

COLLABORATIVE PLANNING FOR CLIMATE RESILIENCE

An Integrated Science-based Framework for the San Diego Region

EXECUTIVE SUMMARY



American Planning Association
Creating Great Communities for All



California-Nevada Climate Applications Program
A NOAA RISA team



Table of Contents

Introduction 2

Who Should Read This Report?..... 3

Important Guidance Documents and Reports that Support the Framework 4

Framework Principle #1:
Understanding Regional Climate Change Impacts and Interconnections..... 5

Framework Principle #2:
The Importance of Integrating Environmental Justice and Equity 8

Framework Principle #3:
Identifying Regional and Local Plans that Require Climate Impact Analysis..... 9

The Proposed Framework for Integrated Climate Resilience Planning..... 10

What Goes into the Planning Process? 12

Examples of Integrated Planning for Co-occurring Extreme Events..... 13

Engagement and Collaboration – Essential to Climate Resilience Planning..... 15

Other Important Considerations for Climate Resilience Planning 16

Future Actions 17

Acknowledgments..... 18

Introduction

Mother Nature Has Finally Gotten Our Attention . . .

The San Diego region is already experiencing climate change, the magnitude and impacts of which will likely intensify. Therefore, unified regional and local planning is needed (Figure 1). This report promotes collaborative and science-based climate resilience planning that builds on existing plans and related research, and that will broaden our vision to take on new challenges. Based on guidance from agencies and individual experts at the national, state, regional, and local levels, the report sets forth a proposed *Framework* for climate resilience planning in the San Diego region. The report's lessons and recommendations also may be applicable to other regions of California and other parts of the country.

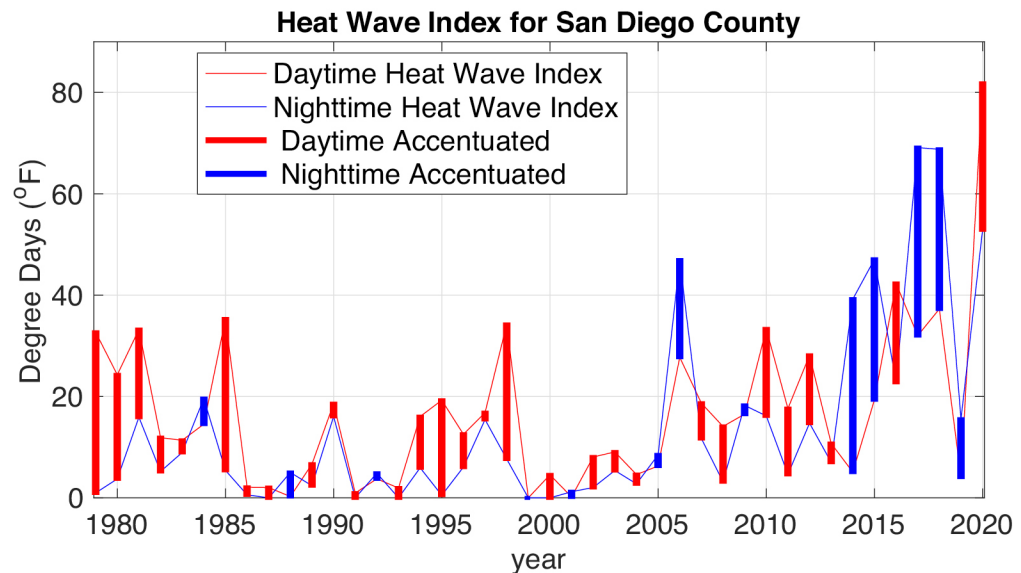


FIGURE 1. The graph illustrates heat wave activity since 1979 for San Diego County, an example of how climate change is impacting the region. The red line is based on maximum temperatures and the blue line is based on minimum temperatures. Degree days are the sum of degrees that exceed the 95th percentile of daily temperatures during the warm season of May-September. The bold parts of the graph indicate when the heat wave activity is accentuated in minimum or nighttime temperatures (blue) or during the day (red), reflecting predominantly humid or dry heat, respectively. **Provided by K. Guirguis**

The proposed Framework first emphasizes the importance of building our resilience equitably by incorporating *Environmental Justice* as an overarching consideration throughout the planning and implementation process. Within this context, the Framework is based on an integrated approach to climate resilience planning, viewing it from a *topical* perspective within four broad focus areas: (i) Infrastructure; (ii) Natural Resources; (iii) Coastal Resources, and (iv) Public Safety and Public Health.

In addition, the Framework emphasizes the importance of viewing these topical focus areas at two distinct geographic scales:

- A *Regional / Subregional* scale, where much of the necessary scientific analysis and other empirical analysis for our major functional systems normally occurs; and
- A *Local* scale, where urban planners and sustainability professionals can most effectively conduct community-based planning and evaluation.

Identifying which plans require climate analysis, and how regional and subregional plans can be leveraged to support local plans such as general plans and local coastal plans, is an integral part of the Framework.

