

State Environmental Health Indicators Collaborative – Climate Change Workgroup

(A CSTE project funded by NCEH, CDC)

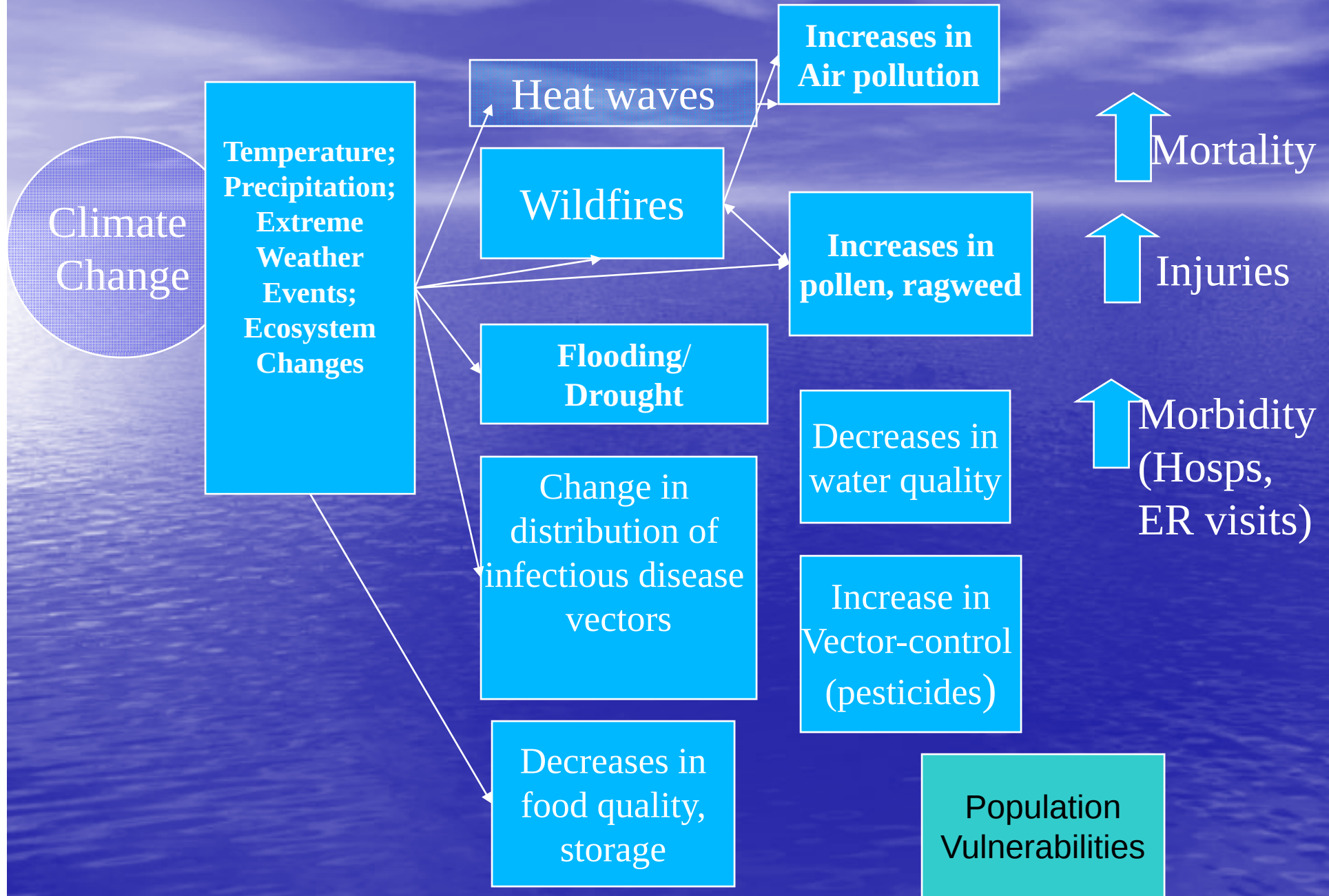
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Public Health Consequences of Climate Change



Workgroup Goals

- To develop, pilot-test, and generate data on:
 - (1) hazard indicators which will detect trends in factors such as increased temperatures, and extreme weather events;
 - (2) population vulnerability Indicators;
 - (3) indicators of health effects of climate change; and
 - (4) intervention indicators, including preparedness, mitigation, adaptation, and policy indicators.

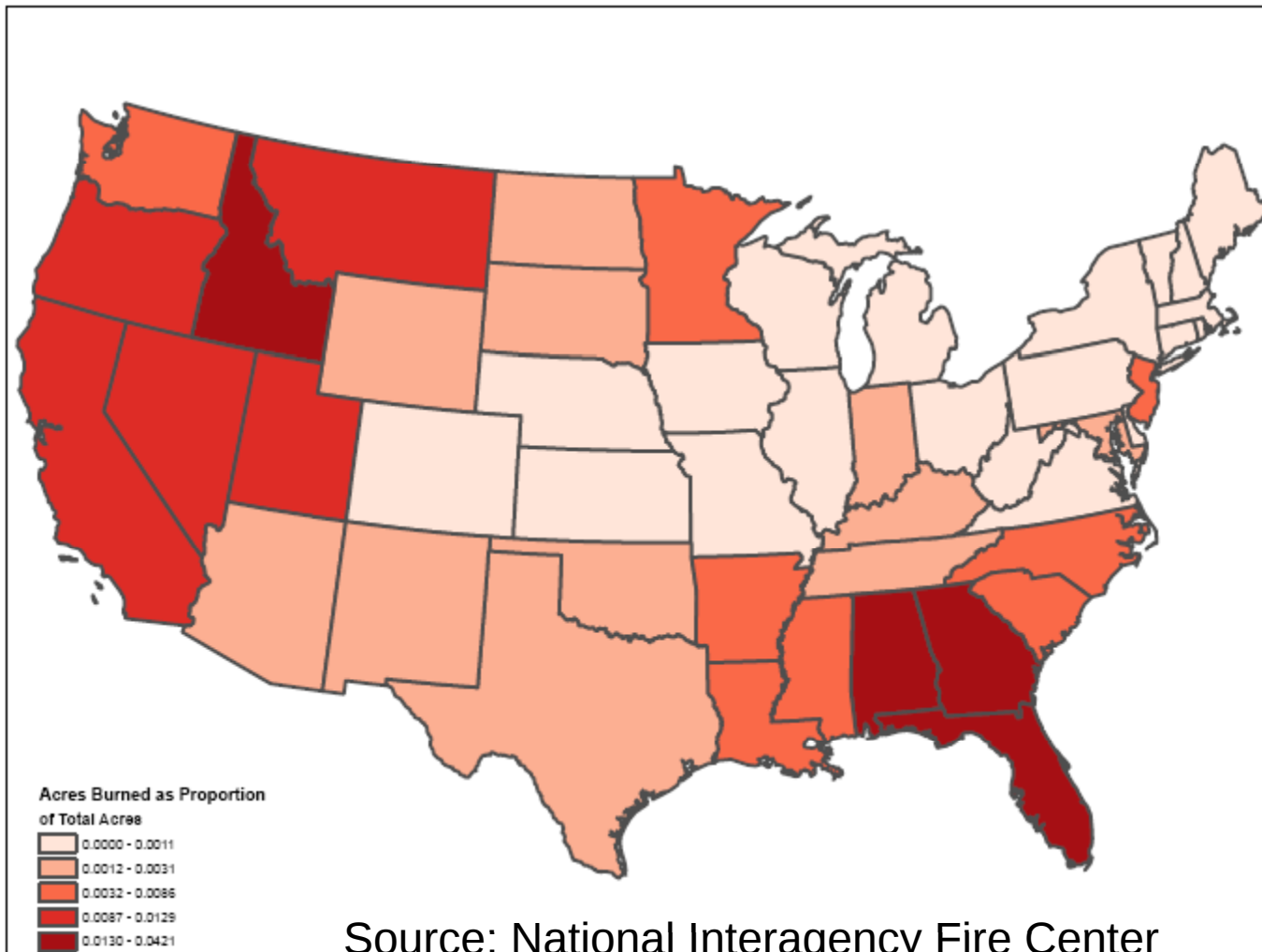
Hazard Indicators

- Heat waves, defining extreme heat conditions
 - i. Fixed vs. seasonally adjust relative temperature threshold (ie 95th percentile)
 - ii. Tracking night-time temperatures
 - iii. Heat index/UV Index

