



Center for Environmental Research at Hornsby Bend



MISSION

Urban Ecology and Sustainability

- Community
- Education
- Research

PARTNERS

- Austin Water Utility
- University of Texas
- Texas A&M University

RESEARCH AREAS

- Soil Ecology, Sewage Recycling and Reuse
- Hydrogeology of the Alluvial Aquifer
- Riparian Ecology and Restoration
- Avian Ecology



50 YEARS OF BIRDING



AUSTIN, TEXAS
Hornsby Bend
1959-2009



Center for Environmental Research at Hornsby Bend



AWU-CER Lunchtime Lectures September – December 2011

Each talk begins AT NOON Waller Center [625 East 10th Street – between I-35 and Red River] Room 104

The 1st Wednesday of the Month! Free and Open to the Public – bring a lunch and learn

Urban Nature and Urban Ecology: Understanding Urban Ecosystems

Over the next four months, we will explore different perspectives and issues of urban nature and ecology. We will begin in September by examining a range of perspectives on nature in the city, including urban ecology, urban planning, restoration ecology, political ecology, and more. In October, we will focus on the issue of officially sanctioned urban nature versus non-native intruders, and the different views of nature in the study of urban ecology. Focusing on urban planning in November, we will look at how nature is incorporated into the urban landscape and how it resists our planning. We will wrap up in December by assessing encounters with urban nature as revealed by urban nature writers.

September 7 Noon-1pm

Varieties of Possibility: Perspectives on Nature and the City

October 5 Noon-1pm

The Weeds and the Wild: Invasive Species and Urban Ecology

November 2 Noon-1pm

The Proper Place of Nature: Urban Planning and Urban Ecology

December 7 Noon-1pm

Encounters with Nature in the City: Urban Nature and Literature

Three Key Perspectives on Urban Nature

1. urban ecology and science
2. urban space and planning
3. urban nature and culture

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The conceptual framework for understanding Nature and the City

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How nature is incorporated into the urban landscape and how it resists our planning and management

December 7 Noon-1pm

Encounters with Nature in the City: Urban Nature and Literature

What is revealed as urban nature writers assess their encounters with urban nature



The Weeds and the Wild: Invasive Species and Urban Ecology

Kevin Michael Anderson, Ph.D.
Austin Water Utility – Center for Environmental Research



In the United States, the foundational metaphors of Nature that we celebrate are wilderness and pastoral arcadia.

They are the basis from which we assess the value of nature in America.



However, we are now predominately a country of urbanites who have only occasional contact with wilderness or pastoral nature.



Our understanding of what constitutes “official” urban nature in cities is shaped by culturally dominant metaphors of nature.

These metaphors valorize urban nature that is either deliberately cultivated in parks and gardens as pastoral landscapes or formally protected in preserves, sanctuaries, and refuges as remnants of native landscapes obliterated by the creation of the city.





In American cities, we perceive nature in the urban landscape filtered through concepts that prejudge its ecological and cultural value.

Urban Wildlife

Urban “wildlife” is another mediated, managed kind of urban nature found in the city.

This urban fauna is judged favorably when it in some way fulfills our expectations of wild or pastoral nature or condemned as pestilent when it fails to follow the narrative for good fauna in the city.

This narrative of urban wildlife declares that everyday non-charismatic house sparrows, grackles, and pigeons are urban pests that further degrade the city, but nesting red-tailed hawks and peregrine falcons are redemptive wild additions to the urban scene.



Shifting Environmental Perception

We need to embrace the full continuum of a natural landscape that is also cultural, in which the city, the suburb, the pastoral, and the wild each has its proper place, which we permit ourselves to celebrate without needlessly denigrating the others.

William Cronon "The Trouble with Wilderness or, Getting Back to the Wrong Nature" in *Uncommon Ground* (1995)



First Nature - Wilderness and the Wild

The West of which I speak is but another name for the Wild; and what I have been preparing to say is, that in Wildness is the preservation of the world. Every tree sends its fibers forth in search of the Wild.

-Henry David Thoreau, "Walking"

Wilderness is the natural, unfallen antithesis of an unnatural civilization that has lost its soul. It is a place of freedom in which we can recover the true selves we have lost to the corrupting influences of our artificial lives. Most of all, it is the ultimate landscape of authenticity. Combining the sacred grandeur of the sublime with the primitive simplicity of the frontier, it is the place where we can see the world as it really is, and so know ourselves as we really are – or ought to be.

William Cronon "The Trouble with Wilderness or, Getting Back to the Wrong Nature"
in *Uncommon Ground: Rethinking the Human Place in Nature* [1995]

Are Wildness and Wilderness the same?



