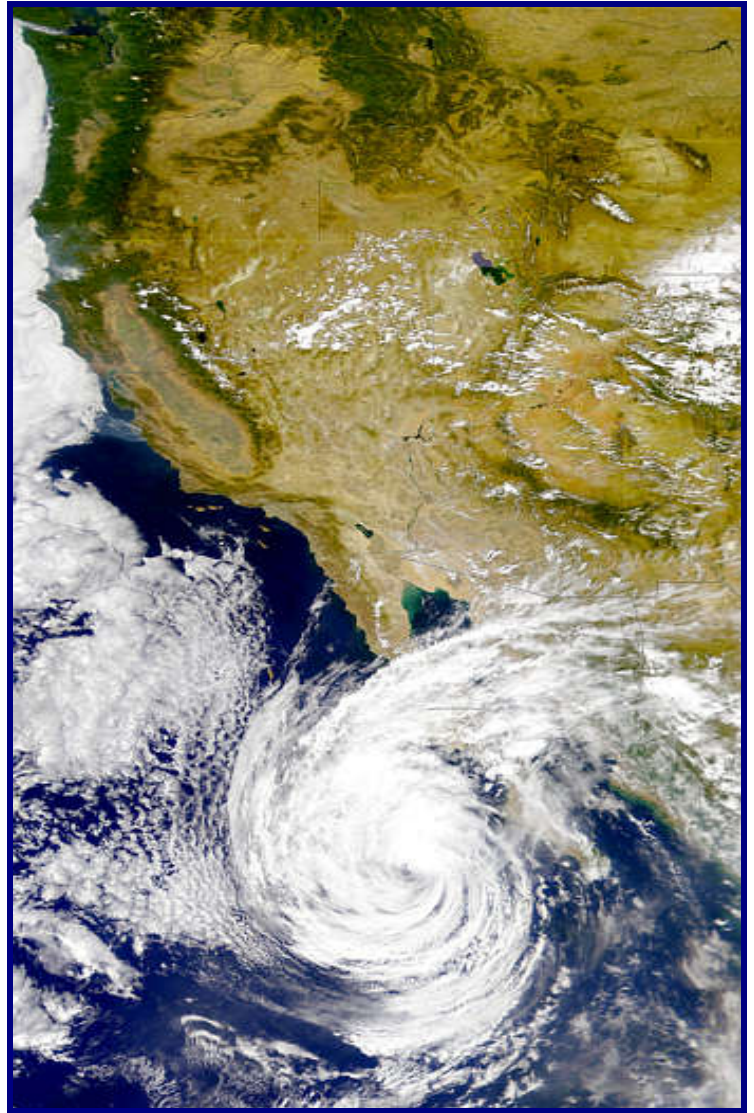


CLIMATE CHANGE IN CALIFORNIA:

HEALTH, ECONOMIC AND EQUITY IMPACTS

EXECUTIVE SUMMARY, SEPTEMBER 2004



Redefining Progress

Redefining Progress is a non-partisan public policy institute focused on the intersection between economics, social equity, and the environment. RP is a 501(c) (3) non-profit organization, celebrating its tenth anniversary in 2004.

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Acknowledgments

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Cover Photos credits: 1. Tropical Storm Hilary, Provided by the SeaWiFS Project, NASA/Goddard Space Flight Center, and ORBIMAGE, NASA 1999. 2. Jones Tract Levee Break, California Department of Water Resources, 2004. 3&4. Calanit Saenger, Redefining Progress. 5. Central Valley Pear Factory, California Heartland, Program 220, KVIE – Central Valley PBS station, 1999.

Report Draft

This executive summary is a draft. It presents preliminary findings based on widely used models of climate change. It combines a rigorous analysis/review of the most current climate change research with original statewide, regional, and demographic projections for California. This draft executive summary and the report itself provide a special focus on the stakes for low-income communities and people of color in California.

The full report, with detailed scientific and demographic data is due for release in November. The full report will include significant additions from a community meeting process that Redefining Progress has helped coordinate. The working title is “CLIMATE CHANGE IN CALIFORNIA: HEALTH, ECONOMIC AND EQUITY IMPACTS”.

