

Defining Vulnerable Communities in the Context of Climate Adaptation

The following material is presented for the ICARP Technical Advisory Council's consideration and discussion, including:

1. A draft definition of climate vulnerability
2. A summary of existing state-wide assessment tools that can be used to evaluate climate vulnerability
3. Additional indicators that could be used to assess underlying vulnerability on a case-by-case basis
4. An Equity Checklist that may provide a process guide for agencies undertaking efforts to define climate vulnerability

Definition: Climate Vulnerability

Climate vulnerability describes the ways in which a person, community, or social system is at a higher risk of exposure to impacts resulting from climate change¹. In addition to having higher risk, climate vulnerable communities have less adaptive capacity to cope with or adapt to impacts. These disproportionate effects are caused by a number of physical (built and environmental), social, and economic factors.

Climate Vulnerability Assessment Tools

An individual or community may be vulnerable with respect to multiple factors at once, the cumulative effects of which may contribute to heightened vulnerability². To fully understand the level of vulnerability a community may experience, one must consider both the level of **adaptive capacity** and the level of **risk** at hand. It is recommended that adaptive capacity be assessed by considering the above-mentioned physical, social, and economic factors by using a number of different tools and indices and that climate risk be assessed by using the State's climate projections data tool, [Cal-Adapt](#), or other locally developed data.

The following tools can be used to begin analyzing adaptive capacity:

Healthy Places Index

The California Healthy Places Index (HPI) is an interactive online data and GIS mapping tool that allows users to easily visualize the social and economic conditions that shape health in each neighborhood in California. HPI is validated with life expectancy and provides census tract rankings across the state. As of 2017, the Healthy Places Index platform also includes climate change indicators. This tool provides graphic overlays of climate risks, vulnerabilities and indicators of adaptive capacity, along with the healthy places index score, and other key decision support layers. HPI moves data into action by providing policy briefs outlining best practices to address risks associated with climate indicators.

CalEnviroScreen

CalEnviroScreen 3.0 provides identification of disadvantage through pollution burden and population characteristics. While CalEnviroScreen does not incorporate climate projections data, when overlaid with climate impact and exposure data, it can provide insight into built and environmental exposure factors that contribute to vulnerability.

Climate Change and Health Vulnerability Indicators for California

The CalBRACE Project developed climate change and health indicator narratives and data to provide local health departments and partners tools to better understand the people and places in their jurisdictions that are more

¹ *Advancing Climate Justice in California: Guiding Principles and Recommendations for Policy and Funding Decisions*. Prepared by the Climate Justice Working Group. August 2017.

² *Ibid*

susceptible to adverse health impacts associated with climate change, specifically extreme heat, wildfire, sea level rise, drought, and poor air quality. The assessment data can be used to screen and prioritize where to focus deeper analysis and plan for public health actions to increase resilience.

Regional Opportunity Index

Another mapping tool to identify census tracts lacking in opportunities and needing investment is the Regional Opportunity Index (ROI) from the UC Davis Center for Regional Change. The goal of the ROI is to help target resources and policies toward people and places with the greatest need. The tool incorporates both a “people” component and a “place” component, integrating economic, infrastructure, environmental, and social indicators into a comprehensive assessment of the factors driving opportunity.

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The following table summarizes each assessment tool by four categories, or *factors*, of vulnerability.³ While there are areas of overlap, each tool was designed to inform different decision-making processes and research questions, and as such, any single tool alone will not provide a comprehensive assessment of climate vulnerability.

Factor	HPI (weighted index and map)	CES (weighted index and map)	ROI (weighted index)	CHVI (not an index)
Existing inequities, institutionalized racism, or exclusion: People facing disadvantage or discrimination often have lower socioeconomic status, which result in fewer resources for preparing, coping and recovering from climate impacts.	Educational attainment	Educational attainment	Educational attainment	Educational attainment
	Employment	Employment	Employment	
	Housing burdened low income households	Housing burdened low income households	Housing burdened low income households	
	Income		Income	
		Linguistic isolation	Linguistic isolation	Linguistic isolation
	Poverty	Poverty		Poverty
			Race and Ethnicity	Race and Ethnicity
	Two parent household			
			U.S. Citizenship	
			Violent crime rate	
	Voting		Voting	
Physical states or conditions that increase vulnerability: Older adults, young children, pregnant women, and people with chronic health conditions or mental illness are more susceptible to harm from effects of climate change.		Asthma emergency department visits		
				Children
		Cardiovascular disease		
				Elderly
		Low birth-weight infants	Low birth-weight infants	
				Mental disability
				Outdoor workers
			Physical disability	
Poor environmental conditions, access to services, or living conditions: Populations at higher risk under a changing climate include those who are uninsured or underinsured or lack access to health care, lack access to transportation, live in areas with poor air quality, live on upper floors of tall buildings, live in areas with lots of impervious surfaces and little tree cover, and lack	Alcohol outlets			
				Air conditioning
	Active commuting			
	Diesel PM	Diesel PM		
		Groundwater threats		
	Housing habitability			
	Hazardous waste facilities and generators			

³ These “factors” are taken from *Planning and Investing for a Resilient California: A Guidebook for State Agencies* developed by the Technical Advisory Group for Executive Order B-30-15

