILS

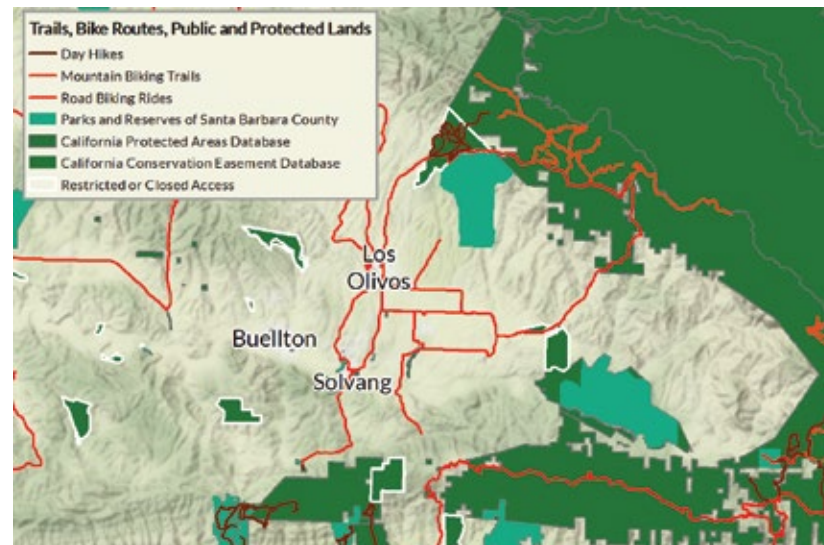
Open space and trail access is an important part of the quality of life Santa Barbarans enjoy. The physical and mental health benefits of access to nature have been well documented,<sup>16</sup> and local ecosystems offer an incredible learning laboratory for students of all ages. Yet access to such spaces in the County varies.<sup>17</sup> There are many perspectives to consider regarding trail access in the County:

**Geographic disparities:** The South Coast offers many open space opportunities within a 5-15 minute drive, but moving north, access becomes more and more limited (see map). In some places, trails exist but accessibility is limited by lack of clear signage and/or poor maintenance (such as the Los Padres access points off of Highway 166). In the last five years, trail access has improved in North County thanks to the efforts of Santa Maria Valley Open Space, and these new trails are in such high demand that the parking lot has already been expanded to accommodate user interest (See also personal story, [Page 76](#)).<sup>18</sup>

**Trail network expansion:** While popular, trail networks have also run into connectivity challenges with trails crossing private lands: public trails on or near ranch lands can pose disturbances for the calving process; trails on or near energy company lands can create good community partnerships, or unwanted legal risk (e.g. exposure to production chemicals). Trail maintenance costs can also be a challenge. Community-led conservation partnerships (e.g. the Trust for Public Land on Ellwood Mesa near Goleta, The Santa Maria Valley Open Space on Orcutt Hill, and the Santa Barbara County Trails Council on Franklin Trail in Carpenteria) have worked creatively to solve challenges and expand access across the County. Access projects that solicit willing participation from landowners and then compensate or incentivize them to provide access to the public have been better received and maintained by the community.

**Socioeconomics of nature access:** Trail access correlates with socioeconomic factors as well. For example, those without cars (often lower income residents and youth) are even more limited in their abilities to access trails, hunting, fishing, and recreation areas. Many Santa Barbara County youth in areas like Lompoc, for example, may live within miles of the beach but have never had the opportunity to touch the ocean, due largely to limitations in transport.

### Trails and Protected Lands (Figure 38)



This map shows trails, mountain and road biking routes, parks, reserves, and public lands in the Santa Ynez Valley. You can explore this further on the [Atlas: Community and the Land - Trails, Bike Routes, Public Land Inset Map](#).

**Species protection and access limits:** Rare and endangered species often occur on or near public beaches and trails, and occasionally this can lead to limitation of access. Beach access may be limited for Snowy Plover nesting, for example, or Tar Plant protection may shut down common recreation trails. Some preservationists would like to see less human disturbance of sensitive habitat, while others find these limitations frustrating, especially in areas where nature access is already limited.

**Agriculture as a bridge:** Local nature educators have observed that those living in areas closely tied to agriculture tend to have a better appreciation for the outdoors than urban residents (residents of Guadalupe vs. Downtown Santa Maria, for example). In addition, farms that offer U-pick, farmstands, CSAs (community supported agriculture), and on-farm tours also offer nature access opportunities to help the community connect with the abundance of the local landscapes.





### Bridging the Access Gap

Recognizing there is a disparity in access, groups such as the Santa Barbara Museum of Natural History, the Guadalupe-Nipomo Dunes Center, Wilderness Youth Project, Nature Track, the Santa Barbara Land Trust, and Boys and Girls Clubs reach out to thousands of youth a year across the County to offer field trips, guided tours, and classroom demonstrations to try to bridge the access gap and offer experiential opportunities to learn about the County's abundant natural resources.

Credit: Tate Larrick



### AT THE EDGE: MANAGING LAND USE BOUNDARIES

Density or Sprawl? That is the question! With increased population and affordable housing challenges in the County, there has been much debate about where and what type of new housing to build. In a 2010 Central Coast Survey, 40% of residents supported low density housing, 33% preferred no development, and only 23% supported high density development (this option received more support in South County).<sup>19, 20</sup> Yet with the realities of population expansion, no growth is not a viable option, and low density housing risks encroaching on wild and/or agricultural land areas. (Avoiding undue sprawl was recognized in the community values earlier in this chapter, [page 69](#)).

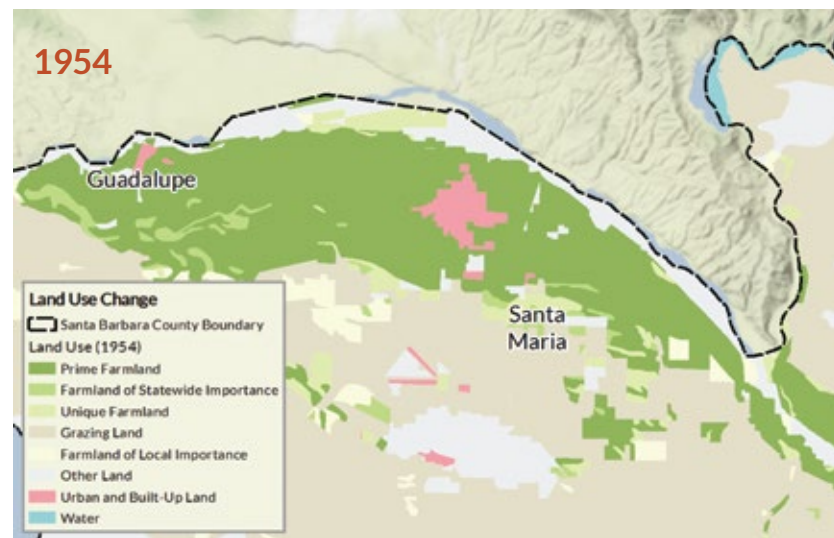
In Blueprint community outreach, infill and/or commercial redevelopment are common suggested options. Some local real estate experts estimate that there are enough infill areas in Santa Maria and areas already slated for development

to meet demand for housing for the next 20-40 years. Others have suggested cluster development which allows for relatively dense housing coupled with communal use of larger open spaces for recreation and habitat connectivity. This approach increases access to outdoor recreation and open space for more segments of the population.

**Urban-Ag Land Boundaries:** The transition zones between urban and agricultural areas can be very thin, leading to challenges for residents, farmers, and the land. Thin buffers can contribute to the spread of invasive species, contamination of local food supplies, restrictions on farmers, and nuisance complaints for normal agricultural operations.

One way this has been addressed in Santa Barbara County is through the Agricultural Buffer Zone Ordinance passed in 2013 establishing a 100 to 400-foot buffer for any new development adjacent to existing agricultural operations. Barriers of native plants and trees act as natural buffers in this example and minimize issues that crop up at the urban-ag land boundary.

#### Land Use Change Over Time (1954-2014) (Figure 39)

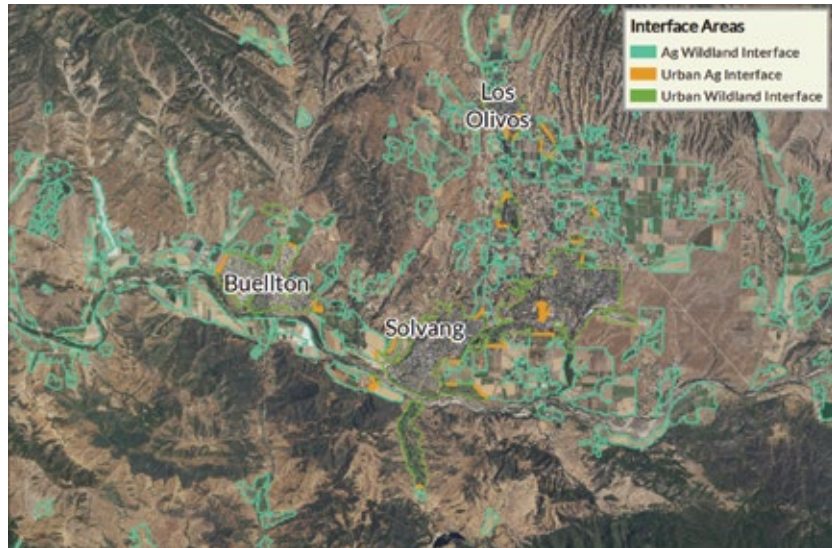


This map shows where development in the Santa Maria Valley since 1954 has replaced active agricultural land in the process.

► You can explore this further on the Atlas: Community and the Land - Land Use Change Inset Map.



