



Collaborative Planning for Climate Resilience

San Diego Integrated Regional Water
Management Program
Regional Advisory Committee
February 2, 2022

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What We'll Cover

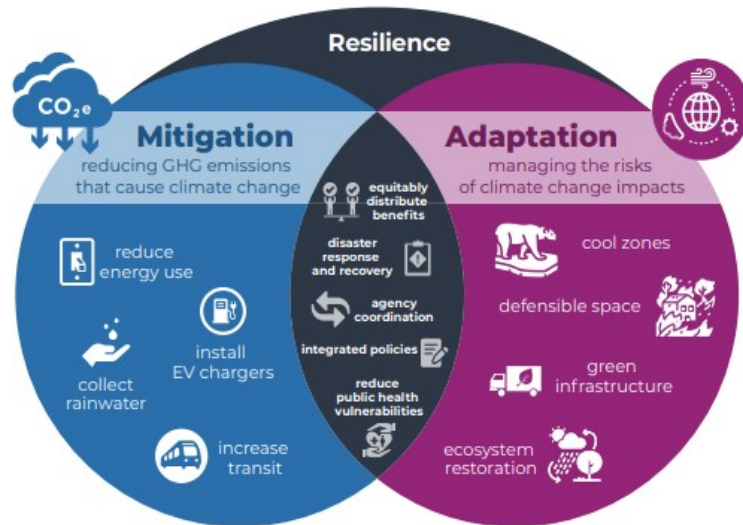
- 1 Introduction (Bob)
- 2 Climate Impacts: Planning for the Future (Julie)
- 3 Environmental Justice and Equity (Cary)
- 4 Planning and Implementation (Bob)

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Defining Our Terms: Mitigation and Adaptation



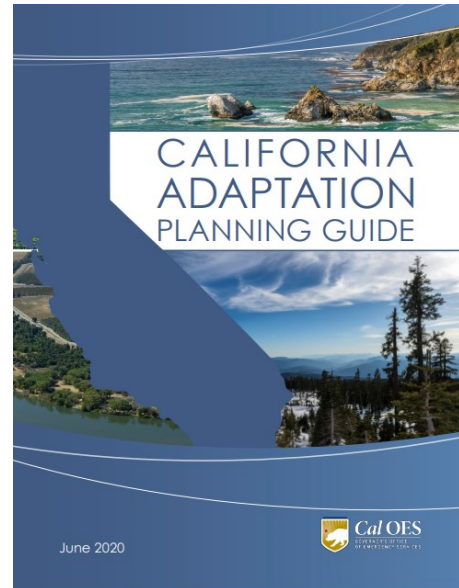
Source: 2021 SANDAG Regional Plan

Key Guidance Documents & Advisory Reports

Document	Agency/Organizations	Publication Date
State Guidance Documents		
<i>California Adaptation Planning Guide (APG)</i>	California Governor’s Office of Emergency Services	2020
<i>California General Plan Guidelines (GPG)</i>	California Governor’s Office of Planning and Research	2017
State Advisory Reports		
<i>Fourth California Climate Change Assessment: San Diego Region Report</i>	State of California / UC San Diego	2018 2018
<i>California Water Resilience Portfolio</i>	California Department of Water Resources	2020
Advisory Reports from Regional Public Agencies		
<i>SANDAG Regional Plan - Climate Change White Paper</i>	San Diego Association of Governments	2018
<i>San Diego Integrated Regional Water Management Plan (SDIRWM)</i>	San Diego County Water Authority	2020
Advisory Reports from the American Planning Association (APA)		
<i>Regional Water Planning for Climate Resilience</i>	APA Regional and Intergovernmental Planning Division Report	2019
<i>Planning for Infrastructure Resilience</i>	APA Planning Advisory Service Report	2020

CALIFORNIA ADAPTATION PLANNING GUIDE: HIGHLIGHTS

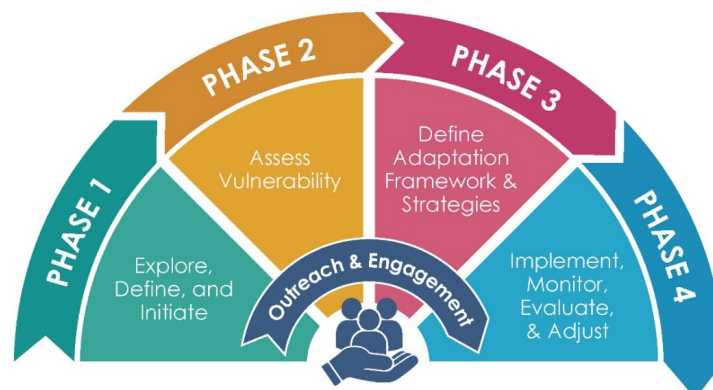
- Published by **Governor's Office of Emergency Services (OES)** in 2020
- Defines State's eleven *Climate Adaptation Sectors*
- Gives guidance on *Climate Adaptation Planning Process*
- Provides examples of:
 - Vulnerability Assessments
 - Adaptation Strategies
 - Implementing Actions
 - Performance Monitoring



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Climate Adaptation Planning Process



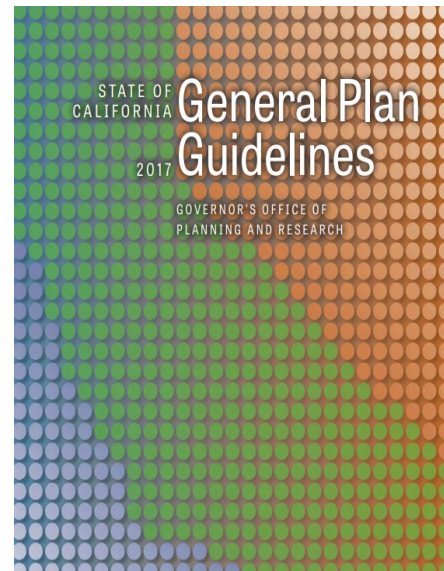
Source: *California Adaptation Planning Guide*, p. 2

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CALIFORNIA GENERAL PLAN GUIDELINES: HIGHLIGHTS

- Updated by **Governor's Office of Planning and Research (OPR)** in 2017
- **Definitions and standards** for:
 - General Plans
 - Community Plans
 - Development Regulations
- **Mandatory General Plan Elements:**
 - **Safety Element** is "home" for climate adaptation planning policies
- Supplement on **Environmental Justice Elements** (2020)



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SAN DIEGO REGION REPORT: HIGHLIGHTS

- One of nine *Region Reports* produced by the State in 2018 in conjunction with *California's Fourth Climate Change Assessment*
- Project was led by climate scientists at Scripps Institution of Oceanography (UC San Diego), with a team of local and regional scientists, planners, and technical experts
- Provides regional-scale analysis of climate change impacts and adaptations on:
 - San Diego Coasts
 - Lands
 - Infrastructure and Services
 - Health and Vulnerable Communities
 - Cross-border Climate Interaction

