CARPE DIEM WEST
Our water – Finding solutions together

Western Water, Climate Change, and Public Health

Summary of Research

November 2015

1) Fuller, A. C., & Harhay, M. O. (2010). Population Growth, Climate Change and Water Scarcity in the Southwestern United States. *American Journal of Environmental Sciences*, *6*(3), 249–252. http://doi.org/10.3844/ajessp.2010.249.252

This journal article was published "to draw attention to and stimulate discussion around the lacking policy discussion domestically" about the consequences of water scarcity in the Southwestern United States. It explores various scenarios that exemplify the interrelated nature of water scarcity and its effects on public health. Some examples include: reduced snowpack in the Sierra Nevada – less available water for drinking/hygiene/etc; Owens and Mono Lake – salt flats lead to dust and particulate pollution; and Gila River Pima Indians – diversion of their water source has led to a decrease in cultivating their own food forcing reliance on government rations which has led to type 2 diabetes.

2) Achieving a Climate for Health: Philanthropy to Promote Health and Justice through the Challenges of Climate Change, a publication by the Health and Environmental Funders Network and ecoAmerica, June 2015.
http://www.hefn.org/learn/resource/achieving_a_climate_for_health_philanthropy_to_promote_health_and_justice_through_the

This report outlines what climate change is, discusses how climate change affects health, and gives three primary suggestions to philanthropists on how to build a climate for health. These include 1) protection from harmful climate impacts through prioritized funding for social equity projects 2) prevention of catastrophic threats to health by diminishing the negative effects of climate change on health and 3) "transformational shifts toward climate resilience" through collaboration.

3) Public Health-Related Impacts of Climate Change in California
A report from California Climate Change Center, White Paper sponsored by CEC and California EPA, March 2006.
http://www.energy.ca.gov/2005publications/CEC-500-2005-197/CEC-500-2005-197-SF.PDF

This white paper examined how increases in California's temperature will affect human health through direct effects on heat-related mortality, indirect effects on air pollution, potential effects on various infectious diseases, and wildfires. It highlights topics including: air-pollution related health effects (i.e. ozone and particulate matter), infectious diseases (i.e. water-borne, vector-borne, rodent-borne, and food-borne), and wildfires. It also includes a chapter on

environmental justice that briefly explains the disproportionate amount of heat related health impacts that affect poor and ethnic minorities.

4) The Clean Water Rule: Clearing Up Confusion to Protect Public Health, a publication by the Trust For Healthy Americans, June 2015. http://healthyamericans.org/report/121/

This publication explores the nexus between upstream waters and public health by summarizing the EPA's Office of Research and Development's peer-reviewed science report, "Connectivity of Streams and Wetlands to Downstream Waters" (http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=296414). The publication briefly summarizes the following topics found in the EPA report including the following:

- Headwaters' role in transporting pathogens from bacteria, viruses, and protozoa
- The significant presence of wastewater contaminants in streams
- The role of tributaries and storm drains in drinking water-related disease outbreaks
- The role of headwaters in transporting lead, industrial metals, radioactive materials, and mercury downstream

5a) Garfin, G., G. Franco, H. Blanco, A. Comrie, P. Gonzalez, T. Piechota, R. Smyth, and R. Waskom, 2014: Ch. 20: Southwest. *Climate Change Impacts in the United States: The Third National Climate Assessment*, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 462-486. doi:10.7930/J08G8HMN. http://nca2014.globalchange.gov/downloads

Explores the key vulnerabilities Southwestern states are facing amid climate change:
1. Reduced Snowpack and Stream flows
2. Threats to Agriculture
3. Increased Wildfire
4. Sea Level Rise and Coastal Damage
5. Heat Threats to Health
    - Water scarcity
    - Vulnerability of urban infrastructure (interdependent nature)
    - Heat stress
    - Air quality

5b) Mote, P., A. K. Snover, S. Capalbo, S. D. Eigenbrode, P. Glick, J. Littell, R. Raymondi, and S. Reeder, 2014: Ch. 21: North- west. *Climate Change Impacts in the United States: The Third National Climate Assessment*, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 487-513. doi:10.7930/J04Q7RWX.

Climate related issues the Northwest is facing include:

1. **Water-related Challenges** - Competing demands amid reduced snowmelt and stream flows, flooding, vulnerability of fish populations
2. Coastal Vulnerabilities - Rising sea level, erosion, inundation, threats to infrastructure
3. Impacts on Forests
4. Adapting Agriculture

5c) Bennett, T. M. B., N. G. Maynard, P. Cochran, R. Gough, K. Lynn, J. Maldonado, G. Voggesser, S. Wotkyns, and K. Cozzetto, 2014: Ch. 12: Indigenous Peoples, Lands, and

Resources. *Climate Change Impacts in the United States: The Third National Climate Assessment*, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 297- 317. doi:10.7930/J09G5JR1.

This chapter outlines the key vulnerabilities that threaten many Native communities in a changing climate:

1. Forests, fires, and food – climate change threatens Native communities' access to traditional foods that have provided medicinal and community health, among other benefits, for generations
2. Water Quality and Quantity – decreases in water quality and quantity affects their ability to adapt to water-related challenges
3. Declining Sea Ice
4. Permafrost thaw
5. Relocation

6) World Resources Institute Fact Sheet, The Climate Change Connection to U.S. Public Health, September 2014.
http://www.wri.org/publication/climate-change-connection-us-public-health

This short fact sheet highlights some of the impacts, threats, and vulnerabilities to human health in the United States associated with extreme weather events, examines how climate change is contributing to human health threats, and summarizes the Center for Disease Control and Prevention's Climate-Ready States and Cities Initiative.

7) Frumkin, H., Hess, J., Luber, G., Malilay, J., & McGeehin, M. (2008). Climate Change: The Public Health Response. American Journal of Public Health, 98(3), 435–445. http://doi.org/10.2105/AJPH.2007.119362.
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2253589/

This publication describes the anticipated health effects of climate change in the U.S. It explores principals that point toward a vigorous, proactive public health approach to climate change and outlines the 10 essential services of public health with examples related to climate change. Example: One service of public health is to diagnose and investigate health problems and health hazards in the community. Investigation of infectious water- food- and vector-borne disease outbreaks is an example of how the public health sector can addresses health issues related to or stemming from climate change.

8) Gordon, E. & D. Ojima, 2015: *Colorado Climate Change Vulnerability Study*, A report submitted to the Colorado Energy Office. *http://wwa.colorado.edu/climate/co2015vulnerability/*

The Colorado Climate Change Vulnerability Study provides an overview of key vulnerabilities (including public health) that climate variability and change will pose for Colorado's economy and resources. The purpose of the study is to provide state agencies, local governments, and others with background for preparedness planning.