CLIMATE CHANGE IN CALIFORNIA: HEALTH, ECONOMIC AND EQUITY IMPACTS

DRAFT EXECUTIVE SUMMARY

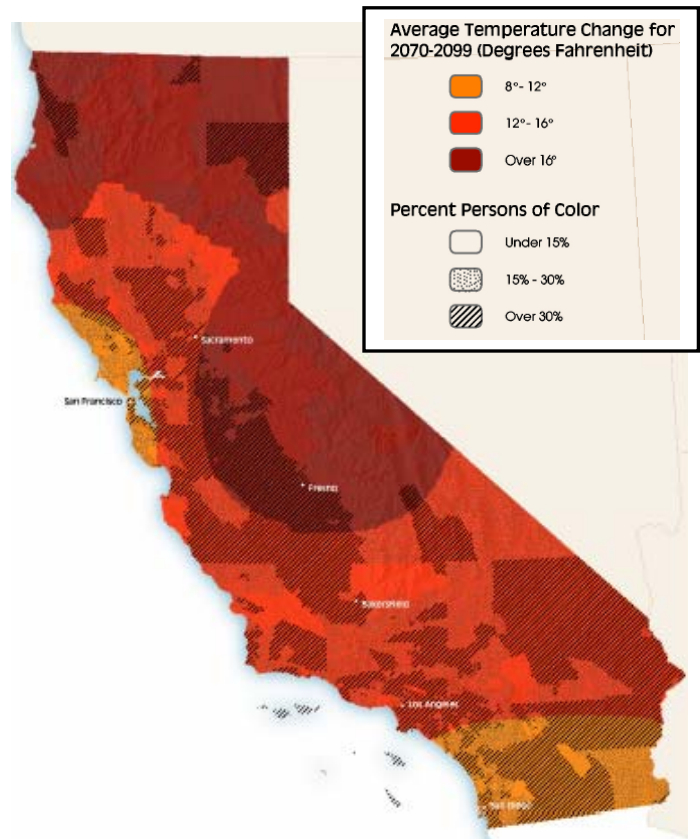
Climate change poses a widespread and growing risk to every Californian. Global warming threatens to reduce water resources; alter coastal areas as sea levels rise; introduce new patterns of vegetative and infectious diseases; and increase the prevalence of fires, droughts and floods. Although the impacts of climate change will be widely distributed, they will not be uniform. The health implications of increased air and water pollution, heat waves and other weather-related crises will disproportionately affect people of color and low-income communities. Driven by climate change, higher prices for food, water, and energy will impose new economic burdens on low-income households.

This report uses the most recent scientific research to assess the effects of regional climate change on the health and economic well-being of all Californians and provides original analysis of the impact of climate change on people of color and low-income communities.

Climate Change in California

The report builds on recently published, peer-reviewed models of climate change at a community level. The model underlying these results is the Hadley CM3 model—a mid-range global climate model that was run with both high and low emissions scenarios for greenhouse gasses. Key impacts for California include:

- By 2050, the snowline in Northern California is estimated to rise by more than 1000 feet, shrinking the state's primary water supply and ski areas;
- By 2090, California will probably face four dry years per decade—four times the average from 1961 to 1990;



- By 2100, average statewide temperatures could increase by 4 to 6°F in a low emissions scenario and 7 to 10.5°F in a high emissions scenario. As the map above indicates, these changes will be heterogeneous, with some areas facing increases of up to 21°F;
- By 2100, snowcap reservoirs could decrease by 90% as precipitation will fall as rain, not snow;
- By 2100, summer mountain runoff, which accounts for 72% of California's water supply, could decrease between 45 to 55% as snowmelt and runoff occur earlier in the year; and
- By 2100, floods across the state are projected to increase between 125 and 275%.

Health Impacts

Health problems due to climate change are likely to be direct and severe for all Californians. Traditional environmental problems such as increased pesticide dependence and mercury in water sources will continue to grow. Incidences of heat mortality and new health concerns such as West Nile virus will increase. Key populations will be harder hit by these changes, including the elderly, low-income families who cannot afford air-conditioning and people who suffer from chronic medical illnesses.

