Syllabus

Course Information

Course Subject, Number and Title: Tackling Sustainability Conflicts ENVIR ST 900

Credits: 3

Credit Hour Explanation: Reading+ Discussion in each class, Presentation-leading a class, participating in two debates, Writing Project

Course Description: What are the consequences of humans adapting to the environment? How do vulnerability and resilience shape who bears the burden or reaps the benefits of environmental change? This seminar will examine foundational concepts and frameworks in human-environment and sustainability science, including vulnerability, adaptation, resilience/robustness, transformation, politics/power/access, institutional analysis, coupled human natural systems (CHANS)/socio-ecological technical systems (SETS), land system science, transdisciplinarity, co-designing sustainable futures, and decolonization. In the 2nd half of the course, we will use these frameworks to formally debate contemporary conflicts and "wicked" sustainability problems (based on class interests!), such as geoengineering, "half-earth"/ nature positive development, Artificial Intelligence (AI)/ Big Data for sustainable development, climate finance, insurance, and justice, limits to adaptation/managed retreat, or other climate adaptation and mitigation solutions assessed in the 2022 IPCC (Intergovernmental Panel on Climate Change) AR6 report. We will use the debates as a foundation for conflict resolution, to envision and explore multiple possible solutions and futures to propose paths forward in addressing wicked sustainability problems. In class we will practice participatory methods for envisioning futures students can use in both research and professional settings that engage actors with divergent viewpoints and agency. The final project will apply course concepts/ frameworks to investigate a mechanism or feedback loop in the human-environment system of your choice, ideally to be used in a grant proposal for an interdisciplinary thesis or dissertation project, or for non-thesis students, to write and publish a compelling op-ed. Students from any background or discipline- from social, biological, and physical sciences, to engineering, law, and business students and beyond, are welcomed and encouraged to attend- especially those outside of more traditional sustainability science fields.

Requisites: Graduate or Professional Standing

Course Designations/Attributes: 50% Graduate Coursework Requirement

Learning Outcomes

By the end of the semester students will:
1) Understand what frameworks (vs. theory and models) are, and how to use or develop one effectively to study human-environment relationships
2) Be able to differentiate vulnerability, adaptation, resilience, robustness, and transformation, how each could be measured quantitatively, and limits to these measurements
3) Articulate and frame their research/theses questions as advances in sustainability science for proposals, grant writing, and in comprehensive exams beyond the context of their "discipline"

Meeting and Instructor Information

Meeting Time and Location: 1:20-3:15pm Mondays, Room 110 Science Hall

Instructional Modality: In-person

Instructor Title and Name: Beth Tellman

Instructor Contact Information: beth.tellman@wisc.edu

Day/Time/Location of Office Hours: by appointment

Overview

Materials

Link to Canvas Site:

Coursework and Grading

Assignments/Exams/Other Graded Work:

Readings:
Through Nov 10, all students must submit an annotation of 2 of the 4-5 articles each week (you may select from optional articles), due at midnite Sunday (the night before class). Students can select which article to annotate. Annotations should be between 250-500 words for each article. The goal of writing an annotation is for reference in comprehensive exams or proposals without having to re-read the article. Annotations should include a short summary (3-4 sentences) of the main contribution of the article, followed by several sentences placing it into the context of other literature read in this course or elsewhere, one's own research, discipline, work or personal experience. Annotations will be graded on a 5 point scale, and returned electronically through Canvas with feedback from the instructor on a weekly basis.

Two students will be assigned to lead the discussion each week (Sept 22-Nov 10) for the first half of class. The week you lead the discussion, you must annotate all the articles assigned for that week (but not the optional articles). Leading implies you summarize the main points for the class before opening it up for discussion, are taking stack/calling on students to structure the conversation, and keeping time for how long we spend on each article and when its time to move on. You may select one other week of your choosing to NOT submit annotations. Thus over our 9 weeks of discussion, you will only submit annotations for 8 of the weeks. Optional articles are ones I will lecture on or touch on, but student leaders do NOT need to be responsible for reading or leading them.

Debates:
We will have seven debates about human-environment topics. I have proposed topics with three "audible" debate topics we pick together. We may also change debate topics based on class interest. Each student will sign up for two debates, with the expectation that you will take feedback from the first debate to improve in your second debate. Improvement will be part of your final grade. We will flip a coin as to the "side" or position you will take in the third week of class. The "pro" side is written as Resolved: xxxx, and the "con" side can negate that position by showing its weakness or offering an alternative solution. You and your debate partner must select 1 required reading (depending on length) for your debate by **Nov 10.** Readings do not have to be academic and can include op-eds, videos, or other media (I have included suggestions and examples for the first 4 debates). Considering including a diversity of voices (e.g. not just articles by White male authors) in your selections. For the five debates in which you are an audience member, you will deliver written feedback (just 2-3 sentences each) to each of the four debate participants regarding at least once thing you think they did well (good use of a certain concept, an effective visual or metaphor, a convincing piece of data or argument, etc) and one area for improvement (an ineffective visual or metaphor, misuse of a concept, or an idea of a fact or metaphor they could have employed etc). Feedback will be **due BEFORE the next class period** (e.g. one week after the previous debate) on Canvas.

