An Introduction to the Concept of Social Vulnerability

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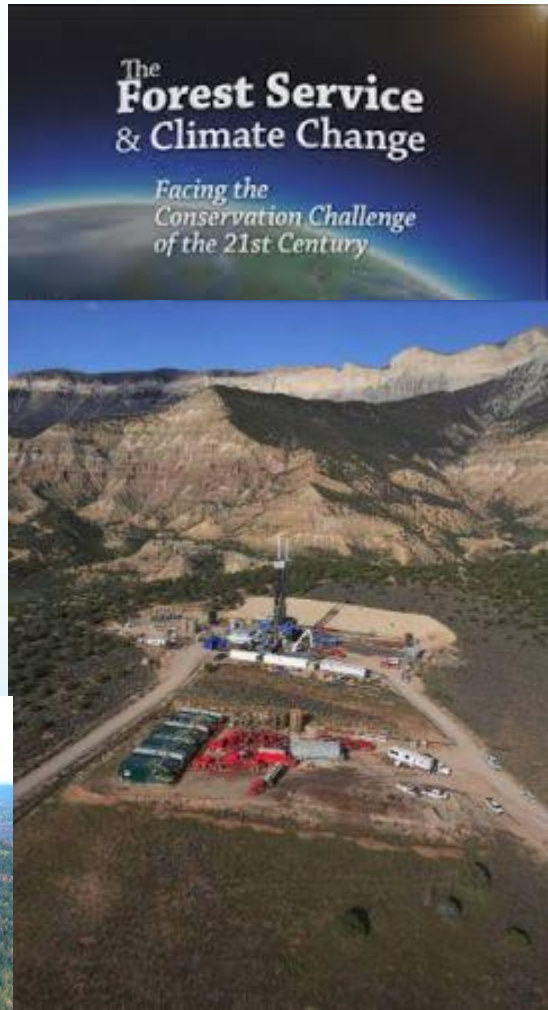
Social Vulnerability Webinar Series

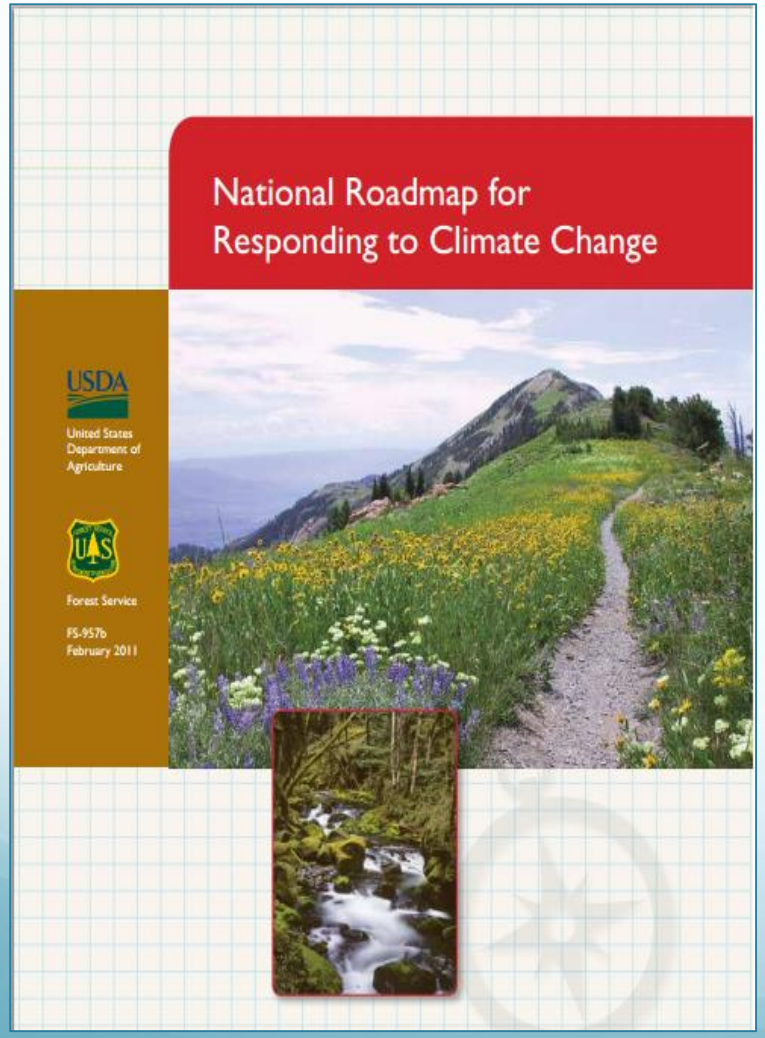
- A working group initiated by Forest Service Research and Development
- Comprised of Forest Service and University scientists from across the country engaged in various research projects related to social vulnerability to climate change
- Today's Speakers: Daniel R. Williams, Rocky Mountain Research Station; Laurie Yung University of Montana; Paige Fischer, University of Michigan; Daniel J. Murphy, University of Cincinnati

Climate Change and Public Lands

- Mitigation
- Impacts and adaptation
  - How public lands are changing as a result of climate change?
  - What changes are predicted?
  - How will these changes affect ecosystems, species, etc.?
  - ***How will these impacts affect users, stakeholders, local communities, and the public?***
    - i.e., how different groups of people are affected by climate change



Policy Context: Why Social Vulnerability?