Hazard Indicators

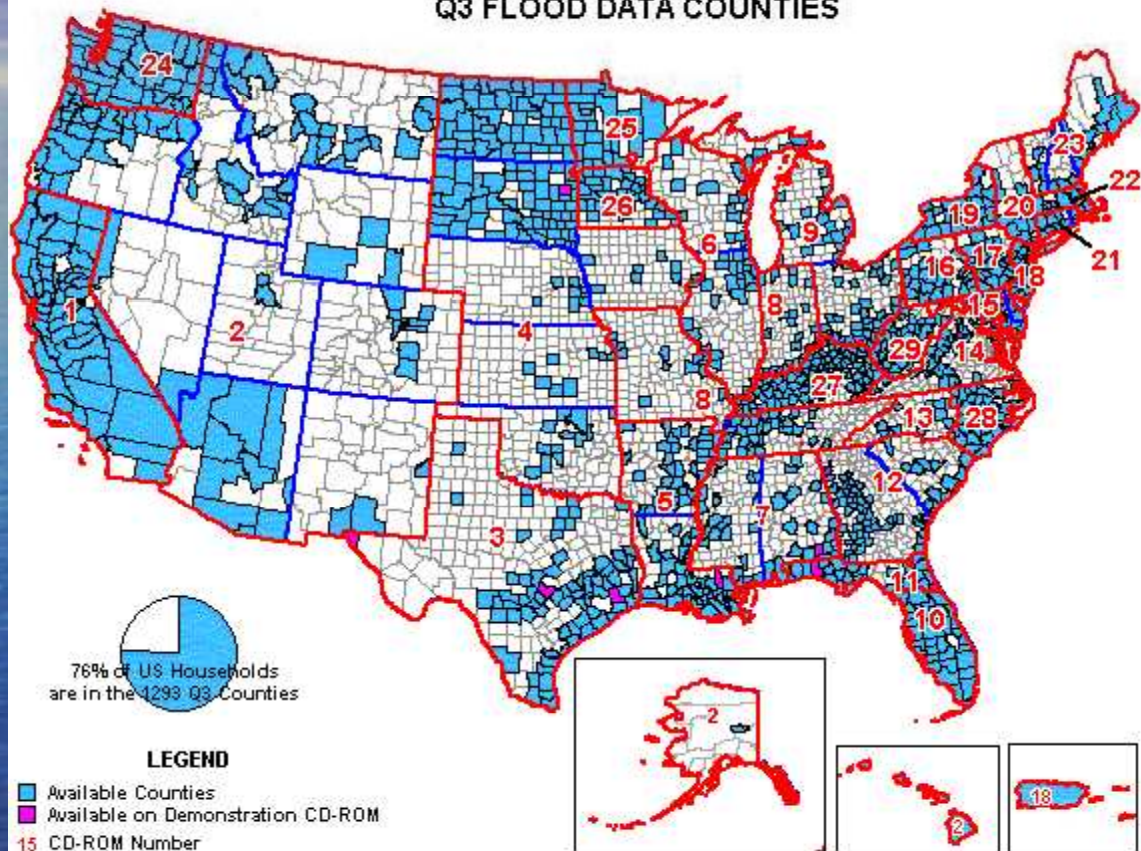
- Changes in the geographic and temporal distribution of severe storms, hurricanes, tornados, outside of recognized temporal or geographic zone
- Pollen
- Wildfires
- Flooding , extreme precipitation