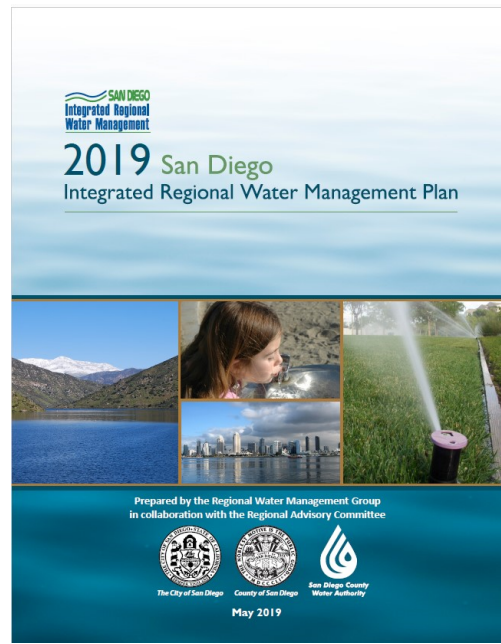
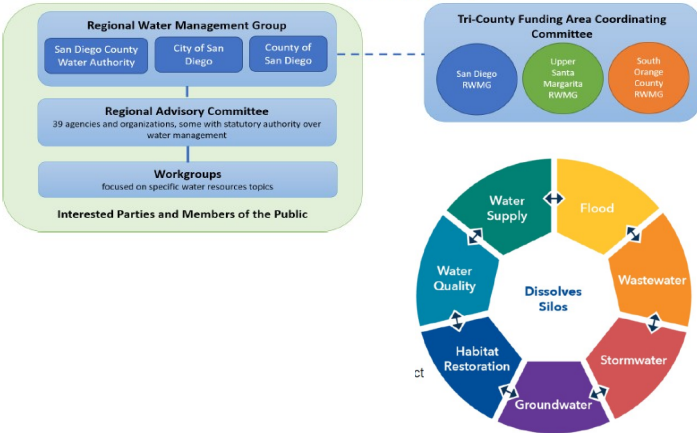


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2019 SAN DIEGO INTEGRATED REGIONAL WATER MANAGEMENT PLAN: HIGHLIGHTS

Figure 6-2: San Diego IRWM Governance Structure



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2019 IRWM Plan Highlights – Climate Change

Table 7-17: Prioritized Climate Change Vulnerability Issues

Priority Level	Category and Vulnerability Issue
Very High	Water Supply: Decrease in imported supply
High	Water Supply: Sensitivity due to higher drought potential Water Quality: Increased constituent concentrations Flooding: Increases in flash flooding and inundation (extreme weather) Ecosystem/Habitat: Decrease in available necessary habitat Sea Level Rise: Inundation of storm drains and sewer systems Ecosystem/Habitat: Decrease in ecosystem services Water Supply: Lack of groundwater and surface water storage* to buffer drought Ecosystem/habitat: Decrease in environmental flows (e.g., stream flows)
Medium	Water Demand: Crop demand would increase Water Demand: Industrial demand would increase Water Supply: Decrease in groundwater supply Water Quality: Increase in treatment cost due to water quality impacts to reservoirs Sea Level Rise: Damage to coastal recreation / tourism due to inundation Water Quality: Increased eutrophication
Low	Water Demand: Limited ability to conserve further Flooding: Increases in inland flooding Ecosystem/Habitat: Increased impacts to coastal species Sea Level Rise: Damage to ecosystem/habitat
Very Low	Water Demand: Limited ability to meet summer demand Water Supply: Invasive species can reduce supply available Water Quality: Decrease in recreational opportunity Sea Level Rise: Decrease in land Hydropower: Decrease in hydropower potential

*The Region's current storage capacity is sufficient; however, it lacks the ability to connect and convey water stored in some regional reservoirs.

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2019 IRWM Plan Highlights – Climate Change

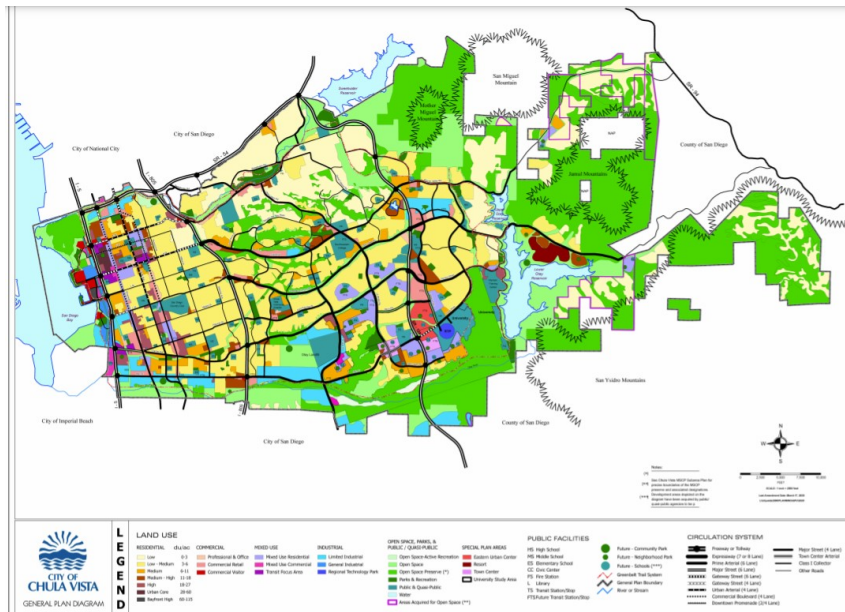
Table 7-18: Climate Change Management Strategies

Tier 1		
<ul style="list-style-type: none"> Urban water use efficiency Crop idling for water transfers Education Gray water use Rainfed agriculture Conveyance – Regional/local System reoperation Conjunctive management & groundwater storage Recycled municipal water Drinking water treatment and distribution 	<ul style="list-style-type: none"> Groundwater/aquifer remediation Pollution prevention Salt and salinity management Urban runoff management Flood risk management Agricultural lands stewardship Economic incentives Ecosystem restoration Land use planning and management Recharge area protection 	<ul style="list-style-type: none"> Water-dependent recreation protection Watershed/soils/forest management Water-dependent cultural resources and practices preservation Increase urban forest management Building water facilities in coordination with land use/sea level rise planning
Tier 2		
<ul style="list-style-type: none"> Conduct emissions inventory and target Increase use of renewable energy courses Surface storage – Regional/local 	<ul style="list-style-type: none"> Protective infrastructure Sediment management Protect water facilities through the relocation or removal of vulnerable structures 	<ul style="list-style-type: none"> Protect resources and facilities by constructing seawalls or levees Protect/restore/create coastal wetlands
Tier 3		
<ul style="list-style-type: none"> Water meters installation Treatment and distribution efficiency Water transfers 	<ul style="list-style-type: none"> Localized treatment Shift water use to off-peak hours Optimize sewer systems 	<ul style="list-style-type: none"> Desalination Indirect potable reuse/Potable reuse

General Plans

Mandatory Elements:

- *Safety*
- *Environmental Justice*
- Land Use
- Circulation
- Housing
- Conservation
- Open Space
- Noise



Climate Impacts: Planning for the Future and Collaborative Planning

Julie Kalansky, Ph.D.