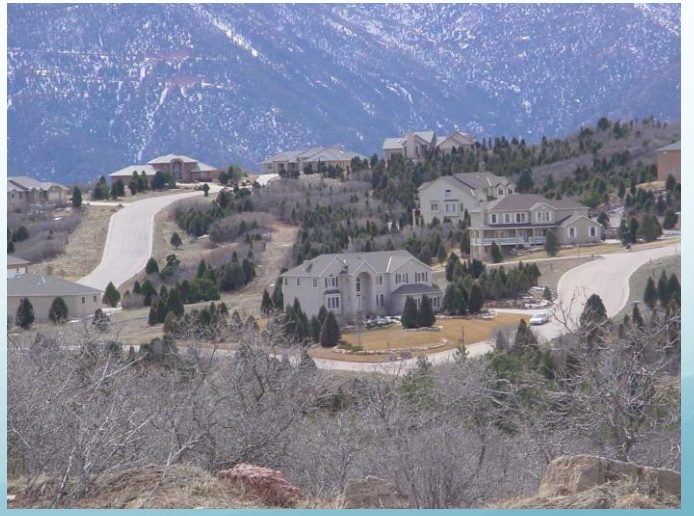


- Land management agencies required to consider and assess impacts of climate change on human communities
  - Strategic Framework for Climate Change
  - National Roadmap for Responding to Climate Change
  - Forest Service Climate Change Scorecard

Forest Service Climate Scorecard

The Forest Service Climate Change Performance Scorecard, 2010 (version 1.2) To be completed annually by each National Forest or Grassland (Unit).		
Scorecard Element	*Please use the template in the guidance document for narratives that support your answers.*	**Yes/No**
Organizational Capacity – engage employees through training and integrate climate change into program of work		
1. Employee Education	Are all employees provided with training on climate change causes, impacts, role of forests and grasslands, and possible responses? Are employees made aware of the potential contribution of their own work to climate change response?	
2. Designated Climate Change Coordinators	Is at least one employee assigned to coordinate and be a resource for climate change questions and issues? Is this employee provided with the institutional support to make his/her assignment successful?	
3. Guidance, Training, Plans of Work	Has Unit leadership developed guidance for progressively integrating climate change activities into Unit-level operations?	
Engagement– develop partnerships and transfer knowledge		
4. Integrate Science and Management	Does the Unit actively participate with the science community to improve its ability to respond to climate change?	
5. External Partnerships	Does the Unit have strategic alliances in place to respond to climate change?	
Adaptation – assess impacts of climate change and manage change		
6.Vulnerability Assessment	Has information relevant to management actions at the Unit level been developed and synthesized to assess the vulnerability of key resources to the impacts of climate change and the interaction with other stressors and human communities?	
7. Adaptation Activities	Is an adaptation strategy in place that helps incorporate the vulnerability of resources and places into priority setting and management actions?	
8. Monitoring	Is monitoring being conducted to track changes in conditions of species, watershed condition, forest and grassland health, and other measures, and the effectiveness of adaptation activities?	
Mitigation and Sustainable Consumption – assess carbon stocks and reduce our Agency footprint		
9. Carbon Assessment	Has information relevant to the Unit level been developed and synthesized to assess carbon stocks and the influence of land management activities and disturbances on potential changes in carbon stocks?	
10. Sustainable Operations	Is progress being made toward achieving sustainable operations targets to reduce energy, emissions, water, and other environmental footprints?	

Element 6. Vulnerability Assessment: Has information relevant to management actions at the unit level been developed and synthesized to assess the vulnerability of key resources to the impacts of climate change, and the interaction with other stressors and human communities?



Social Vulnerability and the Forest Service Context

- Conservation mission to “meet the requirements of our people in perpetuity”
- Tied to environmental justice goals
- The sustainability of rural resource-dependent communities
- Adopts an “all-lands” (landscape) scale approach
- Supports collaborative governance approach
- Builds organizational capacity to engage with local communities

What is social vulnerability?