Number of acres burned as a proportion of total acres, United States, 2007

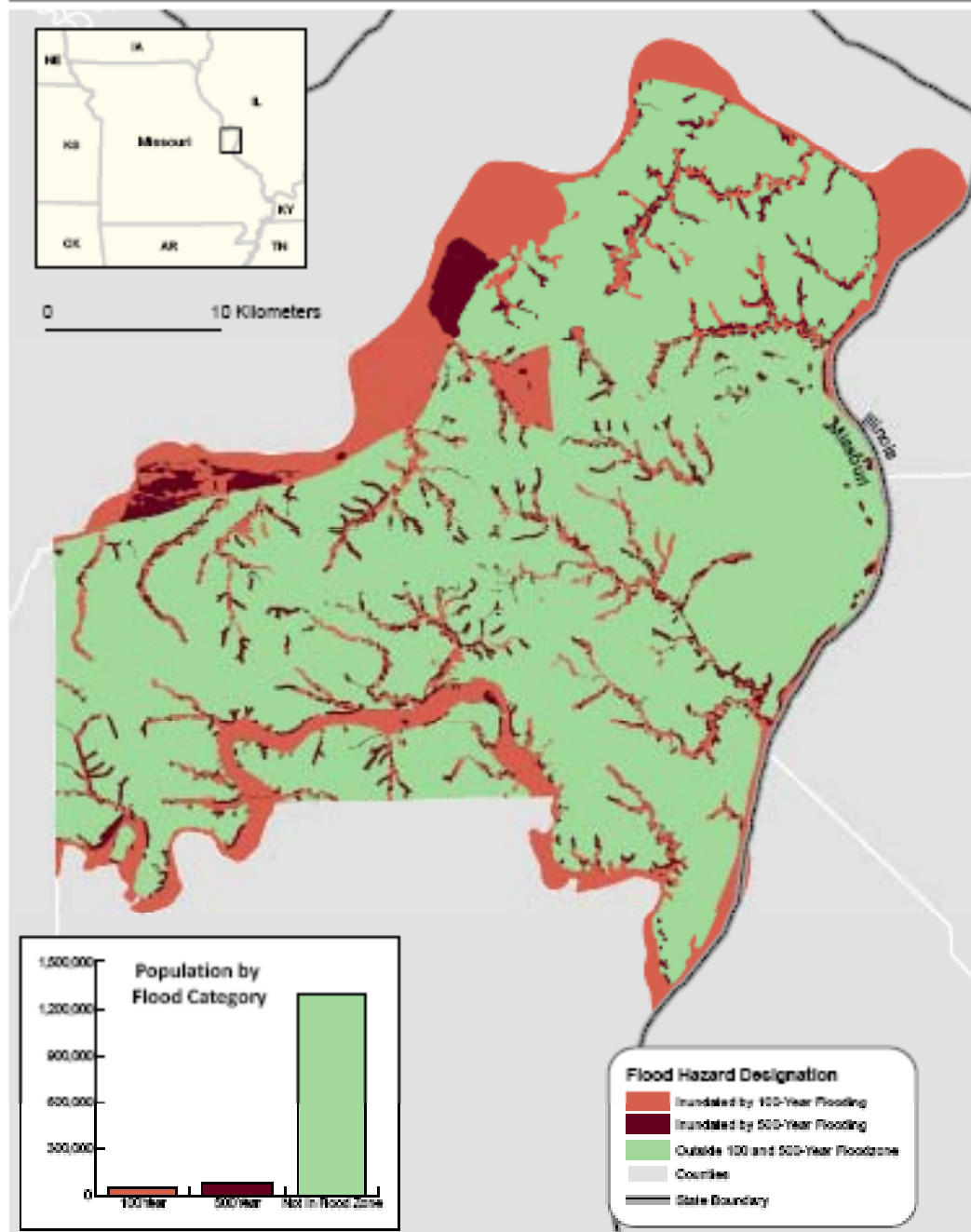


Source: National Interagency Fire Center

Q3 FLOOD DATA COUNTIES

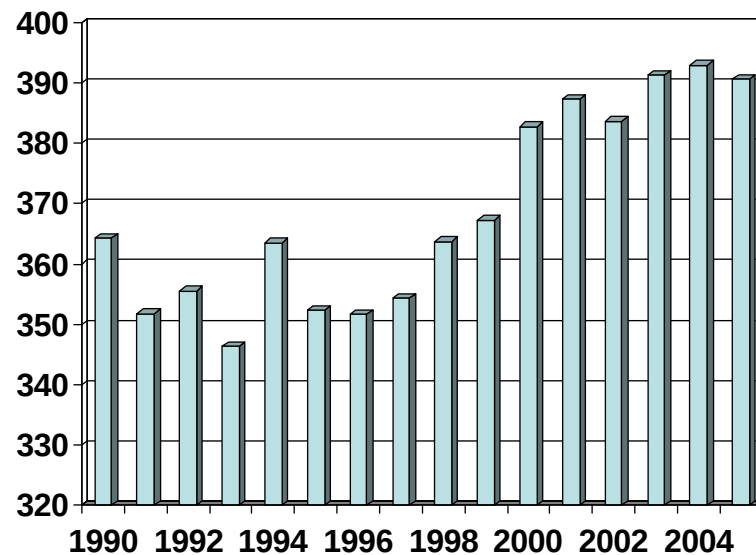


St Louis (City and County)



Indicators of greenhouse gas emissions

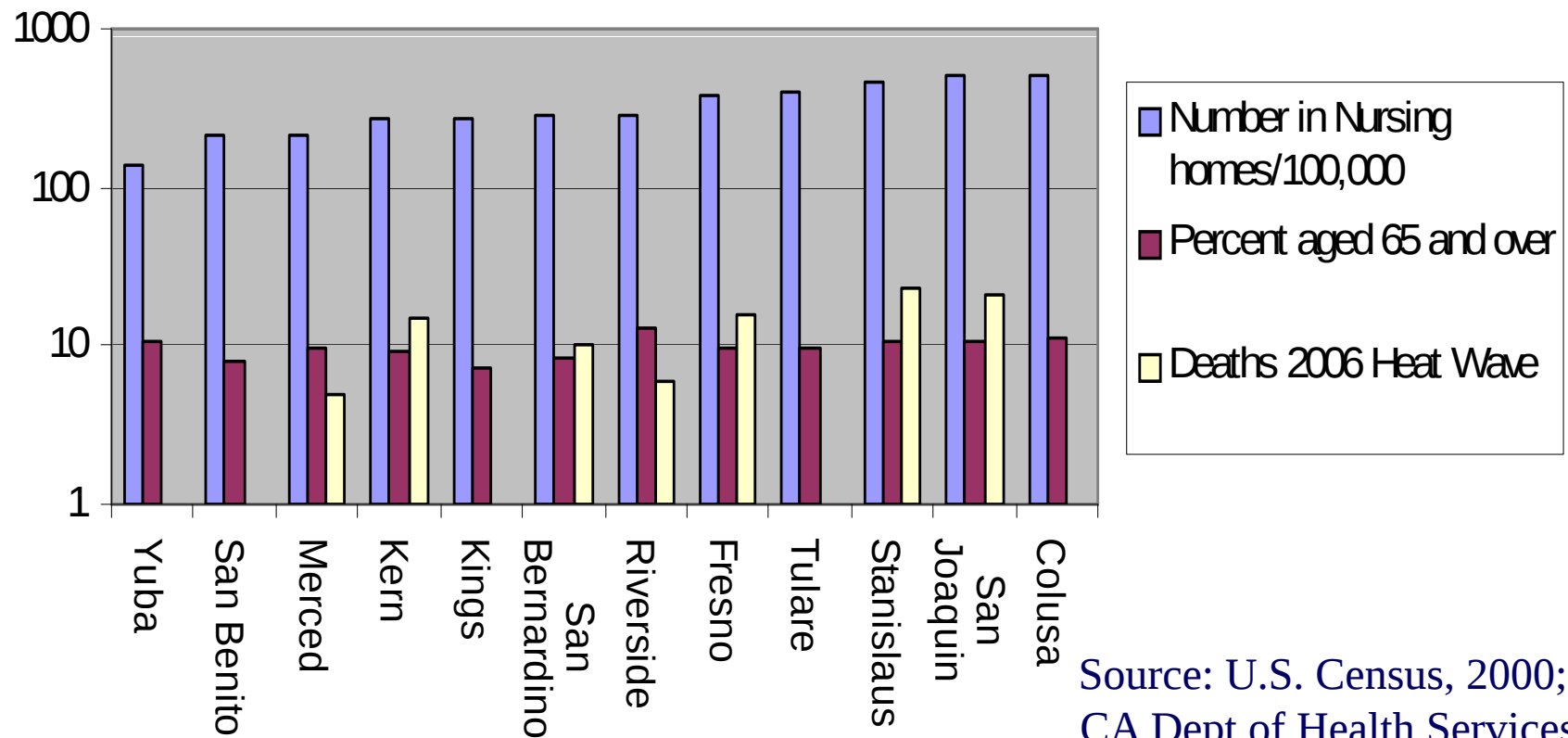
- CO₂ equivalent GGE's per capita in million metric tons from fossil fuel emissions, California 1990-2005



Source: U.S. EPA

Indicators of population vulnerabilities to climate change

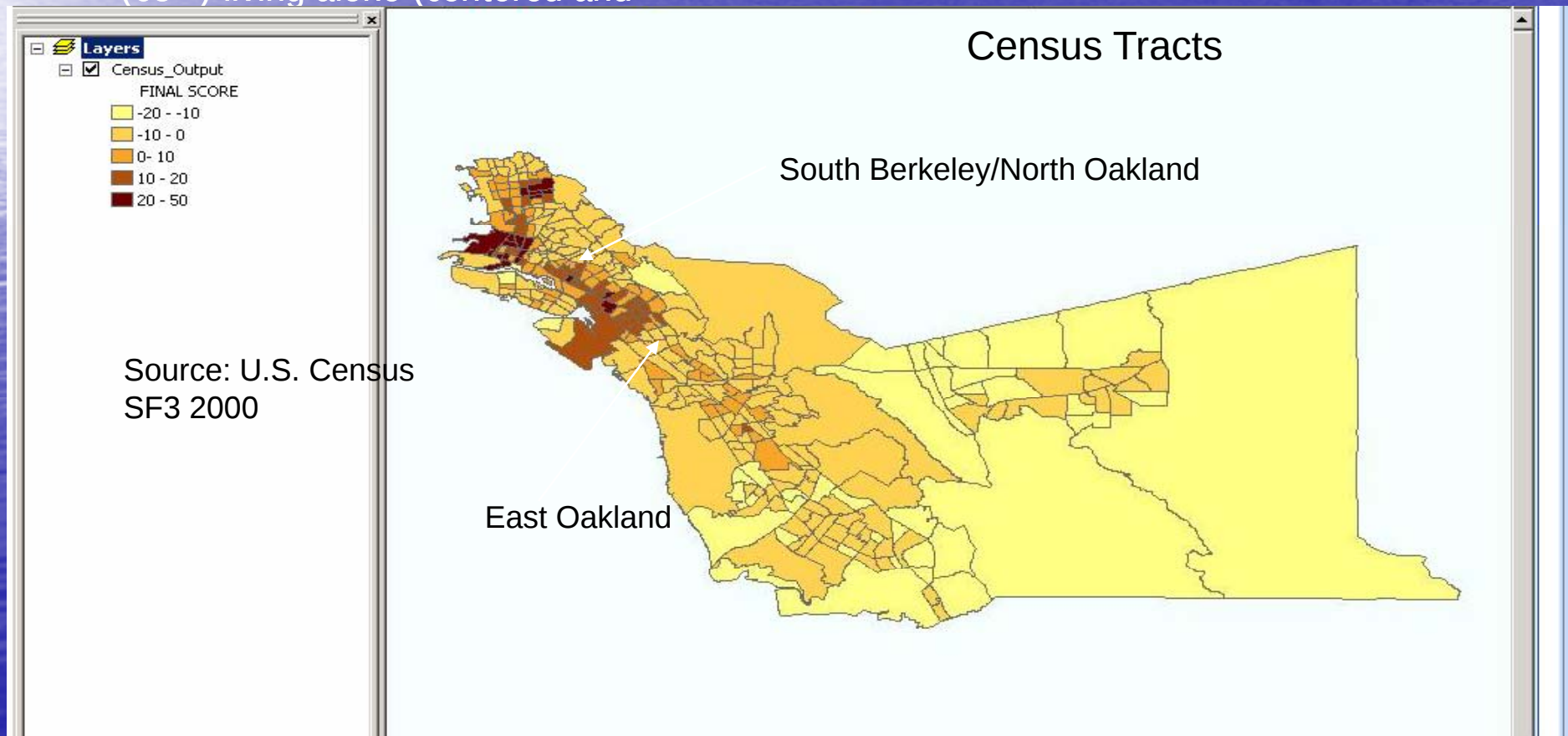
Population Vulnerabilities - Selected CA Counties