Illustrated here is a diagram of the proposed Framework for the San Diego region. However, this conceptual framework can also be readily applied to other regions throughout California. The collaboration and actions required to apply the proposed Framework will lead to a more sustainable and resilient future.

| ENVIRONMENTAL JUSTICE AND EQUITY Plans Requiring Climate Analysis | Proposed Framework Table | | | |
|--|-------------------------------|---|--|--|
| | Focus Areas | | | |
| | INFRASTRUCTURE | NATURAL RESOURCES | COASTAL RESOURCES | PUBLIC HEALTH & SAFETY |
| | Regional & Subregional Plans | | | |
| | SANDAG Regional Plan | San Diego County Urban Water Management Plan San Diego Basin Plan and subregional Water Quality Improvement Plans MSCP Subregional Habitat Conservation Plans | | San Diego County Multijurisdictional Hazard Mitigation Plan San Diego County Regional Public Health and Climate Adaptation Plan |
| | Local Plans | | | |
| | Environmental Justice Element | Environmental Justice Element | Environmental Justice Element Local Coastal Program and related General Plan Elements | Environmental Justice Element Safety Element Local Government Hazard Mitigation Plan |

Regional & Subregional Plans that directly support elements of general plans and other local plans. Use Regional plans to more readily incorporate climate adaptations into Local Plans

Who Should Read This Report?

- For **planners** and other sustainability professionals, this report provides guidance on how to engage a cross-section of partners and collaborators to frame and formulate science-based plans.
- For **scientific researchers**, the report provides guidance on how to work directly with planners, managers, and other stakeholders in order to better integrate applied research to inform solutions at the local and regional levels.
- For **community members and organizations**, this report provides guidance how to engage in the process of developing and implementing plans for climate resilience.
- For **policymakers and decision-makers**, this report provides direction for how to navigate these often complex processes, and should help them to attain the desired results for their communities.

Important Guidance Documents and Reports That Support the Framework

The report summarizes existing planning guidance documents and the current climate science for the region as a foundation to build on for regional climate resilience planning. As a leader in climate planning over the past two decades, the State of California has created its own climate planning framework that assigns responsibilities for dealing with climate change at all levels of government. For regional and local governments, the State provides direction primarily through two “guidance documents”:

The [California Adaptation Planning Guide](#) (APG), published by the Governor’s Office of Emergency Services (Cal OES) in 2020:

- Sets forth the state laws and policies pertaining to climate adaptation planning by regional and local governments;
- Explains the connections between climate adaptation, community resilience, public safety, and security;
- Provides information and planning support for assessing climate vulnerabilities across sectors; and
- Gives examples of effective adaptation strategies that can be tailored to meet local needs.

The [California General Plan Guidelines](#) (GPG), periodically updated by the Governor’s Office of Planning and Research (OPR):

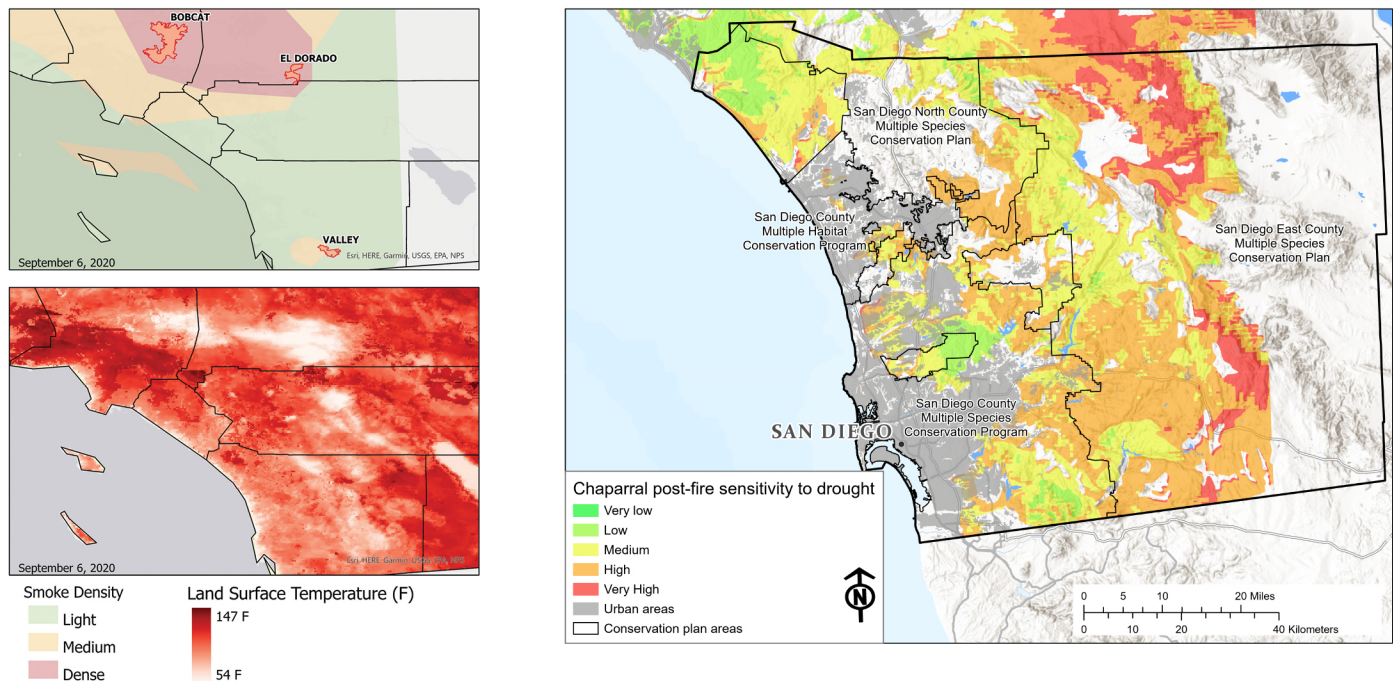
- Sets forth requirements for eight mandatory elements of city and county general plans;
- Provides specific guidance for updating Safety Elements to address impacts of climate change
- Provides guidance for preparation and adoption of Environmental Justice Elements;
- Emphasizes that climate change adaptation and resilience policies and strategies should be integrated throughout the other mandatory elements to create internal consistency and support holistic consideration of this important topic.

