DEPARTMENT OF CITY AND REGIONAL PLANNING
University of North Carolina at Chapel Hill

PLAN 755 Planning for Natural Hazards and Climate Change Adaptation Fall 2018

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Office: New East, Room 302
Office Hours: Wednesday 4-5, or by appointment
Class Location: New East, Room 102
Class Time: Wednesday 5:15-8:00

Course Overview

This course provides a graduate-level introduction to natural hazards risk management planning, including climate change-induced hazards. Specific areas of study include the practice of planning and its application to hazard mitigation (risk reduction) and disaster recovery. Emphasis is also placed on the connectivity between planning for natural hazards and disasters and climate change adaptation, emphasizing the principles of governance, sustainability, and disaster resilience. While the course is grounded in planning principles and practice, and involves the evaluation of plans, it does not require a you to possess a knowledge of planning. Rather, the course is intended for students that seek to gain a better understanding of how governance and planning plays an important role in the larger issue of natural hazards risk management, including our ability to adapt to a changing climate and create more sustainable, disaster resilient communities. The course materials, lectures, and assignments reflect the relatively recent emergence of the Unites State's focus on climate change adaptation, drawing on several domestic examples and comparing them to international cases.

There is clear evidence that the climate is changing and these changes are manifest in natural hazards and disasters. Furthermore, the negative human and societal impacts are becoming more severe as human settlements have been designed in a way that reflects a climate of the past. In the United States, 2017 proved to be the costliest in terms of disaster related losses in our countries history, exceeding 309 billion dollars. Losses tied to episodically occurring disasters like hurricanes coupled with slow onset hazards like sea level rise, coastal erosion, and drought add to the challenges facing communities, states, and nations as they try to recover in the aftermath and reduce risk and exposure to future events, ideally in a proactive, rather than reactive manner.

What can be done to reduce future losses, improve disaster recovery outcomes, and adapt to a changing climate? How do we plan for episodic events and slow onset hazards? Are there lessons that can be drawn from each type? How do we plan for both? This course will help to unpack these interconnected questions.

Course Objectives

1) Identify and explore key planning principles and assess the degree to which they are applied in natural hazards risk management and climate change adaptation planning;

2) Gain a sound understanding of natural hazards risk management as understood through the lenses of hazard mitigation and disaster recovery;

3) Explore the relationship between governance, sustainability, disaster resilience, and climate change adaptation;

4) Identify and assess different types of natural hazards risk management governance frameworks, including how existing policies and programs facilitate or hinder pre- and post-disaster planning and the creation of sustainable, disaster resilient communities that are able to better adapt to changing climactic conditions;

5) Apply the information discussed in class and collected by student teams to enhance an existing climate change adaptation plan for a coastal community; and

6) Think critically about complex topics that don't have a singular answer and to formulate policy options and arguments based on materials explored in class and garnered through outside reading and research.

Course Format

This course meets once per week. Class sessions include lectures (emphasizing applicable cases selected from across the United States and abroad), discussion, oral presentations, the review of plans by students, an assessment of good governance in disaster recovery, and the development of hypothetical climate change adaptation strategies. Invited speakers include nationally and internationally recognized scholars and practitioners in the field of natural hazards risk management and climate change adaptation. It is expected that students will come to each class prepared to actively participate in discussions led by the instructor (and guided by questions in the syllabus), invited speakers, and students; lead class discussions as assigned; and present materials as part of group projects. Students are expected to work on group projects outside of class.

Student Evaluation

One plan quality evaluation exercise and one climate change adaptation strategy (including 1 group paper and; 2 group presentations):	1/3 of total grade
Term paper (abstract and final paper):	1/3 of total grade
Class participation (discussion, presentations, interaction with speakers):	1/3 of total grade

Assignments/Expectations

- Read required assignments and participate in class discussions, including those led by instructor, guest speakers, and students. Students are expected to be prepared to discuss and critically assess class readings. In addition, be prepared to answer specific questions tied to each class session as embedded in the syllabus.
- Analyze hazard mitigation plans (each person will work in a group to develop and participate in a presentation in class (not to exceed 30 minutes) and write a report [not to exceed 10 pages single spaced] summarizing your team's findings. Paper is due as noted in the syllabus.
- Assess the nature of governance in disaster recovery plans, drawing on class readings and the Disaster Recovery Assistance Network (see Smith 2011). Students should write a policy memo to local officials, not to exceed 5 pages. Team presentations describing the policy memo should not exceed 10 minutes.
- Engage with speakers in interactive dialogues guided by questions found in the syllabus and posed by invited guests.
- Work in teams to develop a climate change adaptation strategy briefing for a local commission assessing the quality of their existing Climate Change Adaptation Plan, informed by class readings, speakers, and materials collected by your group.
- Each student will write a term paper no more than 10 pages in length (single spaced). The paper should address a topic that is relevant to the class. Students will submit a 1-page abstract to the instructor on the date noted in the syllabus. The student is encouraged to meet with the instructor to discuss the nature of the paper prior to submitting the abstract and the final paper. Paper is due at the end of the semester.

