

Risk, Resilience and Decision Making

PA 5741

Spring 2016

University of Minnesota

Room: HHH Center 25

Time: Tu/Th 9.45AM – 11AM

Syllabus

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Office Hours: By appointment

Course Description

Risk is a (possibly THE) concept for our time.

Every advance that we make through science and technology brings its own problems for human health and environment.

Anticipating and managing these technological risks is a major role for governments.

Assessing risks involves an understanding of the technology (and its wastes) and the science behind impacts on humans and environment.

Managing risks combines an understanding of impacts and their causes with an understanding of public preferences and values.

This course embraces how risk assessment informs policy development and decision-making in a cross-disciplinary way by addressing the core natural and social science issues. In tune with the basic philosophy of the Science, Technology & Environmental Policy (STEP) program it therefore makes connections between science/technology and policy by integrating understanding across the sciences.

Learning Objectives

Through this course students are expected to:

- Understand the core principles and practices of risk assessment. For example, students will be able to define and distinguish hazard, risk and uncertainty – and understand the basic principles behind exposure and effects assessments for humans and ecosystems.
- Appreciate differences between human health and ecological risk assessments; and be able to recognize how vulnerability and resilience should be taken into account.

- Understand how risk assessment informs, and is informed by, risk management issues. This will entail learning how public preferences can be captured through cost-benefit and public value mapping and how all relate to structured decision making.
- Synthesize the elements of risk assessment and management by evaluating prominent risk laws.

Grading

Two essays (Assignments 3 and 5 – assignment 2 is a practice) – each worth 20%.

Quiz session 7 worth 20%.

Risk law policy assessments (Assignment 8) worth 30% (10% for presentations and 20% for written policy assessment).

Overall attendance and involvement worth 10%.

Please note University policy on grading and student conduct at the following website:
policy.umn.edu/education/syllabusrequirements-appa

Weekly Topics and Learning Objectives (may be subject to change)

Week	Session	Assignments	Resources/Readings
T. 22 March	1. Risk society and the need for risk assessment and management – introduction to the course [PC lecture].	1. In preparation for the next session clarify definitions of hazard, risk, uncertainty and vulnerability.	Use the web to research assignment 1.
Th. 24 March	2. Technical elements of risk assessment [PC lecture; but will be interactive on the basis of Assignment 1]. Possible background readings are Greim & Snyder (2008) for a human health emphasis and Suter (2007) for an ecological emphasis.	2. Write an essay (no more than 1000 words) comparing and contrasting human health endpoints in effects assessments; does it matter which are used? This will provide a basis for session 4. The essay will provide practice for the others that will be graded. Deadline for submission is Tuesday 29 March, end of class for those wanting feedback in Session 4.	See, Robinson (2007) and USEPA (2014). Also consult the web. The issues relate to: lives, lifespan quality of life; vulnerable age groups and vulnerable populations and the extent to which what is measured relates to these.
T. 29 March	3. Exposure assessment [PC lecture].		
TH.31 March	4. Effects assessment I – human health [interactive session based on Assignment 2] PC will give feedback	3. Write an essay (no more than 1000 words) on: what are we trying to protect in	See Calow and Forbes (2003) and Forbes & Calow

	on essays.	ecological systems? This will provide a basis for session 5. Deadline for submission: Th 14 April at 5pm	(2012) as a basis for assignment 3. The issues relate to organisms and sub organismic responses v. ecosystems – how should they be resolved?
T. 5 April	5. Effects assessment II –ecosystems [interactive on the basis of Assignment 3].	4. Write notes on resilience – and consider if/how it should be taken into account in assessing risk. This will provide a basis for session 6.	For assignment 4, see Gibbs (2009) and chapter 1 of Garmestani & Allen (2014).
Th. 7 April	6. Taking into account resilience [interactive on the basis of Assignment 4]. PC will outline the quiz for session 7.	5. Write an essay (no more than 1000 words) that gives a critical account on: how/if risk assessment relates to structured decision making and how both relate to cost/benefit analysis and public value mapping. This will provide a basis for session 9. Deadline for submission: TH 21 April at 5pm. Also prepare for the quiz in session 7.	For assignment 5 read selected chapters from Gregory et al (2012) and for public value mapping Bozeman & Sarewitz (2011).
T. 12 April	7. Qs & As and Quiz Session. There will be an opportunity for questions in first half. <u>There will then be a quiz on previous sessions.</u> There will then be an opportunity for anonymous feedback.		
Th. 14 April	8. Risk assessment informs risk management I – who/what are we trying to protect and how should their views be taken into account? [PC lecture].	6. Write notes on risk perception as a basis for session 11.	For assignment 6 read any of Sunstein’s writings and in particular 2002; and Slovic et al (2004).
T. 19 April	9. Risk assessment informs risk management II – how this relates to structured decision making, cost-benefit analysis and public value mapping [interactive based on Assignment 5].	7. Write notes on the precautionary principle and on how it relates to risk assessment. This will provide a basis for session 12.	For assignment 7 read selected chapters of European Environment Agency Report (2013) and Sunstein

