

The Landscape Ecology of Mannahatta (and Related Topics) - Fall Term 2013

Certificate in Conservation Biology & Environmental Sustainability
EICES/Earth Institute/Columbia University

Instructor: Dr. Eric W. Sanderson, Senior Conservation Ecologist, Wildlife Conservation Society (Email: esanderson@wcs.org; Office phone: 718-220-6825)

Teaching Assistant: Vince Tam (Email: vince.s.tam@gmail.com)

When: Fall term 2013 -- Tuesday evenings, 6:10 – 8 pm, November 19, 26, December 3, 10, 17

Where: SCHMERHORN EXTENSION 467 (4th floor)

Required readings:

- Mannahatta: A Natural History of New York City (Abrams, 2009)
- Terra Nova: The New World After Oil, Cars, and Suburbs (Abrams, 2013)

One page of **written notes and impressions** based on the readings is due at the beginning of each class period (sessions 2 – 5). Selected optional supplementary readings are listed at the end.

Course project (“The Landscape of My Block”): **Due by 8 pm on December 18, 2013**, submitted through email to esanderson@wcs.org and cc’d to vince.s.tam@gmail.com. Project must be submitted as MS Word or Adobe PDF documents, less than 10 Mb in size and no more than 5 double-spaced pages of typed text. (Figures and literature cited are not counted in the page limit.) Only electronic submissions will be accepted. See below for details.

Grading: 50% of grade based on class participation and written impressions of reading material (no more than one page per reading assignment); 50% of grade based on course project.

Course Summary:

Landscape ecology is the study of how ecosystems are distributed in space and time and the consequences of those distributions for living things. Few places have seen as many changes in ecosystem type and distribution as Manhattan Island over the last 400 years. What are the consequences of these changes for the plants, animals and people of Manhattan? How might the ecosystems and habitats of New York City change over the next 400 years? This course will illustrate fundamental concepts and techniques in landscape ecology and geographic analysis, using Manhattan Island’s ecological development as a case study, drawing from materials available from the Wildlife Conservation Society’s Mannahatta Project (see welika.org). It will also touch on larger themes of landscape construction and destruction in the United States and better and more sustainable cities and nations can arise. Core study units will focus on critical concepts in landscape ecology historical map interpretation, computational geography (using geographic information systems or GIS), human interactions with the landscape (both Native American and modern American), urban environmental planning, and where we go from here.

Course Outline:

November 19, 2013

Session 1: Introduction to the Landscape Ecology & Mannahatta

Topics: Introductions. What is landscape ecology? Central concepts in landscape ecology including what is “landscape,” scale, how patterns influence process & processes generate pattern & the greatest pattern maker of them all. Gradients of human influence. The Human Footprint. A first look at Mannahatta in contrast to Manhattan today.

Readings for Session 1:

- None. It’s the first class!

Homework: “Your block today” assignment (also remember to do readings for Session 2!)

November 26, 2013

Session 2: New Technology and Old Maps: Application of Geographic Information Systems to the British Headquarters Map

Topics: What is a GIS? Basic principles of geographic information systems including maps, databases, map projections, data formats, georeferencing, spatial analysis, spatial modeling. Concepts in map reading and map accuracy. Review of the New York history during the Revolutionary period. Introduction to the British Headquarters Map within the GIS context.

Readings for Session 2:

- Chapters 1 - 3 in Mannahatta (remember to write 1 page – no more! – of notes/impressions to be turned in at the beginning of class on November 26)

Homework: “Your block in the past” assignment.

December 3, 2013

Session 3: Human Beings on Manhattan: the Lenape and modern New Yorkers

Topics: The Lenape. History of people in the New York City region prior to Contact. Lifestyle of the first “New Yorkers.” Material culture. Interaction with the land, including humans as a kind of ecological disturbance. Fire, land clearing, hunting and fishing. Landscape species (beavers and humans). Contrast with modern lifestyles.

Readings for Session 3:

- Chapter 4-6 in Mannahatta (+ impressions)

Homework: “The lifestyle of your block” assignment

December 10, 2013

Session 4: Mannahatta2409

Topics: Factors affecting urban environmental performance. Review of water cycle, carbon cycle, biodiversity (species area relationship), and population in an urban and wild context.

