

EAS 567 Social Vulnerability and Adaptation to Environmental Change (3 credits)

Fall 2021 Syllabus

Time: Fridays, 9:00-11:50 AM

Location: Dana 1024

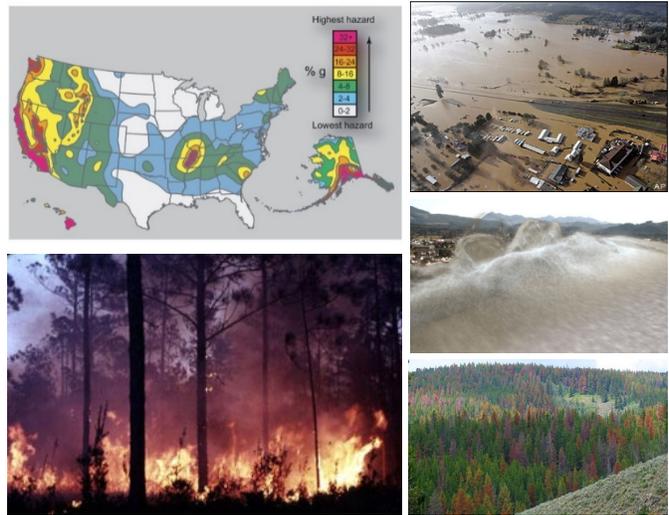
Instructor: Paige Fischer, Assistant Professor, SEAS, apfisch@umich.edu

Graduate Student Instructor: Michal Russo, PhD candidate, SEAS, michalr@umich.edu

Office hours: Mondays 1-2 PM via Zoom

<https://umich.zoom.us/j/95173445394>

Thursdays 1-2 PM in person by appointment



Course overview: Increasingly frequent and severe wildfires, floods, and storm events are raising concerns about how society can adapt to environmental change. Key to identifying opportunities for adaptation is the concept of social vulnerability. *Social vulnerability* refers to the geographic and socio-economic influences on the chance of harm to humans and the capacity of people to prepare and respond. *Adaptations* are strategies undertaken by individuals, societies, or governments, in response to or anticipation of environmental changes and climate threats.

This three-credit course will introduce students to the concepts of social vulnerability and adaptation as well as frameworks for assessing vulnerability and planning adaptation in human communities. The course will explore theories and methods for investigating social vulnerability and adaptation from a behavioral perspective. We will not address these concepts from an environmental policy or politics perspective.

Students will learn methods and skills for evaluating exposure, sensitivity and adaptive capacity at different levels of social organization (individuals, communities, institutions), and designing vulnerability assessments and adaptation plans. The focus will be on climate change and related natural hazards relevant to coastal and inland areas, including wildfire, drought, flooding, sea level rise and storm events. Small group discussions, projects and conversations with practitioners will engage students in co-learning.

Expectations: This is a graduate-level course geared toward students in the natural and social sciences who are interested in human dimensions of climate change, natural hazards management, and human-environment interactions. The course will entail considerable reading, writing and participation in class discussions. Class meetings will involve discussions of the topic areas led by the instructor, student-led discussions of the readings, lectures by guest speakers, use of Michigan Sustainability Cases, and a field trip. Students will submit weekly short writing assignments, and lead and participate actively in class discussions. Students will work individually and in groups to explore a specific community of place using secondary data

and drawing on the class readings. Submissions will include written interim characterizations of the community (individual work), as well as an oral presentation (group work).

Learning outcomes: Upon completion of this course, students will be able to:

- Define and describe social vulnerability and adaptation and their different dimensions
- Compare and contrast perspectives on vulnerability and adaptation
- Articulate needs, challenges, and opportunities for reducing vulnerability and increasing adaptation
- Identify relevant data and how to collect and analyze them
- Design vulnerability assessments and adaptation plans
- Present arguments and recommendations regarding vulnerability and adaptation in a coherent, articulate and professional manner

Assessment: Progress toward learning outcomes will be assessed through evaluation of:

- ***Weekly reflections on assigned reading*** (50% of grade, 5 points each): Twenty-four hours before the class meeting each week students will submit one short (no more than 300 words) clearly and tightly written essay reflecting on the assigned reading (1 point). Students do not have to discuss each paper in equal depth, but must demonstrate that they read each paper carefully (1 point). Students should identify key problems or issues addressed by the readings, critique assumptions about social vulnerability made by the authors, or identify potential contributions made to understanding of social vulnerability (2 points). Students are encouraged to review and respond to each other's reflections, and either be the first to submit or respond to others' reflections (1 point).
- ***Facilitation of class discussions of assigned readings*** (10% of grade): Students will lead discussions of the readings during one class meeting. Students should come prepared to summarize the readings, pose questions to engage class members in discussion, and make critical arguments about the readings. A sign-up sheet will be available in the first week of class.
- ***Class participation*** (10% of grade): Students must demonstrate that they have thoroughly read and reflected on the assigned readings by actively participating and engaging fellow students in class discussion of the readings and with any guest speakers. Students must attend all classes unless arrangements are made ahead of time. Students will evaluate their own participation at the end of the term.
- ***Class project:*** Students will work in groups to investigate and characterize the vulnerability and adaptation efforts of an agreed-upon community or site in the US or elsewhere. Students will work on their project together in groups in class, and both together and independently outside of class. The class project will culminate in a set of four interim submissions (individual work) and a final presentation (group work):
 1. ***Interim characterizations of the exposure, sensitivity, adaptive capacity, and adaptation activities of communities*** (20% of grade, 5 points each): The four interim characterizations should each be submitted in outline form (no length requirement) with full grammatically correct sentences (1 point) conveying well-developed ideas (2 points), properly-referenced (1 point). Figures (e.g., of the community location and/or attributes) and tables (e.g., of data gathered from secondary sources) should also be included and referenced (1 point).

