

# GEOS 3310 Lecture Notes: Hazard Maps for Review

Dr. T. Brikowski

Spring 2012

To aid in review for the optional final, this document contains pointers to the U.S. or world hazard maps that were utilized in this class. For each map you will be asked to identify the hazard depicted in the map (8 points, use the distribution to help you decide), explain why it is distributed as shown (6 points), and

how it can be remediated, avoided or adjusted for (6 points).  
For textbook publisher's copyright reasons, you **must be on a UTD IP address** (or use VPN ) to access the links below.

# Natural Hazards

# Floodplain/Floodway

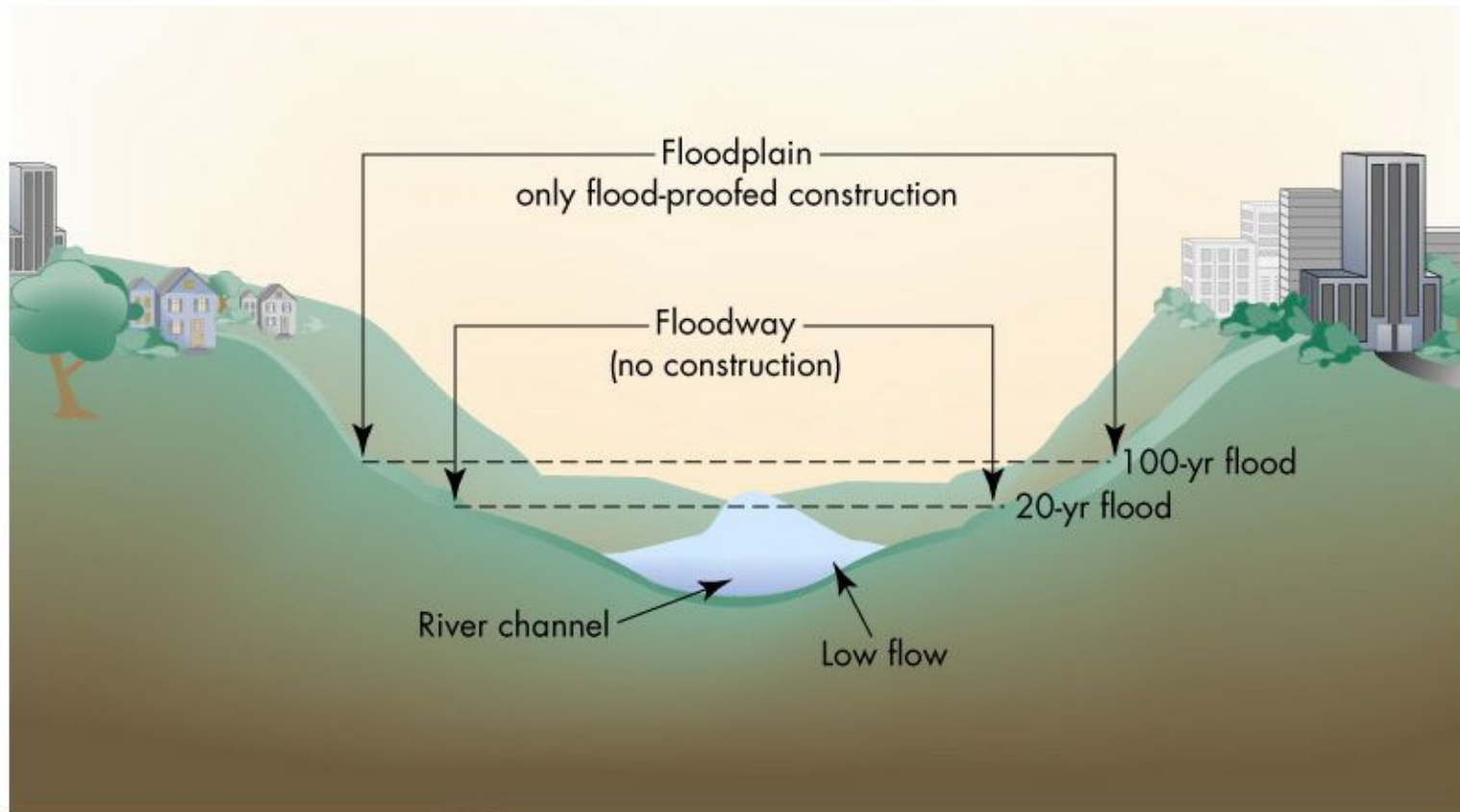


Figure 1: Zoning features of a regulated floodplain [Fig. 9.30, Keller, 2011]. The flood hazard area is generally defined at the 100-year floodplain.

# Volcanic Mudflow Risk, Mt. Ranier

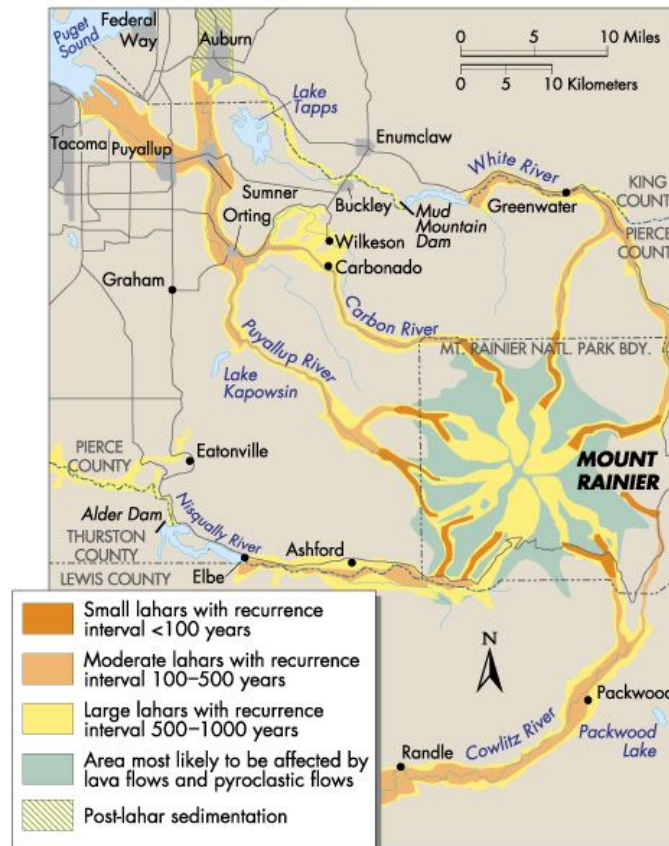


Figure 2: Potential hazards from Mt. Rainier, outside Seattle, WA [Fig. 8.24, Keller, 2011].

