



Planning and Investing in a Changing Climate: Policy Framework and Implementation of EO B- 30-15

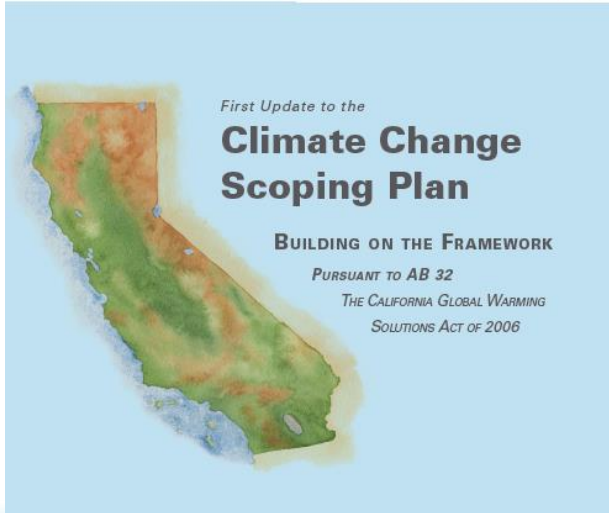
Nuin-Tara Key
Governor's Office of Planning and Research

Presentation to CA HSR Authority Board of Directors
Transit-Land Use Committee Meeting

January 16, 2018



Reducing Emissions



Preparing for Impacts

DRAFT REPORT Safeguarding California Plan: 2017 Update

California's Climate Adaptation Strategy



Research





STATE ADAPTATION FRAMEWORK

Preparing for Impacts

DRAFT REPORT
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Recent State Legislation

Legislation	Direction
SB 379	Requires climate change to be addressed in the Safety Element of General Plans
SB 246	Creates the Integrated Climate Adaptation and Resilience Program at OPR, which includes: <ul style="list-style-type: none">• Technical Advisory Council• Clearinghouse of information
AB 1482	<ul style="list-style-type: none">• Requires updating of Safeguarding every three years• Expands review authority of the Strategic Growth Council to include climate adaptation and non-member agencies
AB 2800	Establishes the Climate Smart Infrastructure Working Group



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Coordination and alignment

Integrated Climate Adaptation and Resiliency Program (ICARP)

Purpose

Coordinate state, tribal, local, and regional activities with a focus on **local implementation**

Cross-cutting objectives

Advance **equity and environmental justice**

Support an **integrated** approach to climate change (adaptation and mitigation)

Programmatic elements

Adaptation Clearinghouse

Technical Advisory Council (TAC)



STATE ADAPTATION FRAMEWORK

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DRAFT REPORT **Safeguarding California Plan:** **2017 Update**

California's Climate Adaptation Strategy



State Activities

- Infrastructure
- Operations
- Funding Programs
- Planning
- Guidance

Local and Regional Activities

- General Planning
- Adaptation Planning Guide
- Regional Collaboratives

Research and Tool Development

- Fourth Climate Change Assessment
- Cal Adapt

Safeguarding California



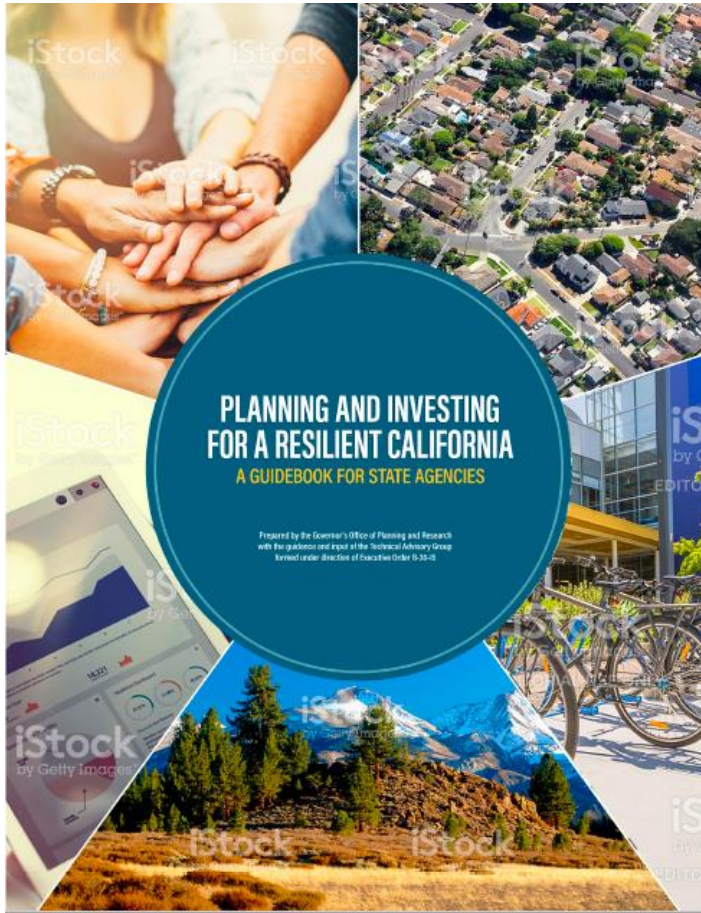
Executive Order B-30-15

- State agencies shall take climate change into account in their planning and investment decisions, and employ full life-cycle cost accounting to evaluate and compare infrastructure investments and alternatives.
- State agencies' planning and investment shall be guided by the following [principles](#)
 - Priority should be given to actions that both build climate preparedness and reduce greenhouse gas emissions;
 - Where possible, flexible and adaptive approaches should be taken to prepare for uncertain climate impacts;
 - Actions should protect the state's most vulnerable populations; and
 - Natural infrastructure solutions should be prioritized.
- The state's Five-Year Infrastructure Plan will take current and future climate change impacts into account in all infrastructure projects





EO B-30-15 Technical Advisory Group



- Roughly 50 members
- Met from March 2016-January 2017
- Workgroups:
 - Scenarios
 - Community Development and Equity
 - Infrastructure
 - Metrics
- Product: Guidebook for State Agencies
 - What to plan for
 - How to plan differently
- Available online:
http://opr.ca.gov/docs/20171117-Building_a_Resilient_CA.pdf



What is a Resilient California?