Climate Change in San Diego: Extreme Heat

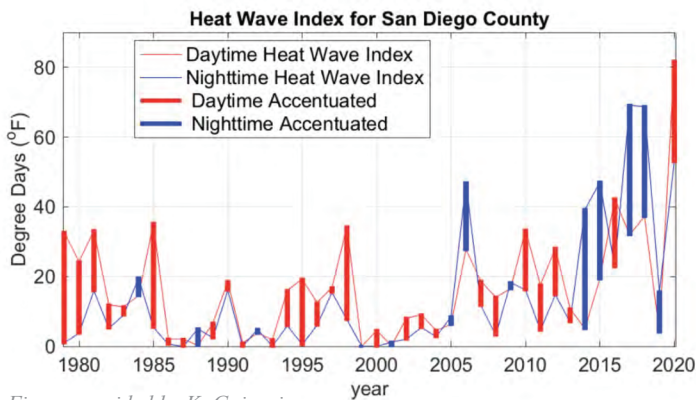
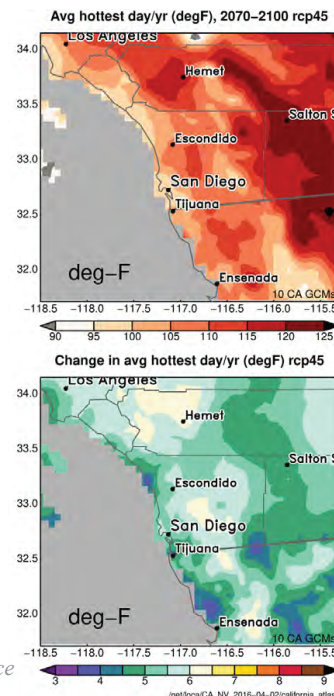


Figure provided by K. Guirguis

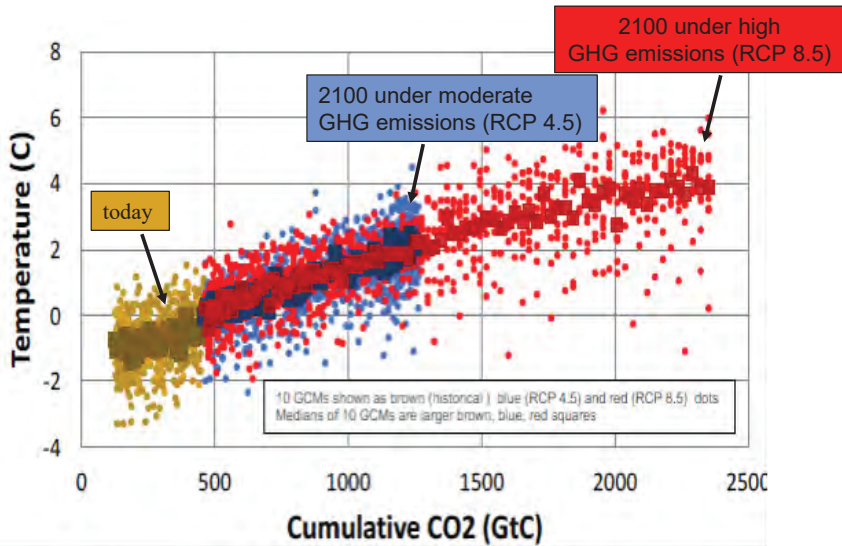


Average Hottest Day per Year at the end of Century
RCP 8.5 ~2-4°F more

Figures provided by D. Pierce



What we do NOW matters



Franco et al. 2018, Fourth California Climate Change Assessment

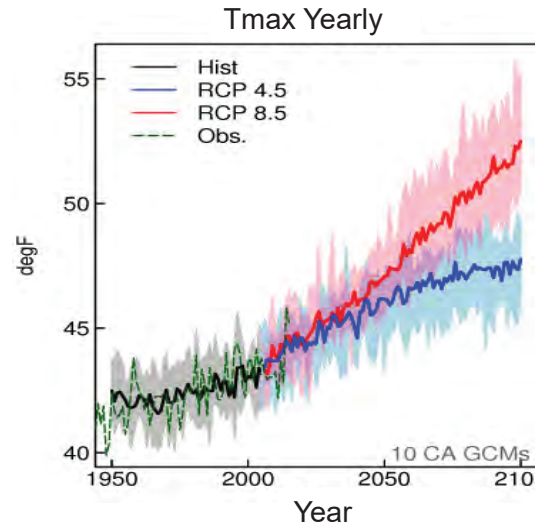


Figure provided by D. Pierce

Climate Change in San Diego: Precipitation Extremes

COEFFICIENT OF VARIATION OF WATER-YR PRECIPITATION

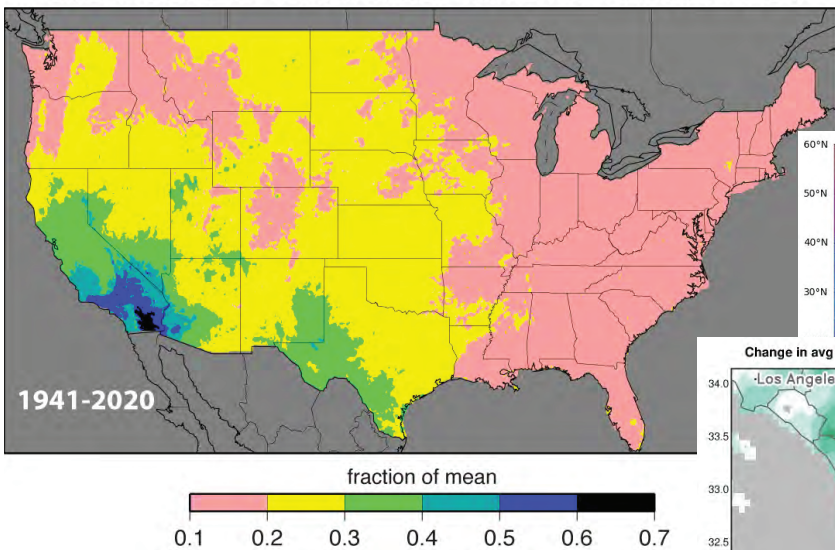
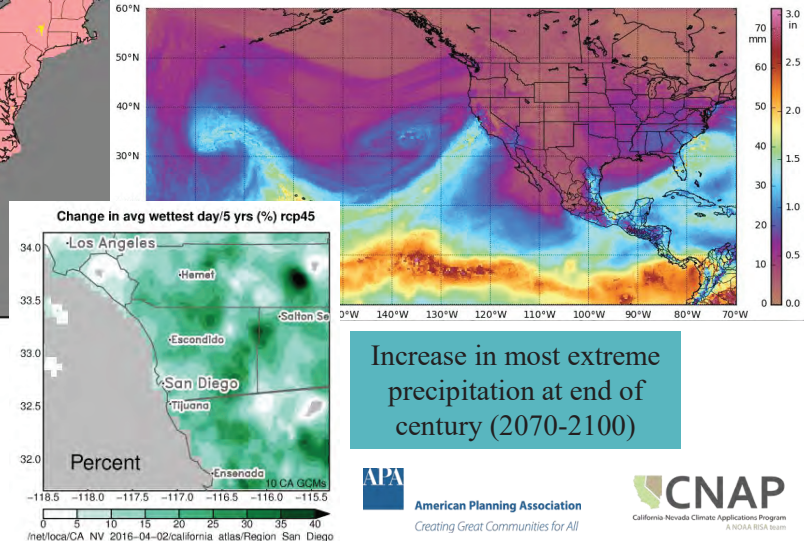


