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Introduction: In spring of 2010, the Center for Whole Communities hired consultant Danyelle O'Hara to research some questions about demographic changes in America. We wanted more statistical documentation, and a fuller understanding, to support our curriculum around climate change and its effect on various populations. The following report gives a summary of that research.

The question(s) posed : *What is the most respected body that determines which parts of USA will be most affected by climate change? There have been two reports about climate change and environmental justice that assert that low-income people of color will be most affected by climate change, but we have not seen a translation of this assertion into actual geographies: which physical communities will be most affected by climate change? This information will be extremely important for our climate change work.*

1. What is the most respected body that determines which parts of the United States will be most affected by climate change?

United States Global Climate Change Research Program

<http://globalchange.gov>

The U.S. Global Change Research Program (USGCRP) coordinates and integrates federal research on changes in the global environment and their implications for society. Thirteen departments and agencies (commerce, defense, energy, interior, state, transportation, HHS, NASA, NSF, Smithsonian, US AID, USDA, and EPA) participate in the USGCRP, which was known as the U.S. Climate Change Science Program from 2002 through 2008. The program is steered by the Subcommittee on Global Change Research under the Committee on Environment and Natural Resources, overseen by the Executive Office of the President and facilitated by an Integration and Coordination Office.

On February 2010 the president announced that NOAA will set up the new NOAA Climate Service to operate in tandem with NOAA's National Weather Service and National Ocean Service. The USGCRP is now falls under this NOAA agency.

<http://www.noaa.gov/climate.html>

2. Which physical communities will be most affected by climate change?

I understand this as a people and place question – which specific people in which specific places will be most affected by climate change? Information I was able to find did not address these two things together in any specificity. In fact, researchers note that a critical role for climate policy is to establish a way to identify the locations where vulnerable populations will be most



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impacted by climate change. (See http://www.huffingtonpost.com/rachel-morellofrosch/the-climate-gap-is-federal-policy-doing-enough-to-narrow-the-disparities-for-people-of-color-and-the-poor?hpid=hp_hp-top-table-main-climate-change%3Aclimate-gap-is-federal-policy-doing-enough-to-narrow-the-disparities-for-people-of-color-and-the-poor%3Ahomepage%2Ftpr&hpt=hp_hp-top-table-main-climate-change%3Aclimate-gap-is-federal-policy-doing-enough-to-narrow-the-disparities-for-people-of-color-and-the-poor%3Ahomepage%2Ftpr Is Federal Policy Doing Enough to Narrow the Disparities for People of Color and the Poor? May 30, 2009)

In “The Climate Gap” 2009 Rachel Morello-Frosch, UC Berkeley, and Manuel Pasteur, USC, use original research to document that climate change (and associated extreme weather events, increased air pollution and higher prices for basic necessities) will disproportionately impact people of color and the poor. This research supports work produced over the past five years making similar arguments, for example:

http://www.ejcc.org/wp-content/uploads/2010/03/coc_execsum.pdf

A Climate of Change: African Americans, Global Warming, and Just Climate Policy for the U.S. (J. Andrew Hoerner and Nia Robinson for Environmental Justice Climate Change Initiative, 2009)

<http://envsc.org/esc-publications/everybodys-movement>

Everybody’s Movement: Environmental Justice and Climate Change (Angela Park for Environmental Support Center, 2009)

Places most impacted by climate change

Although I was unable to find “people and place” specifics (and it seems that this research is yet to be done), there is some information on how different regions of the United States will be impacted by climate change, as well as some assertions about which regions will be most impacted.

USGCRP has put out a comprehensive report on climate change in the United States, which includes a section on impacts by region. I’ve pulled out the highlights for each region and have included them as at the very end of this section. You can click to the website for each of the highlights for more information. The link to the full impacts section of the report is:

<http://globalchange.gov/publications/reports/scientific-assessments/us-impacts>

The Pew Center on Global Climate Change’s “Regional Impacts of Climate Change,” presents four case studies of specific climate change impacts in different regions of the country. In brief, the case studies highlight heat waves in the Midwest, increased fires in the west, impaired wetlands in the Gulf Coast, and hypoxia in the Chesapeake Bay. These impacts overlap with those identified in the USGCRP report.

http://www.pewclimate.org/regional_impacts/intro

EPA’s “basic information” on climate change webpage

(<http://www.epa.gov/climatechange/basicinfo.html>) states, “In the United States, scientists believe that most areas will continue to warm, although some will likely warm more than others. It remains very



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difficult to predict which parts of the country will become wetter or drier, but scientists generally expect increased precipitation and evaporation, and drier soil in the middle parts of the country. Northern regions such as Alaska are expected to experience the most warming. In fact, Alaska has been experiencing significant changes in climate in recent years that may be at least partly related to human caused global climate change.”