In addition to these guidance documents, the State has sponsored a vast array of advisory reports and planning tools to help regional and local governments deal with climate impacts through science-based planning and implementation strategies and actions. For the San Diego region, the most notable of these efforts was the [California Fourth Climate Change Assessment](#) and the [San Diego Region Report](#), both produced in 2018. The California Fourth Climate Change Assessment, a major state-sponsored project, brought together scientists, planners, and other key stakeholders to produce several reports that provide users with a common understanding of the threats that climate change poses to the state generally and to the San Diego region in particular. The *San Diego Region Report* provided an overview of the region’s vulnerabilities to climate-related impacts, including more frequent and intense heat waves, more frequent droughts, and more extreme precipitation events coupled with coastal flooding exacerbated by sea-level rise.

Framework Principle: #1 Understanding Regional Climate Change Impacts and Interconnections

Our understanding of climate change impacts underscores the need for planning to address various forms of extreme events such as intensified and more frequent heatwaves; less frequent precipitation, but wetter extreme storms; drier landscapes and more frequent drought; and increased coastal and inland flooding. All will have dramatic impacts on the built environment, social and economic systems, and the natural environment (see the table on pages 6 and 7). Planning must also deal with the possible occurrence of future “compounding extreme events,” which are weather-related climate extremes that occur sequentially or simultaneously or both, amplifying impacts and potentially overwhelming systems. Two examples are highlighted below (Figure 2).

Figure 2



The two maps show the co-occurrence of wildfire smoke and heat waves in September 2020 for Southern California. The top figure shows the smoke density for Southern California and the lower figure shows the extreme heat. The co-occurrence of these two climate extremes exacerbates the impacts, particularly the public health impacts. **Figure provided by R. Aguilera**

The map shows the sensitivity of the Chaparral ecosystems recovery after wildfire to drought. After wildfire, drought can lead to grasses and other fine fuels growth rather than chaparral which can lead to greater fire risks during dry periods. The interactions between drought and wildfire create a feedback exacerbating challenges to protect ecosystems from drought or wildfire alone.

Figure provided by M. Jennings

| Planning for Climate Resilience | | | | | | |
|---|--|----------------------|---|---|--|---|
| Climate Drivers of Change | Projected Shift | Confidence in Shift | Ecological Impacts | Water Resource Impacts | Public Health and Safety Impacts* | Infrastructure Impacts |
| Warming Temperatures | Increasing | Very High Confidence | <ul style="list-style-type: none"> Shift in species' ranges Interruption in ecosystem processes Degradation of ecosystem integrity | <ul style="list-style-type: none"> Degradation of water quality impacts Increased water demand | <ul style="list-style-type: none"> Increased hospitalizations Increased premature deaths and maternal and child health issues Increased potential for vector borne diseases | <ul style="list-style-type: none"> Increased energy demand, potentially leading to reduced electrical distribution Increased need for air conditioning |
| Heat Waves | Increase in frequency, duration, and severity. Becoming more humid and accentuated at night. | Very High Confidence | <ul style="list-style-type: none"> Negative physiological impacts on fauna Increased mortality Decreased reproductive rates | <ul style="list-style-type: none"> Increased water demand and consumption | <ul style="list-style-type: none"> Increased hospitalizations Increased Premature deaths and maternal and child health issues Increased job loss and productivity especially for those that work outdoors Decreased recreation | <ul style="list-style-type: none"> Increased potential for road damage, rail buckling Increased need for air conditioning, day and night Increased peak energy demand potentially leading to reduced electrical distribution |
| Greater Precipitation Volatility | Increasing | High Confidence | <ul style="list-style-type: none"> Increased risk of vegetation mortality and wildfire More toxic runoff to coastal zone Reduced reproductive success Degraded habitat structure in terrestrial and aquatic environments from extreme flows and drought | <ul style="list-style-type: none"> Greater challenges for water resource management Potentially large swings in outdoor irrigation and water demand | <ul style="list-style-type: none"> Increased toxic runoff in the coastal zone impacting health | <ul style="list-style-type: none"> Similar to flooding |
| Flood | General Increase | High Confidence | <ul style="list-style-type: none"> Most significant impacts to riparian environments Less stabilizing vegetation and increased erosion can increase allochthonous input Increased contaminations of coastal bays, estuaries and ocean waters | <ul style="list-style-type: none"> Greater contaminates in inland rivers and streams Increased sedimentation Greater probability of debris flows | <ul style="list-style-type: none"> Safety hazards related to flooding Safety hazard related to cliff erosion Negative impacts on mental health Decreased water quality Increased in the spread of toxic materials | <ul style="list-style-type: none"> Increased damage to wastewater and stormwater systems Increased damage to and loss of buildings, including housing Increased damage to transportation and energy infrastructure |