Mosquito-Borne Illnesses: Encephalitis and other mosquito-borne diseases will increase as California becomes a more favorable environment for mosquitoes. One study suggests that a 5.4 to 9° F temperature increase could cause a northern shift in the distribution of both St. Louis and Western Equine Encephalitis.

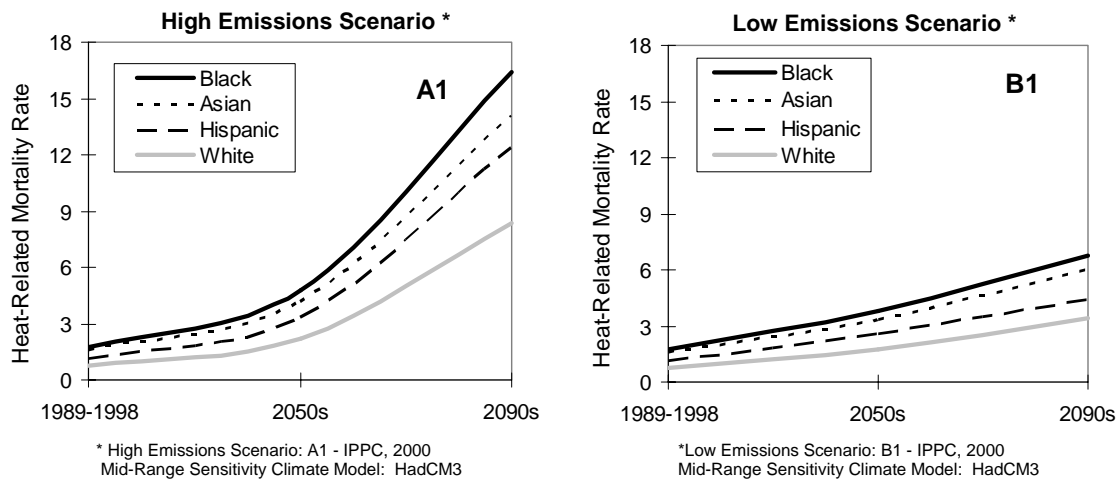
Water Pollution: Low stream flow will pollute waters with higher concentrations of salt, mercury, pesticides and other pollutants. Mercury converts to methyl mercury, which accumulates in the bodies of fish. In high doses, methyl mercury can cause cerebral palsy and mental retardation as well as impair neurological development. Pregnant woman are especially vulnerable to this problem.

Air Quality: All Californians will suffer as air quality decreases during this century. However, the health burdens clearly differ for specific racial and income groups.

- Asthma prevalence is highest among Native Americans, Pacific Islanders and African Americans.
- African Americans experience asthma hospitalization rates three times higher than any other racial group.
- Low-income communities and people of color in California today face significantly higher unhealthy ozone exposures than other groups. Unhealthy ozone exposures translate into higher risks of asthma and chronic bronchitis.
- Existing burdens faced by communities of color are likely to be exacerbated by increased air pollution caused by climate change.

Heat-Related Mortality: A pilot study projecting heat mortality for Los Angeles was conducted. L.A. residents will face significant heat-related mortality increases—with greater increases for people of color than for whites. Under a high emissions scenario, mortality projections could increase eight-fold for whites, twelve-fold for Hispanics, fourteen-fold for Asians, and sixteen-fold for African Americans by 2090.

