Supplementary readings:

Beaver in South America

Anderson, C. B., Pastur, G. M., Lencinas, M. V., Wallem, P. K., Moorman, M. C., & Rosemond, A. D. (2009). Do introduced North American beavers Castor canadensis engineer differently in southern South America? An overview with implications for restoration. *Mammal Review, 39*(1), 33-52. doi: 10.1111/j.1365-2907.2008.00136.x

Lizarralde, M. S. (1993). Current Status of the Introduced Beaver (Castor canadensis) Population in Tierra del Fuego, Argentina. *Ambio, 22*, 351–358.

Malmierca, L., Menvielle, M. F., Ramadori, D., Saavedra, B., Saunders, A., Volkart, N. S., & Schiavini, A. (2011). Eradication of beaver (Castor canadensis), an ecosystem engineer and threat to southern Patagonia. In C. R. Veitch, M. N. Clout & D. R. Towns (Eds.), *Island invasives: eradication and management*. Gland, Switzerland: IUCN.

Parkes, J. P., Paulson, J., Donlan, C. J., & Campbell, K. (2008). Control of North American Beavers in Tierra del Fuego: Feasibility of Eradication and Alternative Management Options *Landcare Research Contract Report: LC0708/084*: Comité Binacional para la Estrategia de Erradicación de Castores de Patagonia Austral.

Theory (big picture)

Goldblatt, D. (1996). *Social Theory and the Environment*. Boulder: Westview Press.

Marquet, P. A., Allen, A. P., Brown, J. H., Dunne, J. A., Enquist, B. J., Gillooly, J. F., . . . West, G. B. (2014). On Theory in Ecology. *BioScience*. doi: 10.1093/biosci/biu098

Moore, J.D. (2008). *Visions of Culture: An Introduction to Anthropological Theories and Theorists*, Third Edition. Altamira Press, MD.

See theory briefs for additional references on World Risk and Novel Ecosystems.

Handout 1: Environmental or Social Problem Journal (at home)

The goal of this exercise is to orient the student's viewpoint towards the complexity of ostensibly "environmental" or "social" issues.

This activity will allow the student to begin to observe his/her everyday life and surroundings and identify diverse "environmental" or "social" problems/issues that include cultural, political and economic dimensions.

In this "journal" students should record 3 cases, situations or problems that are identified in one's neighborhood, city or in the media. The problem should be described from at least 3 dimensions, which should also be classified (e.g., cultural, political, economic, environmental, social…).

Problem/Issue	
Dimension 1:	
Dimension 2:	
Dimension 3:	

Problem/Issue	
Dimension 1:	
Dimension 2:	
Dimension 3:	

Problem/Issue	
Dimension 1:	
Dimension 2:	
Dimension 3:	

Handout 2: Article Comments (in class)

Below are actual comments submitted in response to the *Scientific American* article "Argentina and Chile Decide Not to Leave It to Beavers", by Katie Worth, 10 March 2014. You should have already read the article. Read through the comments and make an abbreviated, bulleted list of the points raised - these will be useful to you later in this unit. Respond substantively to at least two comments (~100 words each). You may agree or disagree, but should add new information and ideas in your responses. You may use a snappy writing style but be respectful. You do not need to do any supplementary research to inform your response - your own current knowledge and opinions are sufficient.

Jerzy v. 3.0.March 11, 2014, 4:28 AM

Eradication shouldn't be difficult. Beavers are slow breeding and visible. Anyway, when beaver pelts were valued, they were almost exterminated in Europe.
|

Link to This

CahokiaMarch 11, 2014, 8:42 AM

It'd be nice if environmentalists would at least occasionally allow that there are humane animal welfare reasons for criticizing invasive species eradication programs.
As for beavers being unfortunately cute... let's be real.
Environmentalists have been exploiting the cuteness of charismatic endangered species for decades. It's one of the major ploys used to receive donations and public support.
Report as Abuse |

Link to This

george19March 11, 2014, 3:02 PM

Isn't this always what happens when they introduce a non-native species? When will they learn?
Report as Abuse |

Link to This

jgrosayMarch 12, 2014, 9:01 AM

The case beavers released in South America sounds as the Australian Rabbit case, where nothing succeeded in eliminating this invasive animal, even when foxes were brought there, it feed on local Marsupials, rather than on Rabbits.
If you think in introducing North American trees that are more resistant to Beaver's bites, you may put there another Kudzu-like species, but it looks easier controlling trees than animals, and perhaps a 'pilot test' can be conducted in some safe place to ascertain what would happen with local trees in competition with North American tree imports.