			(2005).
Th. 21 April	10. Risk reduction laws I [PC outlines some and how to carry out a policy assessment – as a basis for Assignment 8].	8. Class divides into teams. Each selects a risk reduction law. Each carries out a policy assessment on how their choice addresses connection between risk assessment and risk management and if they are likely to deliver effective policy. This will provide a basis for sessions 13 and 14. Each team will produce a written policy assessment to be submitted by 5 th May at 5pm. Each team will make a presentation over a specified time (to be defined) either on 3 or 5 May. Both the written assessment and the presentation will be graded.	For assignment 8, read relevant laws from USEPA web site. PC will provide an outline for carrying out the policy assessment and guidance on presentations.
T. 26 April	11. Risk perceptions I – and why they often differ from the technical assessments [PC lecture on heuristics and implications for risk management].		
Th.28 April	12 Risk perceptions II and the precautionary principle [interactive on the basis of Assignment 6].		
T. 3 May*	13. Reports from Assignment 8.		
TH. 5 May*	14. Reports from Assignment 8.		

* Sessions will be combined to one double session

References

There is no course text because currently there is no book that adequately covers both human health and environment, natural science and social science issues. Background references are suggested for consultation. All the rest will be provided on the class MOODLE.

Bozeman, B. & Sarewitz, D. (2011) Public value mapping and science policy evaluation. *Minerva*, **49**, 1-23. [This is the introduction to a symposium collection. Students might like to read some of the other papers. They are available on line].

Calow, P & Forbes, V.E. (2003) Does ecotoxicology inform ecological risk assessment? *Environmental Science and Technology*, **37**, 146A-151A.

European Environment Agency (2013) *Late Lessons on Early Warnings*, vol 2. EEA, Copenhagen. [Read the Introduction and all the Summary part]

Forbes, V. & CALOW, P. (2012) Problems and promises for the new paradigm of risk assessment and an alternative approach involving predictive systems models. *Environmental Toxicology & Chemistry* **31**, 2663 – 2671.

Garmestani, A.S. & Allen, C.R. (2014) *Social-Ecological Resilience and Law*. Columbia University Press, NY [Read Chapter 1].

Gibbs, M.T. (2009) Resilience: what is it and what does it mean for marine policymakers? *Marine Policy*, **33**, 322-331.

Gregory, R., Failing L., Harstone, M., Long, G., McDaniels, T. & Ohlson, D. (2012) *Structured Decision Making. A practical guide to environmental management choices*. Wiley-Blackwell, Oxford. [Read sections: 1.2 Structured decision making; 2.2.1 Structured decision making compared with cost-benefit analysis; 2.2.4 Structured decision-making compared with risk assessment and management].

Greim, H. & Snyder, R. (2008) *Toxicology and Risk Assessment: A Comprehensive Introduction*. Wiley, NY. (Background reading – present in the library?)

Robinson, L.A. (2007) How the US government agencies value mortality risk reduction. Review of *Environmental Economics and Policy*, **1**, issue 2, pp. 283–299. doi: 10.1093/reep/rem018

Slovic, P., Finucane, M.L., Peters, E & MacGregor, D.G. (2004). Risk as analysis and risk as feelings: some thoughts about affect, reason, risk and rationality. *Risk Analysis* **24**, 311 – 322.

Sunstein, C.S. (2002) *Risk and Reason*. Cambridge University Press, Cambridge. (Background reading – present in the library?)

Sunstein, C.S. (2005) *Laws of Fear*. Cambridge University Press, Cambridge. (Background reading – present in the library?)

Suter, G. (2007) *Ecological Risk Assessment*, CRC Press, Boca Raton. (Background reading – present in the library?)

USEPA (2014) *Framework for human health risk assessment to inform decision making*. USEPA Archive Doc. [PC can supply if needed].

Other resources that will be supplied by tutor

1. Description of Policy assessment
2. Rubric for class presentations
3. Rubric for team assignments
4. PowerPoints will appear on the day of the session. Please note that these are property of the tutor and should only be used by students for the course, except by permission from the tutor.