In a resilient California:

- Built infrastructure systems can withstand changing conditions and shocks, including changes in climate conditions, while continuing to provide critical services;
- People and communities can respond to changing average conditions, shocks, and stresses in a manner that minimizes risks to public health, safety, and economic disruption; and maximizes equity and protection of the most vulnerable so that they do not simply survive climate-related events, but thrive despite and after these events; and
- Natural systems can adjust and maintain functioning ecosystems in the face of change.





Building Resilience – 2 Dimensions

Planning Differently

- Flexibility
- Multi-attribute
- Systems thinking

Planning for a Different Future

- Changing climate conditions
- Averages and extremes





A Process for State Agencies

Step 1:

Identify how climate could affect your project or plan

- Identify impacts of concern
- Identify climate-sensitive planning parameters
- Identify metrics to track performance of plan or investment under changing climate

Step 2:

Select an analytical approach to integrate climate change

- Consider the scale, scope, and context of climate disruption
- Select climate change scenarios and analytical approach for planning and design

Step 3:

Make a climate informed planning or investment decision

- Evaluate alternatives or design
- Apply resilient decision-making principles

Step 4:

Track and monitor progress, adjust as needed

- Evaluate metrics to track progress
- Implement adaptive management approaches



Understanding Impacts – Quantity and Quality

- Project Lifetime: The useful life of a project is important for identifying climate impacts of concern, considering both changing average conditions, occurrence of extreme events, and the pace of change.
- Scale and Scope of Risk: Consider the criticality or consequence of disruption to understand the scale and scope of the risk posed by changing climate conditions and extreme events.
- Vulnerability and Adaptive Capacity: Identify who and what is affected by climate-related disruptions to determine the vulnerability and adaptive capacity of the people, places and resources affected.
- The Nature of the Risk: Consider how a climate-related disruption will affect the ability of people, places and resources affected to adapt, learn, and prepare for future conditions.



Working Under Uncertainty – Managing Risk

Selection of Climate Scenarios

Optimistic/Adaptive

- RCP 4.5 or 2.6
- Monitor and adjust
- Live with change

Adaptive

- Mid-range RCP
- Pathways

Precautionary

- RCP 8.5
- Sensitivity analysis with higher extremes



Considerations	Consequences of impact or disruption	Low: Minimum disruption, limited scale and scope	Medium: Inconvenience, but limited in scope and scale	High: Unacceptable risk and/or extensive scale and scope
	Nature of disruption	<ul style="list-style-type: none"> • Future flexibility maintained • People or systems readily able to respond or adapt 	<ul style="list-style-type: none"> • Limits future flexibility 	<ul style="list-style-type: none"> • Irreversible • Threat to public health and safety
	Who or what is affected?	<ul style="list-style-type: none"> • Low impact on communities, infrastructure, or natural systems 	<ul style="list-style-type: none"> • Communities, systems, or infrastructure readily able to adapt or respond to change 	<ul style="list-style-type: none"> • Vulnerable populations • Critical infrastructure • Critical natural systems • Areas of economic, historic, or cultural significance
	Economic Impacts	Low	Medium	High

Climate Tools

The tools featured here are built using LOCA downscaled CMIP5 climate change projections. If you are looking for our other Climate Tools (local snapshots, snowpack, wildfire, extreme heat) built with CMIP3 downscaled climate change projections visit cal-adapt.org.

ANNUAL AVERAGES



Explore charts of projected annual averages of maximum temperature, minimum temperature and precipitation for your location.

Sources: Pierce et al., 2014; Livneh et al., 2015

EXTREME HEAT



Explore charts of projected frequency and duration of extreme heat events for your location.

Sources: Pierce et al., 2014; Livneh et al., 2015

SEA LEVEL RISE - CalFloD-3D



Explore maps of inundation location and depths for San Francisco Bay Area, Sacramento - San Joaquin Delta and the California coast

SNOWPACK



View timelapse animation and monthly averages of projected Snow Water Equivalent, a common measurement for snowpack.



Working Under Uncertainty

Analytical Approach

Simplest

- Straight use of parameters
- Fewer models
- Limited characterization of uncertainty

More Robust

- More GCMs
- Consideration of more scenarios
- Sensitivity analysis

Most Robust

- Larger # GCMs
- More complete characterization of uncertainty



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Resilient Decision Making Principles

- Prioritize actions that promote integrated climate action
- Prioritize actions that promote equity and foster community resilience
- Coordinate with local and regional agencies
- Prioritize actions that utilize natural and green infrastructure solutions and enhance and protect natural resources
- Base all planning and investment decisions on the best-available science



THANK YOU

Contact Information

Nuin-Tara Key

Governor's Office of Planning and Research

916.322.6079

Nuin-Tara.Key@opr.ca.gov