Figure provided by M. Dettinger

Projections show **increased** precipitation variability in the future

Precipitable Water; March 20, 2018



Increase in most extreme precipitation at end of century (2070-2100)

Climate Change in San Diego: Seasonal Changes

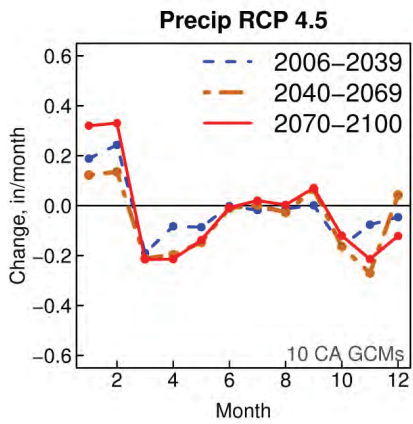


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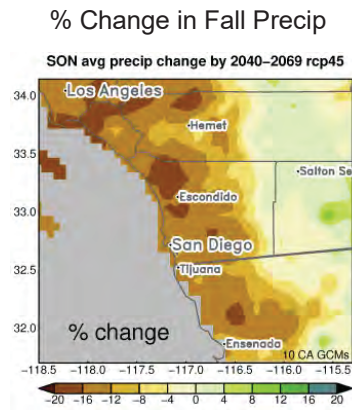
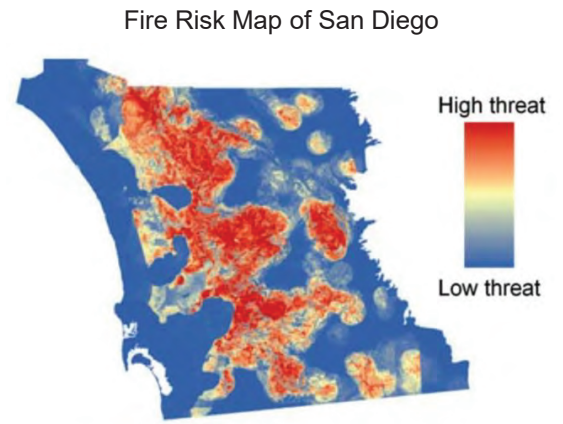
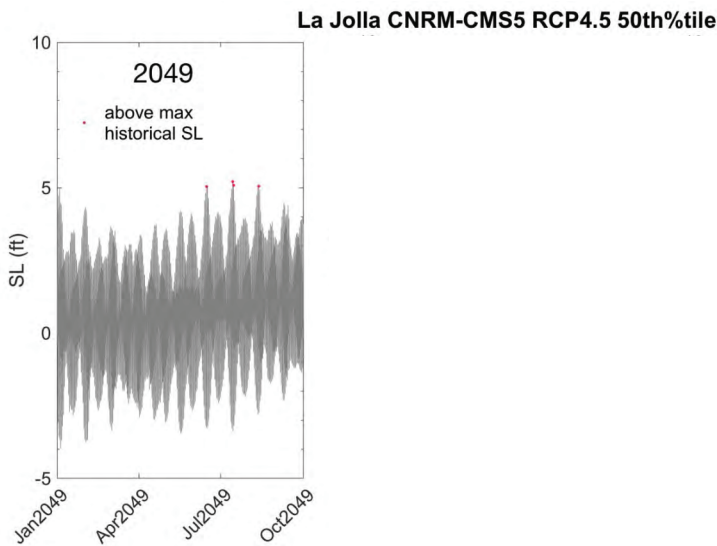


Figure provided by D. Pierce

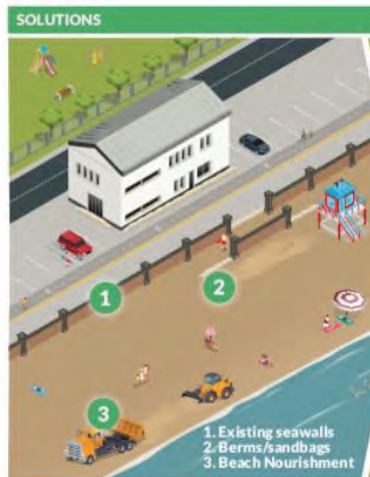


Syphard et al., 2012

Climate Change in San Diego: Sea Level



Climate Change in San Diego: Sea Level



2020 OUTCOMES: TODAY
Existing infrastructure, beaches, and natural resources are protected while long-term shoreline management plans are outlined.

<https://cnap.ucsd.edu/sea-level-rise-adaptation-and-planning/>



Compounding Extremes

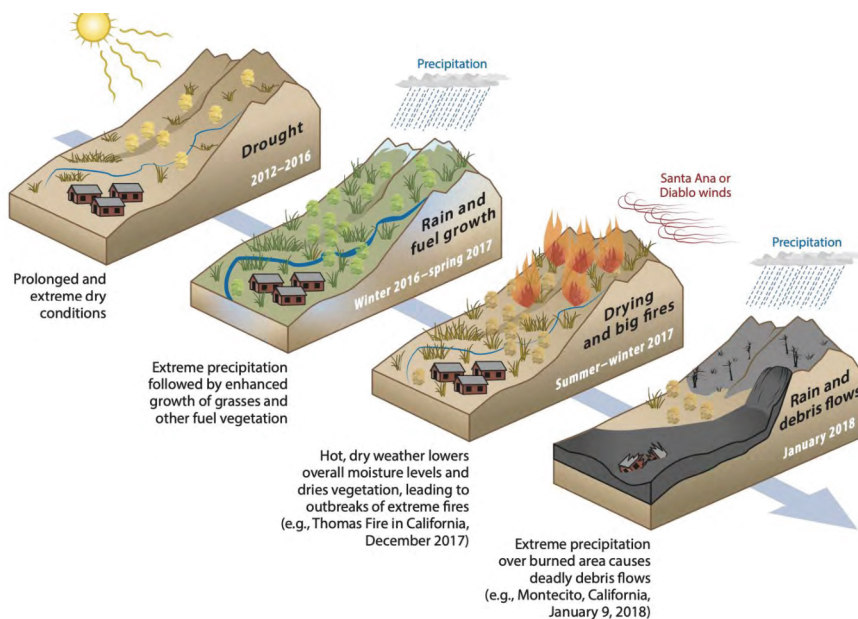


Figure from AghaKouchak et al., 2020

Other Examples

- Co-occurrence of Heatwaves and Fires
- Co-occurrence of Coastal and Inland flooding (Urban flooding)
- Sequential Drought and Wildfire