Second Nature – the transformation of first nature

Positive and Negative Narratives

From Pastoral Arcadia

Cicero –

We enjoy the fruits of the plains and of the mountains, the rivers and the lakes are ours, we sow corn, we plant trees, we fertilize the soil by irrigation, we confine the rivers and straighten or divert their courses. In fine, by means of our hands we essay to create as it were a second world within the world of nature.

to Urban Decay

Lefebvre in *The Production of Space*-

Nature, destroyed as such, has already had to be reconstructed at another level, the level of “second nature” i.e. the town and the urban. The town, anti-nature or non-nature and yet second nature, heralds the future world, the world of the generalized urban. Nature, as the sum of particularities which are external to each other and dispersed in space, dies. It gives way to produced space, to the urban.



Narrative of Redemptive Urban Nature

This narrative presupposes the framework of iterative natures with preserves, parks, and gardens established for imaginative urban landscapes of wild first nature and pastoral second nature. The further presupposition is that the urban industrial second nature is degradation in need of redemption.

Saint Henry – the complete quote – “The West of which I speak is but another name for the Wild; and what I have been preparing to say is, that in Wildness is the preservation of the world. Every tree sends its fibers forth in search of the Wild. The cities import it at any price.”

-Henry David Thoreau, “Walking”



The narrative of redemptive urban nature is the story of nature which is deliberately incorporated into urban design as a tonic for body and spirit. Space for nature is created to provide recreation for physical health and to allow contact with officially sanctioned nature for mental health in parks and gardens and by the creation of preserves, sanctuaries, and refuges.

Are we importing wildness or wilderness or what?



finding bearings in a disorienting landscape - Chaos

Urban nature is not sublime...There's too much sterility in the form of roofs and pavement, and, oddly enough, there's also too much wildness, too many weeds and wooded borders and tangled banks, not to mention vacant lots going to brush.

Of course, "wilderness" won't do to describe such landscapes either. Despite the degree of wildness, there's too much human impact, too many alien species, too few large animals to meet the legal and cultural criteria.

The fact is that urban landscapes are just too mixed up, chaotic, and confused to fit our established notions of beauty and value in nature. ... Maybe it's not really nature at all, not a real ecosystem, just a bunch of weeds and exotics mixed up with human junk.

John Tallmadge, *The Cincinnati Arch: Learning from Nature in the City* (2004)



finding bearings in a disorienting landscape – Not Even Natural

This is the landscape that nobody wants. It's my cup of rejection:
Driven to this unformed scraggly ignored backlot, this not-quite
Prairie, not-quite thicket, not even natural corner of
Texas, the hardscrabble left butt of a demoralized nation,
It is my choice and my pleasure to cherish this haphazard wilderness.
No, it's not even "wild" – it's a neglected product of artifice.
Come, let us walk by an improvised lakeshore, be given a vision:
Beaches of black dust, beautiful white ghosts, this drowned forest...

- Frederick Turner, *Texas Eclogue* (1999) first stanza



Narrative of Restorative Urban Nature

Design with Nature - One version of this narrative focuses on urban design and landscape architecture, and Ian McHarg is the main protagonist.

This urban design version of the restoration narrative emerges from a positive view of cooperation with nature and pastoral ideals of improvement of urban ecosystems.

It is based on a scientific, mechanistic manipulation of nature for our own ends to produce “green space” that is valued both for its ecological function and its aesthetic appeal.

Urban Restoration Ecology - The restoration narrative has another version which has focused almost exclusively on the recovery of native habitats through the restoration of these habitats in urban landscapes.

Restoration ecology developed alongside of conservation biology as a proactive technique not to just conserve remnant habitats and species but to actively restore degraded ecosystems.

In this version of the narrative of restorative urban nature, the transgressive weeds, especially non-native species, must be eradicated because they are disruptive aliens. The most controversial of these aliens are invasive species.



[from the perspective of conservation biology and restoration ecology]

- a bunch of weeds and exotics mixed up with human junk

Biological slumming

...the danger...is being tempted into some biological slumming. The habitats I've described in this book are in no way a substitute for the official countryside. Nor are they something to be cherished in their own right, necessarily.