Planning for Climate Resilience Continued

| Climate Drivers of Change | Projected Shift | Confidence in Shift | Ecological Impacts | Water Resource Impacts | Public Health and Safety Impacts* | Infrastructure Impacts |
|-------------------------------------|-----------------------------|----------------------|---|--|---|---|
| Drought | General Increase | High Confidence | <ul style="list-style-type: none"> Changes in ecosystems resulting from potential structural shifts. Increased mortality of trees and other native vegetation Increased opportunity for invasive species and wildfire Decrease in base flow leading to loss of vegetation in riparian habitats | <ul style="list-style-type: none"> Drought causes water shortages, increased demand for developed water supply Drying of soil moisture conditions Limited water supply for communities reliant on groundwater | <ul style="list-style-type: none"> Increased frequency of dust storms Potential to decrease local food security Negative economic impacts and mental health among agriculture workers | <ul style="list-style-type: none"> Need for increased water storage Possible need to retrofit landscaping in public areas such as parks to more drought tolerant vegetation Investments for water reclamation projects for agriculture areas are needed Water conservation can reduce liquid in sewer systems causing increase debris and maintenance needs |
| Fire Frequency | General Increase | Confident | <ul style="list-style-type: none"> Vegetation type conversion from shrubland systems to non-native grasses and from forests to shrublands or grasslands Direct and indirect negative impacts to habitat for sensitive flora and fauna Impacts to water quality and quantity with increased post-fire erosion and sedimentation | <ul style="list-style-type: none"> Sedimentation, degraded water quality Decreases soil permeability, leading to higher runoff and less groundwater recharge Higher peak flows and flooding risks | <ul style="list-style-type: none"> Wildfire smoke including fine particles (PM2.5 more dangerous to health than similar levels of pollution from other sources) Exposure to mudslides, debris flows Evacuation and potential mental health impacts | <ul style="list-style-type: none"> Increased damage to the built environment |
| Santa Ana Winds | Decrease in Fall and Spring | Modest Confidence | <ul style="list-style-type: none"> Impacts fire cycle, and severity of burn | | <ul style="list-style-type: none"> Fewer out of season heat waves when individuals are not acclimated or not as well prepared. | |
| Variable Marine Layer Clouds | Unknown | More Research Needed | <ul style="list-style-type: none"> Provides moisture to coastal species, e.g. Torrey Pines | <ul style="list-style-type: none"> Reduces evapotranspiration and improves soil moisture conditions | <ul style="list-style-type: none"> Reduces heat waves impacts on health, especially along the coast | |
| Sea Level Rise | Increase | High Confidence | <ul style="list-style-type: none"> Increased beach and cliff erosion More frequent and severe coastal flooding Increased saltwater incursion into freshwater systems affecting flora and fauna | <ul style="list-style-type: none"> Increased damages to water infrastructure Storm water system more frequently overwhelmed from the ocean. Negative effects on fresh water conveyed through Bay/Delta | <ul style="list-style-type: none"> Public safety concerns resulting from flood and erosion of cliffs | <ul style="list-style-type: none"> Increased maintenance on roads, trains, electrical system infrastructure Storm water system more frequently overwhelmed from the ocean. |

Framework Principle #2: The Importance of Integrating Environmental Justice and Equity

This report emphasizes the need to integrate environmental justice and equity into planning for climate resilience and adaptation, at both the regional and the local scales. In addressing climate change impacts, environmental justice demands that we counter the disproportionate impacts on historically disadvantaged communities—primarily communities of color, low-income communities, tribal communities, and many rural areas. Often referred to as environmental justice communities, these areas commonly have been subject to discriminatory land use policies, degraded environmental conditions, substandard infrastructure, and depressed economic opportunity, all of which make them more vulnerable to climate change. Such conditions in large part are the consequences of past discriminatory decisions by planners, public officials, and financial institutions, exacerbated by underrepresentation in the public decision-making process. Public planning and implementation take on even greater importance for environmental justice communities than for the region in general. Consideration of actions to alleviate impacts on these communities is mandated by legal requirements at the federal and state levels. Failure to comply with those mandates may have significant legal, economic, and political ramifications for local jurisdictions.

Overcoming the history of discrimination in disadvantaged communities and the resulting conditions requires extraordinary efforts to open decision-making processes and access to resources. The plans discussed in this report provide important opportunities to rectify prior discriminatory and damaging decisions and to provide for meaningful opportunities for engagement by the impacted communities.

The *California Adaptation Planning Guide* discusses how equity and environmental justice issues can be addressed in a multi-dimensional, overarching manner in climate change adaptation planning.

- Procedural equity requires planning agencies to make extraordinary efforts to engage with the residents, gain their trust, ensure that climate resilience planning considers their input and priorities, and defer to their priorities.
- Distributional equity requires providing disadvantaged communities with greater resources and relieving them of more burdens in order to balance the inequities imposed on them historically, *i.e.*, establishing a “level playing field.”
- Structural equity requires reforming institutional and structural barriers, along with improving the social and economic conditions in such communities.

Plans that effectively address the conditions and needs of environmental justice communities will better serve the needs of the region as a whole.



Framework Principle #3: Identifying Regional and Local Plans That Require Climate Impact Analysis

Despite much progress in recent years, there remain challenges to understanding what public agencies are responsible for determining the legal requirements, completion deadlines, science research needs, and best planning practices for regional and local plans that are required to address the impacts of climate change. In designing a framework for climate resilience planning in the San Diego region, it is important to identify those plans for which an analysis of climate impacts is needed.

