

MEMORANDUM

DATE July 7, 2020

TO Whitney Wilkinson, County of Santa Barbara, Senior Planner

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SUBJECT Climate Change Vulnerability Assessment – List of Hazards

Introduction

The Santa Barbara County Climate Change Vulnerability Assessment (CCVA) is an effort to analyze how climate change may harm the community. This work is an opportunity to improve resiliency in the County in a holistic, thorough, and tailored way. The CCVA can serve as the foundation of policies to help safeguard Santa Barbara County against both current and future hazard conditions that are related to climate change. It may be used to support preparation of a stand-alone Adaptation Plan, an updated Seismic Safety and Safety Element of the County's Comprehensive Plan, or other documents, as relevant. The Seismic Safety and Safety Element can incorporate the CCVA to help meet state requirements under Senate Bill (SB) 379.

Method

CLIMATE SCENARIOS

The CCVA will be based on accurate and up-to-date information, including the State Cal-Adapt database, the California Adaptation Planning Guide, and the California 4th Climate Change Assessment. Many projections of climate change hazards rely on multiple scenarios that reflect different levels of how global greenhouse gas (GHG) emissions and atmospheric GHG concentrations may change over time. The Intergovernmental Panel on Climate Change (IPCC), an organization that represents the global scientific community about climate change uses Representative Concentration Pathways (RCPs) or climate scenarios. RCPs are labeled with different numbers (e.g., RCP 2.6, RCP 6, etc.) that refer to the increase in the amount of energy that reaches each square meter of Earth's surface under that scenario. The four RCPs include¹:

- » **RCP 2.6:** Under this scenario, global GHG emissions peak around 2020 and then decline quickly.
- » **RCP 4.5:** Under this scenario, global GHG emissions peak around 2040 and then decline.
- » **RCP 6:** Global emissions continue to rise until the middle of the century.

¹ IPCC, 2014: *Climate Change 2014: Synthesis Report*. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

» **RCP 8.5:** Global emissions continue to increase at least until the end of the century.

The Cal-Adapt database, which provides California-specific climate change hazard projections, uses RCP 4.5 for a low emissions scenario and RCP 8.5 for a high emissions scenario. The Governor's Office of Planning and Research *Planning and Investing for a Resilient California* recommends using RCP 8.5 for analyses considering impacts through 2050, as there are minimal differences between emission scenarios for the first half of the century. This guide also recommends using RCP 8.5 for late century projections, for a more conservative and risk-adverse approach.² The recently updated California Adaptation Planning Guide follows these recommendations. The PlaceWorks team will use the RCP 8.5 GHG emission scenario to input into global climate models on the Cal-Adapt database and other resources.

In accordance with Cal-Adapt guidance and best practices, the PlaceWorks team will model future conditions in Santa Barbara County using an average of multiple climate models to ensure accuracy of climate projections to the extent that data from multiple models are available. We anticipate using averages of the CanESM2 (average), CNRM-CS5 (cooler/wetter), HadGEM2-ES (warm/drier), and MIROC5 (complement) models³ where possible, as recommended by state guidance. However, the team can use other models where it makes sense to do so, if the models are fully vetted and appropriate for use.

TIME FRAMES

The CCVA will use climate data from two multi-decadal periods to account for interannual variability and appropriately characterize the climate for mid-century and late-century time horizons.⁴ For early-century projections, we will use projections from 2030 to 2050. For mid-century projections, we propose to use projections from the 2050 to 2070 timeframe. For late-century projections, we will use projections from the 2070 to 2100 timeframe.

List of Hazards to Include in the Santa Barbara County CCVA

The CCVA will consider the events or physical conditions that have the potential to cause harm or loss to be hazards and will emphasize changes to hazard frequency and severity due to climate change. Table 1 presents PlaceWorks' recommended hazards for inclusion in the CCVA.

The PlaceWorks team will obtain the related data needed for these items to conduct an effective analysis following review and approval of the list of hazards by County staff and the Core Team.

² Governor's Office of Planning and Research, "Planning and Investing for a Resilient California," 2018, http://opr.ca.gov/docs/20180313-Building_a_Resilient_CA.pdf.

³ Technical studies by the California Energy Commission identify these four models as "priority models" for the state, as they are the ones that are most accurate for California's climate conditions. Data produced by these four, along with six other suitable models, are available from the Cal-Adapt website.

⁴ California Governor's Office of Emergency Services. 2020. *California Adaptation Planning Guide*.