Collaborative Planning

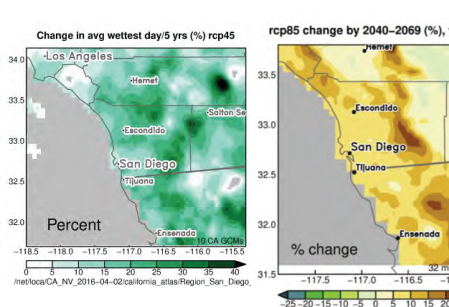
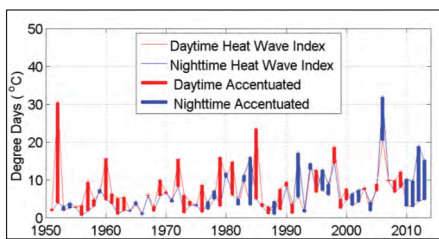
Types of Organizations

- Public Agencies and Other Service Providers
 - *often responsible for developing and implementing the plans*
- Tribal Nations
- Research Organizations
- Boundary Spanning Organizations
- Community Groups
- Education Groups
- Advocacy Groups
- Outreach Groups



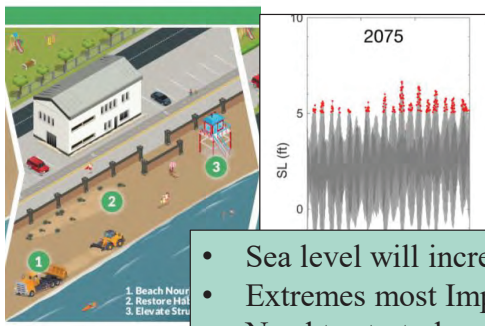
San Diego Climate Summit

Summary



- Extreme precipitation drives year-to-year variability
- Increase variability in future projections
- Wet days wetter, more extreme drought
- Drier spring and fall

- Temperatures will increase
- Heat waves will become more extreme



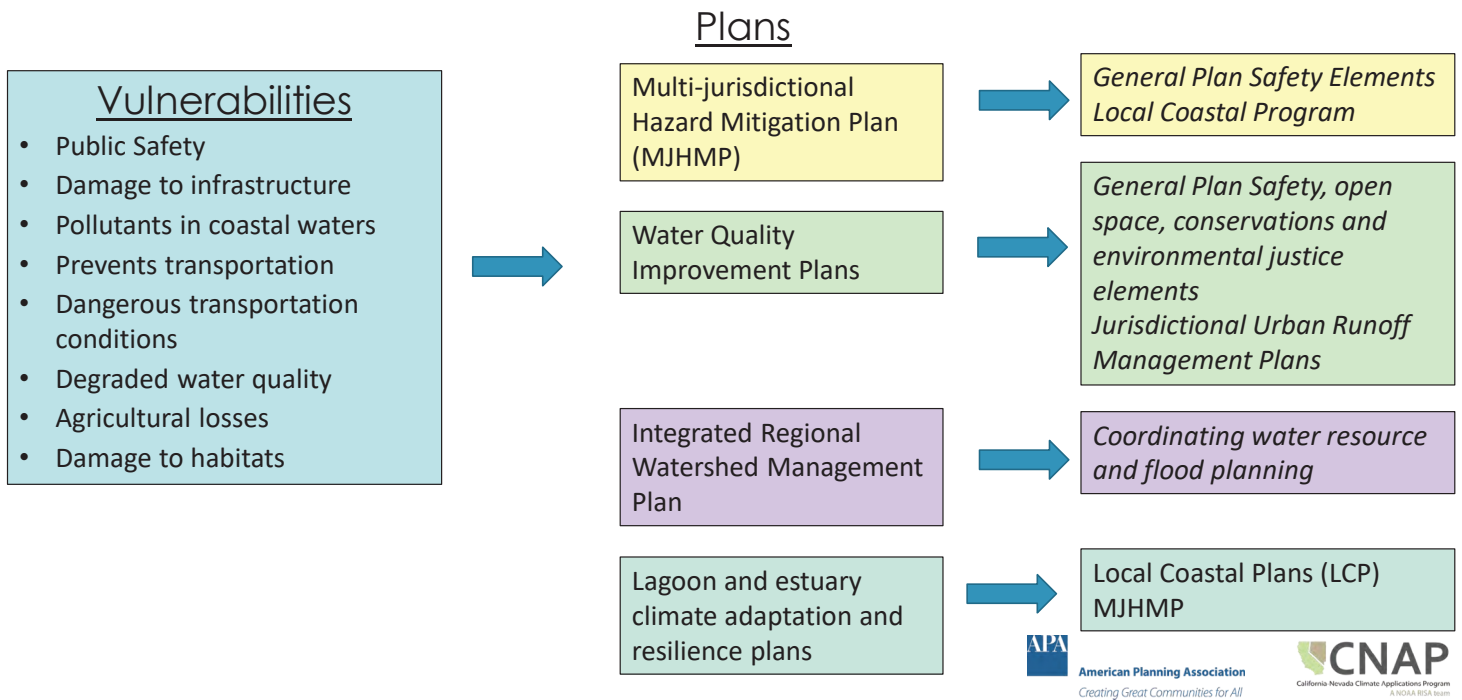
- Sea level will increase
- Extremes most Impactful in near term
- Need to start planning now

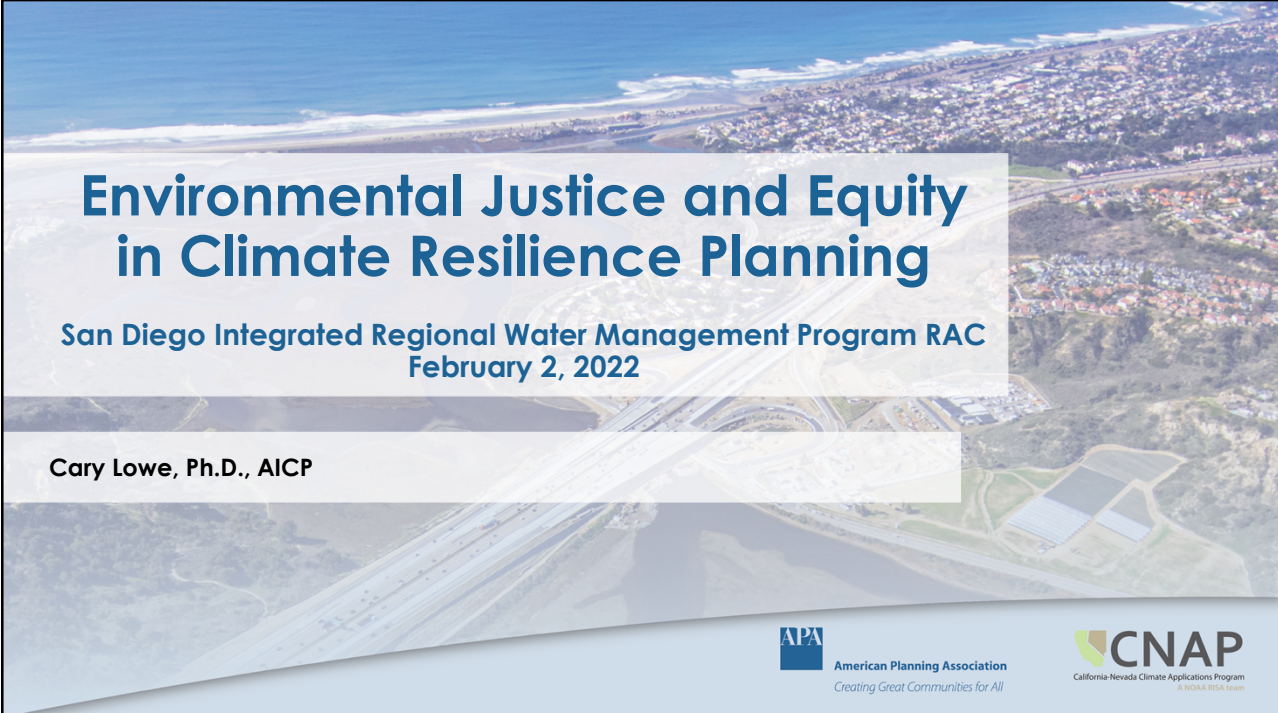
Thank you!
 jkalansky@ucsd.edu



Collaboration and Engagement are really important

Case Study: Urban Flooding (coastal and inland flooding)