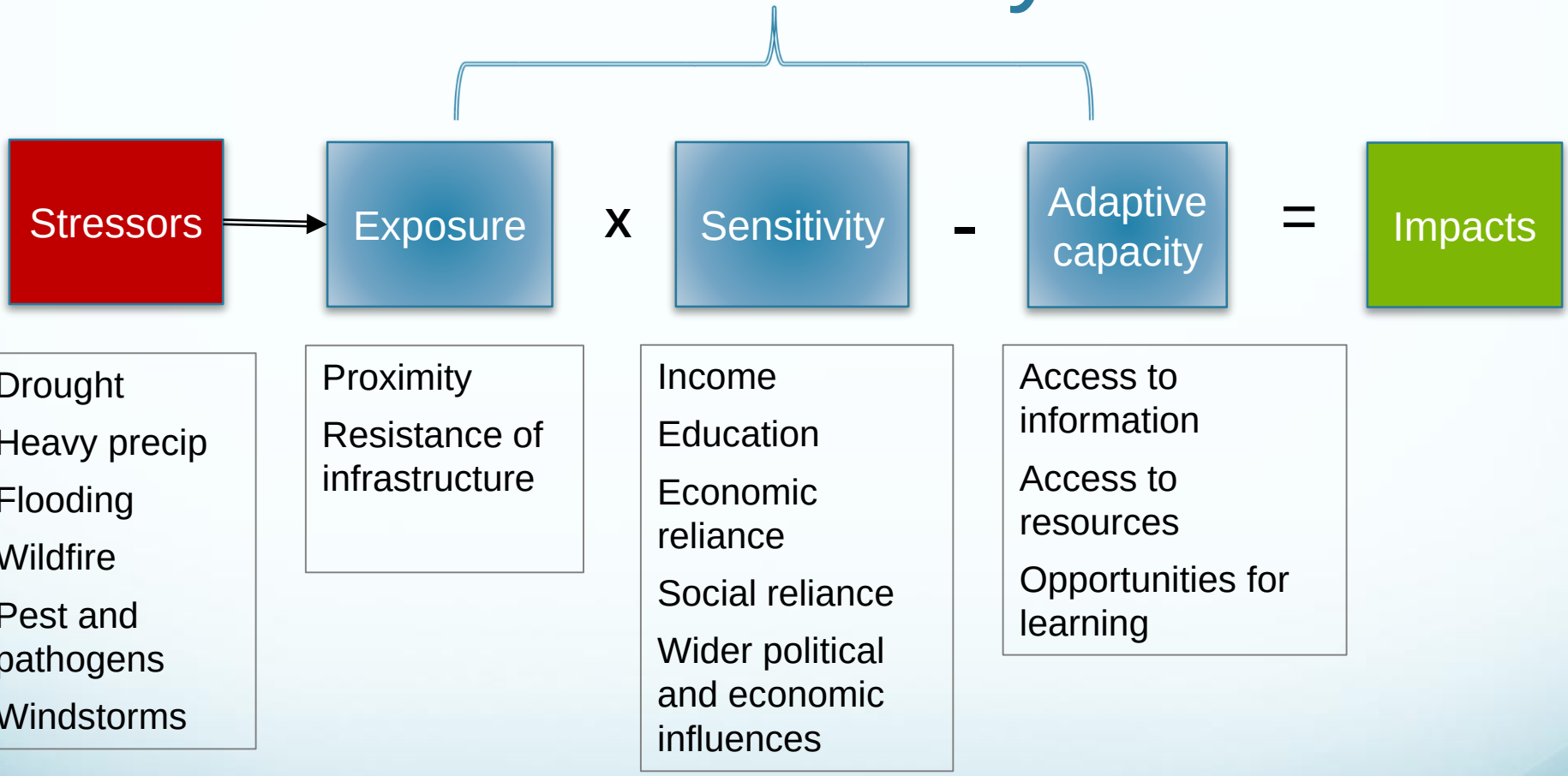
- A concept that helps us understand potential impacts of climate-related changes to human groups or communities
- Rooted in decades of research on why disasters such as earthquakes impact some groups more than others