You will be graded on your preparation and performance in the debate, improvement from first to the second debate, ability to integrate course concepts or frameworks from earlier readings, and participation in the debate via written feedback submitted to participants. The rubric for debate performance is on Canvas.

Debate format
We will use a debate format called "Public Forum" which I have altered to last ~60 minutes. In this format, there are two teams of two people each (we may have a few debates with 3 person teams pending final class size). The teams can decide who speaks or presents in each section (it could be both, or alternating). The class will participate by asking clarifying questions, and then examining each argument and voting for the winner. See more: https://www.mustangps.org/Downloads/Chapter%20I%20-%20PFD%20Overview.pdf. Voting outcomes of debates (who wins) will have no bearing on the grade received. We will rotate being "judge" (keeping time).

Section	Time Limit	Speaker(s)
Presentation	7 min	Pros
Presentation	7 min	Cons
Clarifying questions	5 min	Class+cons+pros
1st Crossfire	3 min	Pros+Cons
Rebuttal	4 min	Pros
Rebuttal	4 min	Cons
2nd Crossfire	3 min	Pros+Cons
BREAK	5 min	debate teams can pull in new material or discuss their strategy during this time
Summary	3 min	Pros
Summary	3 min	Cons
Grand Crossfire	3 min	All speakers
Class Examination	5 min	Audience + speakers
Final Focus	2 min	Pros

Final Focus	2 min	Cons
Vote	5 min	Anonymous virtual voting of which side won the debate and why

Final Papers:
You will take a deeper dive into a human-environment feedback or mechanism in a system or location of your choice drawing on course concepts and frameworks. You will prepare a ~5 page paper and 10 minute presentation communicating your findings. A well-constructed and submitted op-ed may be accepted in lieu of the case paper pending instructor approval. PhD students are strongly encouraged to examine a new human-environment aspect of their dissertation topic. Rubrics are on Canvas. Final paper proposals (~500 words) are due Nov 9. Final papers are due Dec 11th.

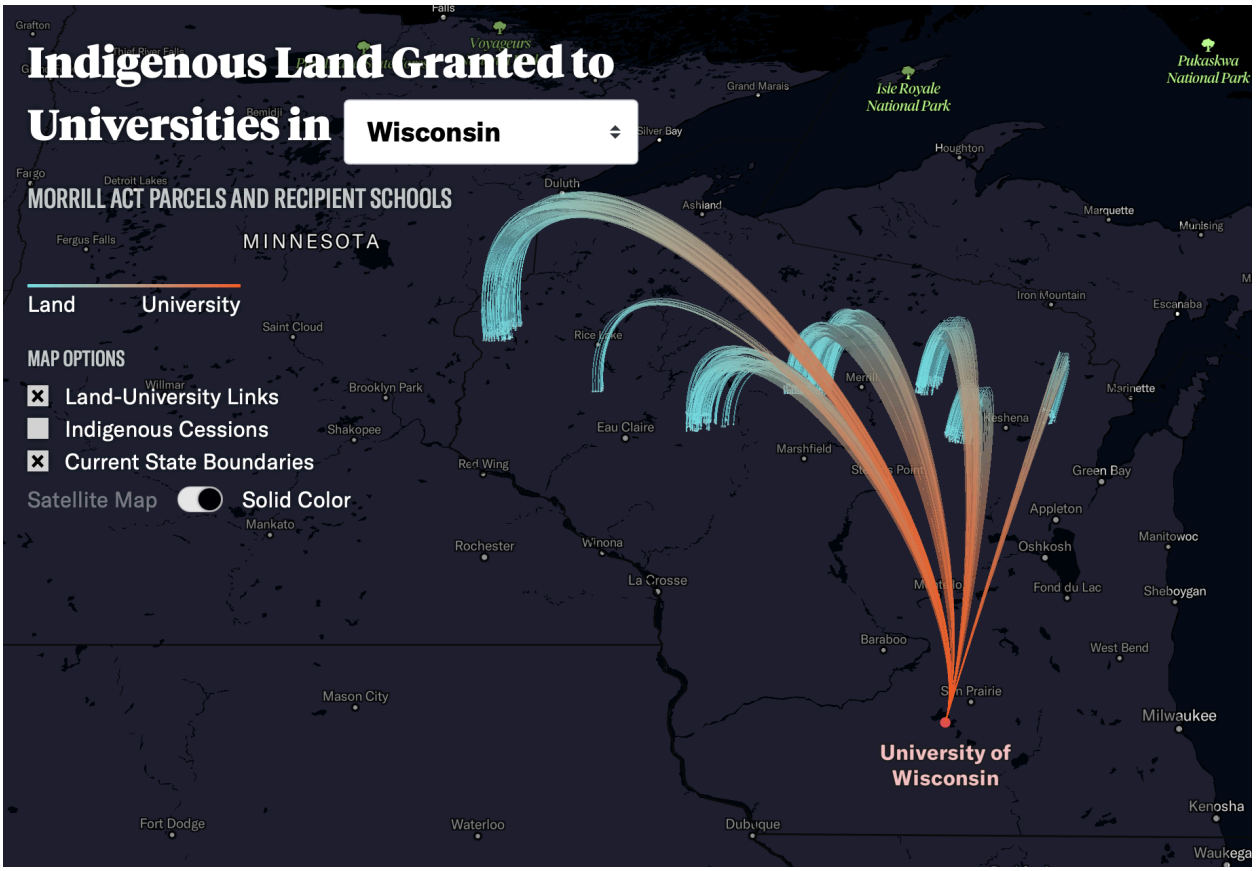
Course Feedback:
In addition to the course evaluation at the end of the semester, I will elicit feedback at two points during the semester to improve the pace of the course, my teaching, and take feedback on suggestions to improve the classroom experience. I welcome at any time articles you think would be important in topics we will cover that are not currently on the reading list- just let me know after class or in an email!