In the Madrid, Spain, 'Casa de Campo', decades ago, some colonies of white Argentinian parrots, that nest in very big size 'collective nests' were detected, somebody proposed eradicating it, I don't know what happened to the white birds, but now the place is full of green parrots' colonies, and a lot of rivers and water collection dams and tubing all over the country are invaded by 'Tiger mussels', as it have no known predator controlling its growth in fresh water; some impacts of ecological mistakes are long term, or affect things that have an important 'stethic' or 'conceptual' value, but other species do produce early hughe economical problems, and in this way are a threat to the survival, population size and welfare of our own human species.
Is it possible a win-win strategy in this?
Report as Abuse |

Link to This

AntonioMarioMarch 13, 2014, 6:46 PM

Boy, that photo of the 'wild animal specialist' holding a beaver he'd captured is telling. The beavers didn't ask to be taken to Tierra del Fuego; they just went on living their lives and doing what they do. Did the 'specialist' have to be so disrespectful with the animal?
Pathetic.
Report as Abuse |

Link to This

timcliffeMarch 17, 2014, 3:27 PM

AntonioMario, the people in the article made it perfectly clear they don't blame the beavers for being beavers: "These animals are not at fault." "The beaver is not the bad guy. Humans are the bad guy. We are trying to fix our mistakes."
And I don't see what's disrespectful about the photo -- the animal is dead; he's not tormenting it or terrifying it or anything like that. He's just showing it to the photographer.
Report as Abuse |

Link to This

Handout 3: World Risk Overview (at home reading)

German sociologist and theorist Ulrich Beck identifies risk as a defining characteristic of contemporary society. Beck is particularly interested in a specific type of risk that he identifies as unique to the modern world; these are techno-ecological problems created by humans, largely through industry (Beck 1999). Such risks include those posed by nuclear, chemical and genetic technologies (1999) as well as climate change, outbreaks of pathogens in large-scale food supply chains, and terrorist attacks (Beck 2006; Beck 2007). Rosa et al. (2013) highlight the importance of the frequency of risks in their capacity to cause anxiety, as formerly "episodic and manageable" risk crises are now "endemic to the normal functioning of the advanced modern era" (p. 13). The actors in risk society include corporations, scientists, governments, and the public, who are all forced to grapple with risks that, by definition, lie outside of their capacity to adequately understand, anticipate and solve (Strydom 2002). Formerly trusted experts (i.e. scientists, public health experts) are caught providing contradictory evidence, false assurances and misinformation regarding risk, thereby violating the "consensus on progress" (p. 52) and leading to an eventual erosion of confidence in formerly trusted experts who were assumed to be working in the public interest (Beck 2006).

Beck asserts that many modern systems are facing profound institutional crises due in large part to their inability to manage the problems they have created. This crisis, Beck predicts, will lead to the dissolution of industrial modernity and drive society towards a second, reflexive phase of modernity, wherein the "inability to know" replaces the "logic of control" that served as the foundation of nineteenth and twentieth century society through the end of the Cold War (Beck, 1999; p. 139).

According to British sociologist Anthony Giddens, a risk society is "a society increasingly preoccupied with the future (and also with safety), which generates the notion of risk,"[1998, p. 27] whilst the German sociologist Ulrich Beck defines it as "a systematic way of dealing with hazards and insecurities induced and introduced by modernisation itself" (Beck 1992:21).