Factor	HPI (weighted index and map)	CES (weighted index and map)	ROI (weighted index)	CHVI (not an index)
life-supporting resources such as adequate housing, ways to cool living space, are food insecure or lack adequate medications, or are tenants or renters.			Healthcare availability	
	Housing crowding			
		Impaired water bodies		
				Impervious surfaces
	Ozone concentrations	Ozone concentrations		Ozone concentrations
	PM 2.5 concentrations	PM 2.5 concentrations	PM 2.5 concentrations	PM 2.5 concentrations
	Park Access			
		Solid waste sites/facilities		
				Public transit access
		Toxic cleanup sites		
		Toxic releases from facilities		
		Traffic density		
	Tree canopy			Tree Canopy
	Retail Density			
	Supermarket Access		Supermarket Access	
	Use of high-hazard, high-volatility pesticides			
Water Contaminants	Water Contaminants			
Lack of investment and opportunities: The disinvestment and resource deprivation historically experienced by communities facing inequities leads to degraded living conditions and lack of power over decisions that affect their lives.	Homeownership		Homeownership	
	Health Insurance			Health Insurance
	Vehicle Ownership/ Access		Vehicle Ownership/ Access	Vehicle Ownership/ Access

Additional Indicators for Consideration

In addition to the above indicators, the NAACP's [Equity in Building Resilience in Adaptation Planning](#) provides examples of additional adaptation-specific indicators that could also be considered. Because these indicators are not incorporated into any of the tools presented above, inclusion of these indicators would require additional data collection and analysis on a case-by-case basis.

Pre-Existing Vulnerabilities/Assets	
Demographics	Sexual Orientation
	Homelessness
	Persons with criminal records
Housing Security	Homeowners or renters insurance
	Homes in flood plains
	Homes with flood-proofing
	Number, location and population of prisons
	Domestic violence shelters
	Shelters for LGBTQ youth and adults
Mobility	Evacuation routes
Health Services	Individuals with health insurance coverages
	Persons with substance abuse
	Mental health services
	Substance abuse services
	Domestic Violence hotline
	Doctors or Nurses per capita
Environmental Hazards	Adequate/effective sewage/waste management systems
Emergency Services	Household knowledge level of disaster resources
	households with disaster kits
	Household distance to nearest fire station
	Availability of hazmat certification programs
	Hazmat certified individuals
	Disaster plans in place at schools, businesses, churches, etc.
Business/Jobs	Minority owned businesses
	Businesses with flood proofing
	Businesses with insurance
	Union jobs
Public/Private Utilities	Telecommunications - availability and access (phone, cable, broadband, etc)
	Households with water/electricity shut offs in last 12 months
	Households reliant on well-water
Social Services	Social services-availability
	Services for undocumented persons
Governance	Inclusive governance
	Policy Landscape
Community Knowledge	Neighborhood cohesion
	Financial literacy
Culture	Has cultural/religious ties to land/water

Process guide: Equity Checklist

The following checklist was created by the Equity and Vulnerable Communities subcommittee of the Technical Advisory Group, facilitated by the Climate Change and Health Equity Program of the California Department of Public Health and is intended to assist State agencies implement Executive Order B-301-5.⁴ While the checklist was not developed solely as a guide for defining climate vulnerability, it may serve as a useful process guide (this checklist can be used alongside any decision-making process to improve equitable outcomes).

- Which vulnerable populations may be impacted by or could benefit from your policy, initiative, program or budget?
 - Have you identified these populations based on population characteristics, location, or both?
- Have you designed a process to collaborate with vulnerable populations?
 - Which best practices for meaningful engagement are you implementing?
 - Are you sharing as much decision-making power as feasible (see the [Spectrum of Public Participation](#))?
 - Is there a need for formal agreements to define collaboration, and if so how will you develop them (see example in Community Engagement Best Practices)?
- How may the policy, initiative, program or budget increase racial equity?
- How may the policy, initiative, program or budget decrease inequality in income or wealth?
- How may the policy, initiative, program or budget ensure safety and improve health outcomes for vulnerable populations, including people with disabilities?
- What mechanisms will you use to assure particular benefit to low-income or otherwise vulnerable populations?

For example:

 - Provide extra financial incentives, investments, or resources
 - Provide higher levels of service
 - Provide capacity building or training
 - Provide jobs
- What mechanisms will you use to assure that vulnerable communities are prioritized for employment and job training in carrying out your project?
- Are you including health objectives in your policy, initiative, budget, or program’s development and implementation?
- Have you included public health staff, agencies or organizations during the development and implementation of your policy, initiative, program or budget?
- Does your policy, initiative, program or budget have dedicated set asides for vulnerable communities?
- What unintended consequences may result for vulnerable populations and how will you address them?
- How will your project, plan or program provide for local capacity building?
- How will your project, plan or program increase the quality, efficiency and effectiveness of existing operations?
- How will you evaluate the equity impact of your program or policies?
- How will you communicate progress to all stakeholders?

⁴ Executive Order B-30-15 directed State agencies to integrate climate change into all planning and investment, including accounting for current and future climate conditions in infrastructure investment. EO B-30-15 also mandates that because “climate change will disproportionately affect the state's most vulnerable people”, all “State agencies' planning and investments shall...protect the state's most vulnerable populations”. This was the first mandate in the United States requiring all state agencies to plan for climate change and to protect vulnerable people while doing so. Members of the Equity and Vulnerable Communities subcommittee included Abe Doherty, Alex Leumer, Alex Ghenis, Aleecia Gutierrez, Angelica Ruiz, Arsenio Mataka, Ben Russak, Brian Beveridge, Carolyn Angius, Claire Jahns, Colin Bailey, Eve Mordaunt, Jamesine Rogers Gibson, Jana Ganion, Julia Ekstrom, Jose Lara, JR DeLaRosa, Kathleen Ave, Kathy Dervin, Kerri Timmer, Kirsten Andrews-Schwind, Linda Helland, Linda Rudolph, Lisa Bates, Margaret Gordon, Marianna Grossman, Megan Walton, Michael McCormick, Michelle Hasson, Monica Palmeira, Nuin-Tara Key, Paul McDougall, Sam Diaz, Solange Gould, Sonya Ziaja, Stacy Farfan, and Tracey Delaney.