Reading List

The reading list contains required and recommended readings. Some materials may be skimmed as noted. Required reading materials will be available in the course folder or as links in the body of the syllabus.

Textbooks:

Glavovic, Bruce and Gavin Smith. 2014. *Adapting to Climate Change: Lessons from Natural Hazards Planning*. New York: Springer.

Smith, Gavin. 2011. *Planning for Recovery: A Review of the United States Disaster Assistance Framework.* Washington, D.C.: Island Press.

Johnson, Laurie and Rob Olshansky. 2016. *After Great Disasters: How Six Countries Managed Community Recovery*. Policy Focus Report. Cambridge, Massachusetts: Lincoln Institute of Land Policy.

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Reports:

Attribution of Extreme Weather Events in the Context of Climate Change. National Academy of Science. 2016. Washington, D.C.: The National Academies Press.

Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change. 2012. Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.). Cambridge: Cambridge University Press.

Florida Department of Community Affairs, Division of Community Planning. *Post-Disaster Redevelopment Planning: A Guide for Florida Communities*. Tallahassee, Florida: Florida Department of Community Affairs.

National Research Council of the National Academies. *Understanding and Responding to Climate Change. Highlights of the National Academies Reports*. 2008. Washington, D.C.: The National Academies Press.

Rosenzweig, C. and W. D. Solecki, S. A. Hammer and S. Mehrota. Eds. 2011. *Climate Change and Cities: First Assessment Report of the Urban Climate Change Research Network.* Cambridge: Cambridge University Press.

Asian Minesterial Conference on Disaster Risk Reduction. Preventing Disaster Risk: Protecting Sustainable Development. Ulaanbaatar Declaration. July, 2018. https://www.preventionweb.net/files/56219_ulaanbaatardeclarationfinal.pdf

Resilient Queensland. 2018-2021. Delivering the Queensland Strategy for Disaster Resilience. 2018. Queensland Reconstruction Authority. http://www.qldreconstruction.org.au/u/lib/cms2/resilient-queensland-2018-21-final.pdf

Grannis, Jessica. 2011. Adaptation Tool Kit: Sea Level Rise and Coastal Land Use: How Governments can use Land-Use Practices to Adapt to Sea-Level Rise. Washington, D.C.: Georgetown Climate Center.

Tools:

Berke, Philip, Gavin Smith and Ward Lyles. 2012. Local Hazard Mitigation Plan Quality Analysis Tool.

National Oceanic and Atmospheric Administration. 2017. Digital Coast Sea Level Rise Viewer, Silver Spring, Maryland. Online at https://coast.noaa.gov/digitalcoast/tools/slr.html

National Oceanic and Atmospheric Administration. 2017. Digital Coast Sea Level Rise Viewer, Frequently Asked Questions. Silver Spring, Maryland. Online at https://coast.noaa.gov/data/digitalcoast/pdf/slr-faq.pdf

Videos (recommended, not required):

- Shenk, John. 2011. *The Island President*. Samuel Goldwin Productions.
- Smith, Gavin. 2016. *Role of States in Disaster Recovery*. Horizon Video Productions. http://coastalresiliencecenter.unc.edu/crc-projects/the-role-of-states-in-disaster-recovery/
- Tidewater by the American Resilience Project. https://www.amresproject.org/tidewater-film/. **Note:** Movie screening followed by panel discussion September 24th, James B. Hunt Library. North Carolina State University Centennial Campus.

Course Outline:
Topical Areas, Reading List, Speakers, Assignments, and Video Viewing Schedule

Session 1 (August 22): Course Introduction; Introduction to natural hazards risk management planning and climate change adaptation; **Sustainability, disaster resilience, and climate change adaptation.**

Note: Be prepared to discuss your background (i.e., undergraduate degree and prospective graduate degree, personal interests that may be relevant to the class topic, why you are taking this class). As always, be prepared to discuss assigned readings, including their connection to class lectures and to inject recent news stories about natural hazards, disasters, and climate change that may be relevant to class.

Introduction: The first class will involve a review of the course and a discussion of the linkage between natural hazards risk management planning, climate change adaptation, and creating more sustainable and disaster resilient communities. Students will introduce themselves, to include a discussion of their major, academic interests, future aspirations, why they chose to take the course, and any personal experience with disasters. A case study describing the Houston/Galveston Bay Area will be presented that addresses many of the topics discussed throughout the class. In addition, we will discuss key elements that define climate change and how these changes are closely associated with natural hazards and disasters.