The *California Adaptation Planning Guide* identifies the types of regional and local plans for which state or federal laws and regulations require climate impact analysis, while the *General Plan Guidelines* provides further guidance regarding those general plan elements for which climate impact analysis and planning is needed. The table below provides a summary of regional and local plans for the San Diego region, for which climate impact analysis appears to be either a functional requirement or a legal requirement.

| Plans Requiring Climate Impact Analysis | |
|--|--|
| Plan | Responsible Public Agencies |
| Regional and Subregional Plans | |
| San Diego County Multi-jurisdictional Hazard Mitigation Plan (MJHMP) and Local Hazard Mitigation Plans | San Diego County Office of Emergency Services (SD County OES); County of San Diego; cities; designated special districts |
| San Diego Forward: The Regional Plan (RTP/SCS) | San Diego Association of Governments (SANDAG) |
| Regional and Subregional Water Quality Plans: <ul style="list-style-type: none"> Water Quality Control Plan for the San Diego Basin (Basin Plan) Watershed Management Area Water Quality Improvement Plans (WQIPs) | San Diego Regional Water Quality Board; County of San Diego; cities; special districts |
| Urban Water Management Plan (UWMP) | San Diego County Water Authority (SDCWA) |
| Regional and Subregional Habitat Conservation Programs: <ul style="list-style-type: none"> San Diego Multiple Species Conservation Program (MSCP) MSCP Subregional Planning Area Programs | US Fish and Wildlife Service; California Fish and Wildlife Service; County of San Diego; cities; SANDAG |
| San Diego County Climate Change and Public Health Plan | San Diego County Public Health Services Department |
| San Diego Port Master Plan | San Diego Unified Port District |
| Local Plans | |
| Safety Element | County of San Diego; cities |
| Environmental Justice Element | County of San Diego; cities |
| Multi-jurisdictional Hazard Mitigation Plan – Local Plans | County of San Diego; cities; designated special districts |
| Local Coastal Programs (LCP) and related general plan elements | California Coastal Commission; County of San Diego; cities in State Coastal Zone |

The Proposed Framework for Integrated Climate Resilience Planning

The proposed Framework presents a science-based and collaborative approach, viewed through lens of *environmental justice and equity*, by which planners, scientists, and other participants can evaluate and respond to future climate change impacts in the San Diego region.

The Framework is designed to encourage public agencies and organizations across geographic scales and sectors to collaborate on strategies and actions cutting across topical sectors informed by regionally relevant science-based climate change research and analysis. Interdisciplinary research and cross-jurisdictional integration of regional and local plans are emphasized in the Framework to avoid duplication of effort in developing local plans and to promote holistic and equitable adaptation actions that address current environmental injustices to communities while preparing the whole region for additional future impacts.

The Framework is organized according to four *Topical Focus Areas*: (i) Infrastructure; (ii) Natural Resources; (iii) Coastal Resources; and (iv) Public Safety and Public Health. The topical areas can be used to evaluate public planning processes. The organization of topical areas also helps to identify the needed planning and science expertise, along with community organizations and policymakers who will have the most direct interest and knowledge in these topics. The areas also enable public agencies in the region to share their plans, strategies, implementing actions, and performance results with agencies statewide.

The report also emphasizes the importance of the geographic scale at which planning for these topic focus areas is being conducted. Climate change impacts and many of the affected systems can best be analyzed at a regional scale. Similarly, the federal and state laws that govern planning recognize the important of regional-scale analysis and planning. At the same time, many of the necessary actions to address these impacts will need to occur at a local or community level, and California's planning laws place responsibility for this scale of planning with local governments, largely through development and adoption of general plans. Therefore, the Framework sets forth two distinct categories of scale: *Regional / Subregional and Local*. Viewing resilience planning in this way helps to illustrate how thorough scientific research and modeling at the regional scale allows results to inform the local planning process.



The Climate Resilience Planning Framework for the San Diego Region is shown below. This Framework can be used in coordinating the important work needed to update existing plans, and to develop new plans that can be foreseen at this time. However, it should be recognized that the Framework is a “work in progress” that may be modified or refined as plans are updated and new scientific research findings emerge.