# Long Valley Ash Hazard

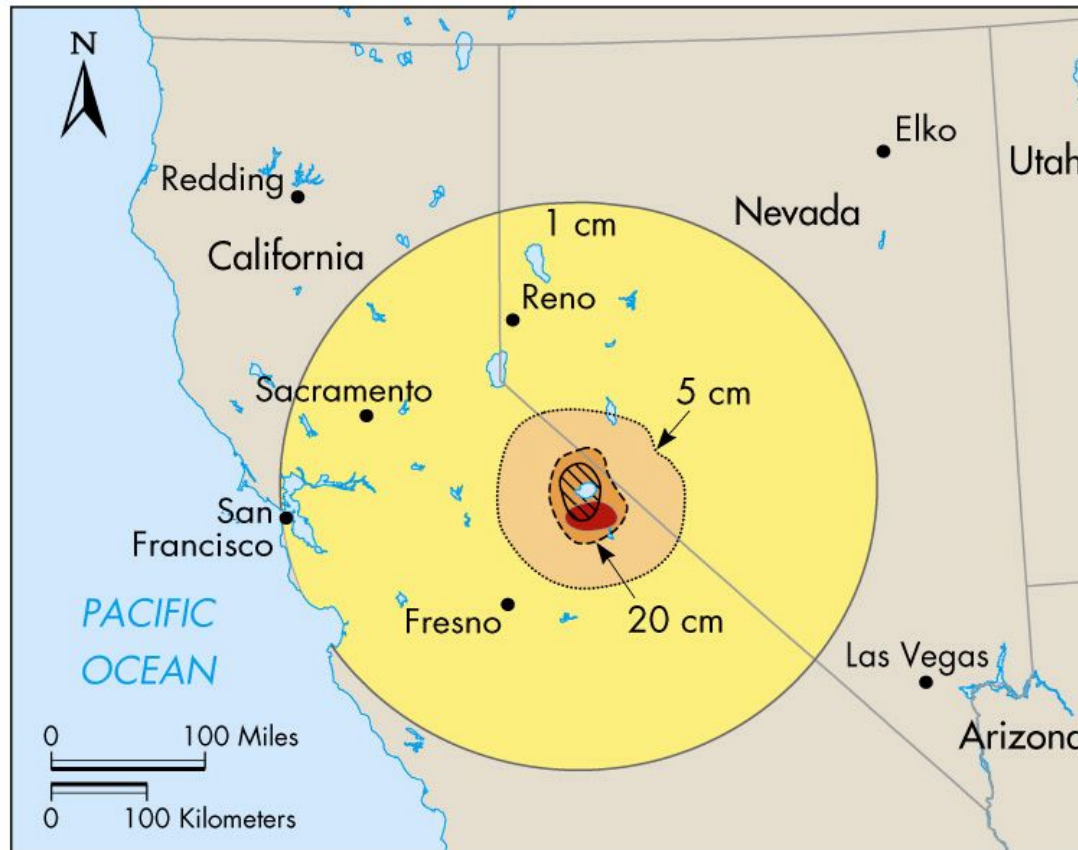


Figure 3: Predicted hazard from Long Valley Caldera [Fig. 7.17a, Keller, 2008]. Contours give probable depth of ash, red area and diagonal lines show area of probable flow events.