Social Vulnerability: IPCC Definition

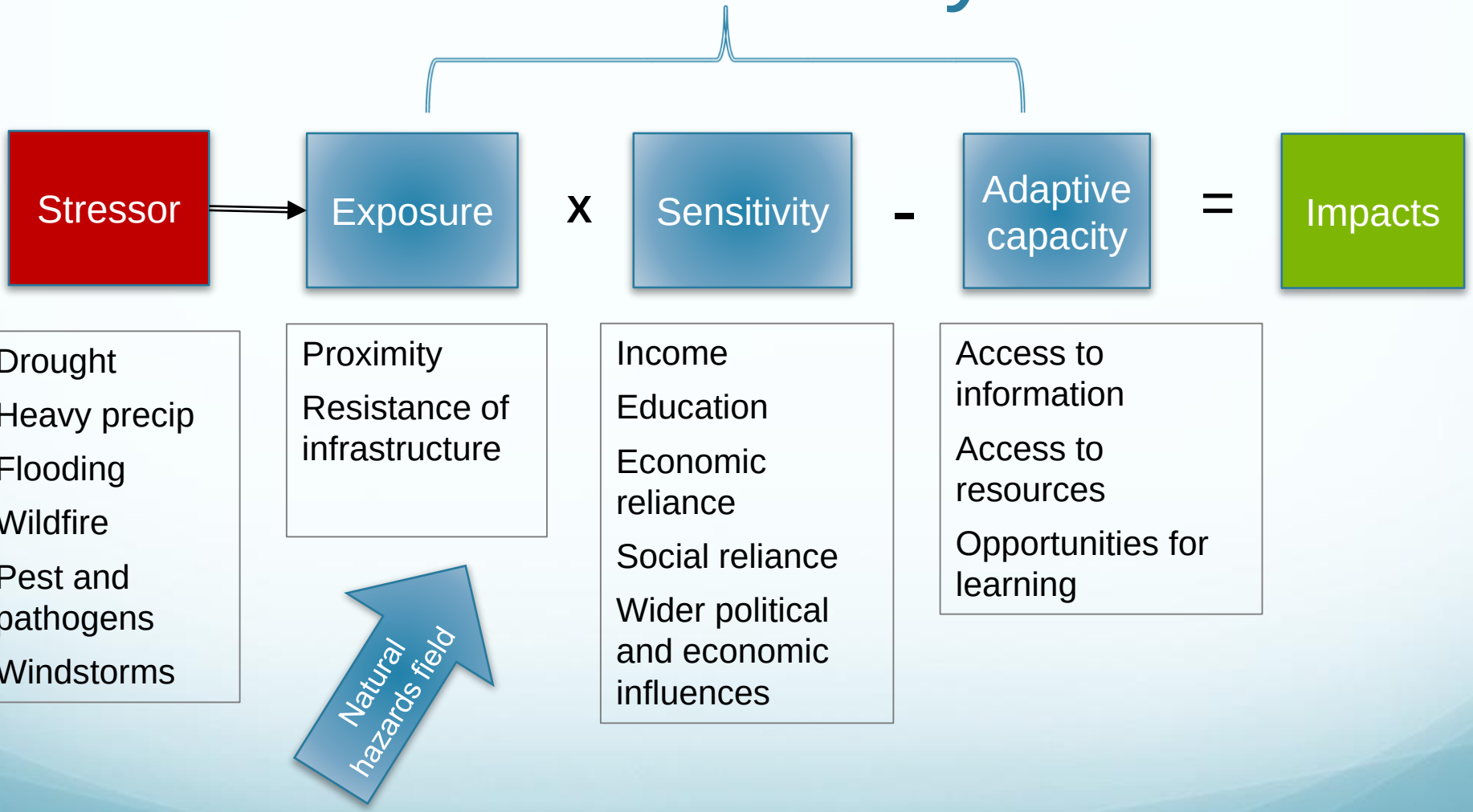
The degree to which a system (social or ecological) is susceptible to or unable to cope with or adapt to effects of climate change and associated hazards

- Exposure: the likelihood of stress on people
- Sensitivity: the potential degree of impact on people
- Adaptive capacity: factors in whether and how people prepare and respond or adapt

Vulnerability



Vulnerability



Vulnerability

- Drought
- Heavy precip
- Flooding
- Wildfire
- Pest and pathogens
- Windstorms

- Proximity
- Resistance of infrastructure

Natural hazards field

- Income
- Education
- Economic reliance
- Social reliance
- Wider political and economic influences

- Access to information
- Access to resources
- Opportunities for learning

Political economy

What can we learn from investigating social vulnerability?

Exposure	What biophysical conditions or events resulting from climate change may adversely affect human communities or populations that rely on forests and grasslands?
	Which human communities or populations may potentially be impacted by biophysical changes to forests and grasslands?
Sensitivity	How are different exposed human communities or populations more or less likely to be adversely affected?
	Which segments of exposed human communities or populations will be impacted to a greater degree?
Adaptive Capacity	What information and resources do exposed and sensitive human communities or populations have access to in order to adapt to or mitigate impacts?
	What opportunities exist for exposed and sensitive human communities or populations to learn to become more capable of mitigating or adapting to impacts?

Example: Wildland Fire and Social Vulnerability

Exposure

- Which ecosystems/areas are prone to increasingly frequent or severe fire?
- Who derives value from these ecosystems or areas?

Sensitivity

- Which groups may be more likely to experience adverse impacts from wildfire?
- Which groups may be more capable of recovering from losses due to wildfire?

Adaptive capacity

- What knowledge and resources can people draw on to reduce the chance of losses to fire?
- What programs, organizations or informal networks can people draw on to learn how to reduce or live with?

Adaptation

Process of change (e.g., a new practice or behavior) in response to change in physical or social environment. Ability to change is determined by access to resources and capacity to cope. More vulnerable groups may have lower capacity to adapt.

PERRY BACKUS, Ravalli Republic

Why Adapt?

- To maintain functioning ecosystems (e.g. conserve biodiversity, preserve ecosystems services)
- To build resilient human communities (e.g. communities that can weather change and remain vibrant, socially and economically).