EPA, in their climate change communication materials

(http://www.epa.gov/climatechange/downloads/Climate_Change_Society.pdf), uses NOAA data to highlight coastal communities as being particularly vulnerable:

“The impacts from climate change are expected to be particularly noticeable to people who live, work, and engage in recreational activities along the coast. Average global sea levels rose during the 20th century and are expected to continue to rise at an increasing rate. Tropical storms are projected to become more intense as well.

The U.S. East Coast and Gulf Coast are particularly vulnerable to sea level rise and storm surges because the land is relatively low and also subsiding in many places. Alaska is also at risk, with extreme changes in local sea level rise caused by a combination of geologic and climate-related factors.”

Other reasons for the coasts’ (particularly in the Southeast) vulnerability include susceptibility to changes occurring in both land and sea and the fact that coastal regions are densely populated. According to the Intergovernmental Panel on Climate Change’s fourth report (2007), 53% of the United States’ population lived in counties bordering the ocean.

The Nature Conservancy’s Climate Wizard Analysis

(<http://big.assets.huffingtonpost.com/ClimateWizardAnalysis.pdf>) indicates that rural Midwestern states will face the greatest consequences of climate change because they will experience the most significant rises in temperature, which will impact capacity to produce agriculturally. For example Kansas, Nebraska and Iowa will have temperatures rise more than 10 degrees Fahrenheit there by 2100.

The U.S. Global Change Research Program report highlights

USGCRP has put out a comprehensive report on climate change in the United States, which includes a section on impacts, by region. Below are the highlighted impacts of climate change for each region in the United States.

Key issues, by region:

Alaska

Over the past 50 years, Alaska has warmed at more than twice the rate of the rest of the United States. Its annual average temperature has increased 3.4°F, while winters have warmed by 6.3°F. The higher



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temperatures are already causing earlier spring snowmelt, reduced sea ice, widespread glacier retreat, and permafrost warming.

[Longer summers and higher temperatures are causing drier conditions, even in the absence of strong trends in precipitation.](#)

[Insect outbreaks and wildfires are increasing with warming.](#)

[Lakes are declining in area.](#)

[Thawing permafrost damages roads, runways, water and sewer systems, and other infrastructure.](#)

[Coastal storms increase risks to villages and fishing fleets.](#)

[Displacement of marine species will affect key fisheries.](#)

Coasts

Global sea level has already risen due to the warming-induced expansion of the oceans, accelerated melting of most of the world's glaciers, and loss of ice on the Greenland and Antarctic ice sheets. Sea level is currently rising at an increased rate. A warming climate will cause further sea-level rise over this century and beyond. Rising sea level is already eroding shorelines, drowning wetlands, and threatening homes, businesses, and infrastructure. The destructive potential of Atlantic hurricanes has increased in recent decades in association with increasing sea surface temperatures.

[Significant sea-level rise and storm surge will adversely affect coastal cities and ecosystems around the nation; low-lying and subsiding areas are most vulnerable.](#)

[More spring runoff and warmer coastal waters will increase the seasonal reduction in oxygen resulting from excess nitrogen from agriculture.](#)

[Higher water temperatures and ocean acidification due to increasing atmospheric carbon dioxide will present major additional stresses to coral reefs, resulting in significant die-offs and limited recovery.](#)

[Changing ocean currents will affect coastal ecosystems.](#)

Great Plains

Over the last few decades, average temperatures have risen throughout the Great Plains, with the largest increases occurring in the winter months and over the northern states. Relatively cold days are becoming less frequent and relatively hot days more frequent.

[Projected increases in temperature, evaporation, and drought frequency add to concerns about the region's declining water resources.](#)



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[Agriculture, ranching, and natural lands, already under pressure due to an increasingly limited water supply, are very likely to also be stressed by rising temperatures.](#)

[Climate change is likely to affect native plant and animal species by altering key habitats such as the wetland ecosystems known as prairie potholes or playa lakes.](#)

[Ongoing shifts in the region's population from rural areas to urban centers will interact with a changing climate, resulting in a variety of consequences.](#)

Islands

Projections for the rest of this century suggest continued increases in air and ocean surface temperatures in both the Pacific and Caribbean, an overall decrease in rainfall in the Caribbean, an increased frequency of heavy downpours nearly everywhere, and increased rainfall during the summer months. Hurricane wind speeds and rainfall rates are likely to increase with continued warming. Island coasts will be at increased risk of inundation due to sea-level rise and storm surge with major implications for coastal communities, infrastructure, natural habitats, and resources.