Source: U.S. Census, 2000;
CA Dept of Health Services

Alameda County, CA, Heat Vulnerability Index

- Percent population below poverty level + percent households with elderly (65+) living alone (centered and
- -20 (min; least vulnerability;
- 50 (max; most vulnerability); median=-3.2



Indicators of population vulnerabilities to climate change

- (a) Population < 5 years of age (U.S. Census);
- (b) Population 65 year of age and over ;
- (c) Population aged 65 and over living in a nursing home;
- (d) Population aged 65 and over living alone (1-person household);
- (e) Population 65 years and over institutionalized in nursing homes;
- (f) Percent of population 18 years or over with one or more chronic disease;
- (g) Population with physical disabilities;
- (h) Proportion of households with income below the poverty level;
- (i) air conditioner use.
- (j) proportions of populations eligible for energy cost assistance.
- (k) Crime rates?

Population Vulnerability Indicators

- Populations vulnerable to displacement
 - Populations in coastal areas vulnerable to flooding due to sea-level rise
- Populations vulnerable to extreme weather events

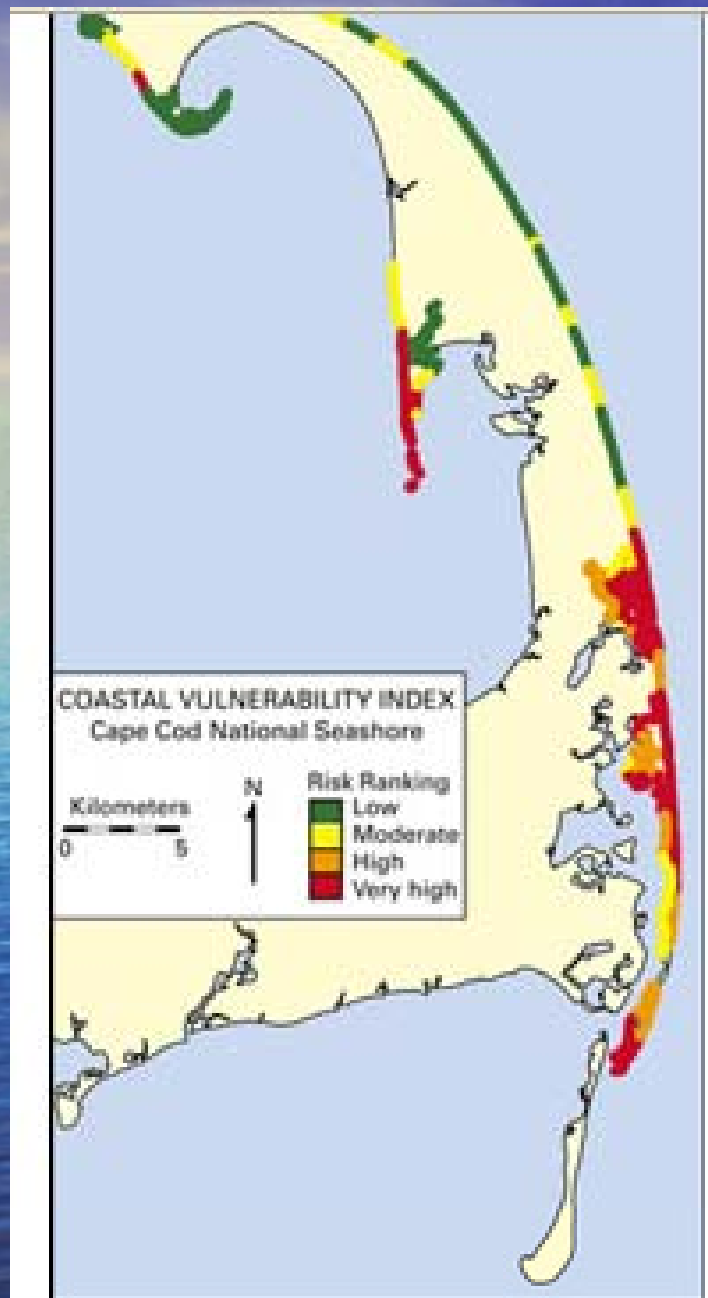
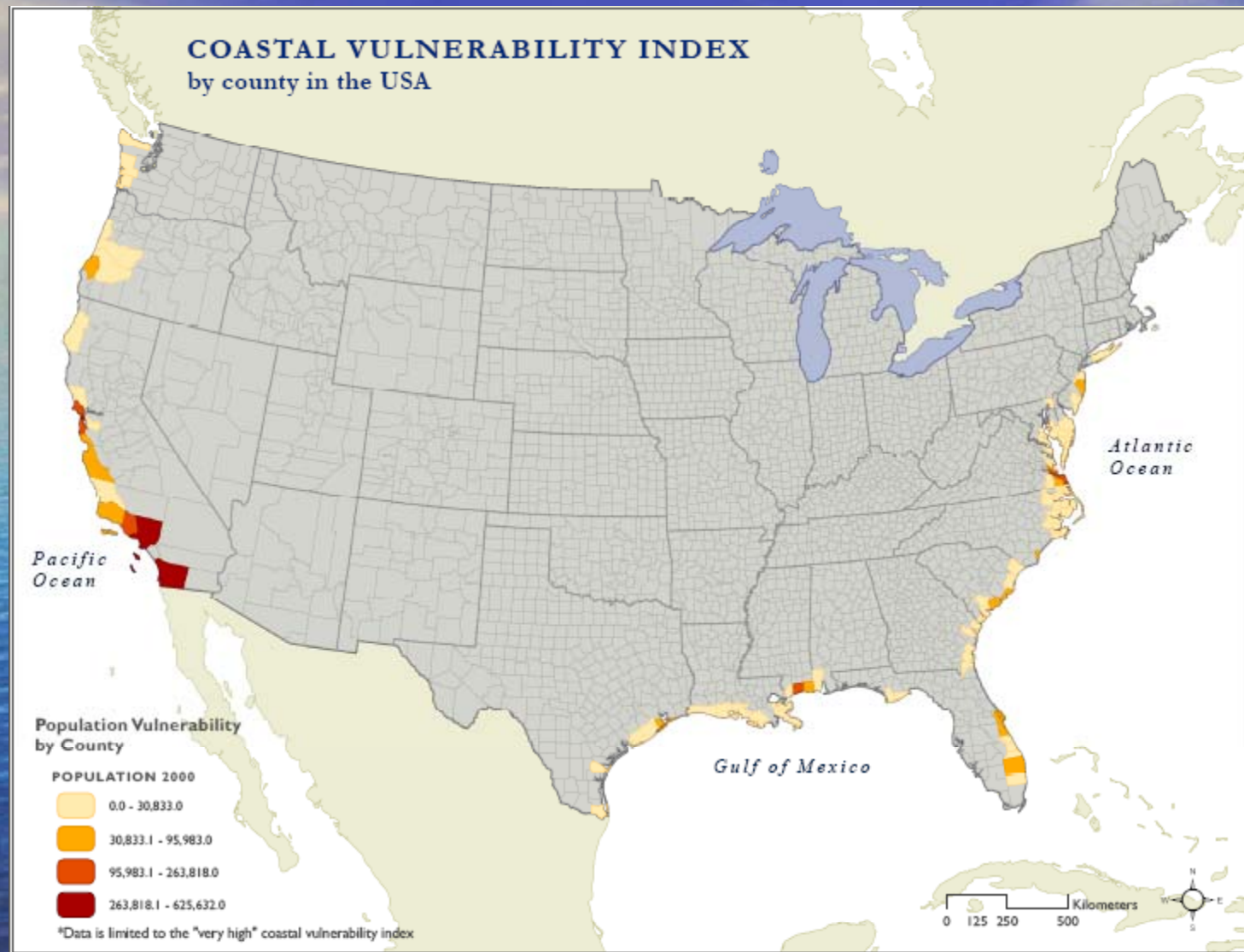