## Wildland, Urban, and Ag Interface Areas (Figure 40)



This map shows interface areas for urban, agricultural, and wildland areas across Santa Barbara County. You can explore this further on the Atlas: Community and the Land - Urban, Ag, Wildland Interface Areas Inset Map.

**Urban-Wildland Boundaries:** As development encroaches on wildland areas, it brings new risks to residents and wildlife alike. Increased risks of fire caused by humans, negative wildlife interactions forcing animals to be put down, and erosion/landslide issues become more prevalent and costly as construction and development into wildland areas expands.

In 2017, the County was reminded of the destruction caused by wildland fires: Heavy rains on the Sherpa Fire Scar brought debris flows and mudslides through El Capitan Canyon, and erosion and siltation from the Rey Fire in Lake Cachuma led to erosion and siltation impacts. Though the conversion to grasslands brought by more frequent and even prescribed fires can have benefits for ranchlands, avoiding development in fire-prone areas can help protect housing and maintain the upper watersheds that provide clean and healthy water supplies.

Restoration of native habitat and natural features in and as buffers around urban areas is one positive way to create habitat and open space for residents (though fire risk remains a concern). Pilot projects, such as the North Campus Open Space and surrounding development along UCSB's west campus, are showing co-benefits from native habitat restoration in proximity to urban areas.

**Ag-Wildland Boundaries:** Native habitat buffers can also provide mutual benefits on agricultural lands.<sup>21,22</sup> A recent study mitigating food-safety concerns around hedgerow buffers offers research support for this approach.<sup>23</sup> Certain types of agricultural lands also provide partial habitat/foraging areas for some species within the County (e.g., mammal habitat in orchards; foraging habitat in grain fields for birds of prey). The Santa Barbara Botanic Garden hedgerow pilot project - which aims to enhance native plants, pollinators and insects on farm - offers another example (see page 61-62).



## KEY TAKEAWAYS TO RESILIENCE FOR COMMUNITY AND THE LAND

Potential resilience strategies for community and the land include actions and mindsets that will improve access to and awareness of the County's natural and agricultural resources, such as:

- Improving access to nature, open space, and trails in proximity to urban areas in all portions of the County
  - Fostering more county-level thinking and leadership on development, housing and job creation strategies
  - Increasing ecological literacy, understanding and appreciation of the benefits of co-existing with wildlands in the County
  - Enhancing education and measurement of the economic and social benefits of the local conservation economy and the ecosystems services on which it is based
- Visit [www.sbcblueprint.net](http://www.sbcblueprint.net) for more resources, project highlights, or to share your ideas!

## ENDNOTES

- <sup>1</sup> This section offers a highly abbreviated history focused on land use. For references and a deeper history, explore the work of Walker A Tompkins (Notably: Tompkins, A. 1975. Santa Barbara Past and Present: *An Illustrated History*. Santa Barbara, CA, Tecolote Books.) The Santa Barbara Historical Museum offers many additional resources on local cultural history.
- <sup>2</sup> For a deeper look at the history of the formation of Los Padres and attitudes about land use in the early 1900s, see *Historical Overview of Los Padres National Forest* (1985): Blakley, E.R., & Barnette, K. 1985. *Historical Overview of Los Padres National Forest*. Los Padres National Forest. and *History of Los Padres National Forest* (1972): Brown, W.S. 1972. *History of Los Padres National Forest*. San Francisco, CA.
- <sup>3</sup> Today, the tribe manages the Chumash Casino and hotel on this land, which contributes significantly to area tourism as well as the tribe's ability to reinvest in its own economic growth and cultural heritage. Learn more about the Santa Ynez reservation management, and Chumash history and culture at <http://www.santaynezchumash.org/reservation.html>.
- <sup>4</sup> Using estimates and counts from: United States Census Bureau Data. 1950-2016. Santa Barbara County. Accessed May 2017: <https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml> & <https://www.census.gov/population/cencounts/ca190090.txt>.
- <sup>5</sup> Woodruff, M., & Agarwal, N. 2016. MagnifyMoney: 2016 Housing Affordability Study. Accessed May 2017: <https://tinyurl.com/y8pzmy6n>
- <sup>6</sup> Santa Barbara County Association of Governments. 2013. 2040 Santa Barbara County Regional Transportation Plan and Sustainable Communities Strategy: Environmental Impact Report. Santa Barbara, SBCAG. Accessed May 2017: <https://tinyurl.com/y7pslvlo>



- 7** Bresolyn, B. 2012. Santa Barbara County Regional Growth Forecast 2010-2040. Santa Barbara, SBCAG. Accessed May 2017: <https://tinyurl.com/ybpn65gh>  
This forecast projects a population of 520,000 in 2040. Most recent Census results showed a population of 446,170 in July 2016. (More at <https://factfinder.census.gov/>).
- 8** Santa Barbara County Association of Governments. 2013. 2040 Santa Barbara County Regional Transportation Plan and Sustainable Communities Strategy: Environmental Impact Report. Santa Barbara, SBCAG. Accessed May 2017: <https://tinyurl.com/y7psvlvo>
- 9** Initial public survey input suggests that citizens are most concerned about how this growth will impact water resources, waste and pollution impacts, traffic, and local wildlife habitat (with impacts on housing costs, ag land loss, stress on public services, and pressure for high density housing also of significant concern). Sixty-eight citizens participated in this survey with little control of sampling bias; these findings are heuristically useful but very likely incomplete representations of all views in the County.
- 10** Cal Fire - Fire Resource and Assessment Program. Fire Perimeters 2015. Released 2016. Accessed May 2017: [http://frap.fire.ca.gov/data/frapgisdata-sw-fireperimeters\\_download](http://frap.fire.ca.gov/data/frapgisdata-sw-fireperimeters_download).
- 11** Cappon, S. 2011, November 29. Local hills hold precious resource. *Lompoc Record*. Accessed May 2017: <https://tinyurl.com/y6uhyzq5>
- 12** Using estimates and counts source: United States Census Bureau Data. 2000-2016. Santa Barbara County. Accessed May 2017: <https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml> & <https://www.census.gov/population/cencounts/ca190090.txt>.
- 13** Santa Barbara County State of the Commute. 2015. Santa Barbara County Association of Governments. Accessed May 2017: <https://tinyurl.com/y7cmgdna>
- 14** Zillow Research Data. City Level Data for Median Home Sale Price. Accessed May 2017: <https://www.zillow.com/research/data/#additional-data>.
- 15** Numbers from the latest economic report commissioned by the Santa Barbara County Workforce Investment Board in 2015 were used. Out of 214,100 workers in Santa Barbara County, those in the following categories were considered to be part of the conservation economy: Tourism and Hospitality; Agriculture, Food, and Beverage; and Energy and Environment. Source: Williams, J., & Lehmann, S. 2015. A Workforce Analysis for Santa Barbara County. Santa Barbara County Workforce Investment Board. Accessed May 2017: <https://tinyurl.com/y995yj8k>
- 16** Studies have shown benefits including increased self-esteem, mood, mental performance, social cohesion and trust, reduction in stress and incidence of violence. Many of these benefits are shown not just for access to open space, but also for well-vegetated urban areas. For an overview of some of this vast literature, visit <https://tinyurl.com/y7rsregg> and <http://sac-tree.com/pages/93>.
- 17** According to the 2016 County of Santa Barbara Community Health Assessment, 27% of the population does not live within a half mile of a park, beach, or open space greater than 1 acre. Source: Santa Barbara County Public Health Department. 2016. County of Santa Barbara Community Health Assessment 2016. Santa Barbara, CA. Accessed May 2017: <https://tinyurl.com/yavavpgc>
- 18** Visit <https://www.smvos.org/> to learn more about this active North County project.
- 19** This data was analyzed in: Cleveland, D.A., Copeland, L., Glasgow, G., McGinnis, M.V., & Smith, E.R. 2016. The Influence of Environmentalism on Attitudes Toward Local Agriculture and Urban Expansion. *Society & Natural Resources*, 29(1), 88-103. DOI: 10.1080/08941920.2015.1043081.
- 20** The small public input survey (n=68) conducted as part of this project also supports these findings: When compared with the benefits of open space, scenic views, intact riparian waterways and habitat, over 85% of respondents agreed that preserving urban height restrictions is a very low priority.
- 21** Long, R., & Anderson, J. 2010. Establishing hedgerows on farms in California. UCANR Publications, 8390. Accessed May 2017: <http://ucfoodsafety.ucdavis.edu/files/26499.pdf>.
- 22** Morandin, L.A., Long, R.F., & Kremen, C. 2014. Hedgerows enhance beneficial insects on adjacent tomato fields in an intensive agricultural landscape. *Agriculture, Ecosystems & Environment*, 189, 164-170. Accessed May 2017: <http://ceyolo.ucanr.edu/files/218337.pdf>.
- 23** Karp, D.S., Gennet, S., Kilonzo, C., Partyka, M., Chaumont, N., Atwill, E.R., & Kremen, C. 2015. Comanaging fresh produce for nature conservation and food safety. *Proceedings of the National Academy of Sciences*, 112(35), 11126-11131. Accessed May 2017: <http://www.pnas.org/content/112/35/11126.full.pdf>.
- 24** Visit <https://www.cdph.ca.gov/Programs/OHE/Pages/CCHEP.aspx> to learn about health impacts research and the state's Climate Change and Health Equity program. This webinar series is also an excellent resource for information on climate change and health equity: <http://www.healslo.com/webinar/>.

# CONCLUSION AND APPENDICES



The Santa Barbara County Conservation Blueprint is intended to support a landscape of opportunity – a healthy and resilient landscape where residents and visitors can enjoy both the economic and environmental benefits that this County is capable of providing.