Interactions among them. Introduction to Mannahatta2409.org, a new web application to develop and share climate-resilient designs for Manhattan, and eventually all of New York City.

Readings for Session 4:

- Chapter 7 of Mannahatta
- Part I of Terra Nova (+ impressions)

Homework: “Your block’s future” assignment

December 17, 2013

Session 5: Terra Nova

Topics: Links between energy, transportation, land use and the economy. Decisions made in the 19th and 20th century and how they influenced New York. Considerations of how the economy relates to nature (or doesn’t). Discussion of how gate duties, urban improvements, non-automotive transportation, renewable energy, and other radical concepts can generate new American and global possibilities.

Readings for Session 5:

- Parts II&III of Terra Nova (+ impressions)

Homework: “Your block in Terra Nova” assignment and wrapping up your course project. Remember that completed course projects are due no later than 8 pm on December 18 by email to Eric at esanderson@wcs.org (cc vince.s.tam@gmail.com).

~~~~~  
Course Project: The Landscape of My Block (due by 8 pm on December 18, 2013)

Choose a block on Manhattan and follow it through the following five exercises below resulting in a five double-spaced page essay, with five figures. Literature cited and figures do not count in page limit. Your project, to be completed incrementally during the five weeks of the course, examines a block in Manhattan today, in 1609, and your visions of its future.

Your block today: Select a block on Manhattan Island that means something to you – perhaps because you live, work or recreate there. Choose one block using the definitions on the Mannahatta website available at [welikia.org/explore](http://welikia.org/explore) (which includes a rough subdivision of the city parks as well as nearby islands and waters.) Choose a block where you can easily visit and make observations. Visit the block and observe it as part of the current ecological landscape; plan your visit for at least one hour. In particular describe the main habitat types, their configuration (producing a map), and identify a minimum of three non-human plants or animals that use that block today.

Your block in the past: Examine the description of your block in 1609 using [welikia.org/explore](http://welikia.org/explore). Summarize its landscape ecology in terms of main habitat types, their configuration (producing a map), and identify a minimum of three non-human plants or animals

that once used that block. Conjecture how a geographic information system could be used to generate this information.

Your block's lifestyle: Find out what foods or other material or spiritual goods the Lenape Native Americans might have found in your block 400 years ago (using [welikia.org/explore](http://welikia.org/explore)). Choose three kinds of food or other material goods that New Yorkers might use in your block today. For one of those goods (e.g. a ham sandwich; an Everything bagel; a silk blouse; gasoline), find out to the best of your ability where the materials that were used in creating those goods came from. Create a map showing the source locations for those materials relative to Manhattan. Speculate on the ecological effects of choices made in your block today to choices made there 400 years ago.

Your block's future: Specify a quantitative goal for the environmental performance of your block in terms of water, carbon, biodiversity, or population. Goals can be multi-criteria. Choose a year when you suppose that goal can be met and which you envision. Name your vision. Use the [Mannahatta2409.org](http://Mannahatta2409.org) website to re-design your block in such a way that it meets your goal. Create a figure from the data available on [Mannahatta2409.org](http://Mannahatta2409.org) describing the performance of your block, vis a vis your goal, in 1609, 2010, and in your new vision.

Your block in Terra Nova: In light of your reflections on Terra Nova and your vision from last week, use [Mannahatta2409.org](http://Mannahatta2409.org) to try to design a block landscape that will enable a non-fossil fuel based economy in the future. Describe your personal sense of the costs and benefits of the Terra Nova vision, as it applies in your block. How would living there change or not? Create a map or figure illustrating tradeoffs. Discuss what lifestyle and ecosystem changes would be necessary to make your Terra Nova-related vision a reality.

~~~~~

Supplementary readings (optional):

Mannahatta related:

Barabasi, Albert-Laslo. 2003. *Linked: How Everything Is Connected to Everything Else and What It Means for Business, Science and Everyday Life*. New York: Plume.

Bean, T. and Sanderson E.W. (2008) "Using ecological models to test scenarios of fire use by Native Americans: an example from the Harlem Plains, New York, NY." *Ecological Modelling*. 208: 301-308.