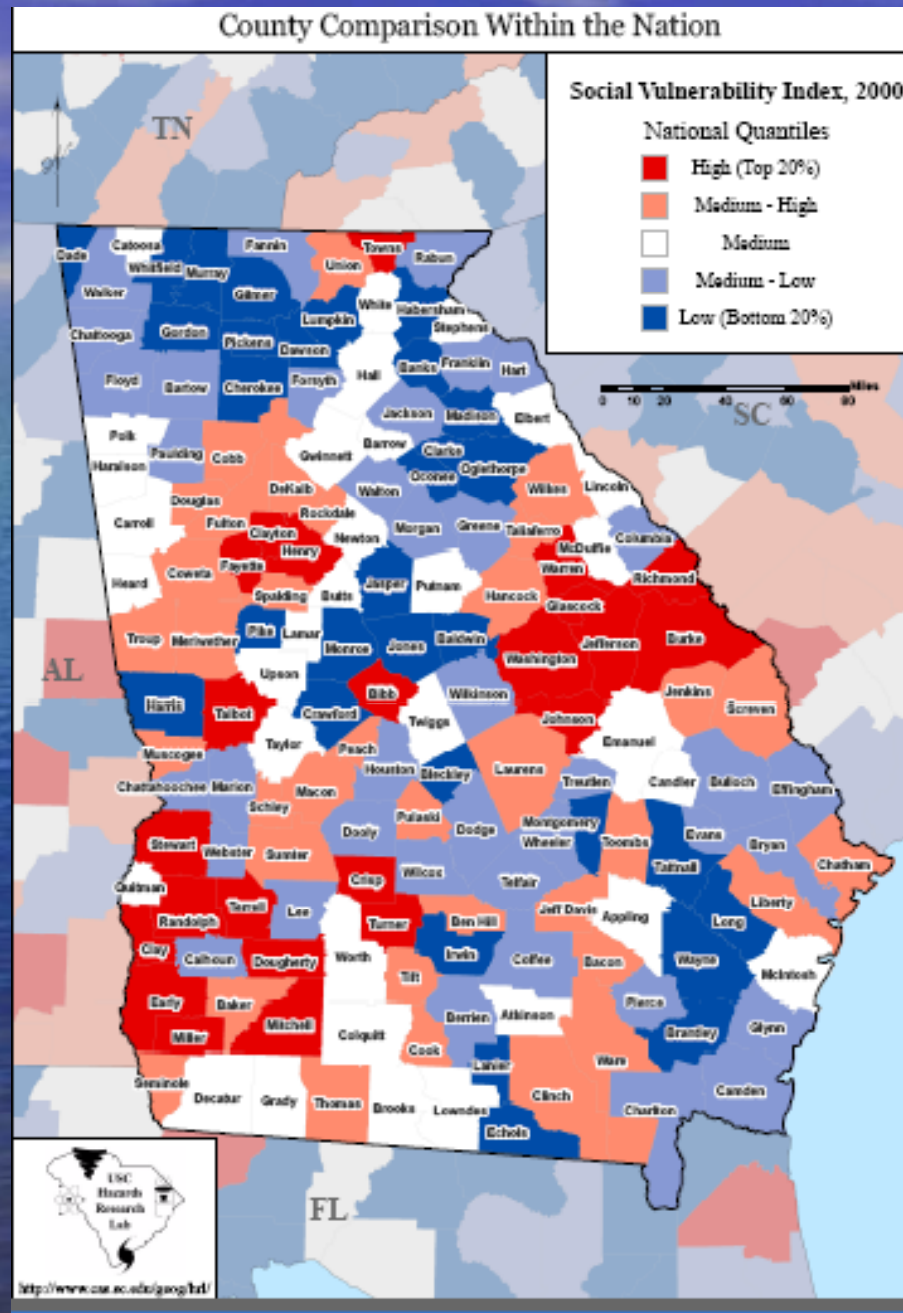
Figure 1. Map of the coastal vulnerability index (CVI) for Cape Cod National Seashore in Massachusetts showing the relative vulnerability of the coast to changes in sea level. Areas along the coast are assigned a ranking from low to very high risk, based on the analysis of physical variables that contribute to coastal change.

Population by County within 5 km of coast with “very high” vulnerability to sea level rise



Source: USGS and U.S.
Census 2000

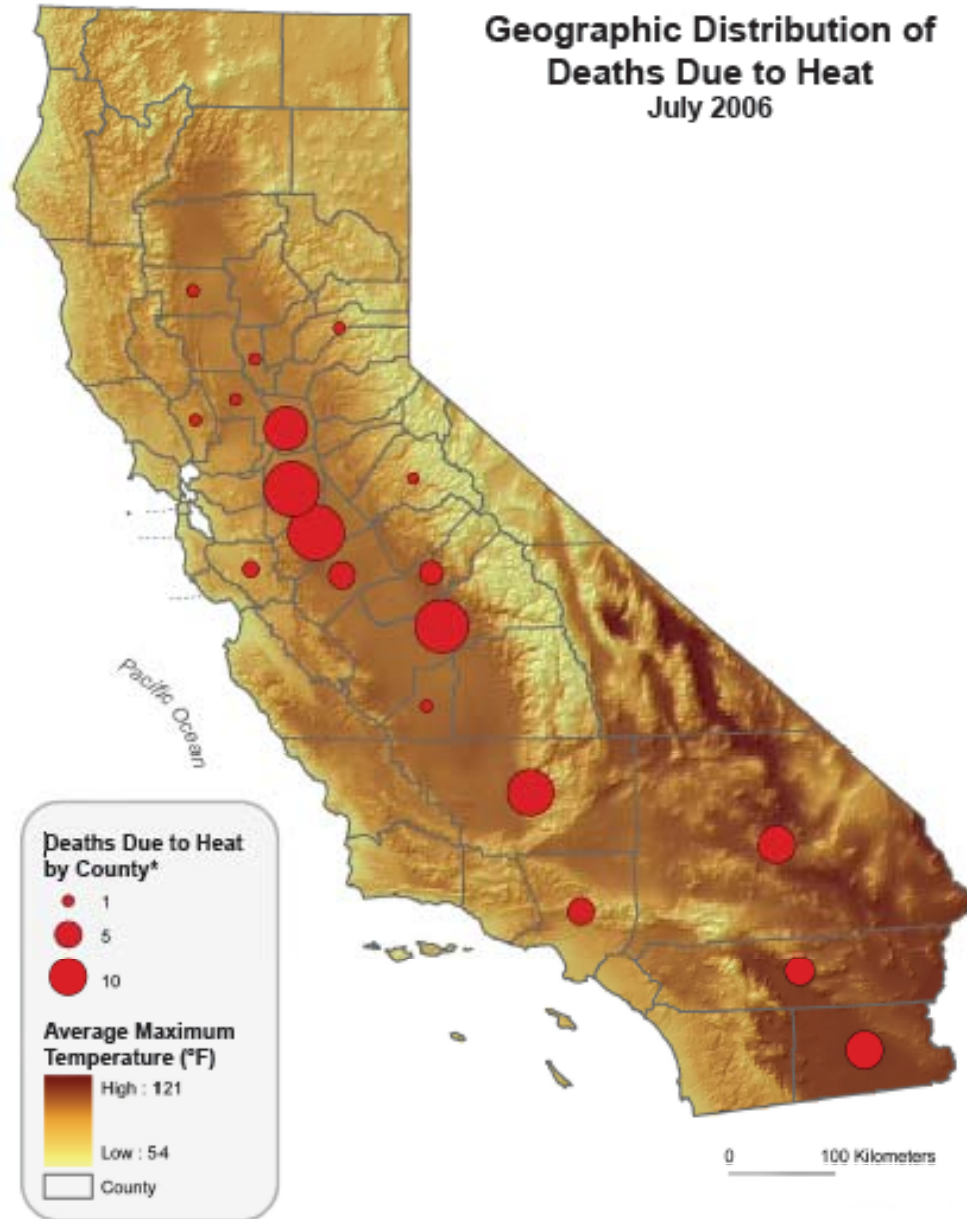
Social Vulnerability Index to Environmental Hazards, Georgia, 2000