Specific questions discussed in class will include:

1) What other options described in the class reading (see Glavovic and Smith 2014) might the Houston Galveston Bay Area employ to reduce risk and adapt to a changing climate? We will return to this question throughout class, so don't worry if you don't have a complete answer to this vexing question.

Required reading:

Smith, Gavin. 2016. Remembrances of the Past, Concerns for the Future, and the Potential Resilience of a Small Coastal Town, *Southern Cultures*. Summer: 64-87.

Bruce Glavovic and Gavin Smith. *Introduction: Learning from Natural Hazards Experience to Adapt to Climate Change*. 2014. Chapter 1, pp. 1-38. Adapting to Climate Change: Lessons from Natural Hazards Planning, Eds. Bruce Glavovic and Gavin Smith. New York: Springer.

Session 2 (August 29): Initial Assessment of Inconsistencies in National Flood Policy, Disasters, Development, and Climate Change Adaptation

Note: Be prepared to discuss how development pressures in high hazard areas and the current US flood insurance program as well as pre- and post-disaster assistance may hinder our efforts to become more resilient. We will return to these apparent inconsistencies throughout class, including ways to address these challenges in an era of climate change.

Specific questions discussed in class will include:

1) What role does the National Flood Insurance Program (NFIP) as well as pre- and post-disaster assistance play in reducing *and* exacerbating risk?
2) How might these programs be altered/expanded to reduce risk and help communities adapt to a changing climate?
3) What are your thoughts about the Isle de Jean Charles and Tangier Island cases? Is this an appropriate use of resources? Are there other options to consider? Who should pay for these actions?
4) Were you aware of the threat to the State of Washington and the Seattle metropolitan area? What might be done to reduce their vulnerability?

Required reading:

Birkman, Jorn and Joanna Pardoe. 2014. *Climate Change Adaptation and Disaster Risk Reduction: Fundamentals, Synergies and Mismatches.* Chapter 2, pp 41-54. Adapting to Climate Change: Lessons from Natural Hazards Planning, Eds. Bruce Glavovic and Gavin Smith. New York: Springer.

Union of Concerned Scientists. 2013 (August). Overwhelming Risk: Rethinking Flood Insurance in a World of Rising Seas. Cambridge Massachusetts: Union of Concerned Scientists.

Union of Concerned Scientists. 2018. Underwater: Rising Seas, Chronic Floods, and the Implications for US Coastal Real Estate.
https://www.ucsusa.org/sites/default/files/attach/2018/06/underwater-analysis-full-report.pdf

Resettling the First American 'Climate Refugees.' Coral Davenport and Campbell Robertson. New York Times. May 3, 2016. http://www.nytimes.com/2016/05/03/us/resettling-the-first-american-climate-refugees.html?mwrsm=Email&_r=0

Gertner, John. July 6, 2016. Should the United States Save Tangier Island from Oblivion?
http://www.nytimes.com/2016/07/10/magazine/should-the-united-states-save-tangier-island-from-oblivion.html?mabReward=A3

Kathryn Schulz. July 20, 2015. The New Yorker. The Really Big One.
http://www.newyorker.com/magazine/2015/07/20/the-really-big-one

What are the worst floods in American history? a rundown of the Top 30. USA Today. July 24, 2018. https://www.usatoday.com/story/money/economy/2018/07/24/worst-floods-in-american-history/37070093/

Session 3 (September 5): Natural hazards risk management and climate change adaptation; governance, sustainability, disaster resilience, and climate change adaptation.

Note: Be prepared to further discuss the linkages (and apparent disconnects) between natural hazards, disasters, and climate change adaptation as well as the linkage between governance, sustainable development, and disaster resilience.

Specific questions discussed in class will include:

1) What is hazard mitigation and how can it be applied to help communities adapt to a changing climate?
2) How would you define disaster resilience and sustainable development?
3) How are the concepts of sustainable development and disaster resilience interrelated?
4) What is governance and why is it so important?

Natural hazards risk management and climate change adaptation

Required reading:

Executive Summary of the Climate Science Special Report: Fourth National Climate Assessment, Volume I. 2017. U.S. Global Change Research Program, Washington, DC, USA. https://science2017.globalchange.gov/chapter/executive-summary/

Union of Concerned Scientists. 2016. Toward Climate Resilience: A Framework and Principles for Science-Based Adaptation. Cambridge, Massachusetts: Union of Concerned Scientists.