## CONCLUSION

The Blueprint report highlights what makes Santa Barbara County such a special place for all species, including our own. It also highlights the various pressures on the quality of life of residents and the hundreds of endemic species that call this place home: human population growth, political and regulatory tensions, housing challenges, climate change, variable water resources, and the challenges of sustaining habitat, rangelands, and farmlands. The County's special qualities are not guaranteed to remain in the future without strategic collaboration to conserve the County's character and enhance the well being of those who live in this unique ecosystem.

At its heart, the Santa Barbara County Conservation Blueprint is intended to support a landscape of opportunity – a healthy and resilient landscape where residents and visitors can enjoy both the economic and environmental benefits that this County is capable of providing. Reflecting back on the work and learning that went into the creation of this report, the following reflections on what resilient conservation may look like for Santa Barbara County stand out:

- **Valuing ecosystem services.** A deeper understanding of the value of nature's goods and services for smarter protection and enhancement of the value of these services will be more and more important in the years to come.
- **Emphasizing landscape connectivity.** A focus on preserving the economic and biological integrity of land by avoiding parcelization of wildlands and farmlands is a critical aspect of creating a landscape of opportunity.

■ **A multi-benefit mindset.** Opportunities are amplified when we seek and support projects and activities on the landscape that provide multiple beneficial uses for people, flora and fauna, shared water resources, and long-term environmental health.

■ **Community commitment.** The genuine interest, will, and commitment of those who live and work in this County form a foundation of hope – the long-term viability and integrity of working and natural lands in the County is in our hands.

Through the Blueprint development process, it also became apparent that the best means for achieving resilient conservation in Santa Barbara County is for all residents to expand their thinking beyond local community resource concerns to the County as a whole, the ecosystem services on which we depend, and the perspectives of the other people and creatures with whom we share this home. Ultimately, resilient conservation requires understanding the nuances and finding balances. We hope that this Blueprint report and the online Atlas provide the information and tools needed to support broader regional thinking, dialogue, and partnerships.

## WHAT'S NEXT?

Though this report is a static document, together with the online interactive Atlas and ongoing community engagement, the Blueprint project offers a shared language, data platform, and starting place for much-needed conversations about nuanced tradeoffs the County faces today affecting the quality of life of all future inhabitants.

## THOUGHT EXPERIMENT

'Thought experiment' questions are great ways to kick-start conversations about the content of this report.

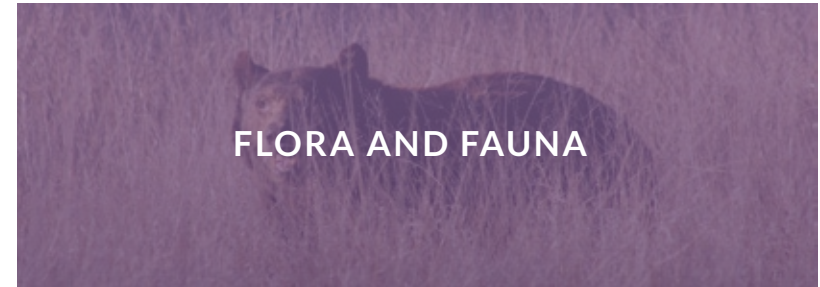


### WATER RESOURCES

As a fast-changing industry vulnerable to climate impacts, it is not a given that agriculture will always remain a dominant economic force and land use in the County. What might be the ecological, economic, and cultural impacts of losing part of our agricultural heritage?

Similarly, with current population, industry, and climate trends, many species that define the Santa Barbara landscape may no longer thrive in the County. What would be the impacts of losing riparian species to the local ecology, economy, and culture?

- **What sorts of voluntary multi-benefit projects and strategies might help maintain the diverse character of Santa Barbara County into the future?**
- **What sorts of education and communication projects might help improve the way Santa Barbara County approaches these challenges?**
- **How could the Blueprint project support such solutions?**



### FLORA AND FAUNA

Driven by threat of habitat loss and land use change, species protection in America is accomplished primarily through species-by-species and even specimen-by-specimen approaches. While the approach has helped to protect many threatened and endangered species, many on-the-ground conservation efforts show unintended impacts that can actually hinder conservation goals (see page 61 for more). Shifting the focus of conservation efforts to a regional level could help reframe both goals and strategies, and bolster new partnerships to support the suite of species that inhabit this region.

- **How could regional planning for conservation create better win-wins for humans and other species?**





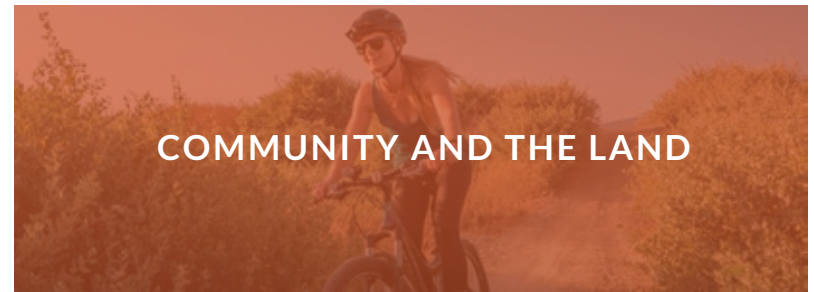
## AGRICULTURAL AND RANCLANDS

A recent analysis of Santa Barbara County resident survey results showed the following somewhat surprising findings about the classic ‘agriculture versus environment’ or North/South County divide:

Those with stronger environmental views support local agriculture over development and urban buffers around new housing developments to protect farms (they are also sensitive to environmental impacts of agriculture).

The study<sup>14</sup> also found that County residents in both northern and southern Santa Barbara County leaned toward pro-environmental views, and a majority in both regions support not building on or fragmenting agricultural land. (Those in North County strongly supported the ‘don’t build’ option, whereas South County was split between this and a ‘build up’ (i.e. high density development) option. Neither support ‘build out’ policies.)

- **What opportunities are created when shared interests throughout the community are considered in keeping agricultural lands in production?**
- **Could this be a jumping off point for community dialogue on how to support shifts in attitudes and policy that might better allow agriculture to respond to ever changing pressures?**



## COMMUNITY AND THE LAND

Santa Barbara County is strong in regional affiliations and mindsets - many residents identify more with an area within the County rather than the County itself (e.g. Guadalupe, Santa Maria, North or South County). While locally sourced community identity is wonderful in many ways, it can have drawbacks when it comes to working together toward larger shared interests. Take traffic, for example: Nearly everyone in the County would like to avoid increases in traffic, but solutions to traffic congestion require thinking systemically at the County level. Land development policies in one area can impact workforce housing and traffic trends across the County.

- **What other examples of county-level impacts of local decisions come to mind?**

On the flip side, county-level thinking without understanding local situations can lead to counterproductive outcomes as well. Regulation of a species that is rare in some areas of the County but common in others is a common example.

- **Do you tend to think more at the local or bigger picture scale?**
- **Do you tend to think more at the neighborhood level or at a larger regional scale?**

## Here are some important actions you can take to stay involved:

1

Visit the online Atlas to explore the data behind the points that have been touched on in this report, and much more: <https://sbcblueprint.databasin.org>. Appendix C is a good starting place for learning more about this significant public resource.

2

Visit <http://www.sbcblueprint.net> to sign up to stay informed of follow-up events and project developments and to explore additional resources.

3

Help spread the word about this new community resource! Using this report and the [online Atlas and tutorials](#), you can:

- Share the report and Atlas with friends and colleagues.
- Host a conversation about the tough choices the County faces.
- Develop a Blueprint-based project or learning experience.
- Ask questions, get help setting up a training, or share stories about how you are using the tool by contacting [info@sbcblueprint.net](mailto:info@sbcblueprint.net).

There are complex and challenging choices ahead, and varying views on the best pathways forward. But Santa Barbara County's residents have more common values than divergent views when it comes to conserving what makes this area such a tremendous place to live, work, visit, and enjoy. Each of the hundreds of people who contributed to the Blueprint development process deeply care about Santa Barbara County – creating a landscape of opportunity for generations to come is within our collective grasp. Ultimately, it is up to the citizens of Santa Barbara County to bring forth the bold leadership, vision, and creative partnerships needed to achieve just that.



## APPENDIX A: GLOSSARY

**Aquifer:** An aquifer is a body of rock or sediment that yields significant amounts of groundwater to wells or springs.

**Areas of Interest:** In this report, this term refers to geographic regions identified using the EEMS (environmental evaluation modeling system) framework that show higher quantities of resources within one of the report theme areas (Water Resources, Flora and Fauna, Agricultural and Ranch Lands, or Community and the Land). For more on the EEMS model, see Appendix C.

**Affordable Housing:** Santa Barbara and the United States Department of Housing and Urban Development define affordable housing as housing for which an occupant pays no more than 30 percent of his or her income for gross housing costs, including utilities.

**Beneficial Uses:** Beneficial uses are one of many ways that water can be used either directly by people or for their overall benefit, and are defined by the State Water Quality Control Board. These uses vary from cold freshwater habitat, to navigation, to agricultural uses of water.

**Biodiversity Hotspot:** A biodiversity hotspot is a defined geographic area with over 1500 vascular endemic plants (plant life found nowhere else) and 30% or less of its original habitat intact. The California Floristic Province counts as one of these hotspots due to the high diversity of plants it encompasses and the large conversion of areas such as the Central Valley and urban centers such as the Bay Area and the Los Angeles Basin.

**Climate change:** A departure from normal variability in climate factors, such as precipitation and temperature.

**Community:** All human members, workers, and residents within the Santa Barbara County area.

**Conservation:** Actions relating to the preservation, restoration, or protection of natural environments, ecosystems, and wildlife.