2. ***Final “Reverse field trip”*** (10% of grade): Student groups will share what they learned about the exposure, sensitivity, adaptive capacity, and adaptation activities of the communities in group presentations at the end of the term using images, video, audio, figures and tables—effectively bringing the community into the class in a reverse field trip. Student groups should demonstrate that they have met the following objectives in the presentations:
 - a) Investigate background of the community, its history and environmental, socio-economic, and demographic context;
 - b) Review and critique any vulnerability assessments and adaptation efforts that have already been undertaken in the community;
 - c) Characterize the community’s exposure, sensitivity, adaptive capacity, and adaptation activities;
 - d) Be explicit about the approach/framework use for assessing vulnerability and adaptation, grounded in the lectures and readings; and
 - e) Make recommendations for future vulnerability assessment and adaptation actions and strategies for the community.

Grading scheme: Minimum for A+=97, A=93, A-=90, B+=87, B=83, B-=80, C+=77, C=73, C-=70, D+=67, D=63, D-=60, F=40

COVID-19 statement: Students and instructors are all adjusting to the changes and regulations that have been put in place this term in response to COVID-19. We are working to provide the best learning experience possible given the current circumstances of the pandemic. We have tried to add flexibility to our course structure and assignments to reflect the uncertainty that many students face. We are happy to work with students if anyone encounters a situation due to the pandemic that requires modified participation in the course. If you have suggestions for how we might support your learning in this course during this semester, please do not hesitate to let us know. You can find the latest updates about the University of Michigan and COVID-19 here: <https://campusblueprint.umich.edu/>

EAS 567 Social Vulnerability and Adaptation to Environmental Change Course Schedule Paige Fischer <apfisch@umich.edu>

Week	Objectives	Assignments (Submitted items due by 9AM the day before class)	In-class activities
1 (9/3)	Understand course goals and expectations Become familiar with key concepts		Course overview Activity: Introductions Lecture: Social vulnerability
2 (9/10)	Learn how a community of tart cherry producers in MI is vulnerable to climate change and how they are responding	Read and submit reflections on MSC narrative and edge notes, and offer comments in the response threads at the top right corners of the text boxes: 1) Souring Climate: Can Michigan tart cherry growers adapt to a changing climate? https://www.learnkala.com/magic_link?key=9E5PsgkuiS9mpooCF021Hw	Discussion of Reading: MSC Activity: MSC 1&2
3 (9/17)	Become familiar with concept of social vulnerability and the evolution of the concept	Come prepared to describe the social vulnerability and/or adaptation efforts of a community with which you are familiar Read and submit reflections on vulnerability readings: 1) Eakin, H., and A. L. Luers. 2006. Assessing the vulnerability of social-environmental systems. <i>Annual Review of Environment and Resources</i> 31(1):365-394. 2) Cross, J. A. 2001. Megacities and small towns: Different perspectives on hazard vulnerability. <i>Global Environmental Change</i> 3(2):63-80. 3) Haalboom, B., and D. C. Natcher. 2012. The power and peril of "vulnerability": Approaching community labels with caution in climate change research. <i>Arctic</i> 65(3):319-327.	Discussion of Reading: Vulnerability Activity: Discuss vulnerability of communities with which students are familiar Lecture: Exposure
4 (9/24)	Understand exposure as a dimension of social vulnerability Become familiar with methods for assessing exposure	Read and submit reflections on exposure readings: 1) Frazier, T. G., N. Wood, B. Yarnal, and D. H. Bauer. 2010. Influence of potential sea level rise on societal vulnerability to hurricane storm-surge hazards, Sarasota County, Florida. <i>Applied Geography</i> 30(4):490-505. 2) Collins, T. W. 2009. Influences on Wildfire Hazard Exposure in Arizona's High Country. <i>Society & Natural Resources</i> 22(3): 211-229.	Discussion of Reading: Exposure Activity: Project discussion - exposure Lecture: Sensitivity
5 (10/1)	Understand sensitivity as a dimension of social vulnerability Become familiar with methods for assessing sensitivity	Submit interim exposure characterization Read and submit reflections on sensitivity readings: 1) Emrich, C. T., and S. L. Cutter. 2011. Social vulnerability to climate-sensitive hazards in the Southern United States. <i>Weather, Climate, and Society</i> 3(3):193-208.	Discussion of Reading: Sensitivity Activity: Project discussion - sensitivity Lecture: Adaptive capacity