Environmental Justice and Equity in Climate Resilience Planning

San Diego Integrated Regional Water Management Program RAC
February 2, 2022

Cary Lowe, Ph.D., AICP


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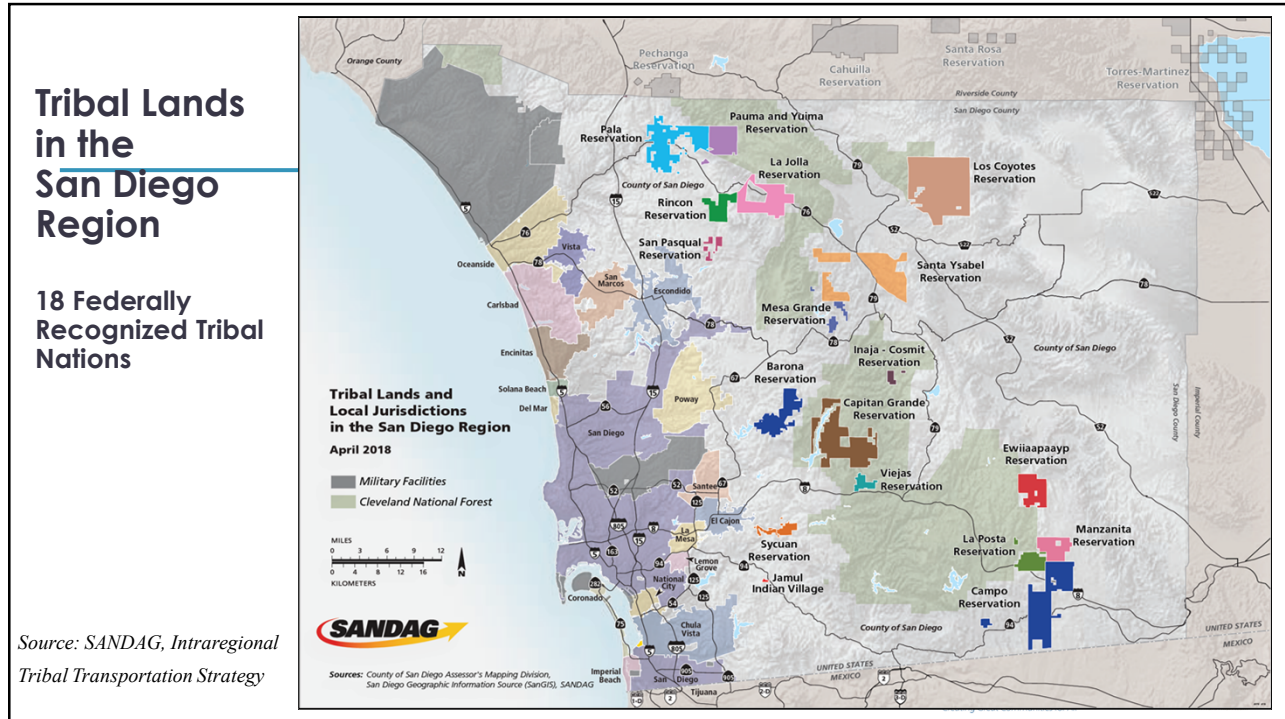
Environmental Justice and Equity

- What?
 - Disadvantaged communities (Cal EPA Enviroscreen)
 - Environmental justice communities (broader definition)
 - Especially vulnerable to climate change impacts due to prevailing conditions
- Why?
 - Historical inequities, lasting effects
 - Neglect by planners
 - Diversion of resources by public officials
 - Avoidance by financial institutions
- Special Consideration for Tribal Nations

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Source: SANDAG, *Intraregional Tribal Transportation Strategy*

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RESULTS

Reduced resilience, vulnerability to compounding extremes

Conflicting Land Uses

Environmental Degradation

Barrio Logan
Photo Credit: Environmental Health Coalition

Chollas Creek, San Diego
Photo Credit: Phys.org

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Flooding



San Diego
Photo Credit: Times of San Diego

Lack of Shade / Excess Pavement



City Heights, San Diego
Photo Credit: San Diego Reader



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Substandard Infrastructure



Borrego Springs
Photo Credit: East County Magazine

Sea Level Rise



Imperial Beach
Photo Credit: KPBS



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Mandates for Action Hierarchy of Legal Requirements

- US and California Constitutions
- Presidential Executive Orders (Clinton & Biden)
- Federal and California Civil Rights Laws
- **California Land Use Statutes
(Planning & Zoning Law, CEQA)**
- ARB Cap & Trade Investment Requirements



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Consequences of Noncompliance

- Legal – General Plan Challenges
Challenges to Project Approvals
- Financial – Remedial Expenses
- Political -- Public Support for Greater Equity



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Achieving Equity (California Adaptation Planning Guide)

- Procedural Equity -- process
- Distributional Equity -- resource allocation
- Structural Equity -- underlying conditions
(more detail on all in report)

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How?

Make Environmental Justice an **Overarching Consideration**

Regional Plans

General Plans (including Environmental Justice Elements, Safety Elements)

Community Plans

Climate Action Plans (resilience/adaptation in addition to ghg reduction)