Richard Mabey, *Unofficial Countryside* (1973) also, Mabey, *Weeds: In Defense of Nature's Most Unloved Plants* (2010)



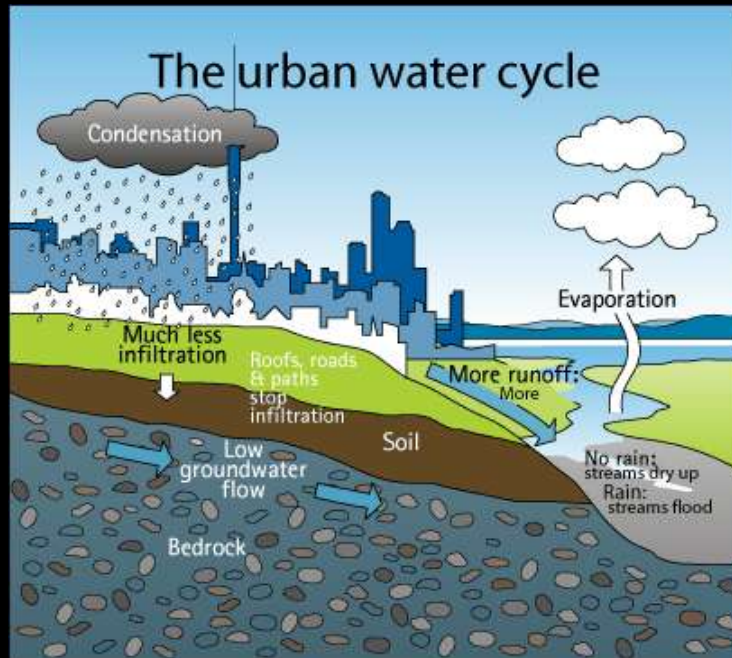
Narrative of Functional Urban Nature

Urban Ecology

The metabolic requirements of a city can be defined as the materials and commodities needed to sustain the city's inhabitants at home, at work and at play...The metabolic cycle is not completed until wastes and residues of daily life have been removed and disposed of with a minimum of nuisance and hazard.

-Abel Wolman "The metabolism of cities" *Science* (1965)

The narrative of functional urban nature that emerges from the study and practice of urban ecology is an account that does not necessarily start with a list of good and bad nature (or native and non-native nature).



Perceptions of European Urban Ecologists

A cosmopolitan community of uniquely adapted ruderal organisms

German botanist, Herbert Sukopp has studied plant succession in Berlin's urban landscape since the 1950s.

For Sukopp, urban "wild" ecosystems are,

"the field laboratories where possibly new and well-adapted ecotypes of our native or naturalized wild plants will originate in the changed environmental conditions. Ecosystems which have developed in urban conditions may be the prevailing ecosystems of the future."

- Herbert Sukopp *The soil, flora, and vegetation of Berlin's waste lands*. In *Nature in Cities*, Ian Laurie, ed. (1979)

For Sukopp, this last statement is not a lament but a fact. Urban ecosystems should be studied because the world is urbanizing.



European Urban Ecology: Wilderness and the Wild

... the reference point is not an original condition of a natural landscape, but rather a condition defined based on the current site potential and the greatest possible degree of self-regulation. From this perspective, therefore, the natural capacity for *process* is the central point, not a particular, retrospectively determined and often idealized, *picture* of nature.

Ingo Kowarik, *Urban Wild Woodlands* (2005)

...although wild and rather specialist species may be missing, cities are great havens for biodiversity, in terms of both ecology and species, even in industrial areas.

Anthony Bradshaw in Berkowitz, *Understanding Urban Ecosystems: A New Frontier for Science and Education*. (2003)





Benefits of Wastelands for the Protection of Urban Biodiversity

Recent research has emphasised the role urban wastelands can play in preserving biodiversity in urban areas: Large connected wasteland seems to be a significant source of floristic diversity and thus disseminates and colonises surrounding neighbourhoods. Scientists suggest that preserving wasteland in urban areas could be necessary to protect urban biodiversity.

Land use planning can have a significant impact on biodiversity. To address this concern, the European Commission issued a strategy on biodiversity¹ in 1998 and four biodiversity action plans in 2001. In May 2006, the Commission adopted a Communication² which sets out an ambitious policy approach to halting the loss of biodiversity by 2010. In particular, it provides an EU Action Plan which proposed concrete measures and outlines the responsibilities of EU institutions and Member States, respectively. Furthermore, the European Commission also adopted a Thematic Strategy on the Urban Environment³ in January 2006 aiming at improving the quality of the urban environment. However, even with this initiative, the specific link between urban wasteland and biodiversity has still received limited attention.

Recently, French researchers tried to determine the role of urban structures in the distribution of wasteland flora in urban areas. Within the framework of this study, they focused on 98 wastelands ranging from a few square meters to more than 18,000 m² over a French department in the greater Paris region. Researchers assessed three parameters quantifying the floristic importance of wastelands: the number of species, the frequency of occurrence of species and the proportion of indigenous versus naturalised species.