After Risk Society

Risk, according to Beck, will lead to a new brand of global interdependence that will "tear down national boundaries and jumble together the native with the foreign" (2006: 331). Since modern global risks, as described by Beck and others, do not abide by national boundaries or target specific demographic strata, they will eventually lead to the replacement of class inequality with risk equality (Rosa et al. 2013). Beck predicts that risk will ultimately make the nation-state irrelevant (Beck 1999; 2006) and will create new opportunities for the protection of individual rights and expressions of morality (Mirchandani 2005).

Environmental issues have indeed become increasingly global in scope over the past few decades, both in terms of how issues are framed as well as in the predominance of international institutions and conservation strategies (Zimmerer 2006). Modern industrial risk as a novel phenomenon in which "global ecological dangers create a meaning-filled horizon of

avoidance, protection and assistance, a moral climate that grows sharper as danger intensifies" (1999: 45). Giddens suggests that insecurity stimulates reflexivity (Goldblatt 1996) and that this, coupled with democratization, will improve risk management in the long term (Rosa et al. 2013).

World risk creates an opportunity for societies to reconsider who maintains the legitimate right and relevant knowledge to participate constructively in ecological-technological decision-making (Collins and Evans 2002; O'Brien 2002). This question of rights has been posed for decades by researchers interested in traditional ecological knowledge and community-driven development. This work often highlights the disconnect between rural people's understandings and methods for managing natural resources and those put forth by Western science, and often depicts locals as highly suspect of development expertise (Leach and Fairhead 2002). According to Beck, the world is entering a state of being that is "post traditional trust" (1999: 116). Giddens asserts that tradition can only persist in the modern world in the context of its relation to "plural competing values" (p. 100) or as fundamentalism (Beck, Giddens et al. 1994).

References

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Beck, U. (2006). Living in the world risk society - A Hobhouse Memorial Public Lecture given on Wednesday 15 February 2006 at the London School of Economics. *Economy and Society, 35*(3), 329-345.

Leach, M., & Fairhead, J. (2002). Manners of contestation: "citizen science" and "indigenous knowledge" in West Africa and the Caribbean. *International Social Science Journal, 54*(3), 299-+.

Goldblatt, D. (1996). *Social Theory and the Environment*. Boulder: Westview Press.

O'Brien, M. (2002). *Making Better Environmental Decisions: An Alternative to Risk Assessment*. Cambridge: The MIT Press.

Mirchandani, R. (2005). Postmodernism and Sociology: From the Epistemological to the Empirical. *Sociologiacal Theory, 23*(1), 86-115.

Rosa E. A., McCright A., Renn O. (2013). *The Risk Society: Social Theory and Governance*. Temple Univ Press, Philadelphia.

Strydom, P. (2002). *Risk, Environment and Society*. Philadelphia: Open University Press.

Zimmerer, K. S. (2006). *Globalization and New Geographies of Conservation*. Chicago: University of Chicago Press.

Handout 4: Novel Ecosystems Overview (at home reading)

The science and practice of ecological restoration focus on the recuperation environmental systems from degraded to pre-disturbance physical states. Restoration ecologists apply the term *novel ecosystem* to highlight the unique biotic assemblages, ecological relationships and emergent properties that result from habitat degradation, self-organization of "native" and "non-native" species, and abandonment of managed systems in a human-dominated planet (Hobbs et al. 2006). The concept explicitly challenges previous assumptions about an "ideal" state that serves as a restoration benchmark, and necessitate new tools to guide research, decision-making, planning, and funding in restoration practice. The term *novel ecosystem* was coined in 1997 to describe "the ultimate outcome of anthropogenic changes to climate, disturbance regimes and species composition in boreal latitudes" (Mascaro et al. 2013, p. 47). Anthropogenic influence is central to the concept, and human agency must be an initiating but not necessarily ongoing factor in the creation of novel ecosystems (Hobbs et al. 2006).