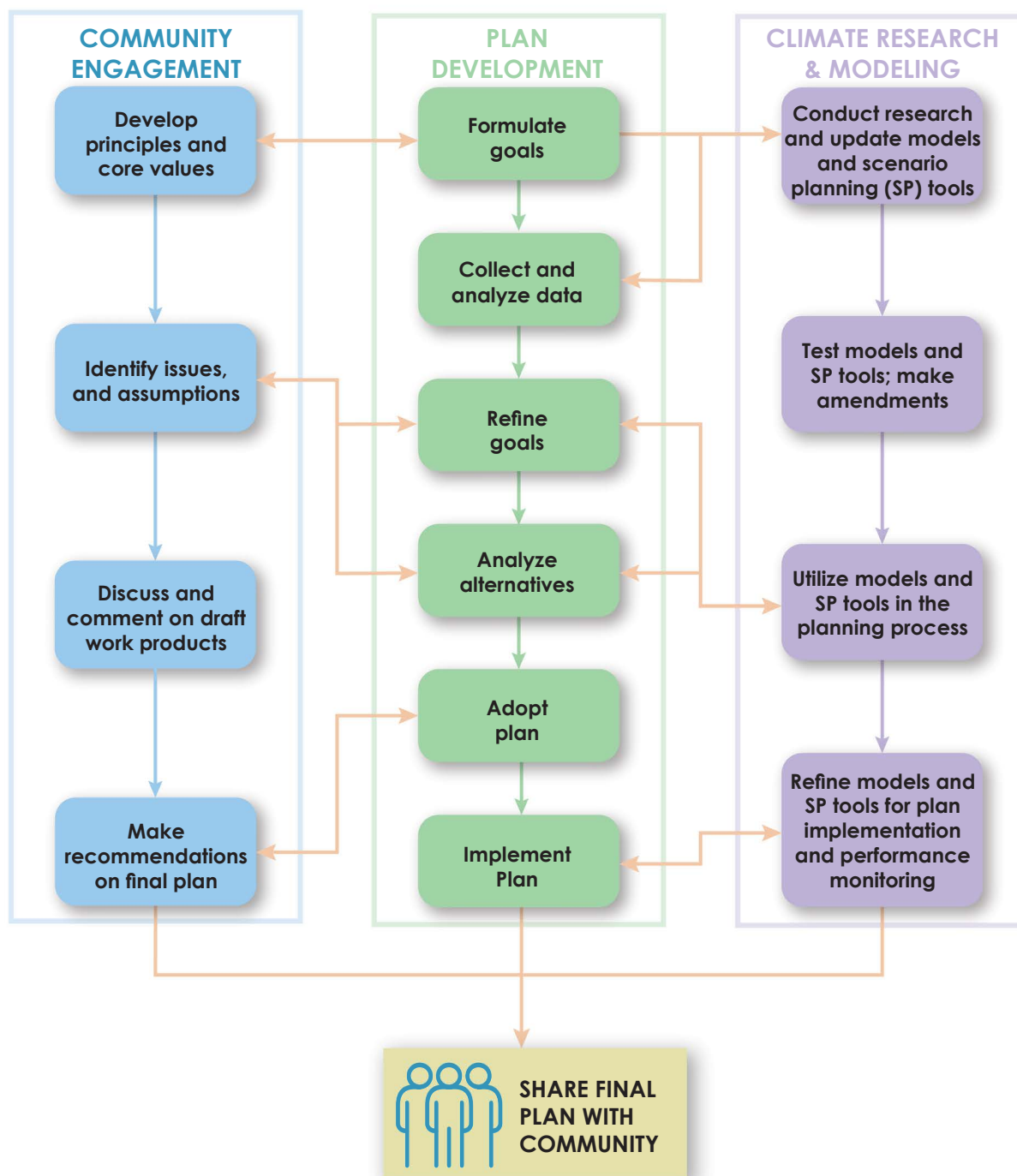
| ENVIRONMENTAL JUSTICE AND EQUITY Plans Requiring Climate Analysis | Proposed Framework Table | | | |
|---|-------------------------------|---|---|--|
| | Focus Areas | | | |
| | INFRASTRUCTURE | NATURAL RESOURCES | COASTAL RESOURCES | PUBLIC HEALTH & SAFETY |
| | Regional & Subregional Plans | | | |
| | SANDAG Regional Plan | San Diego County Urban Water Management Plan San Diego Basin Plan and subregional Water Quality Improvement Plans MSCP Subregional Habitat Conservation Plans | | San Diego County Multijurisdictional Hazard Mitigation Plan San Diego County Regional Public Health and Climate Adaptation Plan |
| | Local Plans | | | |
| | Environmental Justice Element | Environmental Justice Element | Environmental Justice Element | Environmental Justice Element |
| | <i>Circulation Element</i> | <i>Open Space Element</i> | Local Coastal Program and related General Plan Elements | Safety Element |
| | <i>Land Use Element</i> | <i>Conservation Element</i> | | <i>Circulation Element</i> |
| | <i>Housing Element</i> | | | <i>Land Use Element</i> <i>Housing Element</i> Local Government Hazard Mitigation Plan |
| *The plans in italics are very likely general plan elements that will integrate information from the regional and subregional plans listed above. | | | | |

Regional & Subregional Plans that directly support elements of general plans and other local plans. Use Regional plans to more readily incorporate climate adaptations into Local Plans

What Goes into the Planning Process?

The “Conceptual Planning Process” diagram (Figure 3) lays out a proposed approach (not work program) for updating and/or developing a plan that will address climate resilience issues. This diagram emphasizes the importance of conducting a thorough *Plan Development* process that includes goal-setting, analysis of alternatives, and plan adoption, along with specific provisions for plan implementation (e.g., action plans with assignments and schedules, and mandatory performance monitoring and reporting). The diagram also illustrates the importance of designing and implementing effective *Community Engagement* and *Scientific Research and Modeling* processes that are well-integrated with plan development.

Figure 3: Conceptual Planning Process



Examples of Integrated Planning for Co-occurring Extreme Events

The following three examples use compounding extreme events to illustrate how planning and research can work together to form a framework to guide planning efforts. Additional examples are highlighted in the report.



EXAMPLE 1: URBAN FLOODING

Urban flooding in San Diego occurs when stormwater and/or coastal water overwhelms natural and built drainage systems. The widespread flooding caused by both coastal and storm water flooding has the potential to cause more damage, stress infrastructure, and require more emergency services, leading to a longer recovery than if caused by one type of flooding alone. With extreme precipitation events projected to become more extreme and sea level rising, such co-occurrence is more likely in the future.

Integrated Planning:

- A *Multi-jurisdictional Hazard Mitigation Plan* (MJHMP) can be used to support required general plan safety element updates.
- Local Coastal Program (LCP) flooding vulnerability assessments and prescribed adaptation strategies can inform MJMHP risk summary and potential mitigation action.
- *Water Quality Improvement Plans* serve as guiding documents to address stormwater planning and water quality issues that arise from flooding. Updated WQIPs provide guidance in the updates of general plan elements, including safety elements, open space elements, conservation elements, and environmental justice elements.
- Other important plans: *The Integrated Regional Watershed Management (IRWM) Plan* and *lagoon and estuary climate adaptation and resilience plans*.