**Conservation Economy:** The portion of the economy that is dependent on the health of landscapes and ecosystem services. In Santa Barbara County, this includes recreation, environmental nonprofits and conservation labor, ecotourism, and agriculture.

**Desalination:** Desalination is the removal of salts from saline water to provide freshwater.

**Ecosystem Services:** The direct and indirect benefits from services naturally provided by the environment from which human beings and other organisms benefit.

**Ecosystems:** A community of different interacting organisms and their physical environment.

**Ecotones:** Transitional zone where one habitat (grassland) mixes with another habitat (scrubland).

**Endemic Species:** Species that are unique to a defined geographic location such as within a county, region, or state, and are not found anywhere else.

**Groundwater:** Groundwater is a component of the hydrologic cycle where water (in any form - water vapor, liquid, or ice) is found beneath the earth's surface. Groundwater and surface water are connected physically in the hydrologic cycle. For example, at some locations or at certain times of the year, water will infiltrate the bed of a stream to recharge groundwater. At other times or places, groundwater may discharge, contributing to the base flow of a stream. Changes in either the surface water or groundwater system will affect the other, so effective management requires consideration of both resources.

**Groundwater Basins:** A groundwater basin is defined as an alluvial (formed by sand, silt, clay, or gravel) aquifer or a stacked series of alluvial aquifers with reasonably well-defined boundaries in a lateral direction and a definable bottom. A watershed is determined by local topography (e.g. ridges, slopes, and river valleys), whereas a groundwater basin is determined by the underlying geology that shapes underground water storage formations.

**Headwaters:** The source and upper reaches of a watershed.

**Intrinsic Value:** The essential or naturally occurring value held by an object, life form, or system.

**Invasive Species:** Species that are not native to a geographic area and whose introduction has caused or is likely to cause harm to ecosystem functions or human health.

**Microclimates:** The climate of a small geographic area including valleys, small watersheds, or riparian systems that have climates drastically different from others due to the amount of sunlight hitting an area, the moderating influence of the ocean, or other atmospheric or topographic factors.

**Multi-Benefit:** Processes, projects, or areas on the landscape that address multiple human and ecological needs.

**Native Species:** Native species in Santa Barbara County are those that were present historically before European settlement in the region. Functionally, native species are species of flora and fauna that are found naturally within an ecosystem and geographic area that have evolved to live within the soils, climates, and disturbances inherent to that specific geographic areas.

**Open Space:** Land that is largely undeveloped and accessible to the public for recreation and outdoor activities.

**Recharge:** Recharge is the term used to describe the process of excess surface water permeating into a specific aquifer or groundwater basin.

**Recycled Water:** Recycled water is used more than one time before it passes back into the natural hydrologic system. This can include the reuse of discharge water from agricultural operations, commercial operations, or wastewater.

**Reservoir:** A pond, lake, or basin, either natural or artificial, for the storage, regulation, and control of water.

**Resilience:** The ability of an area, community, or species to withstand stresses to a greater degree (i.e. be more resistant) or recover from stresses more rapidly (be more resilient) than other areas, communities, or species.

**Restoration:** Actively or passively returning a system to its former natural state or a state that is desired to produce ecological benefits.

**Riparian Systems:** Areas immediately surrounding river and stream systems including vegetation on the banks of these systems and the floodplains that are part of the active river channel.

**Small Farms:** The United States Department of Agriculture defines a small farm as one that produces and sells between \$1,000 and \$250,000 per year in agricultural products.

**State Water Project:** The California State Water Project is the nation's largest state-built water and power development and conveyance system. It includes facilities—pumping and power plants; reservoirs, lakes, and storage tanks; and canals, tunnels, and pipelines—that capture, store, and convey water to 29 water agencies across the state from Lake Oroville to San Diego.

**Subsidence:** When groundwater is extracted from some aquifers in sufficient quantity, compaction of the fine-grained sediments can cause a loss in elevation of the land surface, commonly referred to as subsidence.

**Surface Water:** Surface water is a component of the hydrologic cycle where water (in any form - water vapor, liquid, or ice) is found above the earth's surface, but not within the atmosphere. Surface water and groundwater are connected physically in the hydrologic cycle. For example, at some locations or at certain times of the year, water will infiltrate the bed of a stream to recharge groundwater. At other times or places, groundwater may discharge, contributing to the base flow of a stream. Changes in either the surface water or groundwater system will affect the other, so effective management requires consideration of both resources.



**Threatened and Endangered Species:** Species listed by the California Department of Fish and Wildlife or the United States Department of Fish and Wildlife due to loss of available habitat, low population numbers, and a high likelihood that they may be lost as a species without intervention and direct action. Threatened species are at risk of becoming endangered, and endangered species are at risk of extinction throughout all or a portion of the species range.

**Topography:** The natural and non-natural features of a landscape including relief, aspect, and elevational gradients.

**Transition Zones:** Sometimes called 'ecotones', ecological transition zones are the areas where two ecological communities or ecosystem meet and integrate.

**Water Rights:** The rights for an entity/person to use a specific amount of surface water or groundwater. These rights in California are often based upon prior and continued uses of water and access to

surface water/groundwater. Groundwater usage is unregulated in California except where local agencies issue permits or in adjudicated basins that have gone through allocation by court proceedings.

**Watersheds:** A watershed is the area of land where all of the water that falls in it and drains off of it goes to a common outlet. Watersheds vary in size, and are determined by local topography (e.g. ridges, slopes, and river valleys), whereas a groundwater basin is determined by the underlying geology that shapes underground water storage formations.

**Wildlands:** Lands not actively managed or cultivated by humans in any way.

**Working Lands:** Lands managed by humans for the production of commodities (food, fiber, and other materials), including farmland, rangeland, and timberland.





## APPENDIX B: EXPERT AND COMMUNITY ENGAGEMENT PROCESS

The Blueprint project was designed and funded to involve community engagement at every step. The founding partners (Land Trust for Santa Barbara County, the Santa Barbara Foundation LEAF Initiative, and the Cachuma Resource Conservation District), with project design consultation from LegacyWorks, designed a two-year process of expanding levels of community engagement. Every step involved learning about and refining the project's goals and potential as a public resource: Nothing like the Blueprint has ever been done in the County before!

The selection and recruitment of the project Steering Committee in early 2015 was an essential first step in the process, as the Steering Committee helped sharpen project goals and guide the next layer of community engagement - expert interviews. During their interviews, these experts were asked to suggest additional names for outreach. Additional interviews were conducted through early 2017; three focus groups were held in fall of 2016 followed by targeted input meetings with sector leaders in environmental conservation, agriculture, energy (wind, solar, oil, and gas) and real estate development; an online survey ran from fall of 2016 until April 2017, and two public input meetings were held in April 2017. By the end of the report development process, over 300 people had been

directly invited to participate in the Blueprint report and Atlas input process, as well as uncountable numbers reached via the project website, partner listservs, Facebook, and media advertisement announcements. Ideally, the community engagement with the project only increases after its launch, as Santa Barbara residents come together to explore ways to use the Blueprint to better understand, talk about, and manage shared resources.

### The Steering Committee

The committee was selected to represent diverse interests and leadership within the County with regard to land and resource management. It is comprised of 13 landowners and thought leaders from across the farming, ranching, conservation, academic, and resource management communities in the County. These people, listed on the following page, donated dozens of hours of their time to help steer the goals, content, and tone of the project, and to help the project management team connect with other community leaders and experts. They have been a central and crucial component of ensuring this report accurately and carefully represents the diversity of community perspectives on sensitive topics related to resource and land use in the County. Five of the members, are also on an 'executive team' of project founders; this group met every few weeks for the last two years to help guide project management.





## The Steering Committee Members:

\*Executive Committee

### \*Anne Coates

Former Executive Director, Cachuma Resource Conservation District

### Frank Davis

Professor, Bren School of Environmental Science and Management

### Pamela Doiron

Rancher, The Spanish Ranch

### Kim Kimbell

Attorney / Partner, Allen & Kimbell, LLP

### \*Sharyn Main

Senior Director of Community Investments, LEAF Initiative, Santa Barbara Foundation

### Andy Mills

Cattle Rancher and State Director, Santa Barbara County Cattlemen's Association, Stewardship Director, California Rangeland Trust

### \*Anna Olsen

Executive Director, Cachuma Resource Conservation District

### \*Greg Parker

Principal, Investec Real Estate Companies and President Board of Trustees of The Land Trust for Santa Barbara County

### Matt Roberts

Rancher and Director of Parks and Recreation, City of Carpinteria

### Randy Sharer

Farmer and Owner, Sharer Brothers Farms

### Paul Van Leer

Farmer and Ranch Manager, Las Varas Ranch

### Steve Windhager

Executive Director, Santa Barbara Botanic Garden

### \*Chet Work

Executive Director, The Land Trust for Santa Barbara County



Photo: Blueprint Some of the Blueprint Steering Committee members on a tour of Las Varas Ranch, June 2016

## Topic Expert Interviews

The development of each chapter began with a series of extended one on one and small group interviews with key topic experts and community leaders to learn more about local trends, community concerns, data resources, and to vet and user-test the growing selection of Atlas datasets. These interviews, conducted throughout 2016 and early 2017, provided crucial nuance on complex issues within the County, as well as access to data sources and research. Roughly 50 topic experts were contacted for interviews, and over 40 were able to offer their time, including:

**Mary Bianchi** - County Director, University of California Cooperative Ext. Santa Barbara County

**Lisa Bodrogi** - Agriculture Land Use Planner, Cuvée Connections, Inc.

**Derek Booth** - Adjunct Faculty, Geology, Geomorphology at UCSB

**Teri Bontrager** - Executive Director, Santa Barbara County Farm Bureau

**Jim Bray** - Public & Government Relations Consultant

**John Campanella** - President, BDC Homes, Santa Barbara City Planning Commissioner

**Russ Chamberlin** - Rancher, Chamberlin Ranch

**Paul W. Collins** - Curator of Vertebrate Zoology, Santa Barbara Museum of Natural History

**Jeremy Deming** - Executive Director, Boys & Girls Clubs of Santa Maria Valley

**Daniel Duke** - BayWa .r.e renewable energy

**Ezaree Erickson** - BayWa r.e. Wind, LLC

**Sue Eisaguirre** - Founder and Executive Director, Nature Track

**Tom Fayram** - Deputy Director, Santa Barbara County Public Works, Water Resources Division

**Joshua Franklin** - Senior Developer, BayWa .r.e Wind, LLC

**Mauricio Gomez** - Director, South Coast Habitat Restoration

**Debra Geiler** - Partner, Conservation Land Group

**Jane Gray** - Board Member, Central Coast Regional Water Quality Control; Regional Planner/Project Manager II, Dudek

**Matt Guilliams** - Ken and Shirley Tucker Plant Systematist/Curator of the Clifton Smith Herbarium, Santa Barbara Botanic Garden

**Mark Holmgren** - Biologist, Former Curator/Director at Cheadle Center for Biodiversity and Ecological Restoration (UCSB)

**Lawrence E. Hunt**, Consulting Biologist, Hunt & Associates Biological Consulting Services

**Doug Jenzen** - Executive Director, Dunes Center

**Denise Knapp, PhD** - Director of Conservation and Research, Santa Barbara Botanic Garden

**Jeff Kuyper** - Executive Director, Los Padres ForestWatch

**John Labonte** - President & Senior Biologist, Wildlands Conservation Science

**John Lowrie** - Assistant Director, Dep. of Conservation, Div. of Land Resource Protection

**Jon Martin** - Principal, M3 Multifamily

**Tom Martinez** - Santa Maria Valley Sportsmen Association & Hunter Safety Class Instructor

**Kevin Merrill** - Treasurer, Santa Barbara County Farm Bureau (Former President); Manager, Mesa Vineyard Management

**Nicole Molinari** - Southern Province Ecologist, United States Forest Service

**Max Moritz** - Fire Ecologist, University of California Cooperative Extension/UC Berkeley

**Detty Peikert** - Principal, RRM Design Group

**Susan Perrell** - Environmental Advisor, Aera Energy LLC

**Jeff Rodriguez** - District Conservationist, Natural Resources Conservation Service

**Amy Roth** - Public and Government Affairs Director, E&B Natural Resources

**Ed Seaman** - Wild FarmLands Foundation, Restoration Oaks Ranch and Santa Barbara Blueberries

**Heather Schneider, PhD** - Rare Plant Biologist, Santa Barbara Botanic Garden

**John Storrer** - Storrer Environmental Services, LLC

**Brian Trautwein** - Environmental Analyst & Watershed Program Director, Environmental Defense Center

**June Van Wingerden** - Ocean Breeze Farms; Director, Carpinteria Valley Water District

**Craig Zimmerman** - President, The Towbes Group, Inc.



## Focus Groups

Targeted focus groups were conducted in fall of 2016 to engage additional experts and leaders who were not previously interviewed for the project. Fifty-three people were invited to focus group meetings, and 20 attended one of three meetings in the Santa Barbara and Santa Maria areas, as listed below. Focus group attendees helped the project team refine education and outreach materials about the project, helped develop priorities for feature maps for each major theme in the Atlas and Report, and helped refine the draft community values statements into the versions shared via the public input survey.

Focus group participants included:

**Jose Baer** - ASFMRA accredited Consultant and Farm Manager, Oso Ag LLC and Rancho La Vina

**John Bowden** - Rancho Guacamole

**Ron Caird** - Por La Mar Nursery Inc.

**Doug Campbell** - Coastal Ranches Conservancy

**Ashley Costa** - Executive Director, Lompoc Valley Community Healthcare Organization

**Beverley Cossart** - GavPAC Member

**Stacey Otte-Demangate** - Executive Director, Wildling Museum of Art and Nature

**Ken Doty** - Ellwood Ranch, Inc.

**Charles Hamilton** - Former General Manager of the Carpinteria Valley Water District

**Lawrence E. Hunt** - Consulting Biologist, Hunt & Associates Biological Consulting Services.

**Bradley Miles** - Miles Family Farm

**Anna Olsen** - Regional Coordinator, CivicSpark

**Ben Pitterle** - Watershed and Marine Program Director, Channelkeeper

**Pedro Paz** - Program & Evaluation Manager, First 5

**Alex Posada** - Recreation and Parks Director, City of Santa Maria

**Tim Robinson** - Sr. Resources Scientist, Cachuma Operation and Maintenance Board

**Shannon Sweeney** - Water Resources Manager, City of Santa Maria

**Gunner Tautrim** - Orella Ranch

**Bob Wilkinson** - Adjunct Professor, Bren School of Environmental Science and Management

**Steph Wald** - Watershed Projects Manager, Central Coast Salmon Enhancement





Photo: Public Preview and Input Meeting at the Santa Barbara Library, April 18, 2017



## Public Survey

Sixty-eight people filled out the online public survey, which asked for input on the draft community values, priorities about land management under pressures of a growing population, and personal stories of their relationship with the local landscape. Some of these stories and data points are featured in this report, and survey comments were used to vet the findings from all the prior input opportunities. However, due to low sample size and sampling bias, quantitative survey data is included only at a heuristic level.

## Public Preview and Input Meetings

Thirty-five people attended the Santa Barbara evening meeting, and 30 attended the next evening in Santa Maria. Participants were given a preview of the key themes and discussion points for each chapter, and given a tour of the live Atlas and some key maps of interest. They were asked to share what interested them about the presentation and project, how they might see it being used, what may have been missed by the project team, and what advice they'd give the Blueprint team in carrying the project forward once fully launched. These comments were carefully recorded and used to refine the draft content of this final report. The advice collected for moving forward with the project is being used to help design the public communications plan for the ongoing education, outreach, and engagement with the Blueprint and Atlas as data and dialogue tools.

## What We Heard

The input gathered through expert and community engagement form the meat of the Blueprint report. The key learnings summarized in the introduction (pages 10-11) were each reflected repeatedly from community members through these various input processes. Agricultural representatives, for example, consistently expressed great concern about additional regulation that might stifle their ability to manage land for ongoing agricultural use, and shared examples of how regulation has stifled on-farm conservation activities. This theme was echoed by many conservationists who emphasized the importance of preserving agricultural lands for long-term habitat protection. The theme of lack of access to nature (in North County especially) was repeated by many as well, with the reminder that per capita trail

access in the County highly favors those on the South Coast. The challenge and impacts of increasing housing costs and the commuter-culture impacts of strict zoning restrictions in Santa Barbara City was another common theme. Interest in data on wells and groundwater recharge was common. The importance of riparian areas as habitat and migration corridors for species under climate change came up many times as well, as did interest in the impacts of climate change, particularly on weather patterns and coastline erosion. This is only a small sampling of common themes, as most of them are well represented within the report.

There were a few themes suggested by the public that are not well covered in this report due to space and scope constraints. These include: causes and effects of air and light pollution; maritime data, beach designations, and a discussion of ocean conservation issues; labor challenges for agriculture; pesticide use; permaculture practices; marijuana production; urban flora and fauna issues; species-specific datasets; data on dog parks, senior citizen resources, and wildlife refuge centers; fracking. Many of these topics are touched on in datasets in the online Atlas, which number in the hundreds, and will continue to be expanded over time. Suggestions that fell in the category of "prescriptive" recommendations toward a particular action on a local resource issue were not included, but the issues raised were included in chapter discussion themes when within scope.

Finally, the public offered some excellent input on how to move this project forward now that the report is written and the Atlas is an interactive online resource. There were many wonderful suggestions for a next phase of the project, funding allowing, such as: developing educational curriculum around the Atlas resource for K-12, college, graduate, and adult education courses; training local librarians and/or volunteer Blueprint ambassadors to support citizens in using the tool; running a resource challenge contest for answering local conservation questions using the tool; and ongoing social media engagement and workshop training opportunities to keep reminding citizens of the resource. Please follow and continue to provide input into how the Blueprint develops at [www.sbcblueprint.net](http://www.sbcblueprint.net).

### ATLAS INTRODUCTION, DATA COLLECTION METHODOLOGY, AND EEMS MAP VIEWER TUTORIAL & METHODOLOGY

The Atlas is a platform for community members to easily access high-quality maps, datasets, and information about land use and resources in Santa Barbara County. This platform is part of a larger system called Data Basin that is focused on providing access to credible data, social networks, and decision-support tools. When you are on the Atlas, if you ever need help please use the 'Get Started' tab on the very left of the page for videos and detailed explanations on how to use the Atlas and Data Basin as a whole.

On the Atlas, you will find Guides and Case Studies, Galleries, Maps, and Datasets (descriptions at right). You can use some features of the Atlas without creating an account, but to benefit from the full functionality, you will need to first create an account. To create an account, you can simply click on the 'Sign Up' link at the top right of the page. As a user, you can create your own Maps, import your own Datasets, and create your own Galleries. You can save, edit, and share anything you create as part of your own account, and you control whether your maps and information are public, shared with only a few others, or private. You can also save any map you make as a .pdf or .ppt slide. Additionally, you can create a group with other users on the Atlas and on Data Basin to collaborate on specific topics, geographic areas, or projects.