Cantwell, Anne-Marie, and Diana diZerega Wall. 2001. *Unearthing Gotham: The Archaeology of New York City*. New Haven, CT: Yale University Press.

City of New York Office of Long-term Planning and Sustainability (2007). [plaNYC: A greener, greater New York](http://www.nyc.gov/html/planyc2030/html/home/home.shtml). City of New York. Available on-line at <http://www.nyc.gov/html/planyc2030/html/home/home.shtml>

Cohen, P. E. and R. T. Augustyn (1997). [Manhattan in Maps 1527-1995](#). New York, Rizzoli.

Cronon, W. (1983). [Changes in the Land: Indians, Colonists and the Ecology of New England](#). New York, Hill and Wang.

- Edinger, G.J., D.J. Evans, S. Gabauer, T.G. Howard, D.M. Hunt, and A.M. Olivero. 2002. Ecological Communities of New York State. Second Edition. A Revised and Expanded Version of Carol Reschke's Ecological Communities of New York State (Draft for Review.). Albany, NY: New York Natural Heritage Program, New York State Department of Environmental Conservation.
- Kraft, Herbert C. 2001. The Lenape-Delaware Indian Heritage: 10,000 BC to AD 2000 CY. South Orange, NJ: Lenape Books.
- Proulx, Stephen R., Daniel E.L. Promislow, and Patrick C. Phillips. 2005. "Network Thinking in Ecology and Evolution." *TRENDS in Ecology and Evolution* 20 (6): 345–353.
- Sanderson, E.W., Jaiteh, M., Levy, M.A., Redford, K.H., Wannebo, A.V., and Woolmer, G. (2002) "The human footprint and the last of the wild." *BioScience* 52(10): 891-904.

Terra Nova related:

- Belasco, Amy. 2011. "The Cost of Iraq, Afghanistan, and Other Global War on Terror Operations Since 9/11". RL33110. Washington D.C.: Congressional Research Service.
- Black, Edwin. 2007. *Internal Combustion: How Corporations and Governments Addicted the World to Oil and Derailed the Alternatives*. New York: St. Martin's Griffin.
- Deffeyes, Kenneth S. 2006. *Beyond Oil: The View from Hubbert's Peak*. 1st ed. New York: Hill and Wang.
- Freyfogle, Eric T. 2003. *The Land We Share: Private Property And The Common Good*. 1st ed. Washington D.C.: Island Press.
- Frumkin, Howard, Lawrence Frank, and Dr. Richard Joseph Jackson. 2004. *Urban Sprawl and Public Health: Designing, Planning, and Building for Healthy Communities*. 1st ed. Washington D.C.: Island Press.
- Hamilton, James D. 2011. "Historical Oil Shocks". NBER Working Paper No. 16790. Washington D.C.: National Bureau of Economic Research.
- Gehl, Jan. 2010. *Cities for People*. 1st ed. Washington D.C.: Island Press.
- Jackson, Kenneth T. 1987. *Crabgrass Frontier: The Suburbanization of the United States*. New York: Oxford University Press, USA.
- Katz, Alyssa. 2010. *Our Lot: How Real Estate Came to Own Us*. New York: Bloomsbury USA.
- MacKay, David JC. 2009. *Sustainable Energy - Without the Hot Air*. 1st edition. Cambridge, UK: UIT Cambridge Ltd. <http://www.withouthotair.com/>.
- Mumford, Lewis. 1968. *The City in History: Its Origins, Its Transformations, and Its Prospects*. New York: Mariner Books.
- Ohland, Gloria, and Shelley Poticha, ed. 2009. *Street Smart: Streetcars and Cities in the Twenty-First Century*, 2nd Ed. Oakland, CA: Reconnecting America.
- Putnam, Robert D. 2001. *Bowling Alone: The Collapse and Revival of American Community*. 1st ed. New York: Touchstone Books by Simon & Schuster.
- Rybczynski, Witold. 2007. *Last Harvest: How a Cornfield Became New Daleville*. New York: Scribner.
- Yergin, Daniel. 1991. *The Prize: The Epic Quest for Oil, Money, & Power*. New York: Simon & Schuster.