The main results from this study are as follows:

- Urban wastelands host a substantial proportion of the floristic diversity of cities: nearly 60% of the total species recorded over the whole department were found in the wastelands under study.
- Large wastelands and wastelands of intermediate ages contain the highest number of species. This is the result of the traditional evolution of floristic diversity: after some years of colonisation and competition among species, a relatively small number of species remain settled.
- Wastelands witnessing the presence of water within a close radius have a higher chance of containing rarer species. Adversely, acting as a biodiversity pool, urban wastelands could have a positive impact on the biodiversity of neighbouring areas according to the authors.
- Individual and collective dwellings around sites have a negative influence on the floristic significance of areas by reducing their overall quality: rare species are less frequent in this type of wasteland.
- Unexpectedly, the environmental characteristics of the area, such as geomorphology and exposition, were not crucial factors in the floristic importance of wastelands. Though these parameters are considered unavoidable by the authors, no evidence could be provided by the study: the fragmentation of the landscape, and the introduction and covering of alien substances in wastelands could have hindered these parameters.

Overall, the authors suggest that the maintenance of wastelands is necessary considering their role in the spreading of species and the colonisation of surrounding areas. Large and connected wastelands contribute to the preservation of biodiversity in urban areas. Therefore, this study provides new insight in the dynamics of biodiversity in urban areas that could be taken into consideration when planning urban land use.

¹ The European biodiversity strategy is available at <http://ec.europa.eu/environment/docum/29542sm.htm>

A weedland community of inappropriate nature

Perceptions of American Biologists, Ecologists, and Environmentalists

(Urban growth) replaces the native species that are lost with widespread “weedy” nonnative species. This replacement constitutes the process of biotic homogenization that threatens to reduce the biological uniqueness of local ecosystems.

- Michael L. McKinney, “Urbanization, biodiversity, and conservation”. *Bioscience* 52(10), (2002)

The discourse of American urban ecology, conservation biology, and restoration ecology is preoccupied by a retrospective longing for lost pristine nature and native habitats, and the rhetoric of warfare with invasive non-native species combines with a vision of urban landscapes as weedlands, thus painting a bleak picture of urban ecosystems in America.



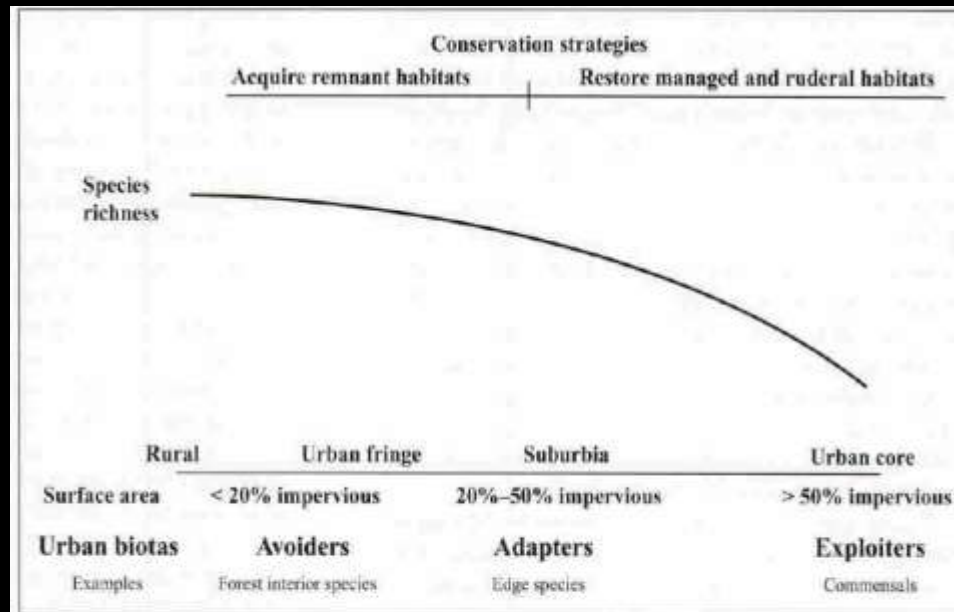


Figure 2. Urban-rural gradient. This is a very generalized and simplified depiction of changes in surface area, species richness, and composition, as compiled from a number of sources discussed in the text. Two basic conservation strategies with respect to urban sprawl are shown at the top.