Grades:
25% annotated readings (16 total)
25% debate (the two debates you lead)
25% participation (debate feedback, leading discussion, attending class)
25% Final paper

Grading: A, AB, B, BC, C, or S

Land Acknowledgement

The University of Wisconsin has financially benefited from at least 235,530 acres of expropriated Indigenous land which was not paid for and resulted in raising over 4.9 M USD for its endowment in 1862. The university campus in Madison sits on ancestral Ho-Chunk land. The Morrill Act of 1862 granted the University of Wisconsin 235,530 acres of land taken through the 1837 Treaty with the Chippewa (Ojibwe), the 1842 Treaty with the Chippewa of the Mississippi and Lake Superior (Ojibwe), and 1831, 1836, and 1848 Treaties with the Menomini (Menominee). - see: https://www.hcn.org/issues/52.4/indigenous-affairs-education-land-grab-universities for more and download the university land grab data here: https://github.com/HCN-Digital-Projects/landgrabu-data. Kasey Keeler and others at UW received an NEH grant in 2023 to document this more extensively and are generating teaching modules on the topic: https://news.wisc.edu/teaching-indigenous-land-dispossession-in-wisconsin-and-beyond/



From: https://www.landgrabu.org, High Country News

Class Anti-Discrimination Policy

"As a classroom community, our capacity to generate excitement is deeply affected by our interest in one another, in hearing one another's voices, in recognizing one another's presence." — bell hooks, Teaching To Transgress: Education as the Practice of Freedom

I encourage you to bring your whole self to the classroom, and to actively make the classroom a respectful place so that others can bring their whole selves if they desire to do so. We will learn more by welcoming a diversity of perspectives and life experiences. Creating a respectful space and being anti-racist is an intentional act. Racism, discrimination, and microagressions will not be tolerated. If you feel another student, or the instructor has done or said something disrespectful to you or others please let me know to address the issue. You may also say "oops" or "ouch" if something says something you feel is disrespectful during class to let them know. If you unintentionally make a comment that may feel like a microaggression, racist, or disrespectful, and someone points it out, I invite you to gratefully accept the learning experience.

Draft Course Schedule

Sept 8 **Human Environment Frameworks I: understanding frameworks, origins of sustainability science, and the history and consequences of underrepresentation of women,**

Black, Indigenous and People of Color, and scholars from the Global South in Sustainability Science

PAGES 7-9 ONLY: Ostrom, E., 2011. Background on the Institutional Analysis and Development Framework. Policy Stud. J. 39, 7–27. https://doi.org/10.1111/j.1541-0072.2010.00394.x

Pages 232-236 ONLY: Poteete, A.R., Janssen, M.A., Ostrom, E., 2010. Pushing the frontiers of the theory of collective action and the commons. Work. together. Collect. action, commons Mult. methods Pract. 346.

Kates, R.W., Clark, C.W., Corell, R., Hall, J.M., Jaeger, C.C., Lowe, I., McCarthy, J.J., Schnellhuber, H.J., Bolin, B., Dickinson, N.M., Faucheux, S., Gallopin, G.C., Grubler, A., Huntley, B., Jager, J., Jodha, N.S., Kasperson, R.E., Mabogunje, A., Matson, P., Mooney, H., Ill, B.M., O'Riordan, T., Svedin, I., 2001. Sustainability Science. Science (80-.). 292, 641–642. https://doi.org/10.1126/science.1059386

Lubchenco, J., Rapley, C., 2020. Our moment of truth: The social contract realized? Environ. Res. Lett. 15. https://doi.org/10.1088/1748-9326/abba9c