Health Outcome Indicators

- Heat-related mortality
 - Standardized case definition; required data elements
 - Estimate of number of excess deaths due to heat vs. deaths attributed to heat

Figure 6:

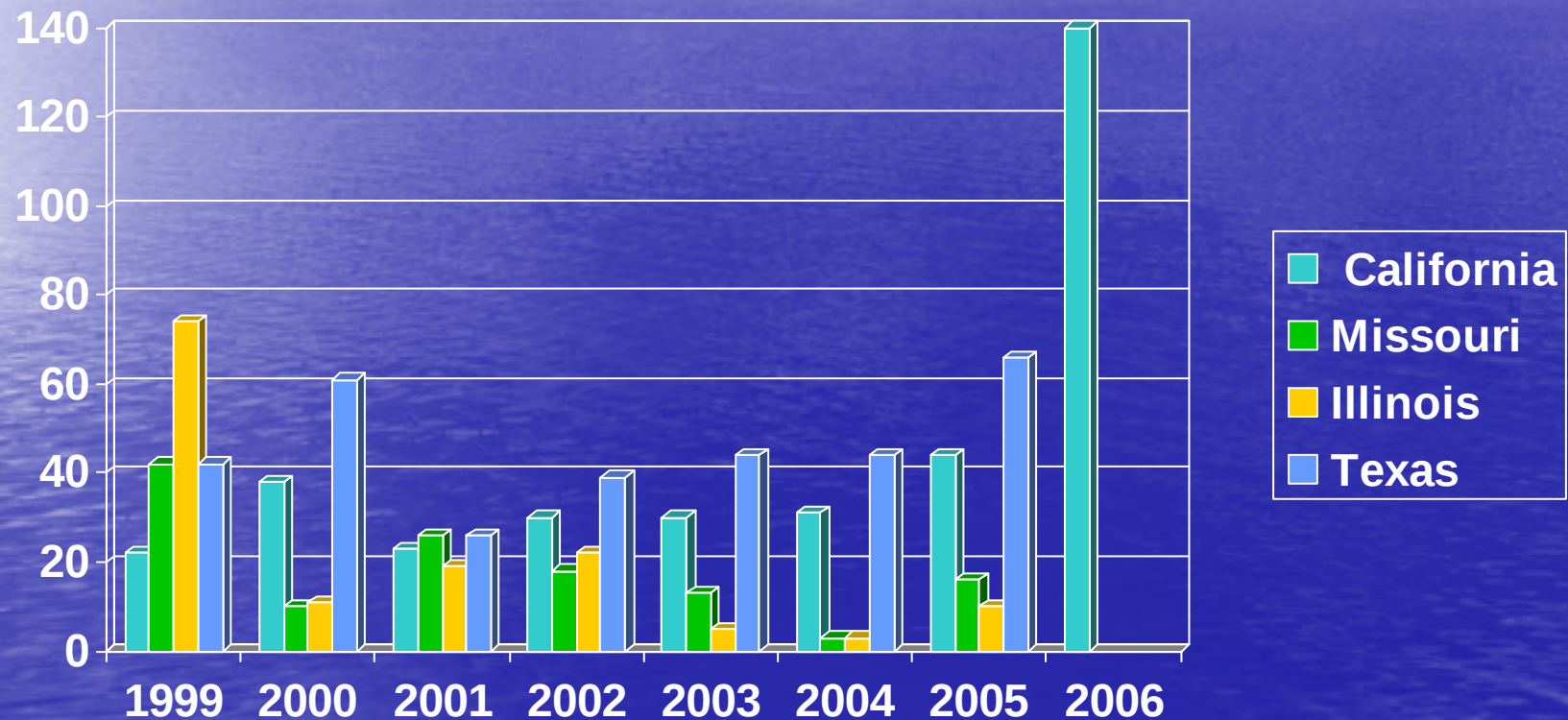


*Note: Proportional circles representing the number of deaths per county have been placed at the counties' geographic centers.

Source: California Department of Public Health

Climate Change Public Health Impacts Assessment and Response Collaborative
California Department of Public Health and the Public Health Institute