Attribution of Extreme Weather Events in the Context of Climate Change. National Academy of Science. 2016. Washington, D.C.: The National Academies Press. (note: read Preface, Glossary, Summary and Introduction – pp. ix-26)

Recommended reading:

International Panel on Climate Change (IPCC). 2012. Summary for Policymakers. In: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK, and New York, NY, USA.

Sustainability, disaster resilience, and climate change adaptation

Required reading:

Beatley, Timothy. 2014. *Planning for Resilient Coastal Communities: Emerging Practice and Future Directions*. Chapter 6, pp. 123-144. Adapting to Climate Change: Lessons from Natural Hazards Planning, Eds. Bruce Glavovic and Gavin Smith. New York: Springer.

Smith, Gavin and Dennis Wenger. 2006. *Sustainable Disaster Recovery: Operationalizing an Existing Framework*. Pp. 234-257. In Handbook of Disaster Research. Editors Havidan Rodriguez, Enrico Quarantelli, and Russell Dynes. New York: Springer.

The role of planning in natural hazards risk management

Session 4 (September 12): Introduction to planning and plan quality analysis; planning and natural hazards risk management.

Note: Be prepared to discuss planning and how it can help address the challenges associated with natural hazards risk management, including hazard mitigation and disaster recovery. We will begin to explore how the practice of hazard mitigation and disaster recovery actions can be assist communities adapt to a changing climate.

Assignment: Identify Final Project Teams

Specific questions discussed in class will include:

1) What is planning and what role does it play in natural hazards risk management and climate change adaptation?
2) What conditions can help or hinder the efficacy of planning?
3) How can we ensure planning addresses equity?

Required reading:

Burby, Raymond, Timothy Beatley, Philip R. Berke, Robert E. Deyle, Steven P. French, David R. Godschalk, Edward J. Kaiser, Jack D. Kartez, Peter J. May, Robert Olshansky, Robert G. Paterson & Rutherford H. Platt. 1999. Unleashing the Power of Planning to Create Disaster-Resistant Communities, Journal of the American Planning Association, 65(3): 247-258.

Campanella, Thomas. J. 2006. Urban Resilience and the Recovery of New Orleans. Journal of the American Planning Association. 72(2): 141-146. Spring.

Berke, Philip. Rising to the Challenge: Planning for Adaptation in the Age of Climate Change. In Adapting to Climate Change: Lessons from Natural Hazards Planning, Eds. Gavin Smith and Bruce Glavovic. Pp. 171-190. New York: Springer.

Planning Magazine. August/September 2018. Special Issue on Climate. Chicago, Illinois: American Planning Association. See articles below:

The Silver Lining of Sea-Level Rise. Norfolk, Virginia, has significant challenges ahead — but also interesting business opportunities https://www.planning.org/planning/2018/aug/silverlining/

Coping With Loss: Louisiana's Strategic Adaptations for Future Environments adapts to the reality of a vanishing coast https://www.planning.org/planning/2018/aug/copingwithloss/

Nature-Based Solutions: Parks — from green urban oases to sandy waterfront beaches — play a big role in making communities more resilient to climate change. https://www.planning.org/planning/2018/aug/naturebasedsolutions/

Water Pressure: Smart management is key to making sure inland cities aren't left high and dry in the face of a warming climate https://www.planning.org/planning/2018/aug/waterpressure/

Recommended reading:

Kaiser, Edward J. and David R. Godschalk. 1995. Twentieth Century Land Use Planning. *Journal of the American Planning Association*, 61(3): 356-385.

Ganapati, N. Emel and Sukumar Ganapati. 2009. Enabling Participatory Planning After Disasters. *Journal of the American Planning Association*, 75:(1): 41-59.

Assignment: Term Paper Abstracts Due

Hazard mitigation

Session 5 (September 19th): Hazard mitigation issues, concepts, policies, and programs; hazard mitigation planning; linkage to climate change adaptation; review of plan quality analysis tool.

Guest Speaker: Kathy Smith (invited). Kathy leads hazard mitigation planning activities for FEMA and is a graduate of UNC's Department of City and Regional Planning. Kathy will discuss the concept of hazard mitigation as well as national hazard mitigation programs, including the Disaster Mitigation Act of 2000, and the requirements to develop state and local hazard mitigation plans. Kathy will also discuss careers in the field as well as personal lessons for job seekers.

Note: Review the plan quality analysis tool and be prepared to discuss in class as you will be using the tool as part of your team's evaluation of hazard mitigation plans. Be prepared to ask the speaker questions based on the class readings and the content of their presentations.

Specific questions discussed in class will include:

1) What is the Disaster Mitigation Act of 2000 and how can it address many of the inconsistencies and shortfalls in national flood policy in the United States?
2) Based on conversations with speakers and class readings, what elements of the Disaster Mitigation Act of 2000 could be improved to better address natural hazards risk reduction across all natural hazards, including slow onset events like sea level rise?
3) How can we better integrate land use planning into hazard mitigation plans?
4) How might the linkage between disaster recovery and hazard mitigation be improved?