Schipper, E.L.F., Ensor, J., Mukherji, A., Mirzabaev, A., Fraser, A., Harvey, B., Totin, E., Garschagen, M., Pathak, M., Antwi-Agyei, P., Tanner, T., Shawoo, Z., 2021. Equity in climate scholarship: a manifesto for action. Clim. Dev. 13, 853–856. https://doi.org/10.1080/17565529.2021.1923308

Nagendra, H., Bai, X., Brondizio, E.S., Lwasa, S., 2018. The urban south and the predicament of global sustainability. Nat. Sustain. 1, 341–349. https://doi.org/10.1038/s41893-018-0101-5

Díaz, S., Demissew, S., Carabias, J., Joly, C., Lonsdale, M., Ash, N., Larigauderie, A., Adhikari, J.R., Arico, S., Báldi, A., Bartuska, A., Baste, I.A., Bilgin, A., Brondizio, E., Chan, K.M.A., Figueroa, V.E., Duraiappah, A., Fischer, M., Hill, R., Koetz, T., Leadley, P., Lyver, P., Mace, G.M., Martin-Lopez, B., Okumura, M., Pacheco, D., Pascual, U., Pérez, E.S., Reyers, B., Roth, E., Saito, O., Scholes, R.J., Sharma, N., Tallis, H., Thaman, R., Watson, R., Yahara, T., Hamid, Z.A., Akosim, C., Al-Hafedh, Y., Allahverdiyev, R., Amankwah, E., Asah, T.S., Asfaw, Z., Bartus, G., Brooks, A.L., Caillaux, J., Dalle, G., Darnaedi, D., Driver, A., Erpul, G., Escobar-Eyzaguirre, P., Failler, P., Fouda, A.M.M., Fu, B., Gundimeda, H., Hashimoto, S., Homer, F., Lavorel, S., Lichtenstein, G., Mala, W.A., Mandivenyi, W., Matczak, P., Mbizvo, C., Mehrdadi, M., Metzger, J.P., Mikissa, J.B., Moller, H., Mooney, H.A., Mumby, P., Nagendra, H., Nesshover, C., Oteng-Yeboah, A.A., Pataki, G., Roué, M., Rubis, J., Schultz, M., Smith, P., Sumaila, R., Takeuchi, K., Thomas, S., Verma, M., Yeo-Chang, Y., Zlatanova, D., 2015. The IPBES Conceptual Framework - connecting nature and people. Curr. Opin. Environ. Sustain. 14, 1–16. https://doi.org/10.1016/j.cosust.2014.11.002

Díaz, Sandra, Josef Settele, Eduardo S. Brondízio, et al. "Pervasive Human-Driven Decline of Life on Earth Points to the Need for Transformative Change." *Science* 366, no. 6471 (2019): eaax3100. https://doi.org/10.1126/science.aax3100.

Optional:

Clark, William C. "Sustainability Science: A Room of Its Own." *Proceedings of the National Academy of Sciences* 104, no. 6 (2007): 1737–38. https://doi.org/10.1073/pnas.0611291104.

Sept 15 **Human Environment Frameworks II: Institutions, SETS, Coupled Infrastructure Systems**

*Clark, W.C., Harley, A.G., 2020. Sustainability science: Toward a synthesis. Annu. Rev. Environ. Resour. 45, 331–386. https://doi.org/10.1146/annurev-environ-012420-043621

*if you choose to annotate this article, you only need to do ONE annotation since it is so long.

Ostrom, E., 2011. Background on the Institutional Analysis and Development Framework. Policy Stud. J. 39, 7–27. https://doi.org/10.1111/j.1541-0072.2010.00394.x

Ostrom, E., 2009. A general framework for analyzing the sustainability of Social-Ecological Systems. Science (80-.). 325, 1–53.

Tellman, B., Bausch, J.C., Eakin, H., Anderies, J.M., Mazari-Hiriart, M., Manuel-Navarrete, D., Redman, C.L., 2018. Adaptive pathways and coupled infrastructure: seven centuries of adaptation to water risk and the production of vulnerability in Mexico City. Ecol. Soc. 23, art1. https://doi.org/10.5751/ES-09712-230101

Anderies, J.M., 2015. Managing variance: Key policy challenges for the Anthropocene. Proc. Natl. Acad. Sci. 112, 14402–14403. https://doi.org/10.1073/pnas.1519071112

Carpenter, S.R., Brock, W.A., Folke, C., van Nes, E.H., Scheffer, M., 2015. Allowing variance may enlarge the safe operating space for exploited ecosystems. Proc. Natl. Acad. Sci. 201511804. https://doi.org/10.1073/pnas.1511804112

Optional:

Janssen, M.A., Anderies, J.M., Baeza, A., Breetz, H.L., Jasinski, T., Shin, H.C., Vallury, S., 2019. Highways as coupled infrastructure systems: an integrated approach to address sustainability challenges. Sustain. Resilient Infrastruct. 00, 1–12. https://doi.org/10.1080/23789689.2019.1708181