#### View the Atlas Resource:

<https://sbcblueprint.databasin.org/>

#### See Detailed Atlas Tutorial:

<https://sbcblueprint.databasin.org/pages/sb-atlas-tutorial>

### Descriptions:

**Guides and Case Studies** - Guides and Case Studies are summaries and interpretations of research methods, models, and scientific results. Guides and Case Studies are written by Conservation Biology Institute staff, invited guests, and engaged Data Basin members. Guides and Case studies are intended to provide examples of how key conservation datasets, maps, galleries, and supporting information are being put to use to improve the well-being of people, wildlife, and landscapes.

**Galleries** - Galleries are created by members to easily showcase and share spatial information as a cohesive collection. They are very useful for creating a digital Atlas, for organizing a set of related datasets and maps, or providing a diverse collection of resources on a particular topic.

**Maps** - Maps are member-created dynamic web visualizations of spatial information, including datasets, drawings, and basemaps. They can be used to easily combine information and tell a story about a place or topic. Maps can be exported to a pdf, image, or powerpoint.

**Datasets** - Datasets are member-uploaded spatial information, typically created using GIS. They can be visualized and analyzed using mapping tools in Data Basin, and downloaded for use in desktop GIS software. Datasets include shapefiles, ArcGRID files, ESRI File Geodatabases, NetCDF files, and csv files. Most datasets can be overlaid, styled, analyzed, and downloaded.



# SANTA BARBARA COUNTY CONSERVATION BLUEPRINT ATLAS

Search by keyword or location 

powered by DATA  BASIN

ABOUT

EXPLORE

CREATE

COLLABORATE

MY WORKSPACE

The Atlas is a platform for community members to easily access high-quality maps, datasets, and information about land use and resources in Santa Barbara County.



What is the Santa Barbara County Conservation Blueprint Atlas?

What is the Santa Barbara County Conservation Blueprint?

How do I start exploring?

What else can I do?

## Explore by theme



Water Resources



Climate



Ag and Ranch Lands



Community and the Land



Flora and Fauna



General

## Explore by watershed

Click on a watershed in the map below to access more data in that area.



## SANTA BARBARA COUNTY CONSERVATION BLUEPRINT ATLAS

Search by keyword or location

powered by DATA BASIN

ABOUT

EXPLORE

CREATE

COLLABORATE

MY WORKSPACE

SANTA BARBARA ATLAS | DATASETS | GROUNDWATER RECHARGE AREAS



### Groundwater Recharge Areas

Uploaded by Conservation Biology Institute

Oct 25, 2016 (Last modified Apr 17, 2017)

Download...

Open in Map



#### Description:

This data layer shows areas that were determined to be of groundwater basin recharge potential within Santa Barbara County.

The recharge zone analysis used GIS layers representing two main criteria (groundwater depth and hydrologic soil type) to determine areas of high, medium and low recharge potential. Recharge potential characterized through previous studies of groundwater basins was incorporated into this analysis when possible. It should be noted that the Figure represents a high level analysis and that a more detailed site specific analysis would need to be conducted prior to selecting any site for a recharge facility.

Data was provided by RMC Water and Environment, pulled from the Long Term Supplemental Water Supply Alternatives Report created for the Santa Barbara County Water Agency.

The dataset was clipped to a buffered boundary of Santa Barbara County, California.

#### Details Data Layers (2)

##### Data Provided By:

RMC Water and Environment; County of Santa Barbara

##### Content date:

2015

##### Contact Organization:

RMC Water and Environment

##### Contact Person(s):

 Dustin Pearce


 This dataset is visible to everyone


Dataset Type:  Layer Package

##### Tags:

california, santa barbara, groundwater recharge

 Downloaded by 1 Member

 Bookmarked by 1 Group

 Included in 2 public maps, 3 private maps



## Spatial Data Collection Methodology

Spatial data collection in this process was guided primarily by the availability of public datasets from local, state, and federal agencies, including university staff, researchers, and other non-agency sources. Each Atlas theme area (*Water Resources, Flora and Fauna, Agricultural and Ranch Lands, Community and the Land, and Climate*) was evaluated to determine the priority datasets needed on the Atlas, with initial review and input from the Steering Committee. After this first pass of prioritization and uploading of datasets was conducted internally, input from the individual interviews, focus groups, surveys, and the public input meetings were used to prioritize and identify additional data acquisition and upload.

Each dataset uploaded on the Atlas by this process includes a description of the dataset, information on who provided the dataset, and a source for who to contact about the data directly. Where possible, additional information is also provided, such as links to the original dataset, where it was accessed online, report attachments, and other detailed metadata on the production of the data itself. If there is not a contact person given for a particular dataset, please contact [info@sbcbblueprint.net](mailto:info@sbcbblueprint.net) to find out more information.

Data will continue to be updated on the Atlas over time as new datasets are released from the original data sources or from new sources. This will happen quarterly to twice a year. If there are any questions or if there is a new dataset that has come out that has not been uploaded to the Atlas, please contact [info@sbcbblueprint.net](mailto:info@sbcbblueprint.net) to inquire about the status of the data.

If you have any further questions about the data or how to use the Atlas, please see our detailed tutorial below and visit the Blueprint website and FAQ page for more information: <http://sbcbblueprint.net/-faq/>. If your Data Basin related questions are not answered there, you can also email support directly at [databasin@consbio.org](mailto:databasin@consbio.org).

## EEMS Model Methodology and EEMS Explorer Tutorial

All EEMS Map results seen in this document were produced using the EEMS (Environmental Evaluation Modeling System) framework.<sup>1</sup> EEMS is a software tool and framework developed by the Conservation Biology Institute for modeling spatial data that allows for integration and comparison of widely varying data types. EEMS is used to meet a variety of challenges, outlined in the “Mapping Multi-benefits of the Landscape with EEMS” section of the introduction (page 13), and summarized here. EEMS features include:

- the ability to compare “apples” and “oranges” (different types and themes of data layers),
- a way to let people “look under the hood” (be able to view the data that were combined, and how this was done), and
- representing community and expert input in a “descriptive, not prescriptive” synthesis of data.

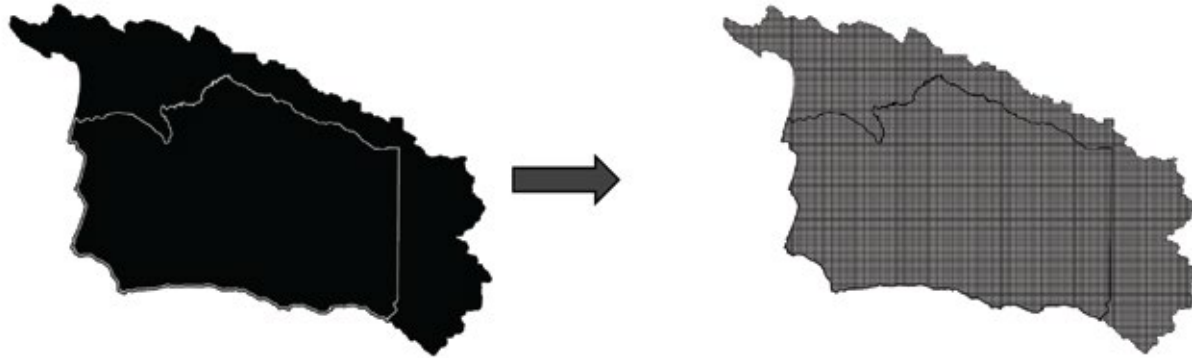
### How is this analysis performed?

First, the Conservation Biology Institute data team creates a simple diagram where each box represents an individual data layer, and arrows indicate how they are combined. This is a “logic model” and is shown below for each theme (e.g. Water Resources, Agricultural and Ranch Lands, etc.).

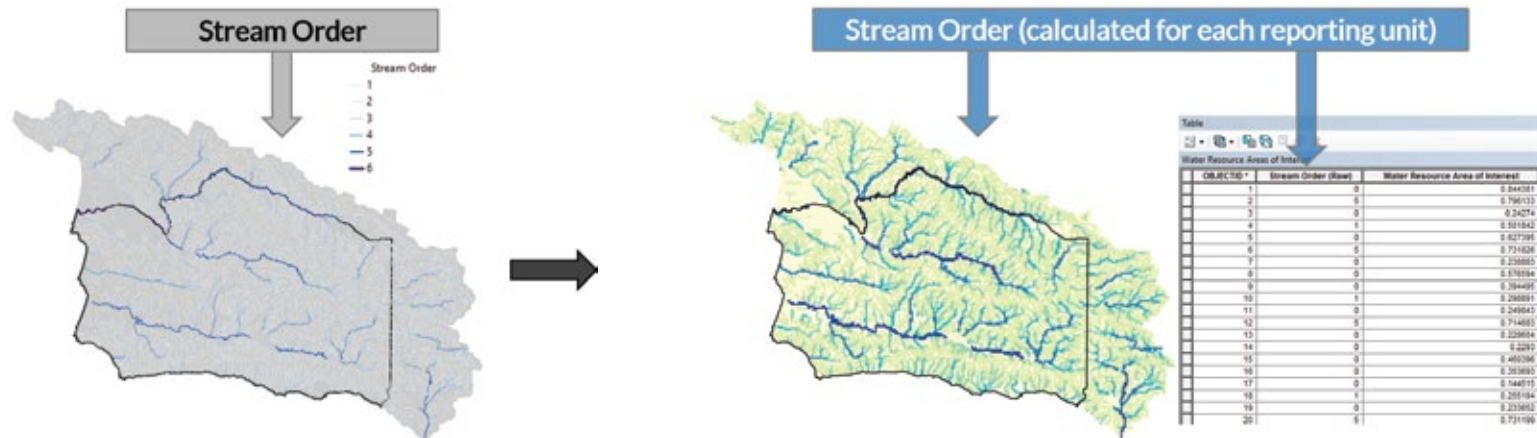
They then process the input data so it can be combined with other input data layers. This is done by first creating a map of 100-acre square reporting units. Here is an example of a study region getting divided into reporting units (see Figure 41, following page):

## APPENDIX C: ATLAS TUTORIAL

### Study Region Divided Into Reporting Units (Figure 41)



### Stream Order Per Reporting Unit (Figure 42)



Input data on the left (stream order) is processed into the reporting units on the right by calculating the maximum value within each reporting unit, and is placed within the Stream Order (Raw) column of the data attribute table.