Capital Improvement Plans

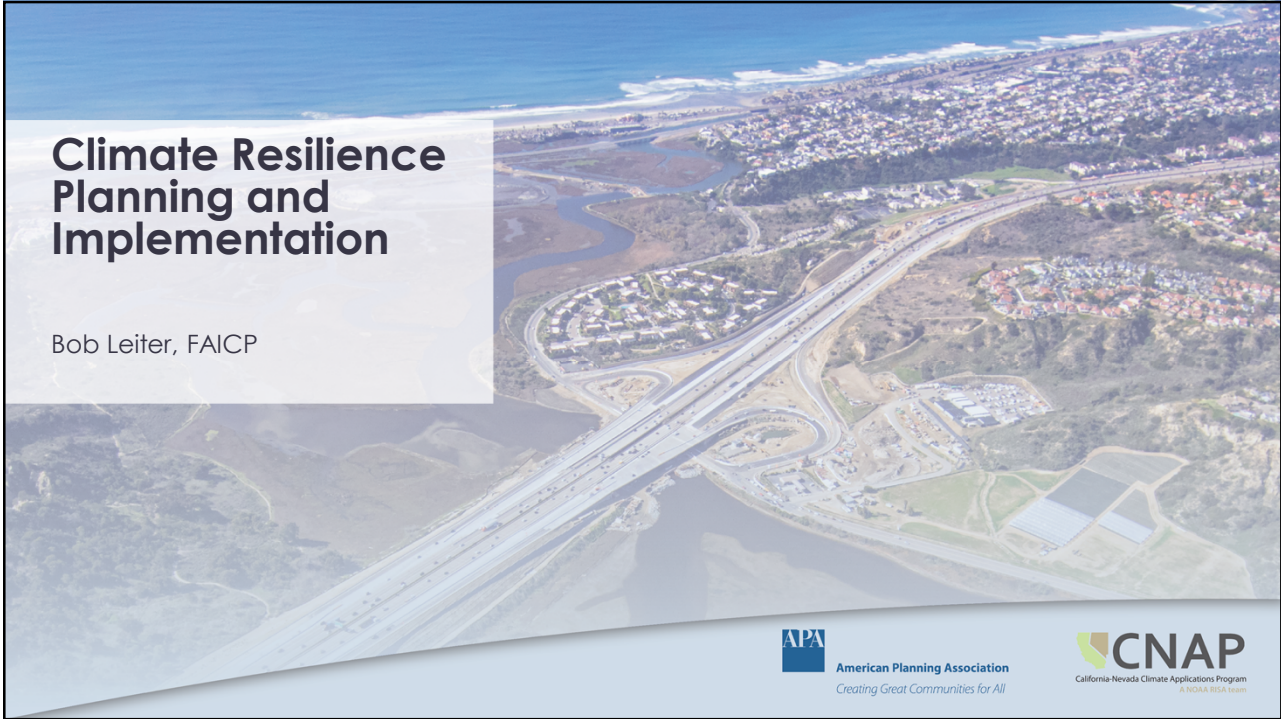
Resource Plans

Public Health and **Hazard Mitigation Plans**

Budgets & Other Funding Plans (e.g., Cap & Trade Auction Proceeds)

Enforcement of Equitable Lending/Investment Laws (e.g., CRA)

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Climate Resilience Planning and Implementation

- A** Plans Requiring Climate Impact Analysis
- B** Proposed Planning Framework and Process
- C** Essential Engagement and Other Considerations
- D** Future Actions – What’s Next?

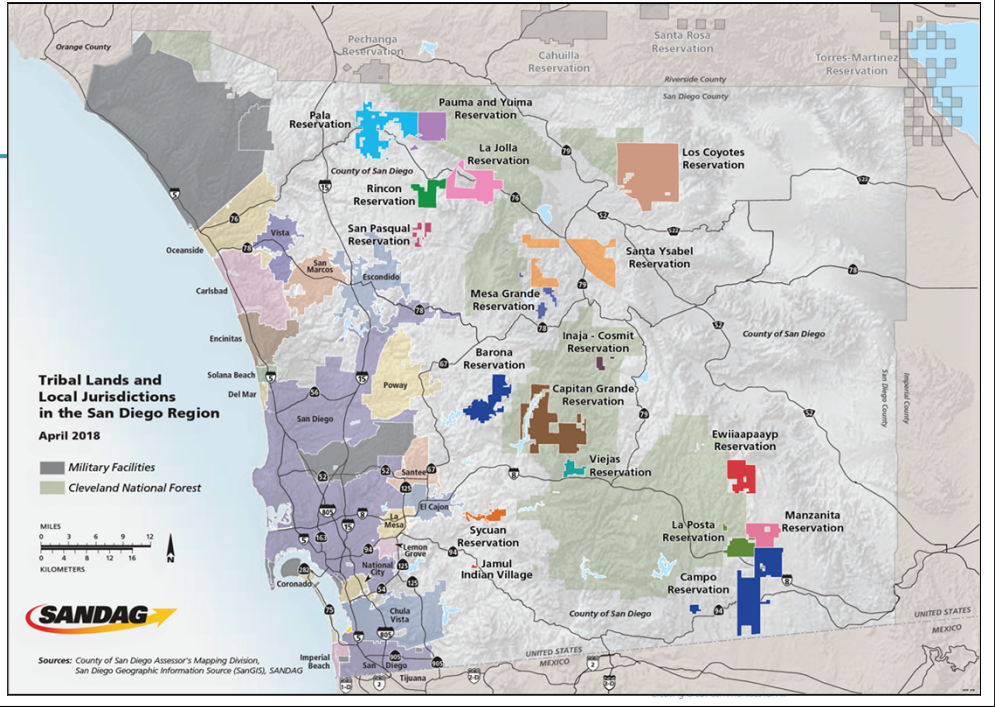
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The San Diego Region



3

Regional and Subregional Plans

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



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Member Agencies

- 1 Carlsbad Municipal Water District
- 2 City of Del Mar
- 3 City of Escondido
- 4 Fallbrook Public Utility District
- 5 Helix Water District
- 6 Lakeside Water District
- 7 City of National City*
- 8 City of Oceanside
- 9 Olivenhain Municipal Water District
- 10 Otay Water District
- 11 Padre Dam Municipal Water District
- 12 Camp Pendleton Marine Corps Base
- 13 City of Poway
- 14 Rainbow Municipal Water District
- 15 Ramona Municipal Water District
- 16 Rincon del Diablo Municipal Water District
- 17 City of San Diego
- 18 San Dieguito Water District
- 19 Santa Fe Irrigation District
- 20 South Bay Irrigation District*
- 21 Vallecitos Water District
- 22 Valley Center Municipal Water District
- 23 Vista Irrigation District
- 24 Yuma Municipal Water District

* The Sweetwater Authority is a service organization for the city of National City and the South Bay Irrigation District

REGIONAL WATER MANAGEMENT PLAN

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REGIONAL AND SUBREGIONAL WATER QUALITY PLANS


- Water Quality Control Plan for the San Diego Basin (Basin Plan)
- Watershed Management Area Water Quality Improvement Plans (WQIPs)


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REGIONAL AND SUBREGIONAL HABITAT CONSERVATION PLANS

- San Diego Multiple Species Conservation Program (MSCP)
- MSCP Subregional Planning Area Programs

Source: County of San Diego

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City and County General Plans

Mandatory Elements (all local governments):


Safety Element
Government Code Section 65302 (g)


- SB 379
- SB 1241
- SB 99
- SB 1035

Environmental Justice Element
Government Code Section 65302 (h)

- SB 1000

Local Coastal Programs (coastal jurisdictions):
May require amendments to various General Plan elements

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Safety Element

Purpose:

“To include safety considerations in the planning and decision-making process by establishing policies related to future development that will minimize the risk of personal injury, loss of life, property damage, and environmental damage associated with natural and human-caused hazards.”