# Seismic hazard

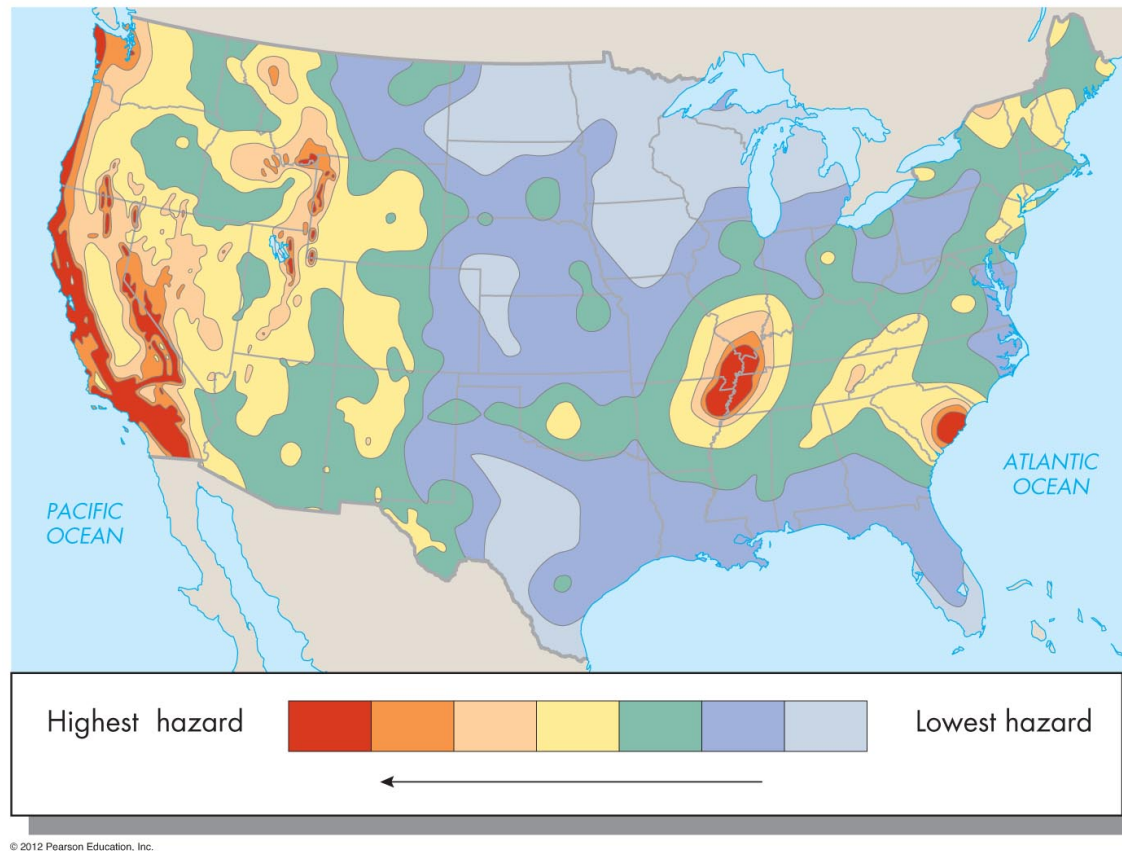


Figure 4: Risk of high horizontal acceleration in U.S. [Fig. 6.28a, Keller, 2011]. See also USGS .

# Landslides

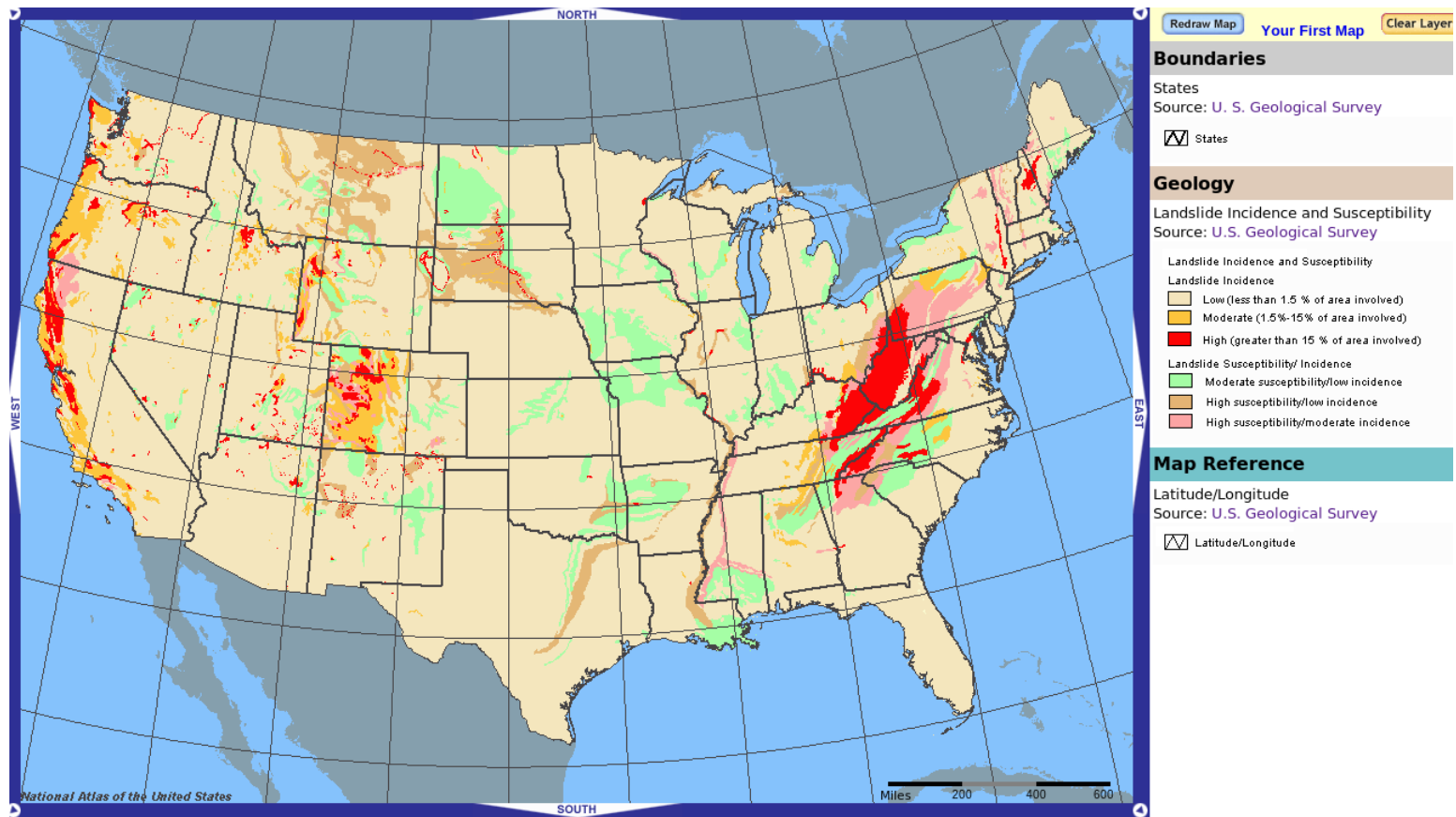


Figure 5: U.S. landslide hazard map, data from USGS Prof. Paper 1183 , drawn by US National Atlas viewer