EXAMPLE 2: HEAT AND WILDFIRE

The current warming trend will continue to increase the intensity and frequency of heatwaves. Increases in wildfire activity have been partially attributed to the warming and drying of fuels, which are accentuated during heat waves. Together, the temperature projections and recent research on wildfire risk underscore the importance of planning for more extreme heat events, more wildfire smoke, and the probability of the co-occurrence of these two public health hazards.

Integrated Planning:

- The *Multi-jurisdictional Hazard Mitigation Plan* (MJMHP) and the forthcoming *San Diego County Public Health and Climate Adaptation Plan* identify the most vulnerable populations and develop mitigation strategies to reduce public health impacts from extreme heat and smoke. Integrating environmental justice is also critical as the people most vulnerable to extreme heat and smoke are often those with fewer resources. The *MJHP* and *Public Health and Climate Adaptation Plan* can be used to support required general safety plan updates, including safety elements and environmental justice elements.
- The Tribal Climate Health Project led by the Pala Band of Mission Indians is an example of coordination between jurisdictions that support climate resilience planning across the region.



EXAMPLE 3: WILDFIRES AND DROUGHT

Warming temperatures and a longer dry season will heighten fire risk in the future, and droughts that follow wildfire can lead to regrowth of fine fuels heightening future wildfire risk. While warming and drought impact fire risk, fire ignitions in San Diego are almost entirely caused by people or infrastructure related to development. Thus, land use and development planning that emphasizes climate resilience is a fundamental adaptation strategy to reduce fire risk and preserve the diversity of habitats in San Diego.

Integrated Planning:

- The San Diego County Multiple Species Conservation Program (MSCP) and the MSCP subregional planning areas throughout San Diego are reliant on wildfire prevention and mitigation to protect sensitive species and maintain ecosystem integrity. Coordination between habitat conservation plans (HCPs) in accordance with the State's Natural Community Conservation Planning Act (NCCP) is important
- Jurisdictions in this region need to coordinate efforts between the development of the updated Multi-jurisdictional Hazard Mitigation Plan (MJHMP), the CAL FIRE Vegetation Management Plan (prepared and adopted per SB 1704), and HCPs to achieve common objectives to protect species and reduce fire risk. Local general plan safety elements can leverage the information in these plans.



Engagement and Collaboration – Essential to Climate Resilience Planning

Collaboration among public agencies, private service providers, tribal governments, and community organizations is critical to producing a successful climate resilience plan. Meaningful engagement leads to long-term partnerships, leveraging of expertise, opportunities for funding, and other resources that are needed to build resilience. It is important to assess and identify successful engagement practices across the region, in order to learn from our experience. Regular evaluations of the engagement process to identify successful components and areas for improvement would benefit the entire region. Planning for a climate resilient region requires significant investment; collaborations can lower this barrier and lead to more effective region-wide planning.



Many agencies and organizations are already working together to advance climate resilience planning in the San Diego region. In addition to the planning agencies, researcher groups, and community groups, there are also *boundary-spanning* organizations, which have become an important catalyst in climate resilience planning. *These organizations*, such as the Climate Science Alliance and San Diego Regional Climate Collaborative, connect planners, researchers, community educators, advocates, and policymakers, and are a vital resource in planning and implementing climate resilience and adaptation solutions.

Other Important Considerations for Climate Resilience Planning

Successful planning for climate resilience will normally consider a common set of topics and processes, highlighted below.

ECONOMIC ANALYSES are important to evaluate costs of possible future climate impacts and assess the value of taking actions or addressing it in plans.

PREDICTIVE MODELS are important for climate resilience planners to develop and use in conducting the necessary environmental impact analyses.

SCENARIO PLANNING TOOLS AND TECHNIQUES allow planners to address uncertainty and identify climate impacts that initiate certain adaptations, i.e., triggers, in their planning process. Scenario planning tools should enable fair comparisons of alternative planning scenarios in terms of their social, environmental, and economic impacts.

FUNDING SUPPORT FOR PLAN IMPLEMENTATION is important to secure as plan implementation will be costly. Federal and state agencies are the most likely sources of funding, but there are also opportunities for local and regional public agency funding, foundation and grant funding, and other sources.

PERFORMANCE MONITORING is vital in order to learn from successful and unsuccessful outcomes and make necessary adjustments to subsequent strategies and actions. Monitoring should be based on a well-conceived set of performance metrics, and the results of the performance evaluation should be presented to policymakers and other decision-makers in a public setting, with opportunities for input by community members and stakeholders.



Future Actions

The San Diego region is already experiencing climate change, the magnitude and impacts of which will likely intensify, so unified regional and local planning is needed. The breadth and complexity of physical, biological, and social structures in the region require a holistic approach to avoid the worst impacts and adapt to unavoidable ones. This report, therefore, presents an integrated approach to planning, using a science-informed, community-based sustainability framework. Integral to this is a planning process based on well-established best practices that can be used for both regional and local climate resilience planning. Allied with this Framework, the report suggests actions that can be taken as soon as possible to improve existing planning activities.