Scope:

- Hazard Mitigation Planning and Disaster Preparedness
- Evacuations
- Fire Protection and Emergency Response
- Geological and Seismic Hazards
- Flooding
- Climate Change
- Hazardous Materials
- Law Enforcement
- Airport Hazards

Source: County of San Diego, Safety Element, pp. 7-2 to 7-3

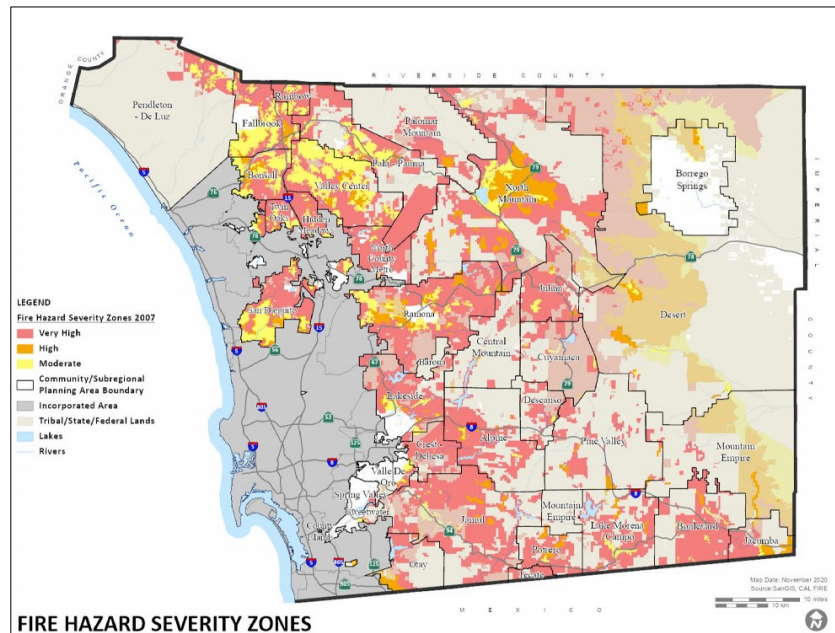
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Fire Hazard Severity Zone Map

(County of San Diego Unincorporated Areas)



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Environmental Justice Element

Required when the following criteria are met (SB 1000):

1. The city or county determines that it contains a *disadvantaged community*; and
2. The jurisdiction adopts or revises two general plan elements concurrently.

EJ Element must address:

- Pollution exposure and air quality
- Public facilities
- Food access
- Safe and sanitary homes
- Physical activity
- Community engagement
- Improvements and programs that address needs of disadvantaged communities

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Proposed Planning Framework

Factors Considered:

- State and Federal Laws
- State General Plan Guidelines
- State Climate Adaptation Planning Sectors (APG)
- *APA Sustaining Places* Comprehensive Planning Framework

Framework Components:

- Integration Across Topical Focus Areas
- Integration Across Scales (Regional – Local)
- *Environmental Justice and Equity* as Overarching Consideration

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State's Climate Adaptation Sectors

↓

Topical Focus Areas

	Infrastructure	Natural Resources	Coastal Resources	Public Health and Safety
Emergency Management	X			X
Energy	X			
Land Use / Community Development	X			
Public Health				X
Transportation	X			
Agriculture		X		
Biodiversity / Habitat		X		
Forests		X		
Ocean and Coast			X	
Water	X	X		
Parks, Recreation and California Culture	X	X	X	X

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Proposed Planning Framework

Environmental Justice and Equity

FOCUS AREAS				
	Infrastructure	Natural Resources	Coastal Resources	Public Health & Safety
REGIONAL & SUBREGIONAL SCALE				
LOCAL SCALE				

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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.*

ENVIRONMENTAL JUSTICE AND EQUITY
Plans Requiring Climate Analysis

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

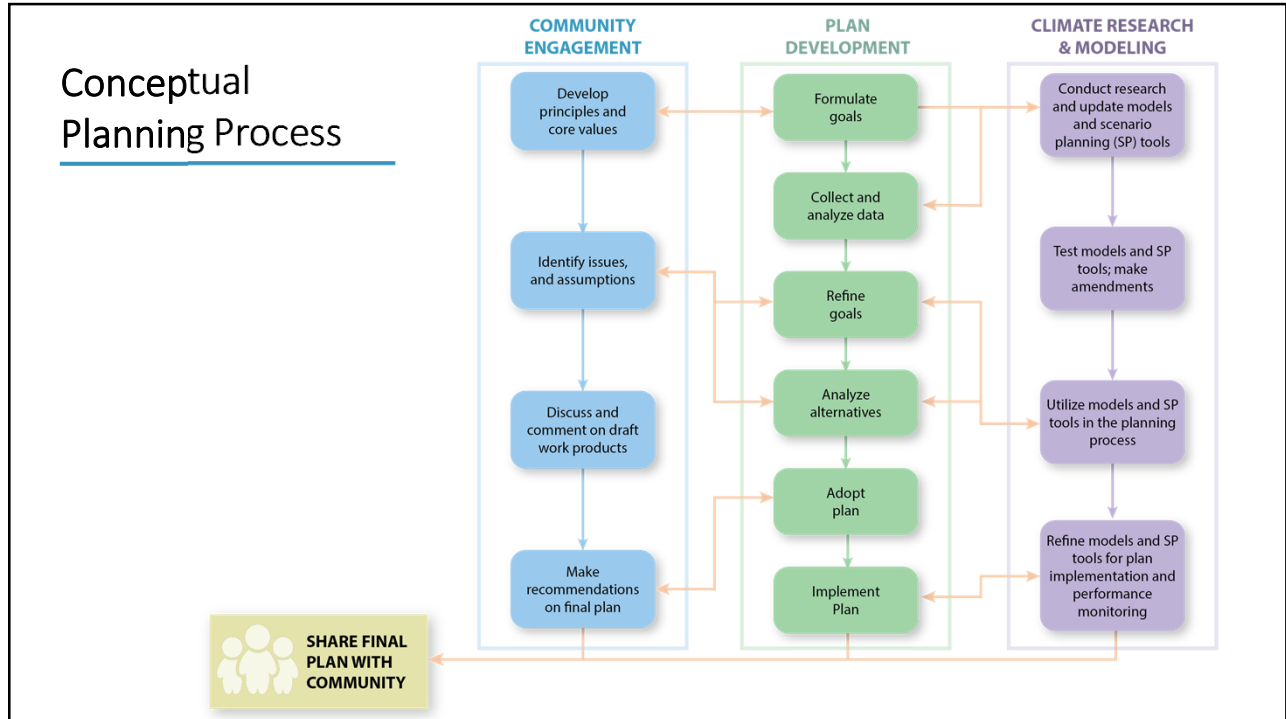
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Conceptual Planning Process

Factors Considered:

- Plan Development Process
 - Climate Adaptation Planning Process (APG)
 - General Plan Development Process (GPG)
- Community Engagement
- Climate Science Research and Modeling:
 - Regional and Subregional Scale (analytical and forecasting models)
 - Local government scale (down-scaled results)

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Essential Engagement

Key Players

- Public agencies and other service providers
- Tribal nations
- Research organizations (universities)
- Community Education, Advocacy and Outreach Groups

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Essential Engagement: Boundary-Spanning Organizations

San Diego Regional Climate Collaborative

- Adaptation Planning Group
- Sea Level Rise Group



Climate Science Alliance of Southern California

- Tribal Working Group
- Connecting Wildlands and Communities Project



Other Important Considerations

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 – What's Next?

- 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.

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Questions?

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COLLABORATIVE PLANNING FOR CLIMATE RESILIENCE

An Integrated Science-based Framework for the San Diego Region



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