Components of Adaptive Capacity

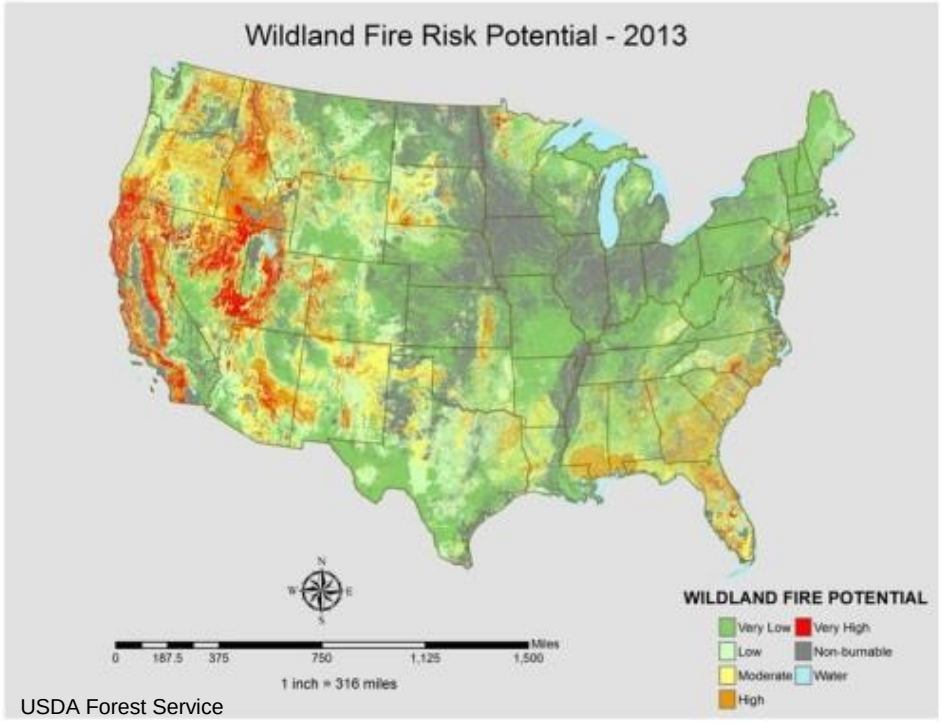
- Availability and equitable distribution of resources
- Awareness of relevant risks
- Understanding of local ecosystems
- Ability to obtain, generate, and apply new knowledge

- Capacity to make decisions and act collectively
- Effective structures for decision-making and governance

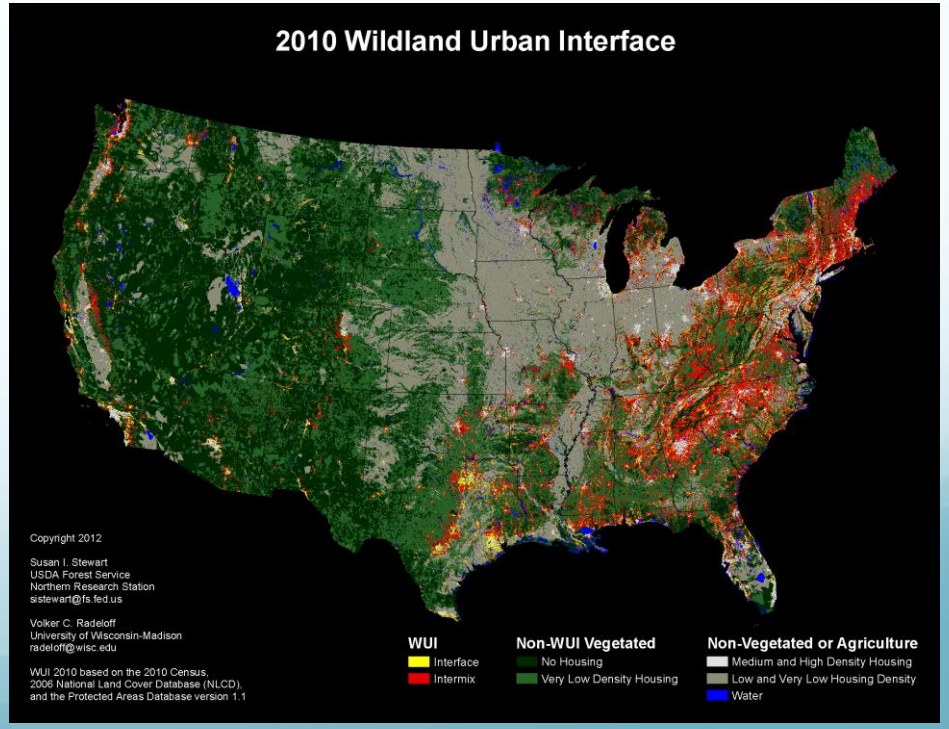
Adger 2003; Folke et al. 2003; Gupta et al. 2010; IPCC 2007; Norris et al. 2008; Pelling and High 2005; Smit and Wandel 2006

How do we know where people are vulnerable?