# Subsidence

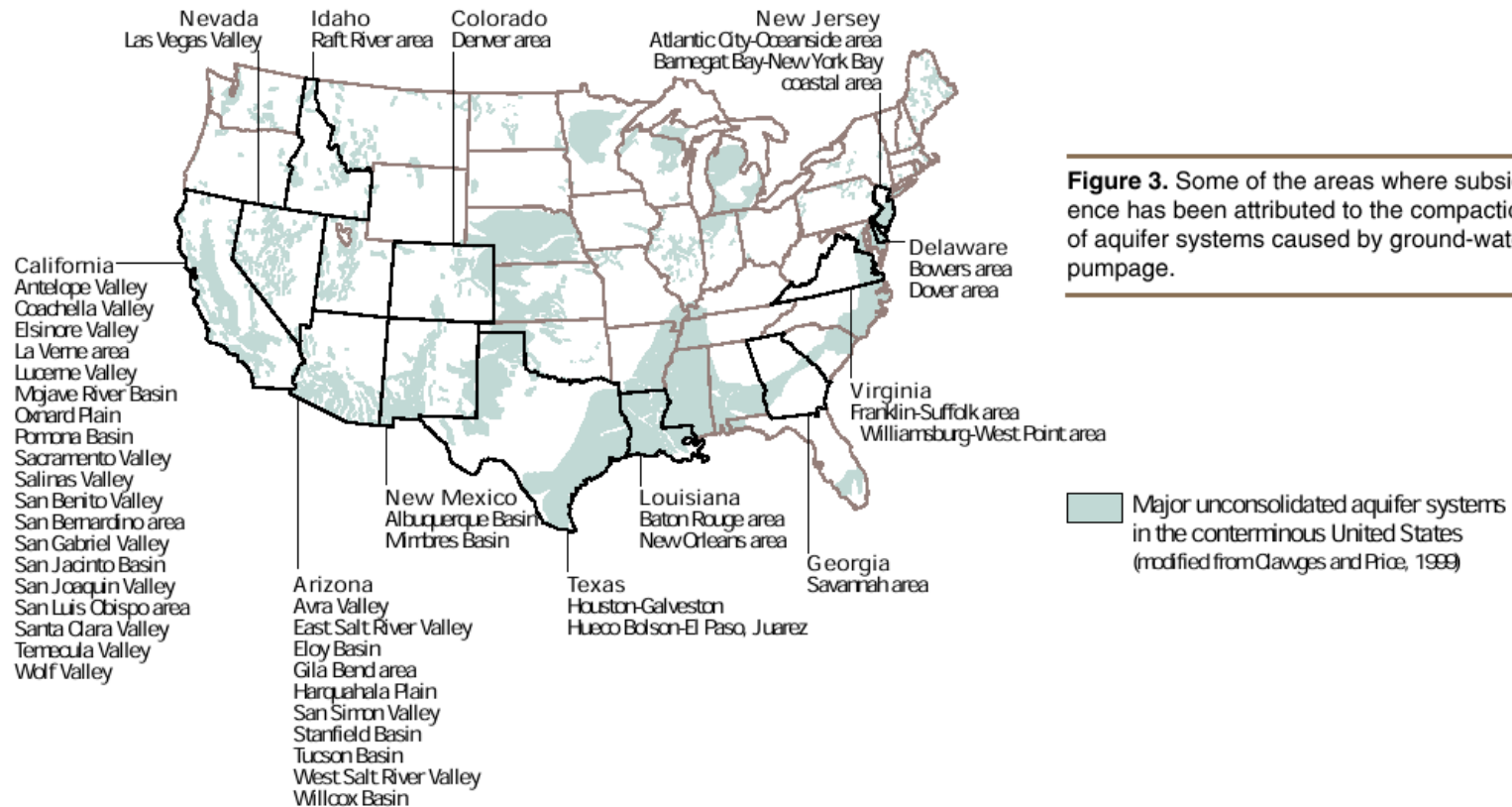


Figure 6: U.S. subsidence areas and potential locations. After USGS USGS Subsidence fact sheet .