Table 1. List of Hazards

Hazard	Definition	Data Source	Mappable?
Agricultural Pests and Diseases	Pests and diseases that may affect crop plants and trees, cut flowers and nursery products, vineyards, and livestock.	<i>California 4th Climate Change Assessment, Santa Barbara County 2017 MJHMP, 2018 Agricultural Production Report.</i>	Yes
Coastal Storms	Coastal storms are storm events that occur along the shoreline and cause wave run-up and high storm surges that can lead to flooding and severe damage.	National Oceanic and Atmospheric Administration, U.S. Geologic Survey, Cal-Adapt, <i>Santa Barbara County Coastal Resiliency Project, Santa Barbara Area Coastal Ecosystem Vulnerability Assessment.</i>	Yes
Drought	A drought is where conditions are drier than normal for a long period of time, making less water available for people and ecosystems.	Cal-Adapt, <i>California 4th Climate Change Assessment, Integrated Regional Water Management Plan, Central Coast Region Water Resilience Portfolio, Climate and Land Use Change Impacts on Water Supplies: Vulnerability Assessment for the Central Coast Region, West Wide Drought Tracker.</i>	No
Dune and Bluff Erosion	Dune and bluff erosion are the processes that wear down or carry away rocks, soils, and sands from beaches and cliffs along the coast.	<i>California 4th Climate Change Assessment, United States Geologic Survey Coastal Change Hazards Portal, Santa Barbara County Coastal Resiliency Project, Santa Barbara Area Coastal Ecosystem Vulnerability Assessment.</i>	Yes
Extreme Heat	Extreme heat is when temperatures rise significantly above normal levels.	Cal-Adapt, <i>California 4th Climate Change Assessment, Santa Barbara County 2017 MJHMP.</i>	Yes
Inland Flooding	Inland flooding is when there is too much water on the ground to be carried away by drains, creeks, or rivers, or to soak into the soil.	2018 FEMA flood hazard maps, <i>Santa Barbara County 2017 MJHMP.</i>	Yes

Hazard	Definition	Data Source	Mappable?
Fog	Fog is a very low cloud—usually low enough to touch the ground—that forms when the air near the surface reaches the right temperature for water vapor in the air to condense into a cloud.	<i>California 4th Climate Change Assessment.</i>	No
Human Health Hazards	Human health hazards are bacteria, viruses, parasites, and other organisms that can cause diseases in people. Climate-related human health hazards are often diseases carried by animals that are considered pests, such as mice and rats, mosquitos, and ticks.	<i>California 4th Climate Change Assessment, Santa Barbara County 2017 MJHMP, Climate Change and Health Profile Report for Santa Barbara County.</i>	No
Landslides and Debris Flows	A landslide happens when a slope, like the side of a hill or mountain, becomes unstable, causing soil and rocks to slide down slope. A debris flow occurs when water begins to wash material from a slope or when water runs off a newly burned stretch of land, picking up speed and debris as it descends the slope. ⁵	California Geologic Survey, <i>Santa Barbara County 2017 MJHMP.</i>	Yes
Ocean Acidification	When the ocean absorbs a higher percentage of carbon dioxide from the atmosphere, increasing the acidity of the ocean, harming commercial fisheries and farmed shellfish. ⁶	<i>California 4th Climate Change Assessment, Santa Barbara Area Coastal Ecosystem Vulnerability Assessment.</i>	No

⁵ Santa Barbara Office of Emergency Management. 2017. *2017 Santa Barbara County Multi-Jurisdictional Hazard Mitigation Plan*. <http://www.countyofsb.org/ceo/asset.c/3416>.

⁶ Bedsworth, Louise, Dan Cayan, Guido Franco, Leah Fisher, Sonya Ziaja. (California Governor’s Office of Planning and Research, Scripps Institution of Oceanography, California Energy Commission, California Public Utilities Commission). 2018. Statewide Summary Report. *California’s Fourth Climate Change Assessment*. Publication number: SUMCCCA4-2018-013.

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LIST OF HAZARDS

Hazard	Definition	Data Source	Mappable?
Sea-Level Rise	Sea-level rise is the gradual rise of the ocean surface.	National Oceanic and Atmospheric Administration, U.S. Geologic Survey, Cal-Adapt, <i>Santa Barbara County Coastal Resiliency Project</i> , <i>Santa Barbara Area Coastal Ecosystem Vulnerability Assessment</i> .	Yes
Severe Weather	Severe weather includes intense winds, lightning, hail, frost, and related events.	<i>California 4th Climate Change Assessment</i> , <i>Santa Barbara County 2017 MJHMP</i> .	No
Wildfire	Wildfires are fires burning in vegetated areas, although they can spread into developed areas between urbanized and wildland areas (called the wildland-urban interface) where they can do damage to people and property. Air quality hazards can arise through the smoke and ash generated by wildfires, including regional wildfires outside of the County.	California Department of Forestry and Fire Protection, Cal-Adapt, <i>Santa Barbara County 2017 MJHMP</i> , <i>Santa Barbara County Fire Department Unit Strategic Fire Plan</i> .	Yes