Heat Deaths, Selected States, 1999-2005, All ages

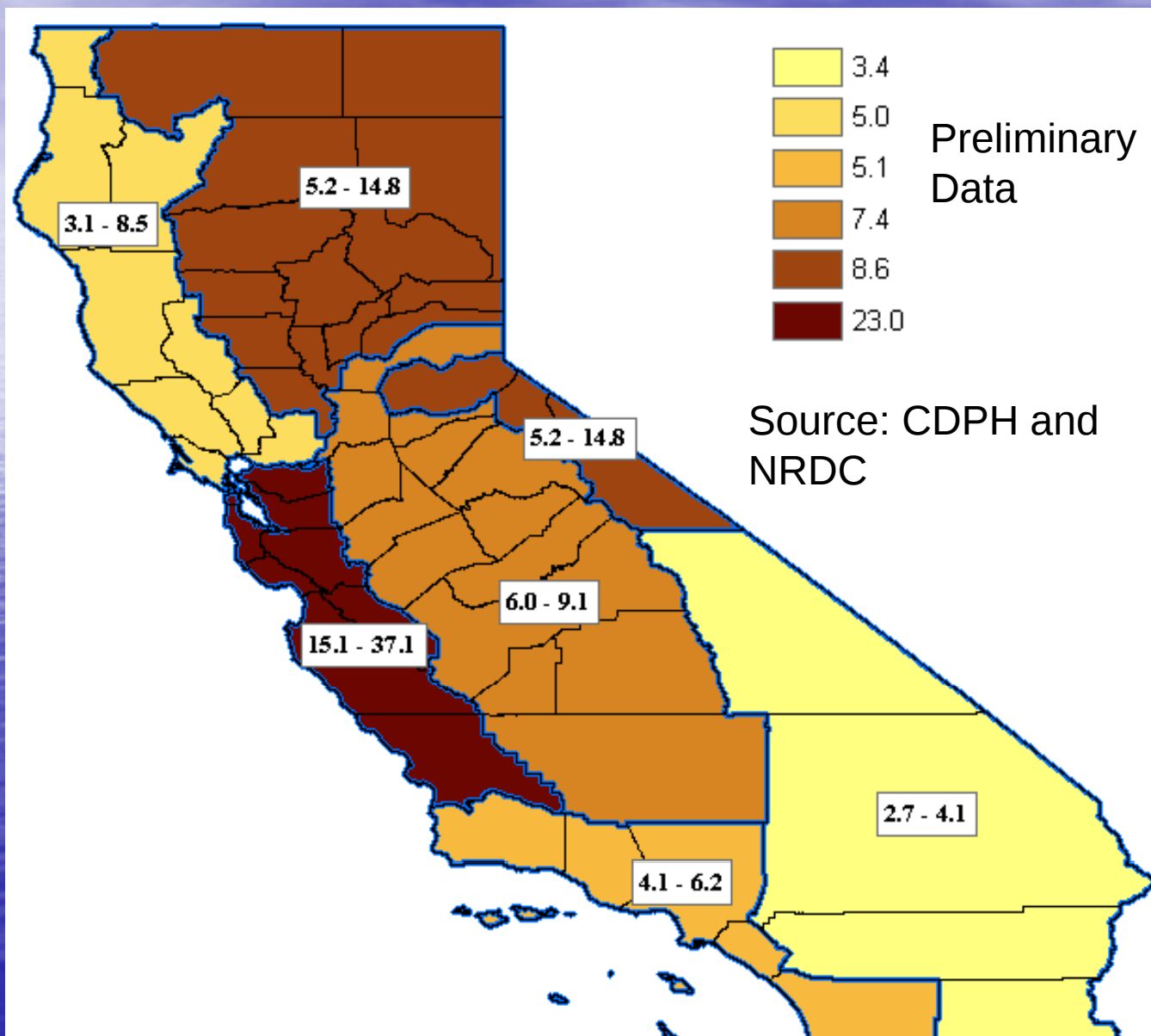


Source: CDC Wonder and CA Dept of Public Health (2006): ICD10: X30

Health Outcome Indicators

- **Heat-related morbidity**
 - Number of ER visits and hospitalizations due to dehydration, heat stroke, hyperthermia (analysis by race, age, gender, location, etc.)
- **Injury morbidity and mortality related to ice storms**
 - Excess morbidity and mortality due to carbon monoxide
- **Excess morbidity and mortality due to trauma and falls**
 - . Excess mortality due to drowning

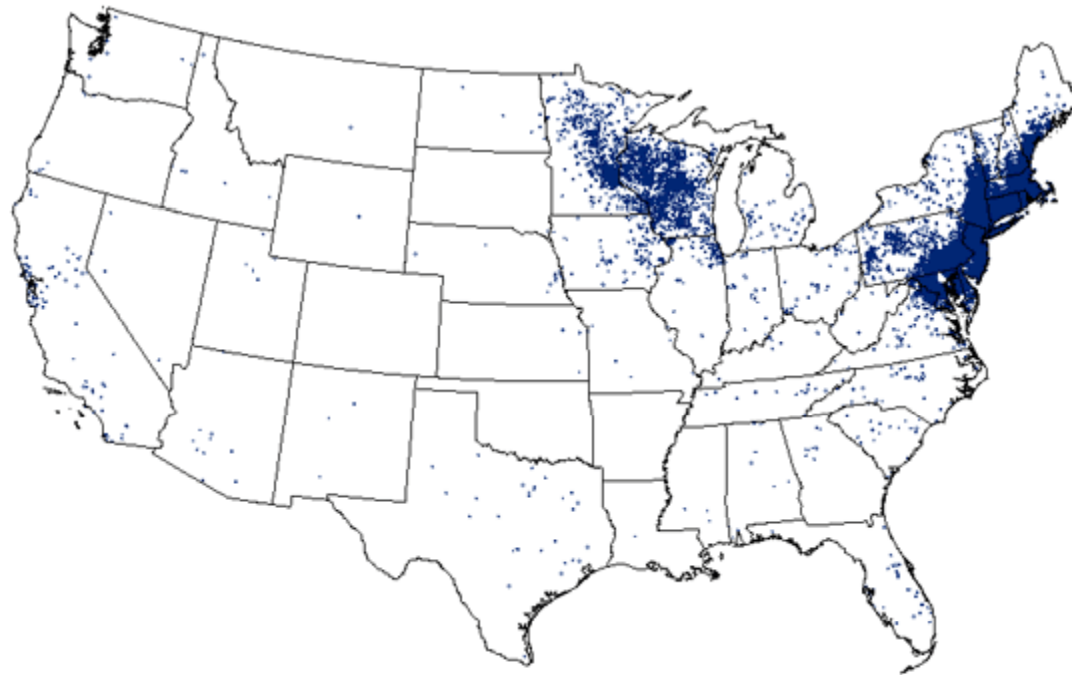
Rate Ratios for Emergency Room Visits for Heat-Related Illness (all ages/races) in California for 2006 Heat Wave Period vs. Referent Period



Health Outcome Indicators

- - **Excess cases of vector borne disease**
 - i. Cases of West Nile Virus
 - ii. Cases of Equine encephalitis
 - iii. Cases of Dengue
 - iv. Lyme Disease
 - v. Malaria?
 - vi. Hantavirus?

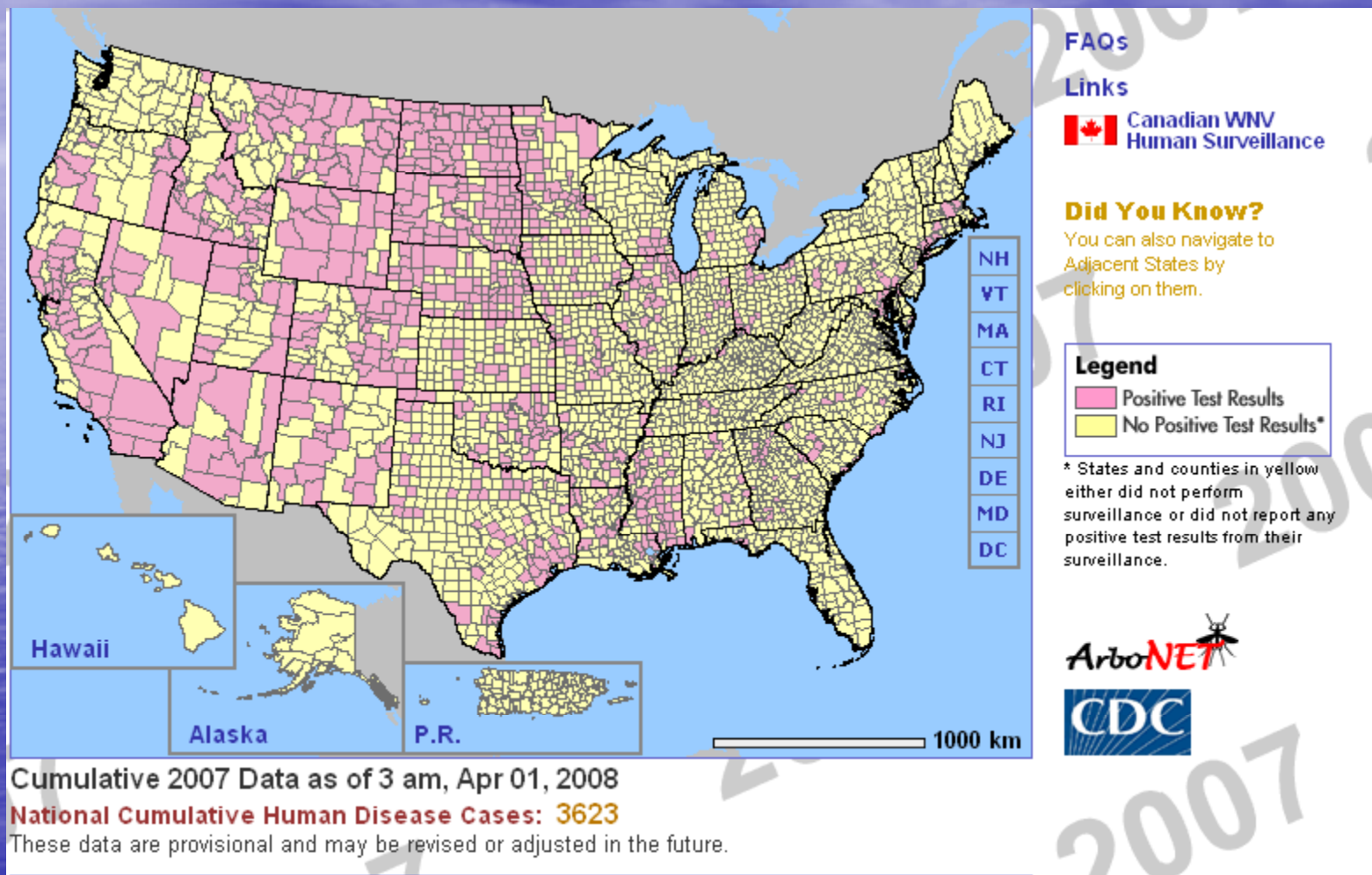
Reported Cases of Lyme Disease -- United States, 2006