Required reading:

Berke, Philip, Gavin Smith and Ward Lyles. 2012. Local Hazard Mitigation Plan Quality Analysis Tool.

Godschalk, David R. 2003. Urban Hazard Mitigation: Creating Resilient Cities. *Natural Hazards Review* 4(3): 136-142.

Stevens, Mark. 2010. Implementing Natural Hazard Mitigation Provisions: Exploring the Role that Individual Land Use Planners Can Play. *Journal of Planning Literature*, 24(4): 362-371.

Required reading (continued):

Lyles, Ward, Phil Berke and Gavin Smith. 2014. Do Planners Matter? Examining Factors Driving Incorporation of Land Use Approaches into Hazard Mitigation Plans, *Journal of Environmental Planning and Management* 57(2):792-811.

Lyles, Ward, Phil Berke and Gavin Smith. 2014. A Comparison of Local Hazard Mitigation Plan Quality in Six States, USA, *Landscape and Urban Planning* 122 (February): 89-99.

September 21st [Friday]: Field Trip to Charlotte/Mecklenburg County North Carolina. The field trip will explore the cutting-edge work undertaken by Mecklenburg County Stormwater Services to reduce flood losses. Specific features observed and discussed include the use of stormwater services fees to fund hazard mitigation measures, the development of "future conditions" flood hazard mapping (and the planning process by which this was adopted), the acquisition and relocation of flood-prone properties, and the multi-objective planning process that enabled the creation of greenways, abatement of point source pollution, and reduction of flood losses.

Note: Be prepared to raise questions of our hosts that are grounded in what we have learned to date in class, including the role of planning and governance. We will also discuss how Mecklenburg County tackled the policy challenges we have talked about involving hazard mitigation and disaster recovery. Additional topics may include how these actions can be used to adapt to a changing climate.

Required reading:

Joseph MacDonald. 2010. In Hazard Mitigation: Integrating Best Practices into Planning. Schwab, James, C. Charlotte-Mecklenburg County, North Carolina, pp. 74-85.

Sipe, Neil and Karen Vella. Relocating a Flood-Affected Community: Good Planning or Good Politics? *Journal of the American Planning Association*, 80(4): 400-412. Special Issue, Planning for Disaster Recovery.

Association of State Floodplain Managers. No Adverse Impact Floodplain Management: Community Case Studies 2004. Association of State Floodplain Managers. Madison Wisconsin: ASFPM Foundation (skim).

Session 6 (September 26): Local hazard mitigation plan evaluation presentations (group papers due the following week-not to exceed 10 single-spaced pages in length). Invited Guest: Lawrence Frank (UNC Department of City and Regional Planning graduate), CFM, Technical Director, Land Planning Practice. Atkins **(confirmed)**.

Student teams will present the results of their evaluation of local hazard mitigation plans (from pre-existing plan inventory found on the last page of the syllabus or a plan your team has identified and sought approval from the instructor) using plan quality principles developed by Berke, Smith, and Lyles. Student teams are expected to present their findings in a PowerPoint to include: 1) general strengths and weaknesses, 2) an assessment of all plan quality principles, and 3) recommendations for plan improvements. The presentation should draw on class readings and group research. The presentation should not exceed 30 minutes in length.

Note: Be prepared to discuss: 1) how the findings of your team's plan quality analysis of hazard mitigation plans might be informed by the comments of Kathy Smith; 2) how your findings were similar or different from the findings described in the Lyles, Berke and Smith articles we read in Session 5; and 3) questions posed by our guest following your presentations.

The group paper should follow a similar theme and describe general strengths and weaknesses, assess all plan quality principles, and make recommendations for plan improvements based on class lectures, readings, and group research.

Disaster recovery

Session 7 (October 3): Disaster recovery issues, concepts, policies, and programs; **planning for post-disaster recovery.**

Assignment: Hazard Mitigation Plan Group Papers Due

Note: Be prepared to discuss the general concept of disaster recovery, including the role of planning and governance. Also be prepared to discuss the role of the public sector, quasi-governmental actors, and non-profits in recovery.

Required reading:

Smith, Gavin. 2011. Planning for Post-Disaster Recovery: A Review of the United States Disaster Assistance Framework. Washington, D.C.: Island Press. Chapters 1-4, pp. 11-156.

Smith, Gavin, Amanda Martin and Dennis Wenger. "Disaster Recovery in an Era of Climate Change: The Unrealized Promise of Institutional Resilience." 2017. In *Handbook of Disaster Research*, Second Edition, Eds. Havidan Rodriguez, Joseph Trainor and William Donner. New York: Springer.