# Hurricanes

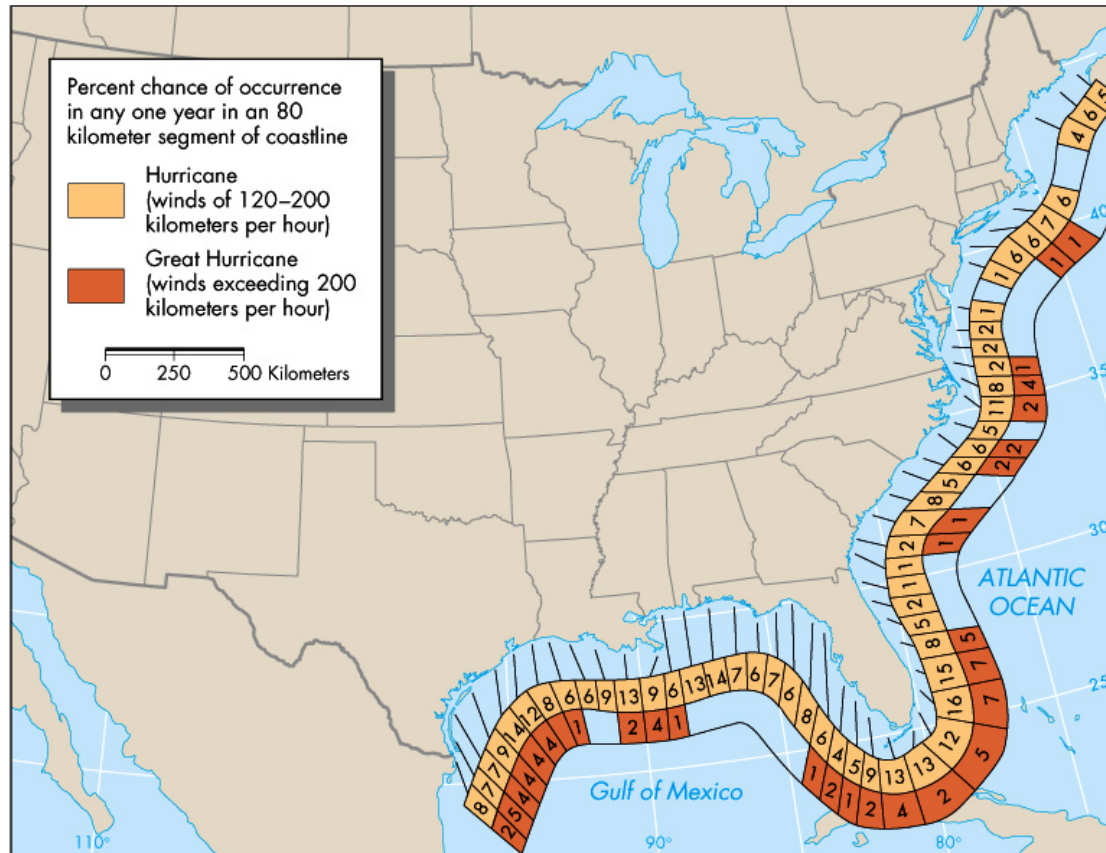


Figure 7: Annual risk of all and major hurricanes for Atlantic coast of U.S. [Fig. 10.22, Keller, 2008].

# Storm Surge

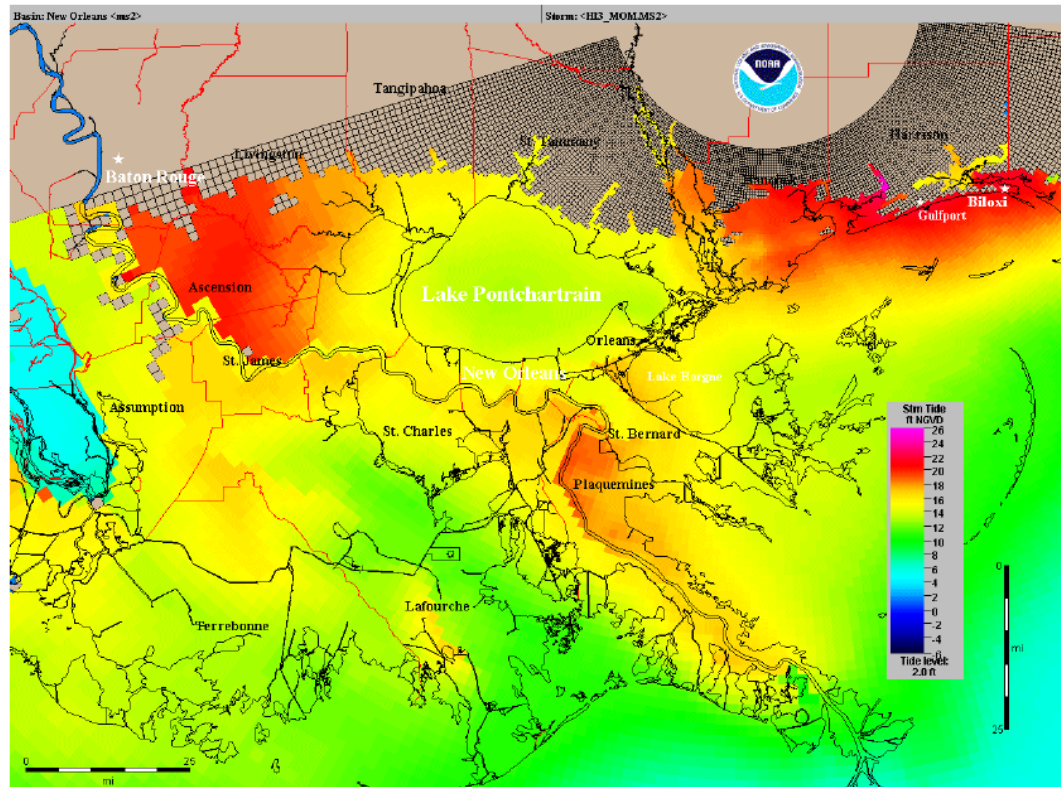


Fig. 2. Category 3 Storm Surge Maximum Flood Elevation

Figure 8: NOAA Category 3 storm surge SLOSH model results. Note New Orleans levees fail [Levitan, 2003].

# Sulfate/Coal and Heart Attacks

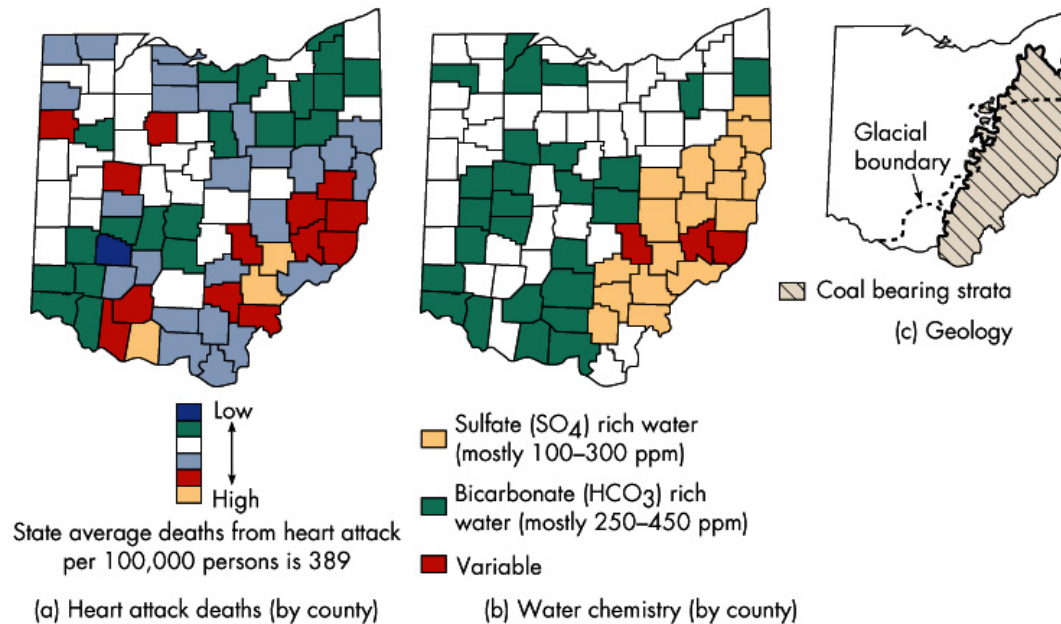


Figure 9: High sulfate and sodium in drinking water linked to heart disease. See classnotes