Ramaswami, A., Weible, C., Main, D., Heikkila, T., Siddiki, S., Duvall, A., Pattison, A., Bernard, M., 2012. A Social-Ecological-Infrastructural Systems Framework for Interdisciplinary Study of Sustainable City Systems: An Integrative Curriculum Across

Seven Major Disciplines. J. Ind. Ecol. 16, 801–813. https://doi.org/10.1111/j.1530-9290.2012.00566.x

Anderies, J.M., Janssen, M., 2016. Institutions and the performance of Coupled Infrastructure Systems. Int. J. Commons Special Is, 1–10. https://doi.org/http://doi.org/10.18352/ijc.651

Sept 22 **Global Environmental Justice, Decolonization, and Indigenous Knowledge**

Táíwò, Olúfẹ́mi O. "What's Next: Why Reparations Require Climate Justice." In *Reconsidering Reparations*, 1st ed., by Olúfẹ́mi O. Táíwò. Oxford University PressNew York, 2022. https://doi.org/10.1093/oso/9780197508893.003.0005.

Tuck, Eve, and K Wayne Yang. "Decolonization Is Not a Metaphor." *Decolonization: Indigeneity, Education & Society* 1, no. 1 (2012).

Liboiron, Max. *Pollution Is Colonialism*. Duke University Press, 2021. Introduction Chapter pages 1-38.

Pulido, L. (2017). Geographies of race and ethnicity II: Environmental racism, racial capitalism and state-sanctioned violence. *Progress in Human Geography*, *41*(4), 524–533. https://doi.org/10.1177/0309132516646495

Nixon, Rob. *Slow Violence and the Environmentalism of the Poor*. Harvard University Press, 2011. Introduction pages 1-44.

Optional:

Whyte, K. P. (2013). On the role of traditional ecological knowledge as a collaborative concept: A philosophical study. *Ecological Processes*, *2*(1), 1–12. https://doi.org/10.1186/2192-1709-2-7

Define final debate topics

Sept 29 **Political Ecology: Power, Politics, and Access**
Paul Robbins Coming for an hour- pick two of his!

Robbins, Paul. "Is Less More … or Is More Less? Scaling the Political Ecologies of the Future." *Political Geography* 76 (January 2020): 102018. https://doi.org/10.1016/j.polgeo.2019.04.010.

Robbins, Paul, and Sarah A. Moore. "Return of the Repressed: Native Presence and American Memory in John Muir's *Boyhood and Youth*." *Annals of the American Association of Geographers* 109, no. 6 (2019): 1748–57. https://doi.org/10.1080/24694452.2019.1613956.

Robbins, Paul, Hilary Habeck Hunt, Francisco Pelegri, and Jonathan Gilbert. "Sovereign Genes: Wildlife Conservation, Genetic Preservation, and Indigenous Data Sovereignty." *Frontiers in Conservation Science* 4 (June 2023): 1099562. https://doi.org/10.3389/fcosc.2023.1099562.

Liverman, D., 2015. Reading climate change and climate governance as political ecologies. Routledge Handb. Polit. Ecol. 303–319.

Mollett, S., & Faria, C. (2013). Messing with gender in feminist political ecology. *Geoforum*, *45*, 116-125.

Galaz, V., Crona, B., Dauriach, A., Jouffray, J., Österblom, H., Fichtner, J., 2018. Tax havens and global environmental degradation 14–16. https://doi.org/10.1038/s41559-018-0497-3

Optional:

Robbins, P., 2000. The rotten institution: Corruption in natural resource management. Polit. Geogr. 19, 423–443. https://doi.org/10.1016/S0962-6298(99)00087-6

Heynen, N. (2014). Urban political ecology I: The urban century. *Progress in Human Geography*, *38*(4), 598-604.

Debate assignments

Oct 6 **Vulnerability, Exposure, and Adaptation**

Turner, B.L., Kasperson, R.E., Matson, P. a, McCarthy, J.J., Corell, R.W., Christensen, L., Eckley, N., Kasperson, J.X., Luers, A., Martello, M.L., Polsky, C., Pulsipher, A., Schiller, A., 2003. A framework for vulnerability analysis in sustainability science. Proc. Natl. Acad. Sci. U. S. A. 100, 8074–8079. https://doi.org/10.1073/pnas.1231335100

Cutter, S.L., Carolina, S., Boruff, B.J., Shirley, W.L., 2003. Social Vulnerability to Environmental Hazards. Soc. Sci. Q. 84.

Kreibich, Heidi, Anne F. Van Loon, Kai Schröter, et al. "The Challenge of Unprecedented Floods and Droughts in Risk Management." *Nature* 608, no. 7921 (2022): 80–86. https://doi.org/10.1038/s41586-022-04917-5.