1 dot placed randomly within county of residence for each reported case

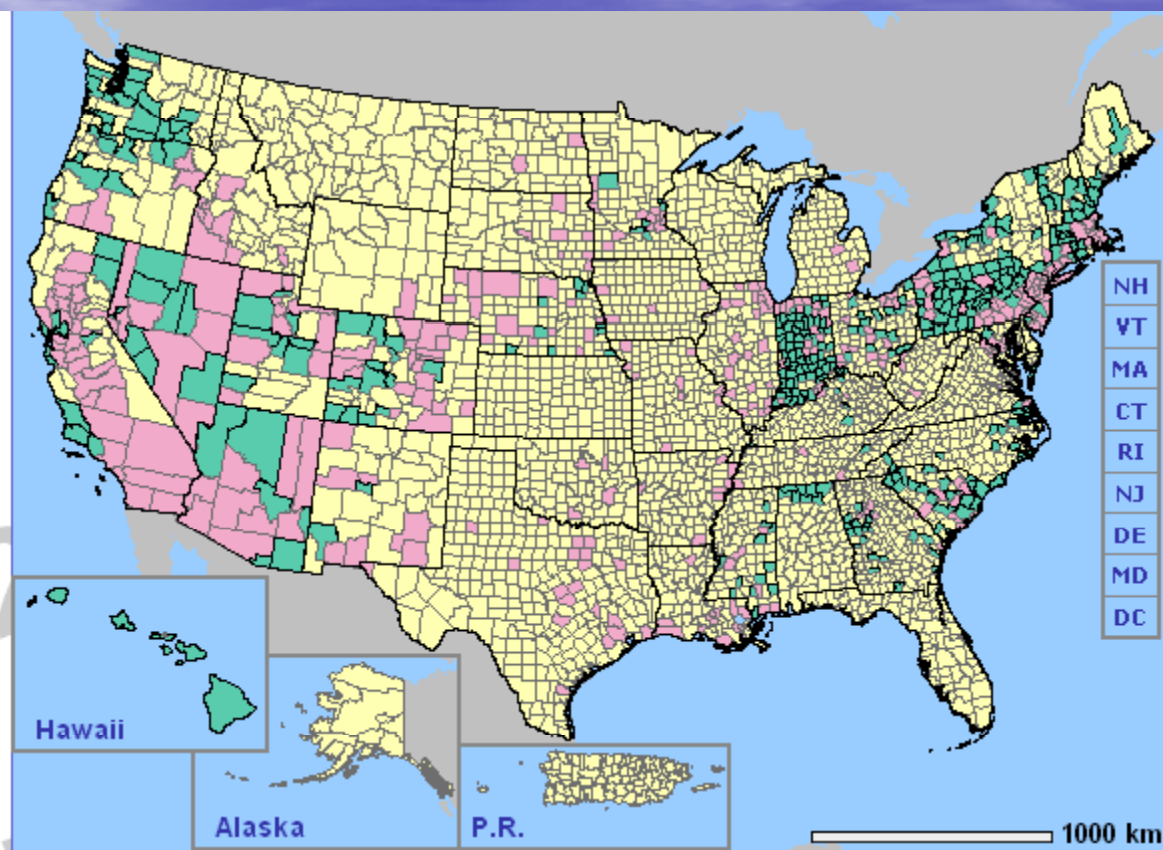
Source: CDC, Division of Vector Borne Infectious Disease

Human Cases, West Nile Virus, 2007



Source: USGS and ArboNET, CDC

Mosquito Infections, 2007, West Nile Virus



[FAQs](#)

[Links](#)

Did You Know?

You can also navigate to Adjacent States by clicking on them.

Legend

- Positive Test Results
- Samples Submitted
- No Positive Test Results*

* States and counties in yellow either did not perform surveillance or did not report any positive test results from their surveillance.



Cumulative 2007 Data as of 3 am, Apr 01, 2008

National Cumulative Mosquito Infections: 8051

These data are provisional and may be revised or adjusted in the future.

Health Outcome Indicators

- Food and water-borne disease
 - Toxic algae blooms
- Cancer
 - Melanoma

Intervention Indicators

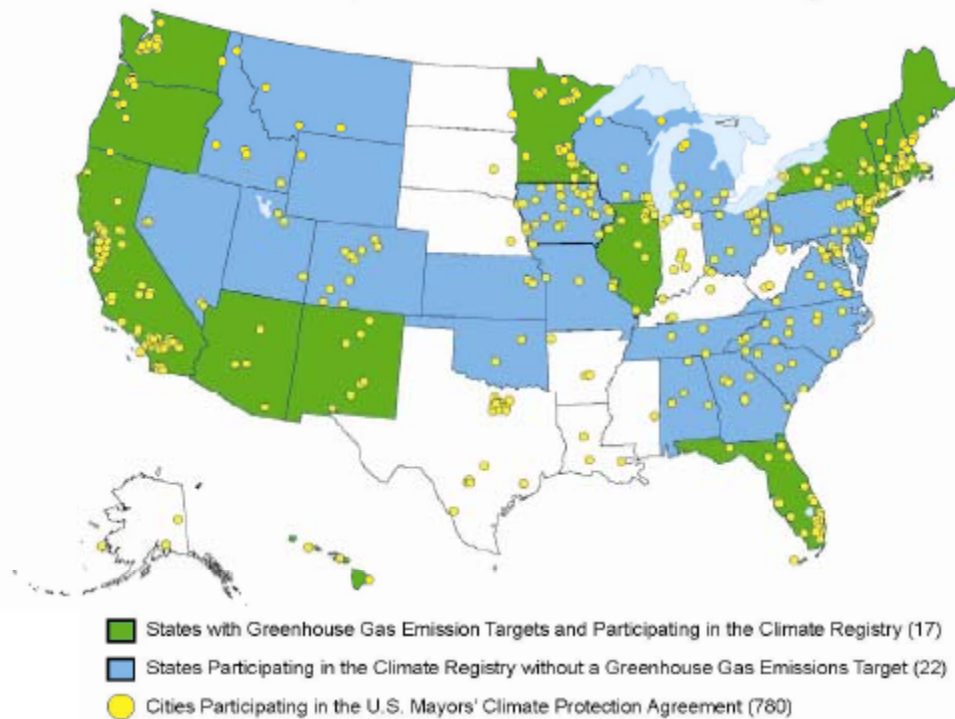
- Indicators of Preparedness
 - i. Access to Cooling centers
 - ii. Transportation out of afflicted areas
- Indicators of Adaptation
- Indicators of Mitigation
 - i. Survey of local mitigation plans
 - ii. Heat wave early warning systems
 - iii. Heat island mitigation

Intervention Indicators

- Policy Indicators
 - i. Percent of each state's population covered by Kyoto Protocol
 - ii. Number of cities, counties and states signed on to the Kyoto Protocol
 - iii. Number of cities, counties and states with emissions standards below federal standard

Figure 1¹¹

State and Local Participation in Selected Climate Change Initiatives



¹¹ Information in this figure was taken from the Climate Registry, the Pew Center on Climate Change, and the US Conference of Mayors.