- In some cases, we can map where people are relative to specific climate impacts (e.g. droughts, floods, fires) to understand exposure

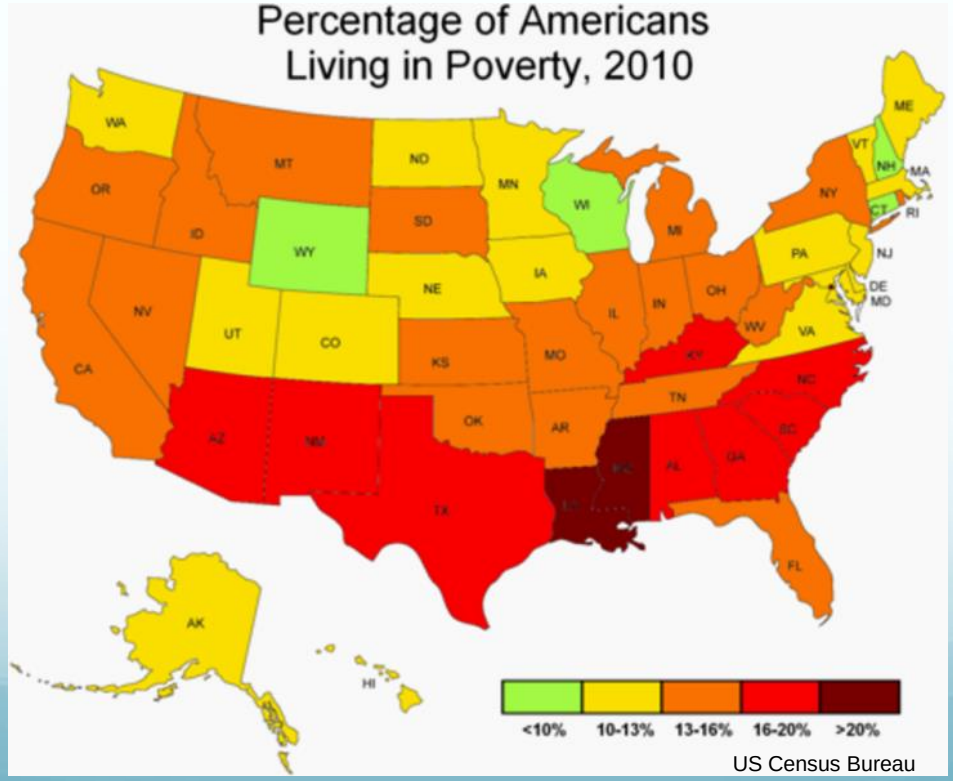


USDA Forest Service

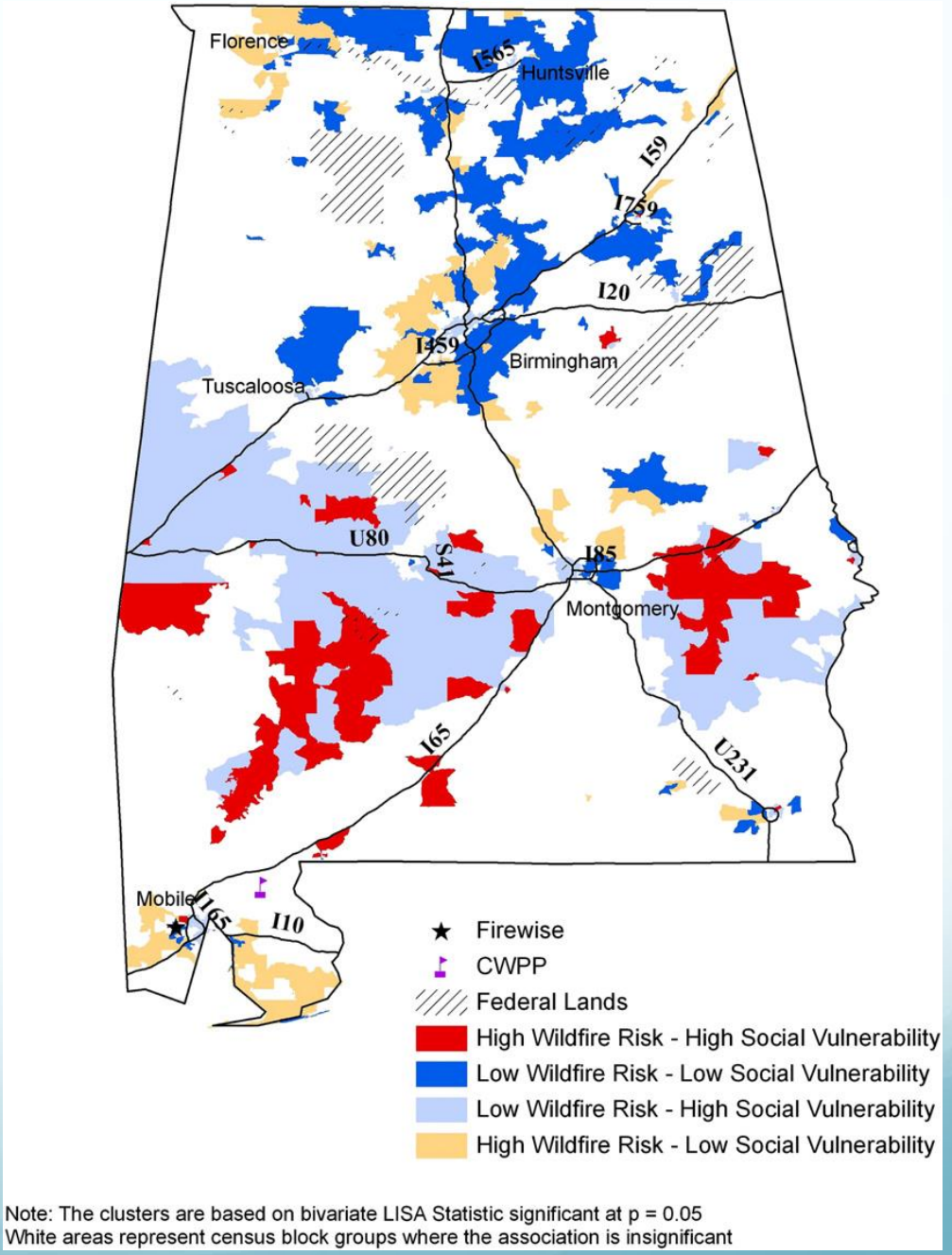


How do we know who is vulnerable?

- In some cases, we can examine existing data on poverty, education, and other socioeconomic factors to understand sensitivity



When we overlay this information, we can paint a spatial picture of both exposure and sensitivity.



Gaither et al 2011

Vulnerability in Rural Communities

- Disproportionately EXPOSED to climate change impacts due to proximity to ecological systems that will be affected:
  - Wildfire
  - Drought
  - Floods