		2) Ford, J. D., B. Smit, and J. Wandel. 2006. Vulnerability to climate change in the Arctic: A case study from Arctic Bay, Canada. <i>Global Environmental Change</i> 16(2):145-160.	
6 (10/8)	Understand adaptive capacity as a dimension of social vulnerability Become familiar with methods for assessing adaptive capacity	Submit interim sensitivity characterization Read and submit reflections on adaptive capacity readings: 1) Granderson, A. A. (2017). The Role of Traditional Knowledge in Building Adaptive Capacity for Climate Change: Perspectives from Vanuatu, <i>Weather, Climate, and Society</i> , 9(3), 545-561. 2) Gupta, J., C. Termeer, J. Klostermann, S. Meijerink, M. van den Brink, P. Jong, S. Nooteboom, and E. Bergsma. 2010. The adaptive capacity wheel: A method to assess the inherent characteristics of institutions to enable the adaptive capacity of society. <i>Environmental Science and Policy</i> 13(6):459-471.	Discussion of Reading: Adaptive capacity Activity: Project discussion - adaptive capacity Lecture: Adaptation
7 (10/15)	Understand the concept of adaptation and how it differs from coping and maladaptation Become familiar with frameworks for assessing adaptation	Submit interim adaptive capacity characterization Read and submit reflections on adaptation readings: 1) Smit, B., Burton, I., Klein, R. J. T. & Wandel, J. 2000. An Anatomy of Adaptation to Climate Change and Variability. <i>Climatic Change</i> 45: 223-251. 2) Adger, W. N., S. Dessai, M. Goulden, M. Hulme, I. Lorenzoni, D. Nelson, L. Naess, J. Wolf, and A. Wreford. 2009. Are there social limits to adaptation to climate change? <i>Climatic Change</i> 93(3-4):335-354.	Discussion of Reading: Adaptation Activity: Project discussion - adaptation Lecture: Adaptation at the level of individuals
8 (10/22)		Submit interim adaptation characterization Field Trip TBD	
9 (10/29)	Understand adaptation at the individual and household level	Read and submit reflections on individual adaptation readings: 1) Lopez-Marrero, T. 2010. An integrative approach to study and promote natural hazards adaptive capacity: A case study of two flood-prone communities in Puerto Rico. <i>Geographical Journal</i> 176(2):150-163 2) Wolf, J., Adger, W. N., Lorenzoni, I., Abrahamson, V., & Raine, R. (2010). Social capital, individual responses to heat waves and climate change adaptation: An empirical study of two UK cities. <i>Global Environmental Change</i> , 20(1), 44-52.	Discussion of Reading: Individual adaptation Activity: Guest speaker TBD Lecture: Adaptation at the level of communities
10 (11/5)	Understand adaptation at the community level	Read and submit reflections on community adaptation readings: 1) Vásquez-León, M., C. T. West, and T. J. Finan. 2003. A comparative assessment of climate vulnerability: Agriculture and ranching on both sides of the US–Mexico border. <i>Global Environmental Change</i> 13(3):159-173.	Discussion of Reading: Community adaptation

		2) Ürge-Vorsatz, D., et al. 2018. Locking in positive climate responses in cities. <i>Nature Climate Change</i> 8(3): 174-177.	Activity: Guest speaker TBD Lecture: Adaptation planning
11 (11/12)	Adaptation planning	1) Hardy, R. D., et al. (2017). Racial coastal formation: The environmental injustice of colorblind adaptation planning for sea-level rise. <i>Geoforum</i> 87: 62-72. 2) van Aalst, M. K., et al. (2008). "Community level adaptation to climate change: The potential role of participatory community risk assessment." <i>Global Environmental Change</i> 18(1): 165-179.	Discussion of Reading: Community adaptation Activity: Guest speaker TBD Lecture: Adaptation planning
12 11/19	Learn how networks and institutions can foster climate change adaptation	Read and submit reflections on MSC narrative and edge notes and offer comments in the response threads at the top right corners of the text boxes: 1) Great Lakes Climate Adaptation Network - How can an adaptation network sustain effective partnerships for climate adaptation? https://www.learnkala.com/magic_link?key=SW1IXrtuXG583MmEoeJoLg	Discussion of Reading: MSC Activity: MSC activities
13 (11/26)	Thanksgiving/no class		
14 (12/3)	Learn how communities around the world are vulnerable and adapting	Submit presentation PPTs, urls, or recordings	Discussion of Reading: None Activity: Reverse field trips, course evaluations Lecture: None
15 (12/10)	Learn how communities around the world are vulnerable and adapting	Submit presentation PPTs, urls, or recordings	Discussion of Reading: None Activity: Reverse field trips, course evaluations Lecture: Course recap