Heat-Related Mortality Rate Predictions for Los Angeles by Race/Ethnicity

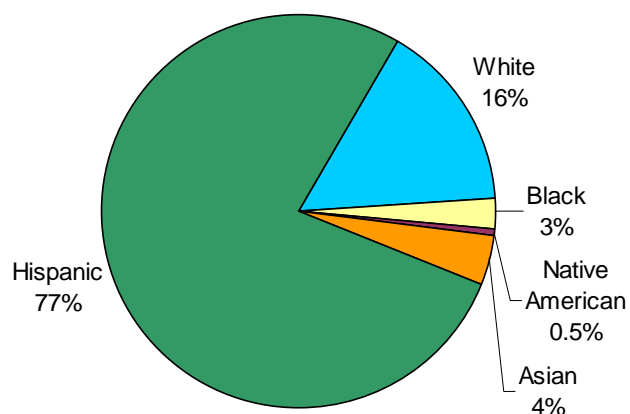


Economic Impacts

Employment levels for people of color and low-income communities are at risk as climate impacts emerge through the century. Public infrastructure and large climate-sensitive industries are projected to suffer. Tourism and agriculture are especially dependent on climate and both industries employ many people of color—especially Hispanic Californians. Tourism generates more than \$75 billion in direct travel spending each year. Agriculture generates close to \$30 billion in annual revenues.

Reduced water resources, sea-level rise, a shift in snowfall patterns and increased frequency of floods, fires, and droughts all threaten to significantly undermine productivity and viability for these industries. Instability in these industries will have a disproportionate impact on people of color in California, who make up

Agriculture, Forestry, Fishing & Hunting Employment by Race/Ethnicity, 2003



50 to 75% of the employees in tourism-related industries and almost 85% of the employees in agriculture.

Tourism: Sea-level rise, reductions in snow precipitation and extreme weather events will affect the various ways Californians enjoy their natural environment. The projected impacts this century include:

- Ski seasons will be shortened and annual industry losses will range between \$205-430 million, depending on the emissions scenario;
- Coastal regions and infrastructure—including major tourist destinations such as the Santa-Cruz Boardwalk, which attracts three million visitors a year—will face weather-related damages;
- Accessibility to natural recreation areas and related visitor revenues will decrease. For example, during a summer 2004 wildfire, Yosemite National Park lost nearly 5,000 acres and smoke conditions decreased park attendance during this peak season; and
- Other extreme weather events such as droughts and floods will severely impact ecosystems, thus reducing opportunities for fishing, hunting, swimming, rafting and boating activities.

Agriculture: The California breadbasket will change significantly under global warming. The projected impacts this century include:

- Water scarcity may reduce annual agriculture income as much as \$1 to 1.5 billion;
- Higher temperatures may reduce soil moisture, lower crop and livestock productivity and increase the prevalence of pests and weeds. Recent studies project considerable productivity losses in the dairy and wine industries. In the Central Valley, where over 40% of California's wine-grapes grow, higher temperatures could impair the quality of wine-grapes as early as 2020; and
- Floods and fires could produce extensive crop losses. For example, Northern California flooding in 1997 inundated 300 square miles of agricultural land; Southern California fires in November 2003 produced nearly \$30 million in agricultural damages.

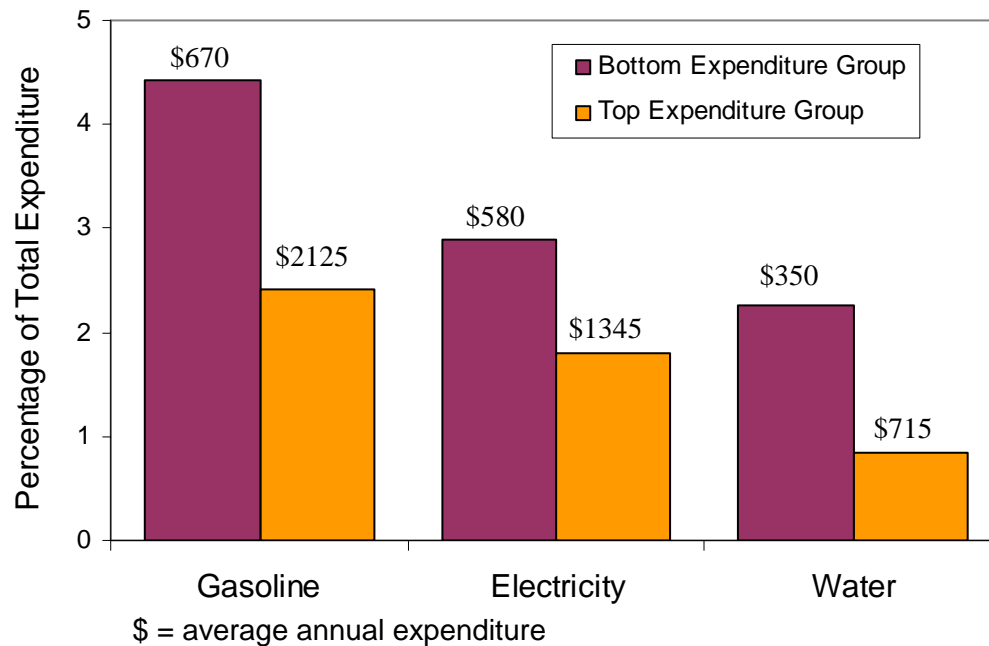
Energy and Water Costs: Climate change threatens to limit basic resources such as water and electricity. Supply reductions and demand increases together will increase water and energy prices, placing significant burdens on California businesses and households.