# Radon Risk

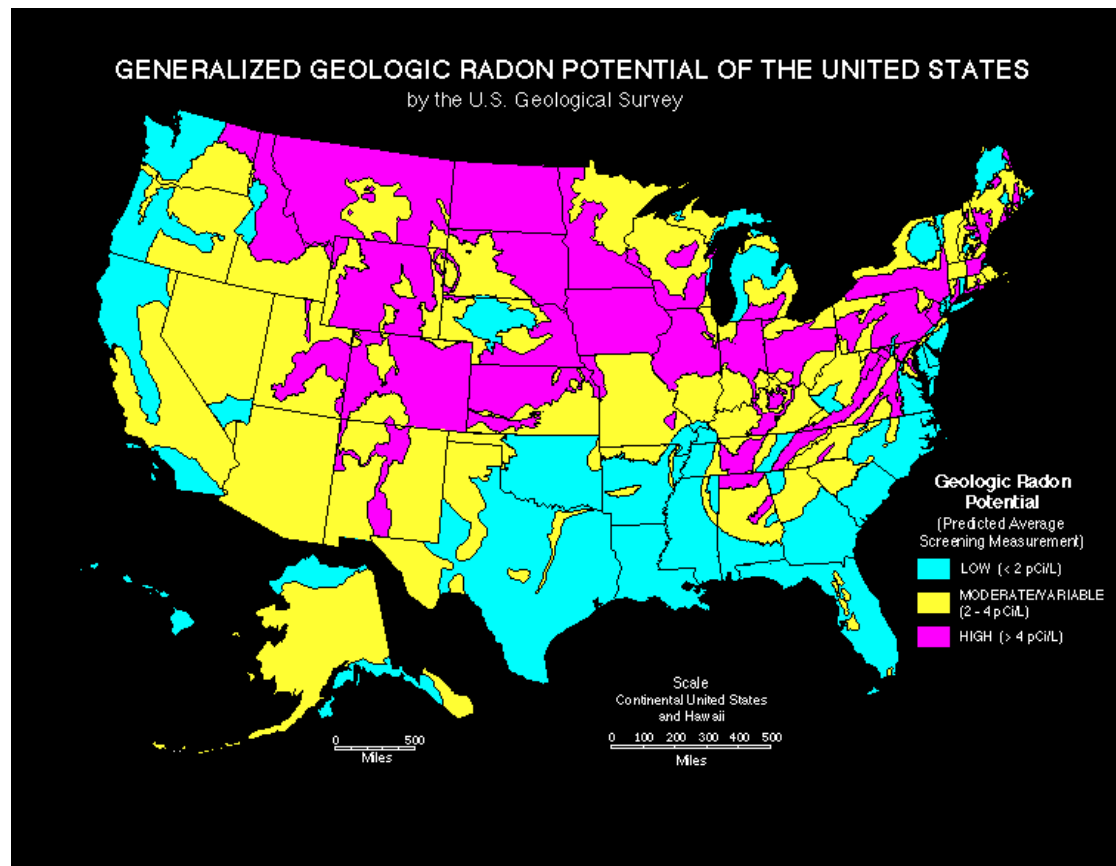


Figure 10: High soil uranium content, or granite bedrock yields radon, which can accumulate in basements. See classnotes

# Man-Made Hazards

# Population Growth

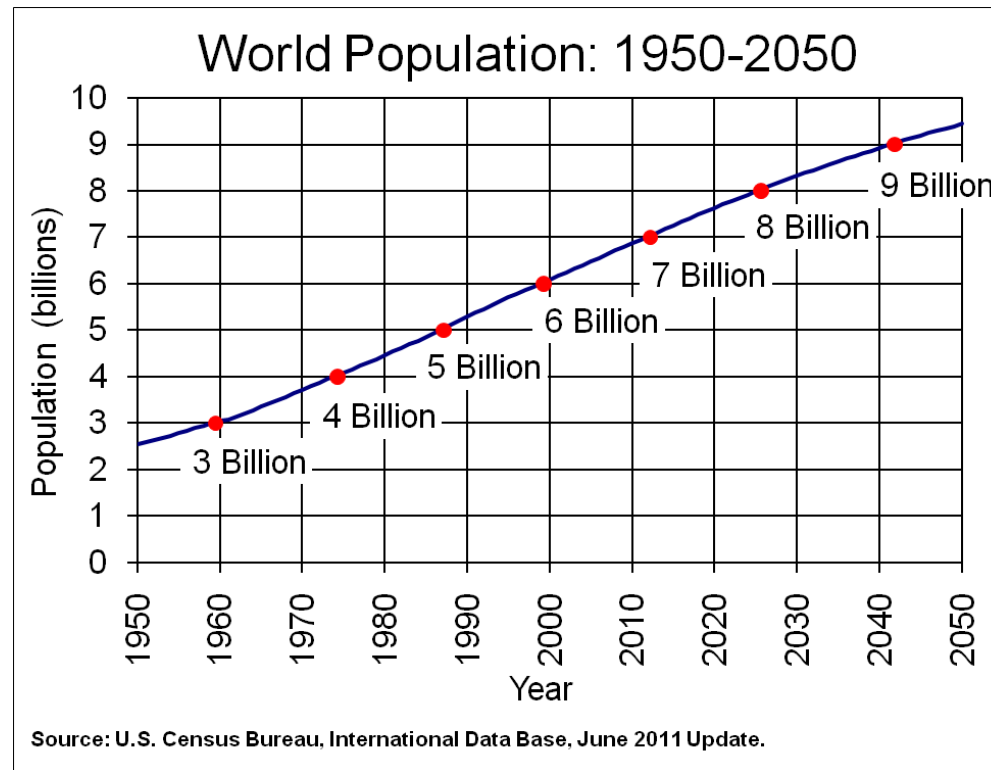


Figure 11: Declining growth rates lead to a less-than-exponential growth in world population (after U.S. Census Bureau ). Still troubling, but not as bad as it could be!