Specific questions discussed in class will include:

1) What role do federal, state, and local governments play in disaster recovery? What might help or hinder this goal?
2) How does governance apply to disaster recovery?
3) What role can land use planning play in improving governance?
4) Why do you think most local governments don't have a disaster recovery plan in place? What might we do to increase the number and quality of disaster recovery plans?

Session 8 (October 10): Disaster recovery issues, concepts, policies, and programs; linkage to climate change adaptation; planning for post-disaster recovery.

Note: Be prepared to discuss the concept of disaster recovery, including how it provides an "opportunity" to inject risk reduction (hazard mitigation) and climate change adaptation measures. Also be prepared to discuss how disaster recovery can increase hazard risk and fail to incorporate climate change adaptation. What factors might encourage OR hinder injecting risk reduction and adaptation into the disaster recovery process? What options might we employ to

improve disaster recovery outcomes? How might approaches commonly used in your discipline/degree be applied?

Specific questions discussed in class will include:

1) What roles do the private sector, international aid organizations and nations, and individuals and emergent groups play in disaster recovery?
2) Based on what we have discussed so far in class, what needs to be changed to improve disaster recovery outcomes?

Smith, Gavin. 2011. Planning for Post-Disaster Recovery: A Review of the United States Disaster Assistance Framework. Washington, D.C.: Island Press. Chapters 5-8, pp. 157-320.

Johnson, Laurie, A. and Robert B. Olshansky. 2016. India: State-Managed Recovery with NGO Involvement. Pp. 36-40. In After Great Disasters: How Six Countries Managed Community Recovery. Cambridge, Massachusetts: Lincoln Institute of Land Policy.

October 17: FALL BREAK

Session 9 (October 24th): Comparative Assessment of Disaster Recovery as Practiced in the US and Australia. Professor and guest speakers will skype from Brisbane, Australia. Speakers: Brendan Moon, CEO Queensland Recovery Authority (QRA) and Graeme Milligan, General Manager Resilience and Recovery (confirmed). Brendan and Graeme will discuss the work of the QRA, to include flood recovery and broader efforts to increase the resilience of Queensland to multiple hazards, including adapting to climate change-induced effects though planning and policy-related activities.

Note: Students should be prepared to compare and contrast pre- and post-disaster recovery as practiced in the United States and Australia. You should draw from class lectures, discussions, readings, and field trip.

Specific questions discussed in class will include:

1) How is disaster recovery as described in Australia similar or different from how it is practiced in the United States?
2) What disaster recovery lessons might we draw from the Australian experience and apply in the United States?
3) Based on class readings and discussions, are their disaster recovery lessons from the United States that might help improve disaster recovery outcomes in Australia?
4) Is climate change adaptation explicitly addressed in either policy framework? Can you think of ways in which it could be better integrated?

Required reading:

Resilient Queensland. 2018-2021. Delivering the Queensland Strategy for Disaster Resilience. 2018. Queensland Reconstruction Authority. Skim.

Required reading (continued):

State Disaster Recovery Plan 2017-2019. (Queensland Disaster Recovery Plan). Operation Queensland Recovery. (skim)
http://www.qldreconstruction.org.au/u/lib/cms2/State%20Plan%20201719%20Operation%20Qld%20Recovery.pdf

Smith, Gavin Smith, Gavin. 2011. Planning for Post-Disaster Recovery: A Review of the United States Disaster Assistance Framework. Washington, D.C.: Island Press. Chapter 9. *Addressing the Challenges of the Disaster Recovery Assistance Framework: Creating the Disaster Recovery Act*. Pp. 321-376. Chapter 10. *The National Disaster Recovery Framework: A New Vision for Recovery?* Pp. 377-404.

Recommended reading:

Ulaanbaatar Declaration. 2018. Asian Ministerial Conference on Disaster Risk Reduction. Preventing Disaster Risk: Protecting Sustainable Development. (skim)

Session 10 (October 31st): Climate Change Adaptation issues, concepts, policies, and programs; planning for climate change adaptation.

Note: Students should be prepared to discuss key issues related to climate change adaptation, including how land use planning can play a vital role in addressing this complex topic. Be prepared to discuss and apply land use planning techniques to varied US and international cases we have read about or discussed in class. Also, be prepared to discuss the Florida Adaptation Planning Guidebook. Your comments should draw on materials explored to date in class as well as your own research.

Class Speaker: Julie Dennis. Director, Division of Community Development at Florida Department of Economic Opportunity (invited). Julie will discuss her work in disaster recovery following Hurricane Irma, which struck Florida in 2017 as well as her work addressing the nexus between disaster risk reduction, disaster recovery and climate change adaptation as evidenced by the recent publication of the Florida Adaptation Planning Guidebook.