Projected impacts this century include:

- Summer hydroelectric production could decrease 30% from California's main reservoirs, contributing to nearly a \$19 billion annual increase in state electricity expenditures;
- Existing utility problems such as water-contamination and power blackouts will likely to become more prevalent as demand for water and electricity increase due to temperature changes and population growth; and

- Higher energy and water costs will hit low-income households the hardest because these costs make up a larger proportion of their expenditures—double the proportion for the highest income families.

Percent of Annual Expenditure Spent on Utilities



[Source: Consumer Expenditure Survey 2002, Western Region]

Additional economic effects: Increased extreme weather events could generate economic instability and threaten property and infrastructure at all levels.

- Businesses and households will face increased insurance costs and decreased property values; and
- State government will have to address increased expenditures on, for instance, levee maintenance, infrastructure reconstruction and disaster relief. These expenditures will likely reduce investments in health, education and other essential social services.

Equity Impacts

Several factors determine why people of color and low-income communities experience a disproportionate burden from climate change. Those factors include work hazards, existing inequality, proximity to industrial pollution and, most critically, access to resources for mitigation and adaptation. The report identifies several disproportionate impacts including:

- Higher heat-related mortality projections for specific groups in Los Angeles.
- Higher exposure to air pollution such as ozone, resulting in disproportionately increased illness, disability, job loss and health expenditures.

- Low-income communities spend a larger share of their income on climate-sensitive commodities and will experience a more severe shock from increases in energy, water and food prices.
- Vulnerable communities will face disproportionate impacts as extreme weather events increase. Although most damages incurred during extreme weather impact the affluent, the impact on low-income communities can last an entire lifetime. Access to information, resources for mitigation and adaptation and high insurance costs expose vulnerable communities to greater proportional damages.

Furthermore, just as the impact of climate change is disproportionate, so is the responsibility for climate change. While the most vulnerable communities carry an unequal burden, affluent people contribute more to the causes of climate change through greater energy use and greenhouse gas emissions (see figure above). Conversely, cost-effective policies that reduce energy consumption are likely to be of particular benefit to these people of color and low-income communities.

Policy Choices

California is an economic, technological and regulatory leader. It has a unique capacity to take a lead on cutting-edge climate policy for the 21st century. Policies that reduce greenhouse gas emissions are likely to have a triple bottom-line:

1. Reduced emissions will help reduce the impacts of climate change on the state;
2. Energy policies that reduce fossil fuel consumption will disproportionately benefit low-income and people of color communities; and
3. Policies that integrate concerns over disproportionate impacts also represent the most efficient policies for reducing greenhouse gas emissions overall.

Public policy choices over the next decade will determine whether California contributes to higher or lower global emissions scenarios. As the impacts of climate change and climate policies grow, there is an ongoing need for analysis of impacts on different communities.

Conclusion

Although *exposure* to climate change will be widespread, existing disparities in access to health care, insurance and high quality housing promise that climate change in California will not be *experienced* equally. Climate change will disproportionately affect California's most vulnerable communities and populations. Similarly, the damage to specific sectors and rising utility prices will particularly impact low-income communities and people of color. Analysis of these inequities points the way to climate policies that are both fair and efficient.