<sup>1</sup> Sheehan, T., & Gough, M. 2016. A platform-independent fuzzy logic modeling framework for environmental decision support. *Ecological Informatics*, 34, 92-101. Accessed May 2017: <https://d2k78bk4kdhbpr.cloudfront.net/media/publications/files/SheehanAndGough2016.pdf>.

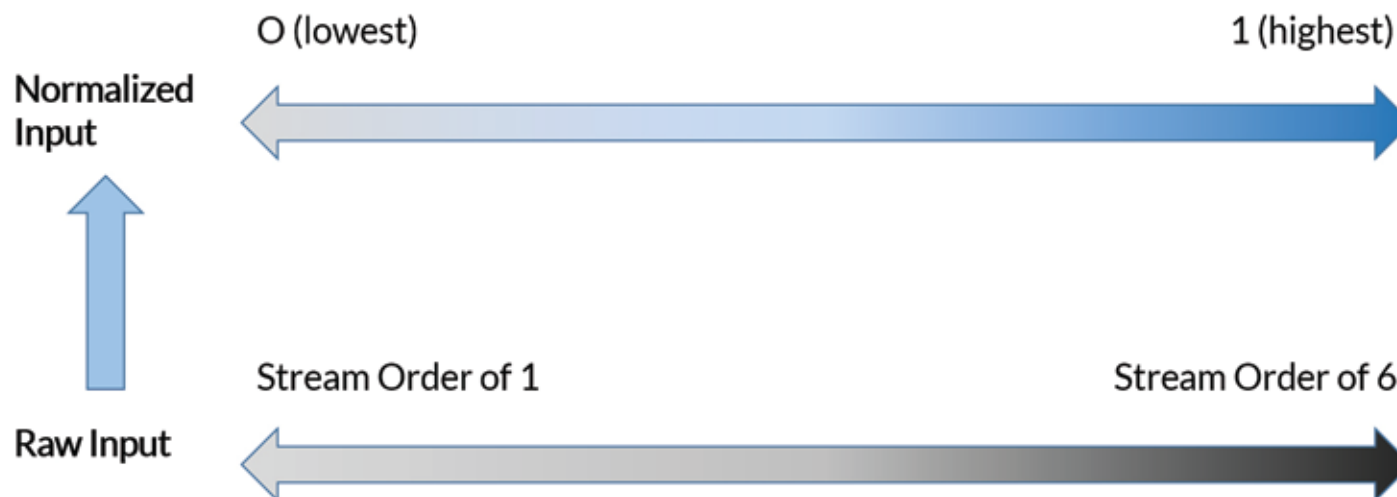
<sup>2</sup> In a few cases, like wetland density, the values were scaled with a more complex function based on the mean wetland density in the region. As a result, for example, a few acres of wetlands in a 100-acre reporting unit is considered an important number of acres, rather than just a marginal number of acres. This normalization type is transparently indicated in the Graphical User Interface (described below) as Mean-to-Mid Value Normalization. The linear normalization is indicated as Score-Range Normalization.



Each input layer is represented using these 100-acre reporting units. For example, stream order for the region shown on the prior page (Figure 42) was calculated as the maximum stream order value per reporting unit. This gives a numerical value for each reporting unit for road density.

Each input layer is summarized in a similar fashion across the 100 acre reporting units: either by percent cover of the input layer within the reporting units, density of the input layer within the reporting units, or by calculating another similar metric. This puts all the input layers within the same reporting units across the study area. Before these summarized input layers (i.e. column of the table) can be combined with other summarized input layers, they need to be placed on the same range of numerical values. For example (see figure 43), the stream order values are normalized to range from 0 (lowest value) to 1 (highest value).

### Conversion from Raw to Normalized Input (Figure 43)



The normalization of Input data on the top (stream order per reporting unit) is shown converted to a range of 0 (lowest) to 1 (highest).

In most cases, the summarized input layer was normalized linearly, such that the highest value became a 1, the lowest a 0, and the rest scaled accordingly.<sup>2</sup>

Now the different data layers, our “apples and oranges”, can be combined using map algebra since they are on the same scale. For the Blueprint, the simplest algebra was used: summing the layers. Here the value of a reporting unit for one normalized input data layer (a value that will be between 0 to 1) is summed with the value of that reporting unit for a different normalized input layer type (that will also have a value between 0 to 1). The resulting layer can have a number that is higher than 1, so this layer is then normalized again, linearly, so that the highest value is a 1 and the lowest a 0. This synthesized layer can then be combined with another synthesized layers if desired.

## APPENDIX C: ATLAS TUTORIAL

### EEMS Explorer Tutorial

#### How are the results displayed in a transparent fashion?

You can click on the link to the online EEMS map in the caption of any of the EEMS maps of the report. Viewing an EEMS map online gives you full transparency. Any data layer that has a range of values for all the reporting units can be mapped such that low values have a lighter shade of a color, and higher values have a darker shade of the same color. The EEMS Explorer is a “graphical user interface” (GUI) tool within the Atlas that allows you to see a similar shaded map for any layer in the logic model, and also see the logic model on the same screen.

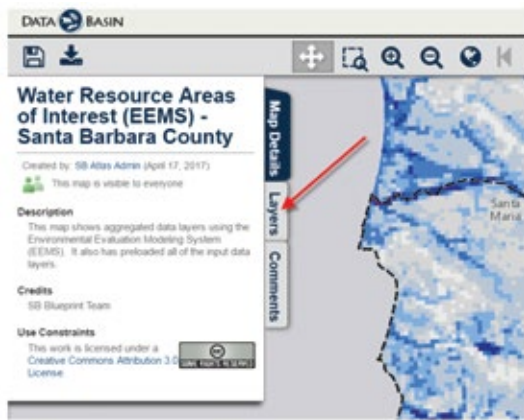
Once in EEMS Explorer, you can zoom in and out on the map and the logic model diagram. You can click on any box of the diagram, and the

map will change, displaying that layer, be it an input or an output. You can also click on any reporting unit on the map to see the numerical value (and color) for each data layer type in the logic model. You can hover over each box in the logic model to see a pop-up window describing the layer, and for the input layers, you can also see the url to the input data before it was summarized to the 100-acre reporting units. This allows you to click through to that input data layer to “drill down” even further where you can see the methods for how that layer was created, where it came from, etc. in the description field.

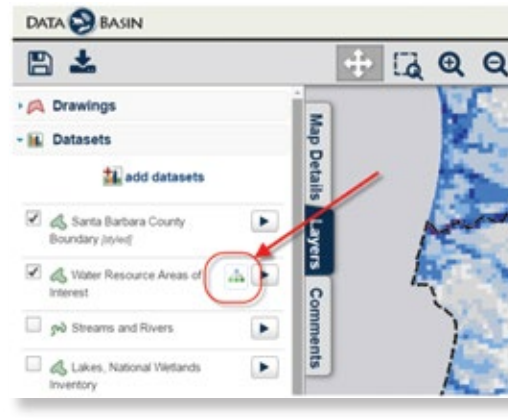
To get to EEMS Explorer, first open a Map that has an EEMS layer in it (**below, far left**). Then click on the layers tab on the left (below, center), and then follow the GUI instructions and hotlinks (**below, right**).

You can contact Data Basin support with questions: [databasin@consbio.org](mailto:databasin@consbio.org). There is also a three minute introductory and instructional video for using EEMS Explorer on this page.

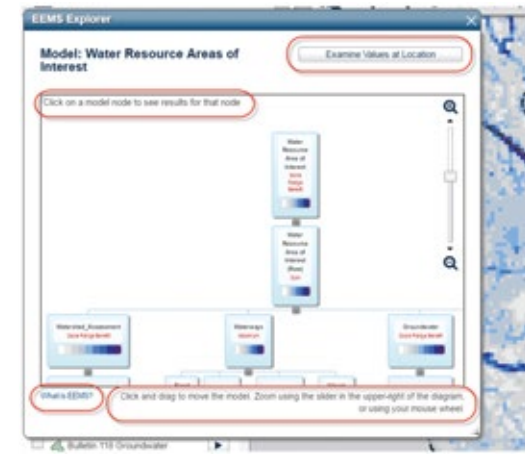
#### Open a Map with EEMS Layers and Click on Layers to Access EEMS Explorer



#### Then click on the icon next to the name of the EEMS enabled layer:



#### You can then follow the instructions and hotlinks from within the GUI:





## APPENDIX D: RESOURCES FOR FURTHER LEARNING

### Water Wise SB

The water conservation website for Santa Barbara County

<http://www.waterwisesb.org/>

### Real-time Rainfall, River Stream, and Reservoir Data

<https://rain.cosbpw.net/>

### Santa Barbara County Water Agency Website

Information, data, and reports on flood control, water use, water supply and water quality within the County

<http://cosb.countyofsb.org/pwd/pwwater.aspx?id=2956>

### California Water Science Center

Information on California-wide water data, conditions, and reports

<https://ca.water.usgs.gov/index.html>

### California Drought Monitor

Real-time drought conditions in California

<http://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?CA>

### Groundwater Information Center Interactive Map Application

Data on groundwater boundaries, well locations, and other groundwater data from the California Department of Water Resources (CA DWR)

<https://gis.water.ca.gov/app/gicima/>

### Water Management Planning Tool

Data on boundaries for water management and hydrologic management from the CA DWR

<https://gis.water.ca.gov/app/boundaries/>

### Strategic Actions for Enhancing Local Agricultural Water Efficiency in Santa Barbara County

In 2016 and 2017, the Cachuma Resource Conservation District collaborated with many key agencies and the agriculture community to propose a set of cost-effective, implementable activities and tools that can result in real water efficiency gains in Santa Barbara County agriculture.