# Atmospheric Inversions

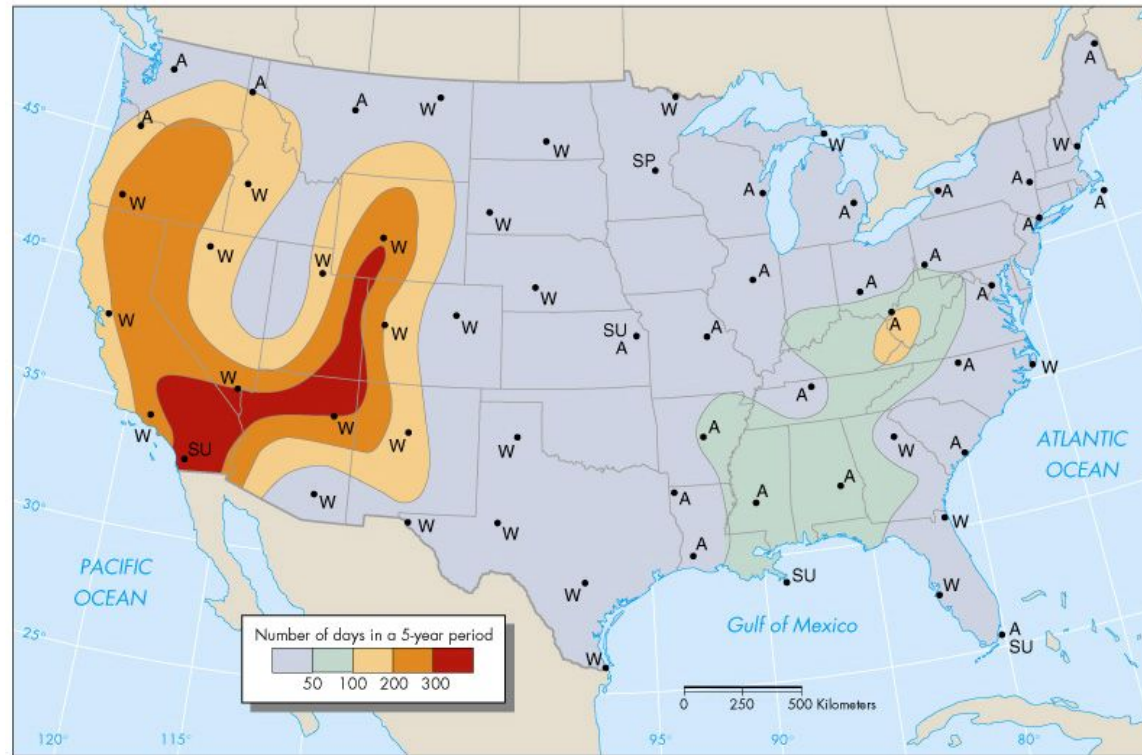


Figure 12: *Atmospheric inversions* occur when cold air is trapped in an enclosed area (e.g. valley) by overlying warm air. These are especially a problem in the Western U.S., where topography favors trapping of air. See air pollution classnotes .

# Ozone Hole

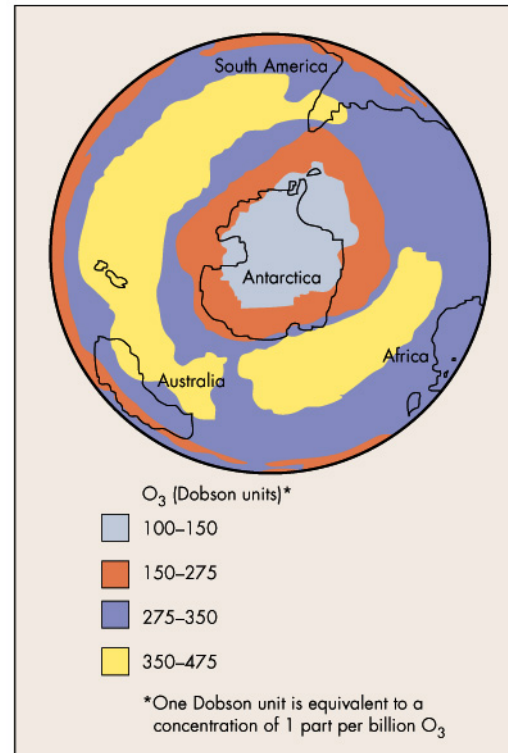


Figure 13: Since the mid-1980's an *ozone hole* has been present in the winter at both poles, primarily the South Pole. See Global Change classnotes .