Tellman, Beth, and Hallie Eakin. "Risk Management Alone Fails to Limit Hazard Impact." *Nature* 608 (2022): 41–43. https://doi.org/10.1038/d41586-022-02031-0.

Eriksen, S., Schipper, E.L.F., Scoville-Simonds, M., Vincent, K., Nicolai Adam, H., Brooks, N., Harding, B., 2020. Adaptation interventions and their effect on vulnerability in developing countries: help, hindrance or irrelevance? World Dev. Rev. 141, 105383. https://doi.org/10.1016/j.worlddev.2020.105383

Huq, S., Roberts, E., Fenton, A., 2013. Loss and damage. Nat. Clim. Chang. 3, 947–949. https://doi.org/10.1038/nclimate2026

(Pick one of the four articles below)

Farrell, J., Burow, P.B., McConnell, K., Bayham, J., Whyte, K., Koss, G., 2021. Effects of land dispossession and forced migration on Indigenous peoples in North America. Science (80-.). 374. https://doi.org/10.1126/science.abe4943

Rhiney, K., 2020. Dispossession, disaster capitalism and the post-hurricane context in the Caribbean. Polit. Geogr. 78, 102171. https://doi.org/10.1016/j.polgeo.2020.102171

Méndez, M., Flores-Haro, G., Zucker, L., 2020. The (in)visible victims of disaster: Understanding the vulnerability of undocumented Latino/a and indigenous immigrants. Geoforum 116, 50–62. https://doi.org/10.1016/j.geoforum.2020.07.007

Optional:

Baldassarre, G. Di, Viglione, A., Carr, G., Kuil, L., Yan, K., 2015. Debates - Perspectives on Socio-Hydrology : Capturing Feedbacks between Physical and Social Processes. *Water Resources Research* 1–26.

Turner, B.L., and Bing-Bing Zhou. "Reflections on a Vulnerability Framework for Sustainability Science." *Jàmbá Journal of Disaster Risk Studies* 15, no. 1 (2023). https://doi.org/10.4102/jamba.v15i1.1335.

Thomas, K., Hardy, R.D., Lazrus, H., Mendez, M., Orlove, B., Rivera-Collazo, I., Roberts, J.T., Rockman, M., Warner, B.P., Winthrop, R., 2019. Explaining differential vulnerability to climate change: A social science review. Wiley Interdiscip. Rev. Clim. Chang. 10, 1–18. https://doi.org/10.1002/wcc.565

Tate, E., Rahman, M.A., Emrich, C.T., Sampson, C.C., 2021. Flood exposure and social vulnerability in the United States. Nat. Hazards 106, 435–457. https://doi.org/10.1007/s11069-020-04470-2

Tellman, B., Schank, C., Schwarz, B., Howe, P.D., Sherbinin, A. De, 2020. Using Disaster Outcomes to Validate Components of Social Vulnerability to Floods : Flood Deaths and Property Damage across the USA. Sustainability 15, 1–28. https://doi.org/10.3390/su12156006

Eakin, H.C., Lemos, M.C., Nelson, D.R., 2014. Differentiating capacities as a means to sustainable climate change adaptation. Glob. Environ. Chang. 27, 1–8. https://doi.org/10.1016/j.gloenvcha.2014.04.013

Adger, W.N., Dessai, S., Goulden, M., Hulme, M., Lorenzoni, I., Nelson, D.R., Naess, L.O., Wolf, J., Wreford, A., 2009. Are there social limits to adaptation to climate change? Clim. Change 93, 335–354. https://doi.org/10.1007/s10584-008-9520-z

Turner, B.L., Shajaat Ali, A.M., 1996. Induced intensification: Agricultural change in Bangladesh with implications for Malthus and Boserup. Proc. Natl. Acad. Sci. U. S. A. 93, 14984–14991. https://doi.org/10.1073/pnas.93.25.14984

Oct 13 **Resilience and Transformation**

Scoones, I., Stirling, A., Abrol, D., Atela, J., Charli-Joseph, L., Eakin, H., Ely, A., Olsson, P., Pereira, L., Priya, R., van Zwanenberg, P., Yang, L., 2020. Transformations to sustainability: combining structural, systemic and enabling approaches. Curr. Opin. Environ. Sustain. 42, 65–75. https://doi.org/10.1016/j.cosust.2019.12.004

O'Brien, K., 2012. Global environmental change II: From adaptation to deliberate transformation. Prog. Hum. Geogr. 36, 667–676. https://doi.org/10.1177/0309132511425767