Key characteristics of the novel ecosystems concept include:

- New species combinations
- Potential for changes in ecosystem functioning
- Human agency, since novel ecosystems are the result of deliberate or inadvertent human action

Weaknesses of the novel ecosystems concept identified by Murcia et al. (2014) include:

- The concept 'novel ecosystems' is ill-defined and can lead to undesirable practical and policy outcomes.
- Successful restoration projects abound in areas that could have been considered 'novel'.
- To develop a pragmatic and operational framework for deciding when and how to intervene in an ecosystem, 'novel ecosystem' proponents must first demonstrate when and why an irreversible ecological threshold has caused an ecosystem to shift to a new stable state.
- Socioeconomic and political limitations to ecological restoration should not be confused with ecological thresholds.

Ecological restoration often combines the active restoration of key physical characteristics of a degraded system and natural successional processes in order to return biotic systems to original their conditions (Suding et al. 2004). The novel ecosystems concept addresses a perceived fundamental shift in ecosystem states that prevents natural succession. In addition to ecological limits to restoration there are also social and cultural barriers to implementation (Hobbs 2007).

A major challenge in identifying novel ecosystems relates to scale. As Morse et al. (2012) describe,

> *One specific hurdle in identifying and defining novel ecosystems continues to be the interaction between the timescale of ecosystem change and the amount of*

> *monitoring needed relative to such changes…The high variability in individual life spans, biological processes, abiotic/biotic interactions, ecosystem function, and drivers of ecological change makes it impossible to set uniform limits for a timescale appropriate for all novel ecosystems.*

Mascaro et al. ask whether the "desirability of a novel ecosystem should be a factor in differentiating novel ecosystems?" and they suggest that it should not since "desirability is a value-based assessment often linked to ecosystems services, and not everyone will place the same value on those services (2013, p. 50).

References:

Hobbs, R. J., Arico, S., Aronson, J., Baron, J. S., Bridgewater, P., Cramer, V. A., . . . Zobel, M. (2006). Novel ecosystems: theoretical and management aspects of the new ecological world order. *Global Ecology and Biogeography, 15*(1), 1-7. doi: 10.1111/j.1466-822X.2006.00212.x

Hobbs, R. J., Higgs, E. S., & Harris, J. A. (2007). Novel ecosystems: concept or inconvenient reality? A response to Murcia et al. *Trends in Ecology & Evolution, 29*(12), 645-646. doi: 10.1016/j.tree.2014.09.006

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Murcia, C., Aronson, J., Kattan, G. H., Moreno-Mateos, D., Dixon, K., & Simberloff, D. (2014). A critique of the 'novel ecosystem' concept. *Trends in Ecology & Evolution, 29*(10), 548-553. doi: http://dx.doi.org/10.1016/j.tree.2014.07.006

Suding, K. N., Gross, K. L., & Houseman, G. R. (2004). Alternative states and positive feedbacks in restoration ecology. *Trends in Ecology & Evolution, 19*(1), 46-53. doi: 10.1016/j.tree.2003.10.005

Handout 5: Theory reflection (in class)

Working in your groups you will be given 10 minutes to read each letter and jot down relevant connections to theory that you can identify. You do not need to cover every point, just identify what you notice. If ideas are repeated across letters, try to hone in on different ideas in each letter. Use additional sheets as necessary.

Paper (title/student)	**World Risk Theory**	**Novel Ecosystem Theory**

Appendix A: Selected Theories and Concepts in Social Science and Ecology

Social Science	Ecology
Anomie theory	Biogeographical gradient theory
Dramaturgy or Dramaturgical Perspective	Community ecology theory
Feminist standpoint theory	Domain and propositions of succession theory
Critical race theory	Ecological Niche theory
Critical Realism	Evolution
Grounded theory	Fitness Set theory
Marxist theory: theory of labor, theory of value	Foraging theory
Materialism	Geographic mosaic theory of coevolution
Mathematical theory (a.k.a. formal theory)	Maximum entropy (MaxEnt) theory of ecology
Middle Range theory	Metabolic scaling theory
Network theory	Metacommunity concept
Panarchy	Natural enemy-victim interactions
Post-colonial theory	Panarchy
Postmodernism	r/K selection
Rational choice theory	Resilience
Resilience	Resource partitioning theory
Social constructionism	Single species population dynamics
Social exchange theory	The equilibrium theory of island biogeography
World systems theory	Unified neutral theory of biodiversity