This report is not intended to be the final word on the subjects discussed. As climate change and its impacts become increasingly severe, constant follow-up work is needed. Important areas for additional study and implementation include:

- Refining the tools that planners, scientists, and others can utilize in these continuing efforts.
- Enhancing the capacity of public agencies and non-governmental organizations to conduct research and formulate policies relating to climate change and to climate resilience planning.
- Identifying further research and analysis needed to create effective adaptation responses and resilience plans.
- Increasing meaningful collaboration with tribal nations and other communities that are especially impacted by climate change, with particular focus on disadvantaged communities.
- Developing financial and other resources to support the work of planners and sustainability professionals and to fund the adaptation projects and programs that the region requires.
- Analyzing legal, economic, and other obstacles to implementation of effective climate resilience plans.
- Learning from the experience of other regions and collaborating with them in formulating the best practices for climate resilience research and planning.
- Advising local governments on how to use the Framework set forth in this report when conducting a comprehensive update to a general plan, recognizing that all of the mandatory elements of such plans will be affected either directly or indirectly over time by the impacts of climate change.



Acknowledgments

Lead Authors

| | |
|------------------------|--|
| Robert Leiter, FAICP | <i>American Planning Association, Regional and Intergovernmental Planning Division</i> |
| Julie Kalansky, Ph.D. | <i>Scripps Institution of Oceanography, California-Nevada Climate Applications Program</i> |
| Cary Lowe, Ph.D., AICP | <i>American Planning Association, Regional and Intergovernmental Planning Division</i> |

Contributing Authors

| | |
|----------------------------|--|
| Tarik Benmarhnia, Ph.D. | <i>UC San Diego School of Medicine, Department of Family Medicine and Public Health</i> |
| Michael Grim | <i>City of Carlsbad</i> |
| Kate Barba | |
| Daniel Cayan, Ph.D. | <i>Scripps Institution of Oceanography, California-Nevada Climate Applications Program</i> |
| Stephanie Ellsworth | <i>American Planning Association, Regional and Intergovernmental Planning Division</i> |
| Laura Engeman | <i>Scripps Institution of Oceanography, Center for Climate Change Impacts and Adaptation</i> |
| Megan Jennings, Ph.D. | <i>San Diego State University, Institute for Ecological Monitoring and Management</i> |
| Diane Foote, MCP | <i>San Diego State University, Institute for Ecological Monitoring and Management</i> |
| Alexander Gershunov, Ph.D. | <i>Scripps Institution of Oceanography</i> |

Additional Contributors: *Connecting Wildlands and Communities Project*

| | |
|-------------------|------------------|
| Alexandra Syphard | Krista West |
| Doug Stow | Alicia Kinoshita |
| Erin Conlisk | Jack Mikesell |
| Emanuel Storey | |

External Reviewers

| | |
|--------------------------|---|
| Erik de Kok, AICP | <i>Governor's Office of Planning & Research</i> |
| Kendall Skillicorn | <i>Governor's Office of Emergency Services</i> |
| Kasmira Kit | <i>Governor's Office of Emergency Services</i> |
| Coleen Clementson | <i>San Diego Association of Governments</i> |
| Anna Lowe, MCP | <i>San Diego Association of Governments</i> |
| Jane Clough, Ph.D. | <i>San Diego Association of Governments</i> |
| Kim Smith | <i>San Diego Association of Governments</i> |
| Omar Passons, Esq., MPH | <i>County of San Diego, Health and Human Services Agency</i> |
| Kelly Bray | <i>County of San Diego, Department of Planning and Development Services</i> |
| Ryan DeHart | <i>County of San Diego, Department of Emergency Services</i> |
| Jo-Ann Julien, MED | <i>County of San Diego, Department of Public Health Services</i> |
| Mark Stadler | <i>San Diego County Water Authority</i> |
| Lark Starkey, MAS | <i>San Diego Regional Water Quality Control Board</i> |
| Jill Harris, Ph.D. | <i>San Diego Regional Water Quality Control Board</i> |
| Julia Chase, MS, SEP | <i>City of San Diego Planning Department</i> |
| Cory Downs | <i>City of Chula Vista Office of Sustainability</i> |
| Emily Young, Ph.D. | <i>University of San Diego, The Non-profit Institute</i> |
| Matt O'Malley | <i>San Diego Coastkeeper</i> |
| Dan Silver | <i>Engangered Habitats League</i> |
| David Victor, Ph.D. | <i>UC San Diego School of Global Policy & Strategy</i> |
| Brad Calvert | <i>APA Regional and Intergovernmental Planning Division</i> |
| Mark VanderSchaaf, Ph.D. | <i>APA Regional and Intergovernmental Planning Division</i> |
| Amber Pairis, Ph.D. | <i>Climate Science Alliance and Desert Research Institute</i> |
| Savannah North, MPH | <i>Public Health Alliance of Southern California</i> |
| David Engel, DDS, Ph.D. | <i>STAY COOL for Grandkids</i> |

Sponsors

The work of R. Leiter and C. Lowe was sponsored by the Regional and Intergovernmental Planning Division of the American Planning Association. The NOAA Regional Integrated Science and Assessment Program (RISA) supported the contributions of D. Cayan, A. Gershunov and J. Kalansky, and the design development of the Framework and this report. The contributions of L. Engeman were supported by the California Sea Grant. In addition, contributions to this report from San Diego State University's Connecting Wildlands and Communities project team were supported by funding from the California Strategic Growth Council's Climate Change Research Program through the California Climate Investments Initiative (Grant #CCRP-0061).



American Planning Association
Creating Great Communities for All