# World Desertification

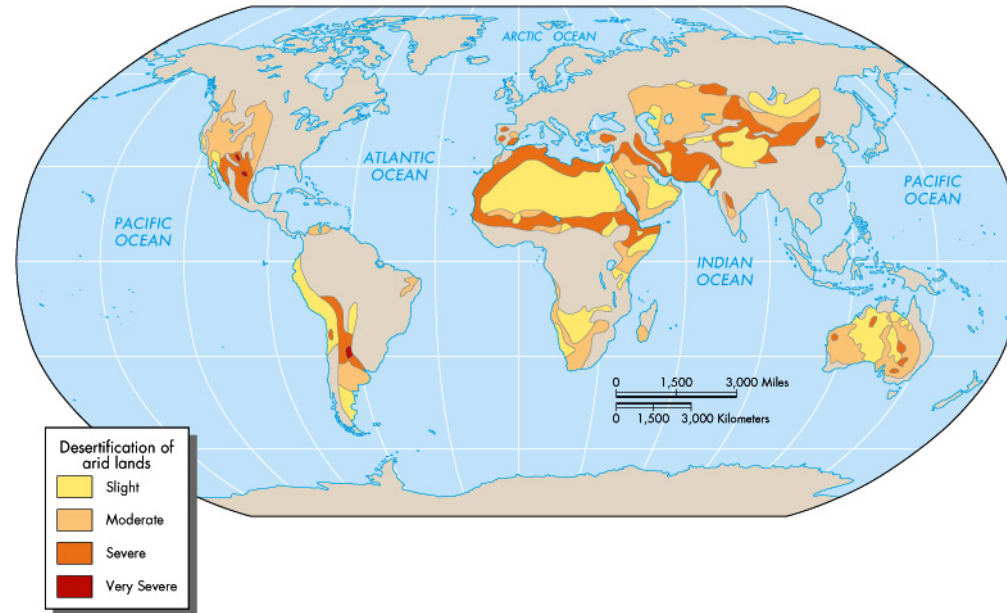


Figure 14: World areas of desertification [Fig. 3.19, Keller, 2000]. Note main areas in the U.S. lie west of  $100^{\circ}\text{W}$  longitude. Many humanitarian crisis areas are related to desertification (e.g. expansion of the Sahara Desert in Darfur region, Fig. ??).

# Global Warming

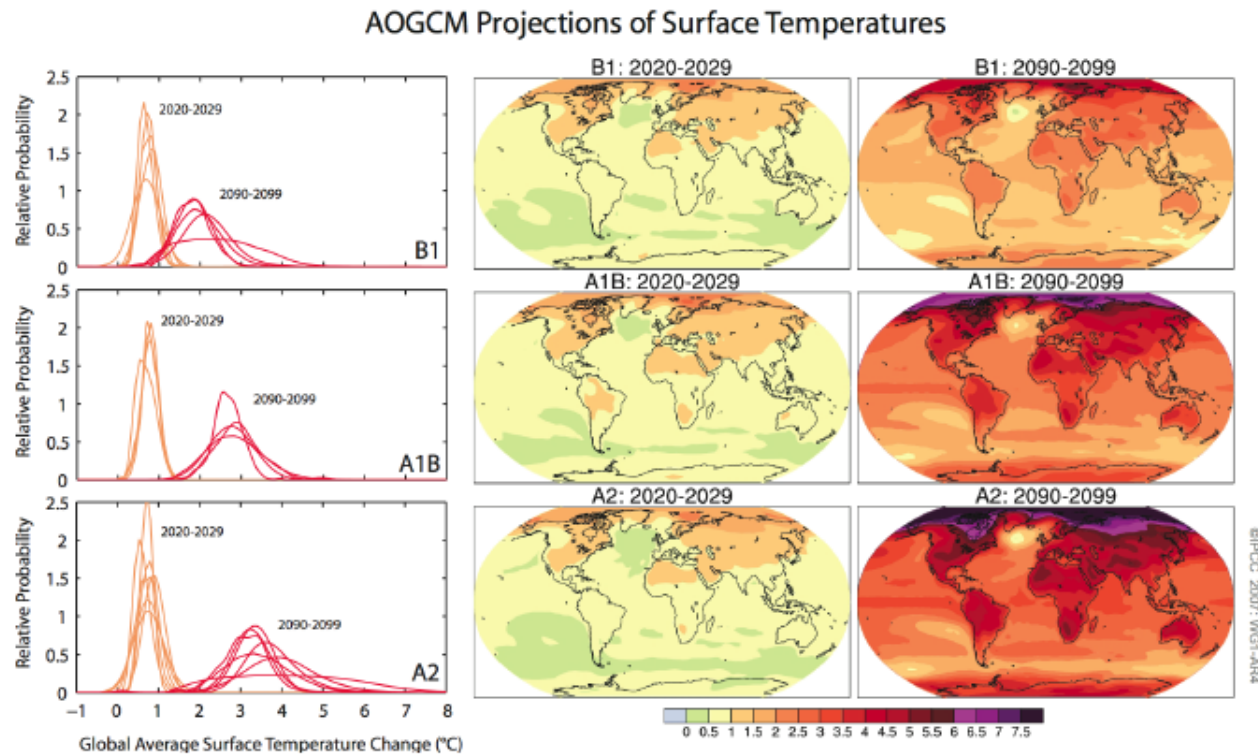


Figure 15: U.S. warming to be 2-5C, with a range of scenarios and probability distribution functions within those. From IPCC4 [2007]. See Global Change classnotes .

# Bibliography

IPCC4. Climate Change 2007: The Physical Science Basis, Summary for Policymakers (4th Climate Assessment Report). Technical report, U.N. Intergov. Panel on Climate Change, 5 February 2007. URL <http://www.ipcc.ch/SPM2feb07.pdf>. 18 pp.

E. A. Keller. *Environmental Geology*. Prentice Hall, Upper Saddle River, NJ, 8th edition, 2000. ISBN 0-13-022466-9.

E. A. Keller. *Introduction to Environmental Geology*. Prentice Hall, 4th edition, 2008. ISBN 9780132251501. URL <http://www.pearsonhighered.com/educator/academic/product/0,3110,0132251507,00.html>.

E. A. Keller. *Introduction to Environmental Geology*. Prentice Hall, 5th edition, 2011. ISBN 9780321727510. URL <http://www.pearsonhighered.com/educator/product/Introduction-to-Environmental-Geology-5E/9780321727510.page>.

M. Levitan. Comparative Analysis of Hurricane Vulnerability in New Orleans and Baton Rouge. report, Louisiana State University Hurricane Center, April 2003. URL <http://www.publichealth.hurricane.lsu.edu/Adobe%20files%20for%20webpage/LevitanHurrVulnBR&NO.pdf>. Accessed Aug. 2005.