Chambers, J.M., Wyborn, C., Klenk, N.L., Ryan, M., Serban, A., Bennett, N.J., Brennan, R., Charli-Joseph, L., Fernández-Giménez, M.E., Galvin, K.A., Goldstein, B.E., Haller, T., Hill, R., Munera, C., Nel, J.L., Österblom, H., Reid, R.S., Riechers, M., Spierenburg, M., Tengö, M., Bennett, E., Brandeis, A., Chatterton, P., Cockburn, J.J., Cvitanovic, C., Dumrongrojwatthana, P., Paz Durán, A., Gerber, J.-D., Green, J.M.H., Gruby, R., Guerrero, A.M., Horcea-Milcu, A.-I., Montana, J., Steyaert, P., Zaehringer, J.G., Bednarek, A.T., Curran, K., Fada, S.J., Hutton, J., Leimona, B., Pickering, T., Rondeau, R., 2022. Co-productive agility and four collaborative pathways to sustainability transformations. Glob. Environ. Chang. 72, 102422. https://doi.org/10.1016/j.gloenvcha.2021.102422

Olsson, L., Jerneck, A., Thoren, H., Persson, J., O'Byrne, D., 2015. Why resilience is unappealing to social science: Theoretical and empirical investigations of the scientific use of resilience. Sci. Adv. 1, e1400217–e1400217. https://doi.org/10.1126/sciadv.1400217

Holling, C.S., 2001. Understanding the complexity of economic, ecological, and social systems. Ecosystems 4, 390–405. https://doi.org/10.1007/s10021-001-0101-5

Lawrence, Michael, Thomas Homer-Dixon, Scott Janzwood, Johan Rockstöm, Ortwin Renn, and Jonathan F. Donges. 2023 "Global Polycrisis: The Causal Mechanisms of Crisis Entanglement." *Global Sustainability* 7 (2024): e6. https://doi.org/10.1017/sus.2024.1.

Optional:

*Umbela Conversatorio 2: Planting Shared Dreams
https://www.umbela.org/post/la-siembra-de-sueños-compartidos
*this is a 30 min video

Meerow, S., Newell, J.P., Stults, M., 2016. Defining urban resilience : A review. Landsc. Urban Plan. 147, 38–49. https://doi.org/10.1016/j.landurbplan.2015.11.011

Eakin, H., Bojórquez-Tapia, L.A., Janssen, M.A., Georgescu, M., Manuel-Navarrete, D., Vivoni, E.R., Escalante, A.E., Baeza-Castro, A., Mazari-Hiriart, M., Lerner, A.M.,

2017. Opinion: Urban resilience efforts must consider social and political forces. Proc. Natl. Acad. Sci. 114, 186–189. https://doi.org/10.1073/pnas.1620081114

Oct 20 **Land Systems Science**

Foley, Jonathan A., Ruth DeFries, Gregory P. Asner, et al. "Global Consequences of Land Use." *Science* 309, no. 5734 (2005): 570–74. https://doi.org/10.1126/science.1111772.

Meyfroidt, Patrick, Ariane de Bremond, Casey M. Ryan, et al. "Ten Facts about Land Systems for Sustainability." *Proceedings of the National Academy of Sciences* 119, no. 7 (2022): e2109217118. https://doi.org/10.1073/pnas.2109217118.

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Pick one of the following:

Murillo-Sandoval, Paulo J., John Kilbride, Elizabeth Tellman, David Wrathall, Jamon Van Den Hoek, and Robert E. Kennedy. "The Post-Conflict Expansion of Coca Farming and Illicit Cattle Ranching in Colombia." *Scientific Reports* 13, no. 1 (2023): 1965. https://doi.org/10.1038/s41598-023-28918-0.

Skidmore, Marin Elisabeth, Fanny Moffette, Lisa Rausch, Matthew Christie, Jacob Munger, and Holly K. Gibbs. "Cattle Ranchers and Deforestation in the Brazilian Amazon: Production, Location, and Policies." *Global Environmental Change* 68 (May 2021): 102280. https://doi.org/10.1016/j.gloenvcha.2021.102280.

Pendrill, Florence, Toby A. Gardner, Patrick Meyfroidt, et al. "Disentangling the Numbers behind Agriculture-Driven Tropical Deforestation." *Science* 377, no. 6611 (2022): eabm9267. https://doi.org/10.1126/science.abm9267.

Optional:

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Gibbs, H. K., L. Rausch, J. Munger, et al. "Brazil's Soy Moratorium." *Science* 347, no. 6220 (2015): 377–78. https://doi.org/10.1126/science.aaa0181.

Oct 27 IPCC Working group 2: Vulnerability, Adaptation, and Impacts of Climate Change, The Anthropocene and Planetary Boundaries, and The Earth Commission: Safe/Just Corridors

Visit from Jonathan Patz in the second hour!

Working Group II Summary for Policy Makers (see canvas for pdf, 35 page document): https://report.ipcc.ch/ar6wg2/pdf/IPCC_AR6_WGII_SummaryForPolicymakers.pdf

Ishtiaque, Asif, Ronald C Estoque, Hallie Eakin, Jagadish Parajuli, and Yasin Wahid Rabby. "IPCC's Current Conceptualization of 'Vulnerability' Needs More Clarification for Climate Change Vulnerability Assessments." *Journal of Environmental Management* 303 (February 2022): 114246. https://doi.org/10.1016/j.jenvman.2021.114246.