Specific questions discussed in class will include:

1) What aspects of the Florida Adaptation Planning Guidebook do you think are particularly strong? Conversely, what aspects of the guidebook do you think could be improved?
2) How can we plan for uncertainty?

Required reading:

Quay, Ray. 2010. Anticipatory Governance: A Tool for Climate Change Adaptation. *Journal of the American Planning Association*, 76(4): 496-511.

Carmin, J, Nadkarni, N. and Rhie, C. *Progress and Challenges in Urban Climate Adaptation Planning: Results of a Global Survey*. Cambridge, Massachusetts: MIT 2012, pp. 1-33.

White, Iain. 2014. *Firm Foundations of Castles on Sand? The Shifting Sources of Flood Risk and the Implications for Flood Risk Governance: An English Case Study*. Chapter 5, pp. 101-122. Adapting to Climate Change: Lessons from Natural Hazards Planning, Eds. Bruce Glavovic and Gavin Smith. New York: Springer.

Florida Adaptation Planning Guidebook. 2018. Florida Department of Environmental Protection (skim)

Session 11 (November 7): The State of Practice in Natural Hazards Risk Management and Climate Change Adaptation.

Guest Speaker: Jenniffer Santos-Hernandez, Research Professor, University of Puerto Rico, Rio Piedras (confirmed). Jenniffer will discuss the issues and challenges of recovery in Puerto Rico, to include pre-event conditions that exacerbated losses as well as insights on how recovery provides a venue to address climate change adaptation.

Required reading:

Grannis, Jessica. 2011. Adaptation Tool Kit: Sea Level Rise and Coastal Land Use: How Governments can use Land-Use Practices to Adapt to Sea-Level Rise. Washington, D.C.: Georgetown Climate Center.

Smith, Gavin and Bruce Glavovic. 2014. *Integrating Natural Hazards Risk Management and Climate Change Adaptation through Natural Hazards Planning*. Pp. 405-450. Adapting to Climate Change: Lessons from Natural Hazards Planning, Eds. Gavin Smith and Bruce Glavovic. New York: Springer.

Hamin, Elisabeth M., Nicole Gurran. 2009. Urban Form and Climate Change: Building Adaptation and Mitigation in the U.S. and Australia. *Habitat International* 33: 238-245.

Note: We will discuss examples of how natural hazards risk management and climate change adaptation can be integrated, to include drawing on Glavovic and Smith (2014) as well as Grannis (2011).

Specific questions discussed in class will include:

1) Based on what we have discussed in class regarding hazard mitigation and disaster recovery, what lessons can be applied to climate change adaptation?
2) What factors may help or hinder our ability to achieve this aim?
3) What challenges may coastal communities face when using tools like the NOAA sea level rise viewer? What role might good governance play in addressing this issue (be prepared to discuss specific examples)?
4) Based on the land use techniques discussed in Grannis (2011), how might you apply these techniques to address other natural hazards (e.g., wildfire, earthquake, tsunami, flooding, etc.)?
5) How might the varied land use techniques described by Grannis (2011) be modified to address the uncertainty of a changing climate?

Recommended reading:

Promising Practices in Adaptation and Resilience: A Resource Guide for Local Leaders. 2010. Institute for Sustainable Communities. (skim)

Session 12 (November 14) Applying tools and techniques to climate change adaptation: A discussion of the NOAA sea level rise viewer. Guest Speaker: Doug Marcy, Science and Geospatial Services National Oceanic and Atmospheric Administration (NOAA). Presentation via webex (confirmed). Doug will discuss the role of NOAA in advancing coastal resilience, focusing on Digital Coast a suit of date and tools used to assist coastal communities become more resilient in the face of coastal hazards, including those tied to a changing climate. Emphasis will be placed on the delivery of a tutorial on the NOAA Sea Level Rise Viewer, which teams in this class will use as part of your final class project.

Note: Following Doug's webex tutorial, we will discuss team presentations and the class dialogue to be held on November 28th. Students should be prepared to discuss Smith, Anderson and Perkes as well as class readings in Session 10 and 11 relative to the upcoming class assignment/presentation on November 28th.

Required reading:

Sea Level Rise in Miami-Dade County. Miami-Dade County Office of Resilience. https://mdc.maps.arcgis.com/apps/Cascade/index.html?appid=6ff1c86445114dc7b82e13b67b439093

Smith, Gavin, Allison Anderson and David Perkes. New Urbanism and the H-Transect: Improving the Integration of Hazard Mitigation, Disaster Recovery, and Design (under development).

Woodruff, Sierra C. and Mary Stults. 2016. Numerous Strategies but Limited Implementation Guidance in US Local Adaptation Plans. *Nature Climate Change*, May: 1-9.