  - Storm events
  - Forest pests and pathogens

- Disproportionately SENSITIVE to climate change impacts due to reliance on and interdependencies with products and services from those ecological systems:
  - Tourism
  - Recreation
  - Water
  - Timber
  - Grazing
  - Fisheries

Montana Fly Fishing Guides

What makes some people more vulnerable than others?

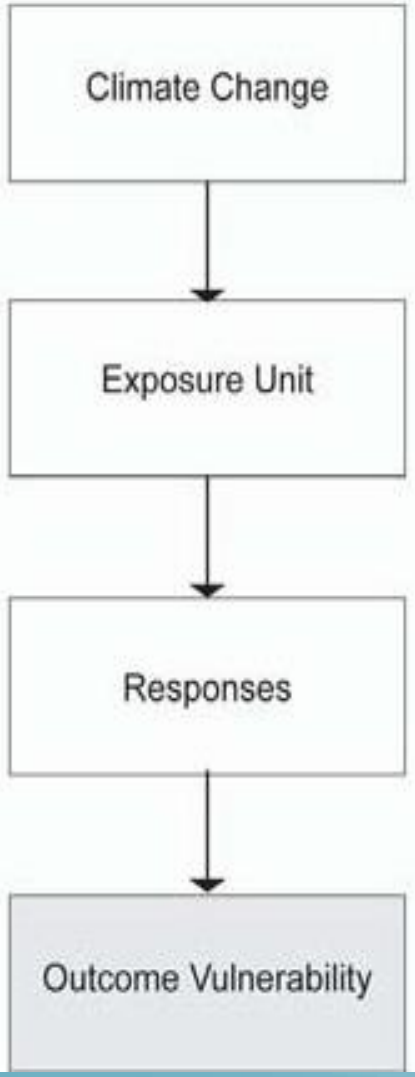
- Some people live or work in landscapes/ecosystems that experience climate impacts (biophysical information – helps us understand exposure)

- Some people are disadvantaged and/or more susceptible to harm from climate impacts (**profile information** – use demographic characteristics to gain insight into sensitivity)