<http://www.rcdsantabarbara.org/water/>

For the most up to date resource list see:

<http://www.sbcblueprint.net/resources>



## UC Natural Reserves within Santa Barbara County

Protected natural areas within the County:

Santa Cruz Island Reserve  
<http://santacruz.nrs.ucsb.edu/>

Coal Oil Point Reserve  
<http://copr.nrs.ucsb.edu/>

Sedgwick Reserve  
<http://sedgwick.nrs.ucsb.edu/>

Carpinteria Salt Marsh Reserve  
<http://carpinteria.ucnrs.org/>

## Manual of California Vegetation Online

Information on all plants and vegetative communities in California

<http://vegetation.cnps.org/>

## Cal Flora

Information on native plants and invasive plants in California

<http://www.calflora.org/>

## California Invasive Plant Council

Information on invasive plants throughout California

<http://www.cal-ipc.org/>

## Whippet

Site and application to help land managers prioritize invasive plant populations

<http://whippet.cal-ipc.org/>

## Cal Weed Mapper

Data and profiles on invasive species within the state and an application to track and record new observations

<http://calweedmapper.cal-ipc.org/>

## EBird

Data, checklists, and information on bird species across the globe

<http://ebird.org/content/ebird/about/>

## iNaturalist

A site and application to record your observations, share with fellow naturalists and discuss your findings

<https://www.inaturalist.org/>

## California Department of Fish and Wildlife (Conservation and Management of Wildlife and Habitat)

Information on the state's wildlife species, vegetative communities and conservation programs

<https://www.wildlife.ca.gov/Conservation>

## Santa Barbara Botanic Garden

Information on classes, visiting the garden, and on conservation issues related to the region's vegetative species

<http://www.sbbg.org/>

## Santa Barbara Natural History Museum

Information on programs, visiting the museum, and on the many species and communities in the region

<https://www.sbnature.org/>

## Ventura Fish and Wildlife Office

Information for landowners, educators, and the general public

<https://www.fws.gov/ventura/>

## Cachuma Resource Conservation District Invasives List

Visual resource guide to invasive species in Santa Barbara County

<http://www.rcdsantabarbara.org/invasive-plants-grasses/>



### Santa Barbara County Cooperative Extension

Information, data, and reports for Santa Barbara County producers, gardeners, and agricultural enthusiasts

<http://cesantabarbara.ucanr.edu/>

### Santa Barbara County Agricultural Commissioner

Information, data, and reports for Santa Barbara County producers

<http://cosb.countyofsb.org/agcomm/>

See especially 'Economic Contributions of Santa Barbara Agriculture', heavily cited in the Blueprint Report

<https://tinyurl.com/yctg8zaa>

### UC Rangelands

New website resource hub for supporting working landscapes

<http://rangelands.ucdavis.edu/>

### Local Harvest

Information and localities for local food supply throughout the County

<https://www.localharvest.org/santa-barbara-ca>

### Local Harvest Delivery

Local company and web tool connecting local growers and eaters in Santa Barbara County

<http://www.localharvestdelivery.com/>

### Census of Agriculture

Information on agricultural production, history, and data

<https://www.agcensus.usda.gov/>

### California Department of Conservation (Division of Land Resource Protection)

Information, reports, and maps for landowners, local government, and researchers on land resource conservation in California

<http://www.conservation.ca.gov/dlrp>

### California Department of Food and Agriculture

Resources and information on agriculture in California

<https://www.cdffa.ca.gov/>

### Farm ecosystem services database

Explore ecosystem services provided by agriculture

<https://apps1.cdffa.ca.gov/ecosystemservices/>

### Healthy Soils Initiative

Information on the new program focused on protecting and restoring soil organic matter in California's soils

<https://www.cdffa.ca.gov/oefi/healthysoils/HSInitiative.html>

### Santa Barbara Carbon Farming Compost Study

A partnership of local and state groups identifying local interest in carbon farming, conducting carbon farm plans, and monitoring several field trials in Santa Barbara County – including one of only 17 NRCS trials in California.

<http://www.rcdsantabarbara.org/compost-study/>

**Santa Barbara Outdoors**

Fun outdoor activities in Santa Barbara County

<http://www.sboutdoors.com/>

**Hike Los Padres**

A free resource for exploring Los Padres National Forest

<http://www.hikelospadres.com/>

**California State Parks**

Information on state parks, locations, and activities throughout California

<https://www.parks.ca.gov/>

**Los Padres National Forest Interactive Visitor Map**

Interactive map of activities for visitors

<https://tinyurl.com/y8elomwe>

**Los Padres National Forest**

Information on all activities and resources

<https://www.fs.usda.gov/lpnf/>

**Wineries of Santa Barbara County**

List and Map of Wineries and Wine Trails within Santa Barbara County

<http://www.sbcountywines.com/wineries.html#countymap>

<http://www.sbcountywines.com/wine-tasting-routes.html>

**American Viticultural Areas (Appellations) maps**

<http://www.sbcountywines.com/ava-maps.html>

**Edible Santa Barbara**

Magazine celebrating the abundance of local food and wine throughout Santa Barbara County

<http://ediblesantabarbara.com/>

**Santa Barbara County Food Action Plan**

A strategy-based community framework for an accessible, thriving, sustainable, and healthy food system

<http://www.sbcfoodaction.org/>

**Santa Barbara County Association of Government**

State of the Commute report

[http://www.sbcag.org/up-](http://www.sbcag.org/uploads/2/4/5/4/24540302/state_of_the_commute_summaryv5.pdf)

[loads/2/4/5/4/24540302/state\\_of\\_the\\_commute\\_summaryv5.pdf](http://www.sbcag.org/uploads/2/4/5/4/24540302/state_of_the_commute_summaryv5.pdf)

**Gaviota Coast Planning Advisory Committee**

2013 GAVPAC Report:

<https://tinyurl.com/yeh74fsk>

**Children and Nature Resources**

Research, resources, and tools for nature education

<http://www.childrenandnature.org/learn/tools-resources/>





## CLIMATE

### California Climate Change

Information and data from California funded research and initiatives on climate change

<http://www.climatechange.ca.gov/>

### California Climate Console

Information on projected climate change that allows for exploring climate change projections and impacts

<http://climateconsole.org/>

### California Landscape Conservation Cooperative Climate Commons

Science and information for climate-smart conservation

<http://climate.calcommons.org/>

### Cal-Adapt

Information on projected climate change that allows for exploring climate change projections and impacts

<http://beta.cal-adapt.org/>

### Sea Grant California

Local Climate Research Project (final report forthcoming 2017)

<https://tinyurl.com/y9vp5ty3>

## LEARNING FROM OTHER REGIONAL EFFORTS

### Other Conservation Land Use Data Mapping Efforts:

Santa Cruz County Conservation Blueprint

<http://www.landtrustsantacruz.org/blueprint/>

Santa Clara Valley Greenprint

<http://www.openspaceauthority.org/about/strategicplan.html>

San Joaquin Valley Greenprint

<http://sjvgreenprint.ice.ucdavis.edu/>

Bay Area Conservation Lands Network Explorer & Progress Report

<http://www.bayarealands.org/>

The Pajaro Compass (Pajaro River Watershed)

<http://www.pajarocompass.org/>

Sonoma Resource Conservation District's 'Slow it Spread it Sink it Store it' stormwater runoff & conservation guide

<https://tinyurl.com/yc9nzjz4>

The Nature Conservancy-led 2016 statewide land conservation and sustainable communities strategy for California

<http://www.southernsierrapartnership.org/scs-policy-report.html>

Other Ecosystem Service Evaluation Projects and Learning Natural Capital Coalition Primer for businesses

<http://naturalcapitalcoalition.org/protocol/>

CDFA farm ecosystem services database

<https://apps1.cdfa.ca.gov/ecosystemservices/>

Enviro Atlas Data

<https://www.epa.gov/enviroatlas/ecosystem-markets-enviroatlas>

Earth Economics has conducted ecosystem service evaluation projects, including for the Santa Clara Open Space Authority's work with the Greenprint project

<http://www.eartheconomics.org/publications/>

# SANTA BARBARA COUNTY CONSERVATION BLUEPRINT

## BLUEPRINT PARTNERS:



## PROJECT MANAGEMENT TEAM:



## PRINCIPLE FUNDERS:



SANTA BARBARA  
FOUNDATION



CALIFORNIA COASTAL  
CONSERVANCY

JACK & JUDY  
STAPELMANN FUND

HOLLIS NORRIS  
ENDOWED FUND

WALTER J. AND HOLLY  
O. THOMSON FUND



JAMES S. BOWER  
FOUNDATION



BRITTINGHAM FAMILY  
FOUNDATION



DECKERS  
OUTDOOR  
BRANDS



HUTTON PARKER  
FOUNDATION

RICHARD L. AND MARYAN S. SCHALL FUND

JACK & GRETCHEN NORQUAL

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[www.sbcblueprint.net](http://www.sbcblueprint.net)



CLIMATE &  
RESOURCE TRENDS



INTERACTIVE PUBLIC  
DATA PLATFORM



MULTI-BENEFIT CASE  
STUDIES



YOUR RESOURCE ON  
SHARED RESOURCES