November 21: NO CLASS - THANKSGIVING BREAK

Session 13 (November 28): Team Presentations: Climate Change Adaptation Strategies; Class Dialogue and Course Wrap Up

Student teams will develop abbreviated climate change adaptation strategies for a chosen city drawn from the last page of the syllabus. Your findings will be presented during class in a powerpoint format (no team paper is required). Team presentations should not exceed 30 minutes. The Strategies will focus on two proposed options: 1) Managed Retreat/Avoidance and 2) Protect/Accommodate. Presentations may draw from Smith, Anderson and Perkes, but do not limit yourself to this approach.

It is incumbent on each team to define managed retreat/avoidance and protect/accommodate, and identify specific land use, codes, site design, and engineering actions you think are appropriate for differing strategies and sea level rise scenarios. Two sea level rise scenarios of 1 and 5 feet will be applied in your city (using the NOAA Sea Level Rise Viewer) and used to inform both managed retreat/avoidance and protect/accommodate strategies. This means that each team will develop a total of 4 scenario-based strategies. It is important to think about strategies that account for uncertainty, social vulnerable populations, the lifespan of existing public

infrastructure and other community assets, key public facilities, as well as housing and businesses.

Approaches should draw from class lectures, readings, and your own research, including a cursory evaluation of existing hazard mitigation, disaster recovery, climate change adaptation, comprehensive land use plan and other pertinent documents found in your city. Your strategies (Managed Retreat/Avoidance strategy and Protect/Accommodate) should focus on specific policies and projects. This assessment should apply the following concepts: pre and post disaster hazard mitigation and disaster recovery, social vulnerability, planning, non-stationarity, and governance. For instance, the strategy should include a brief discussion of key stakeholders that should be involved in the process and why their participation is important. You may want to draw from our extensive discussion of governance during the class sessions focused on disaster recovery, although governance is certainly relevant when discussing hazard mitigation as well. Given the number of items to address, it is highly advisable that you break up work assignments across members of your team and agree to meet throughout the semester to ensure your project is completed and ready to present on the last day of class. In addition, I will be available to meet with individuals and teams during my office hours or at agreed upon times throughout the semester as needed.

Class Dialogue and Course Wrap Up

Following team presentations students are expected to engage in a class discussion about what you have learned in class. Students are also expected to propose possible solutions to the key challenges discussed.

Specific questions discussed in class include:

1) Based on the material discussed in class, what do you believe are the key elements or lessons that should be conveyed to local officials as they seek to adapt to a changing climate?
2) Based on your own observations, what additional issues should have been addressed in class, to include topics you think a federal, state, local government official; scholar/researcher; private sector contractor; etc. might want to know about natural hazards, disasters, and climate change adaptation (realizing that you might be that person in the not too distant future)?

Term Paper

Students are required to write a term paper (not to exceed 10 pages in length-single spaced). Papers should present a clearly articulated issue/problem linked to the existing literature followed by your own observations about the topical area and a set of well-crafted policy recommendations intended to address the problems identified. Students should identify a paper topic that addresses natural hazards, disasters and/or climate change adaptation.

The paper should include the following sections: 1) an introduction to your chosen topic, including why it is important/significant; 2) a review of the literature; 3) a discussion of your observations/findings; 4) policy recommendations addressing identified issues/problems; 5) conclusion; and 6) references.

LOCAL and REGIONAL PLAN SELECTION LIST

Student teams may select one of the Hazard Mitigation Plans or Sea Level Rise Adaptation Cities provided or identify another plan subject to the approval of the instructor.

Hazard Mitigation Plans

1) City of Baltimore Combined Hazard Mitigation & Climate Adaptation Plan. 2013. http://www.baltimoresustainability.org/plans/disaster-preparedness-plan/.
2) Somerset County, New Jersey All-Hazard Mitigation Plan. 2013. http://www.co.somerset.nj.us/government/public-health-safety/hazard-mitigation/hazard-mitigation-plan
3) Fairview, Massachussetts. 2018. (see class folder)
4) New Hanover County, North Carolina. September 2010. (see class folder)
5) City of Seattle, Washington. July 2009. (see class folder)
6) Chesapeake, Virginia Hazard Mitigation Plan. 2014. (see class folder)
7) City of Berkeley Hazard Mitigation Plan 2014. https://www.cityofberkeley.info/Mitigation/

Sea Level Rise Adaptation Strategy – Select Cities

1) Norfolk, Virginia

2) Charleston, South Carolina

3) San Francisco, California

4) Miami / Dade County, Florida

5) Broward County, Florida

6) New York City

7) San Diego, California

8) King County, Washington