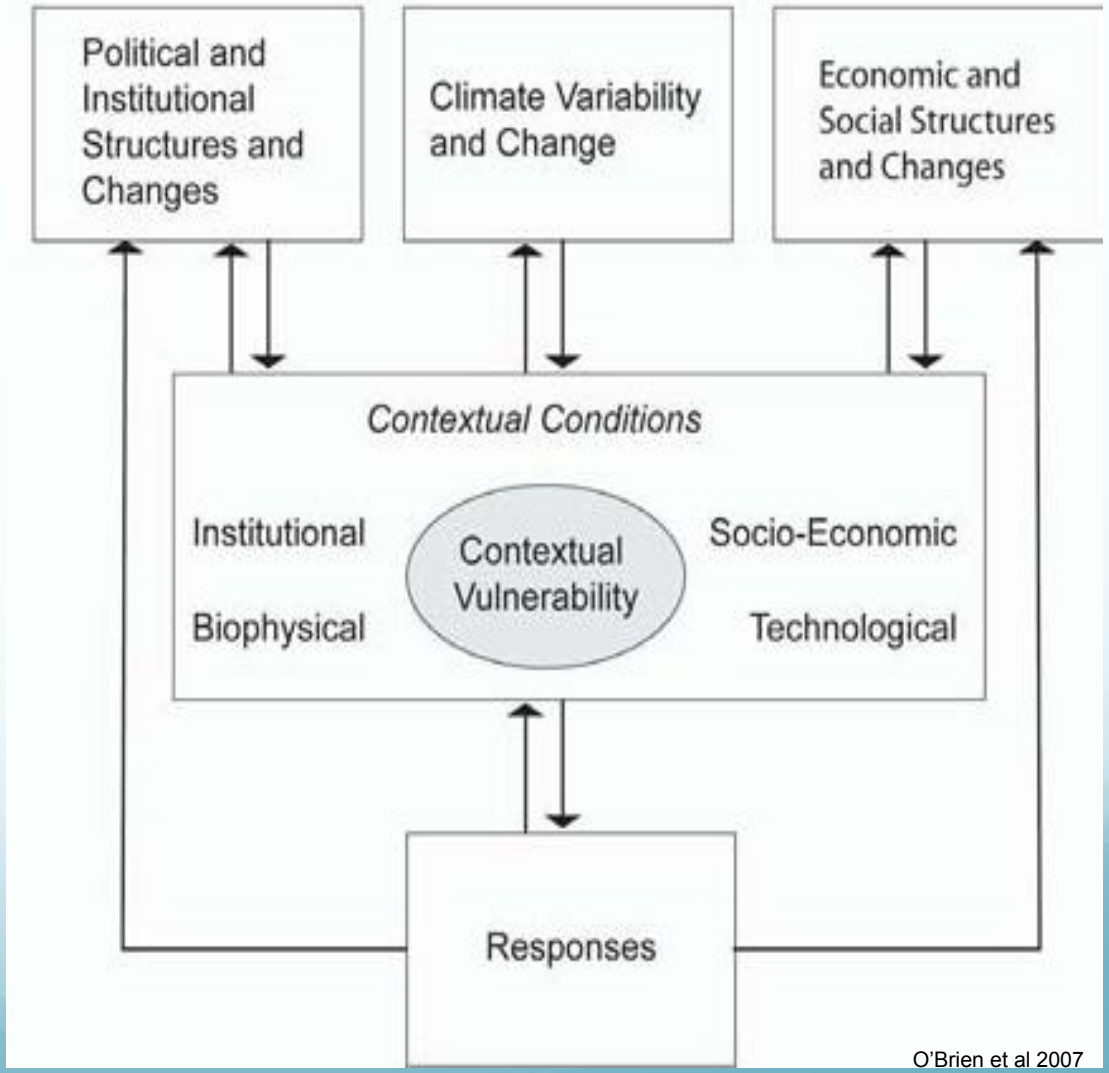
- Some people are better able to mobilize knowledge, resources, and networks to reduce vulnerability and adapt (**process information** – examine how social processes interact to produce and reduce vulnerability and adaptive capacity)

For more on profile and process information see Fischer et al 2013

Outcome Vulnerability



Contextual Vulnerability



O'Brien et al 2007

Northern Nomad

Community Complexity and Contextual Vulnerability

Implications for Integrating into Land Management

- Different ways to understand social vulnerability, which can inform different kinds of management decisions
  - Spatial scale of decisions
  - Profile versus process in vulnerability
- Identify key relationships that might be at risk
- Highlight counter-productive socio-economic trends that might conflict with or undermine management goals
- Identify resource and knowledge gaps in communities that could be filled by management agency
- Identify opportunities and trends to promote or pursue new goals or avenues for collaboration and engagement

Future Webinars

February 11, 2015	Engaging Uncertainty through Scenarios
February 25, 2015	Exploring Social Vulnerability through Regional Socio-Economic Assessment
March 11, 2015	Employing Q-methodology for Vulnerability Assessment
March 25, 2015	Using Existing Socioeconomic Data to Understand Vulnerability
April 8, 2015	Understanding Risk and Exposure in an Urban Case Study
April 29, 2015	A GIS Approach to Assessing Population Vulnerability to Smoke in the Southeastern US
May 6, 2015	Integrating Social Vulnerability into Planning and Decision-Making

Further Reading

- Fischer, A.P., Paveglio, T., Carroll, M., Murphy, D. and H. Brenkert-Smith. 2013. Assessing social vulnerability to climate change in communities near public forests and grasslands: A framework for resource managers and planners. *Journal of Forestry* 111(5):352-369.

- Lynn, K., MacKendrick, K. and E. Donoghue. 2011. Social vulnerability and climate change: Synthesis of literature. Gen. Tech. Rep. PNW-GTR-838. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 70 p.

- Murphy, D. J., Wyborn, C., Yung, L., & Williams, D. R. (in press). Key concepts and methods in social vulnerability and adaptive capacity. RMRS-RP-xxx. Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station.

- O'Brien, K., Eriksen, S., Lynn, P.N. and A. Schjolden. 2007. Why different interpretations of vulnerability matter in climate change discourses. *Climate Policy* 7(1):73-88.

Questions and Discussion