Liverman, D., Nying, P., Stendahl, K., Gay-antaki, M., Craig, M., Bynoe, P., Call, F., Connors, S., David, L., Hayward, B., Jayawardena, S., Touray, L.M., 2022. *Nature* Survey of gender bias in the IPCC.

Rockström, Johan, Joyeeta Gupta, Dahe Qin, et al. "Safe and Just Earth System Boundaries." *Nature* 619, no. 7968 (2023): 102–11. https://doi.org/10.1038/s41586-023-06083-8.

Expert Working Group on Climate Change and Health in the United States. September 25 2025. Reconsideration of 2009 Endangerment Finding and Greenhouse Gas Vehicle Standards. Docket ID No. EPA-HQ-OAR-2025-0194. https://zenodo.org/records/17280667 read 5, 8-9, and 46-49. *Skim section 3 or pick an impact you are most interested in.*

Optional:

Gupta, Joyeeta, Xuemei Bai, Diana M Liverman, et al. “A Just World on a Safe Planet: A Lancet Planetary Health–Earth Commission Report on Earth-System Boundaries, Translations, and Transformations.” *The Lancet Planetary Health* 8, no. 10 (2024): e813–73. https://doi.org/10.1016/S2542-5196(24)00042-1.

Patz, Jonathan A., Howard Frumkin, Tracey Holloway, Daniel J. Vimont, and Andrew Haines. “Climate Change: Challenges and Opportunities for Global Health.” *JAMA* 312, no. 15 (2014): 1565. https://doi.org/10.1001/jama.2014.13186.

Liverman, Diana. “Geography and Climate Vulnerabilities.” *Transactions of the Institute of British Geographers* 49, no. 4 (2024): e12721. https://doi.org/10.1111/tran.12721.

Nov 3 **Futures**

-Lakshmi Charli-Joseph guest speaker, coming second half (2:15-3:15)
http://lancis.ecologia.unam.mx/personal/lakshmi

Ketonen-Oksi, Sanna, and Minna Vigren. “Methods to Imagine Transformative Futures. An Integrative Literature Review.” *Futures* 157 (March 2024): 103341. https://doi.org/10.1016/j.futures.2024.103341.

Juri, Silvana, Andrea Marais-Potgieter, Therezah Achieng, et al. “Transforming towards What? A Review of Futures-Thinking Applied in the Quest for Navigating Sustainability Transformations.” *Environmental Research Letters* 20, no. 5 (2025): 053006. https://doi.org/10.1088/1748-9326/adcbc4.

Paprocki, Kasia. “We Have Come This Far- We Cannot Retreat. Adapation, Resistence, and Competing Visions of Transformed Futures.” In *Threatening Dystopias: The Global Politics of Climate Change Adaptation in Bangladesh*. Cornell University Press, 2021.

Charli-Joseph, Lakshmi, Jesús Mario Siqueiros-García, Hallie Eakin, et al. “Enabling Collective Agency for Sustainability Transformations through Reframing in the Xochimilco Social–Ecological System.” *Sustainability Science* 18, no. 3 (2023): 1215–33. https://doi.org/10.1007/s11625-022-01224-w.

Ezra Klein and Derek Thompson. 2025. Abundance, Chapter 1.

OR listen to the podcast summary (use your Wisc NYtimes subscription to access): Abundance and the Left. April 29, 2025. The Ezra Klein Show. https://www.nytimes.com/2025/04/29/opinion/ezra-klein-podcast-saikat-chakrabarti-zephyr-teachout.html?login=email&auth=login-email

Optional:

Bennett, Elena M, Martin Solan, Reinette Biggs, et al. “Bright Spots: Seeds of a Good Anthropocene.” *Frontiers in Ecology and the Environment* 14, no. 8 (2016): 441–48. https://doi.org/10.1002/fee.1309.

Nov 10 Debates I Locations that become uninhabitable due to climate change require mandatory managed retreat funded by the federal government

+ Manoa Mashup- Beth facilitate

NOV 17 NO CLASS BETH TRAVELING TO RIO GRANDE VALLEY FOR FIELDWORK

Nov 24 Debates II AI is the new engine of global inequality and this drawback outweighs benefits in sustainable development and conservation

And III

The digital and economic gains of new data centers outweigh their environmental and community impacts

Dec 1 Debates IV Given the climate emergency, nuclear power should be expanded

and

V Disaster relief should be publically (not privately) funded and insurance publically subsizied as climate change increasing severity and frequency of events

Dec 8 Final project presentations

UW Academic Policies and Statements

- Academic Calendar and Religious Observances
- Academic Integrity
- Accommodations for Students with Disabilities
- Course Evaluations
- Diversity and Inclusion
- Mental Health and Well-Being
- Privacy of Student Records and the Use of Audio Recorded Lectures
- Students' Rules, Rights and Responsibilities
- Teaching & Learning Data Transparency