[The availability of freshwater is likely to be reduced, with significant implications for island communities, economies, and resources.](#)

[Island communities, infrastructure, and ecosystems are vulnerable to coastal inundation due to sea-level rise and coastal storms.](#)

[Climate changes affecting coastal and marine ecosystems will have major implications for tourism and fisheries.](#)

Midwest

Average temperatures in the Midwest have risen in recent decades, with the largest increases in winter. Heavy downpours are now twice as frequent as they were a century ago. The Midwest has experienced two record-breaking floods in the past 15 years. There has also been a decrease in lake ice, including on the Great Lakes. Since the 1980s, large heat waves have become more frequent than anytime in the last century, other than the Dust Bowl years of the 1930s.

[During the summer, public health and quality of life, especially in cities, will be negatively affected by increasing heat waves, reduced air quality, and increasing insect and waterborne diseases. In the winter, warming will have mixed impacts.](#)

[The likely increase in precipitation in winter and spring, more heavy downpours, and greater evaporation in summer would lead to more periods of both floods and water deficits.](#)



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While the longer growing season provides the potential for increased crop yields, increases in heat waves, floods, droughts, insects, and weeds will present increasing challenges to managing crops, livestock, and forests.

Native species are very likely to face increasing threats from rapidly changing climate conditions, pests, diseases, and invasive species moving in from warmer regions.

Northeast

Northeast annual average temperature has increased by 2°F since 1970, with winter temperatures rising twice this much. Warming has resulted in many other climate-related changes including more frequent very hot days, a longer growing season, an increase in heavy downpours, less winter precipitation falling as snow and more as rain, reduced snowpack, earlier break-up of winter ice on lakes and rivers, earlier spring snowmelt resulting in earlier peak river flows, rising sea surface temperatures, and rising sea level.

Extreme heat and declining air quality are likely to pose increasing problems for human health, especially in urban areas.

Agricultural production, including dairy, fruit, and maple syrup, are likely to be adversely affected as favorable climates shift.

Severe flooding due to sea-level rise and heavy downpours is likely to occur more frequently.

The projected reduction in snow cover will adversely affect winter recreation and the industries that rely upon it.

The center of lobster fisheries is projected to continue its northward shift and the cod fishery on Georges Bank is likely to be diminished.

Northwest

Annual average temperature over the Northwest region as a whole rose about 1.5°F over the past century, with some areas experiencing increases up to 4°F. The region's average temperature is projected to rise another 3 to 10°F in this century, with higher emissions scenarios resulting in warming in the upper end of this range. Increases in winter precipitation and decreases in summer precipitation are projected by many climate models, though these projections are less certain than those for temperature.

Declining springtime snowpack leads to reduced summer streamflows, straining water supplies.

Increased insect outbreaks, wildfires, and changing species composition in forests will pose challenges for ecosystems and the forest products industry.



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[Salmon and other coldwater species will experience additional stresses as a result of rising water temperatures and declining summer streamflows.](#)

[Sea-level rise along vulnerable coastlines will result in increased erosion and the loss of land.](#)

Southeast

Southeast annual average temperature has risen 2°F since 1970, with the greatest seasonal increase in the winter months. There has been a 30 percent increase in fall precipitation over most of the region but a decrease in fall precipitation in South Florida. Summer precipitation has decreased over almost the entire region and moderate to severe drought increased over the past three decades. There has been an increase in heavy downpours. The power of Atlantic hurricanes has increased since 1970.

[Projected increases in air and water temperatures will cause heat-related stresses for people, plants, and animals.](#)

[Decreased water availability is very likely to affect the region's economy as well as its natural systems.](#)

[Sea-level rise and the likely increase in hurricane intensity and associated storm surge will be among the most serious consequences of climate change.](#)

[Ecological thresholds are likely to be crossed throughout the region, causing major disruptions to ecosystems and to the benefits they provide to people.](#)

[Quality of life will be affected by increasing heat stress, water scarcity, severe weather events, and reduced availability of insurance for at-risk properties.](#)

Southwest

Recent warming in the Southwest has been among the most rapid in the nation. This is driving declines in spring snowpack and Colorado River flow. Projections of future climate change indicate continued strong warming in the region, with much larger increases under higher emissions scenarios compared to lower. Projected summertime temperature increases are greater than the annual average increases in parts of the region and are likely to be exacerbated by expanding urban heat island effects.

[Water supplies will become increasingly scarce, calling for trade-offs among competing uses, and potentially leading to conflict.](#)

[Increasing temperature, drought, wildfire, and invasive species will accelerate transformation of the landscape.](#)



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Increased frequency and altered timing of flooding will increase risks to people, ecosystems, and infrastructure.

Unique tourism and recreation opportunities are likely to suffer.

Cities and agriculture face increasing risks from a changing climate