McKinney, "Urbanization, biodiversity, and conservation."
Bioscience (2002)

Invaders^{of} Texas

a Citizen Science Program to Detect and Report Invasive Species

“Invaders of Texas” website was created by the Lady Bird Johnson Wildflower Center as a tool for mobilizing the public against non-native invasive plants and the website employs the rhetoric of war and a homeland resistance movement composed of “citizen scientists”

“The Invaders of Texas program provides training and materials to volunteers who find, track, describe and photograph invasive species and report occurrences to a centralized database on the [texasinvasives.org](http://www.texasinvasives.org) website. The anticipated outcomes of this citizen scientist program include a statewide network of volunteers contributing to our knowledge of the distribution of invasive species in Texas and increased public awareness of the dangers imposed by invasive species and what steps citizens can take when they encounter them; and reduced spread of invasive species through more timely control and eradication.”
- from <http://www.texasinvasives.org/>



Don't judge species on their origins – the 2011 Debate

We are not suggesting that conservationists abandon their efforts to mitigate serious problems caused by some introduced species, or that governments should stop trying to prevent potentially harmful species from entering their countries. But we urge conservationists and land managers to organize priorities around whether species are producing benefits or harm to biodiversity, human health, ecological services and economies. Nearly two centuries on from the introduction of the concept of nativeness, it is time for conservationists to focus much more on the functions of species, and much less on where they originated.

9 JUNE 2011 | VOL 474 | NATURE | 153

Mark A. Davis is DeWitt Wallace professor of biology at Macalester College, St Paul, Minnesota, USA. Matthew K. Chew, Richard J. Hobbs, Ariel E. Lugo, John J. Ewel, Geerat J. Vermeij, James H. Brown, Michael L. Rosenzweig, Mark R. Gardener, Scott P. Carroll, Ken Thompson, Steward T. A. Pickett, Juliet C. Stromberg, Peter Del Tredici, Katharine N. Suding, Joan G. Ehrenfeld, J. Philip Grime, Joseph Mascaro, John C. Briggs.



"Non-natives: 141 scientists object",
141 Scientists Can't Be Wrong

- A response in *Nature*

Mark Davis and colleagues assail two straw men.



First, most conservation biologists and ecologists do not oppose non-native species per se — only those targeted by the Convention on Biological Diversity as threatening “ecosystems, habitats or species”. There is no campaign against all introductions: scarcity of resources forces managers to prioritize according to the impact of troublesome species

Second, invasion biologists and managers do not ignore the benefits of introduced species. They recognize that many nonnative species curtail erosion and provide food, timber and other services. Nobody tries to eradicate wheat, for instance. Useful non-native species may sometimes still need to be managed because they have a negative impact, such as tree invasions that cause water loss

Pronouncing a newly introduced species as harmless can lead to bad decisions about its management. A species added to a plant community that has no evolutionary experience of that organism should be carefully watched.

- Daniel Simberloff, "Non-natives: 141 scientists object", *Nature*, vol. 475, 2011, pp. 36-36

Another response in *Nature*

Bias against non-native species is not xenophobic — it has a sound scientific foundation.

The non-native status of a species is highly relevant to assessing its potential environmental and economic impact. Unrestrained growth and environmental damage follow when there are no natural enemies in newly colonized areas. This is not necessarily a sign of an invader's superior evolutionary fitness: it may lead to a population collapse due to overexploitation of resources.

Non-native species can increase the variety of species in a community, but it is an oversimplification to equate this with increased biodiversity, of which species richness is only one component. Surviving populations of native species may shrink or become restricted to poor-quality marginal habitats. Such unevenness hardly contributes to a more diverse community.

Andrei Alyokhin, University of Maine



1. Non-native species can have devastating impacts, especially on islands. Exotic pests (such as the emerald ash borer) and plant pathogens cause enormous economic damage. Some plant invaders totally remake ecosystems — altering fire regime, nutrient cycling, productivity and resident animals. Some introduced animals have devastated fish, bird and lizard diversity.
2. But non-native plants can also provide habitat for endangered species, and when landscapes have been trashed, exotic trees with rapid growth can be the best bet for erosion and mudslide control.
3. Trade restrictions and border inspections substantially (and relatively cost-effectively) reduce the flood of non-native pests, and some eradication programs have succeeded. For example, on Santa Cruz Island (off the coast of southern California), the Conservancy has eliminated pigs and in the process greatly enhanced the prospects for the highly endangered island fox.
4. But millions of dollars have been spent by federal agencies to control certain invasive species that have no measurable impacts on biodiversity or ecosystem function, and that in the end are not even reduced by the investment — in other words, lots of money has been wasted.
5. It is important to protect ecosystems from certain invaders that could radically change the communities and overwhelm native species.
6. But we must admit that novel ecosystems are increasingly common and these may contain non-native species that will have to be treated as “part of the ecosystem” going forward.

Peter Kareiva, Chief scientist at The Nature Conservancy – on his blog

Changing perceptions within Ecology

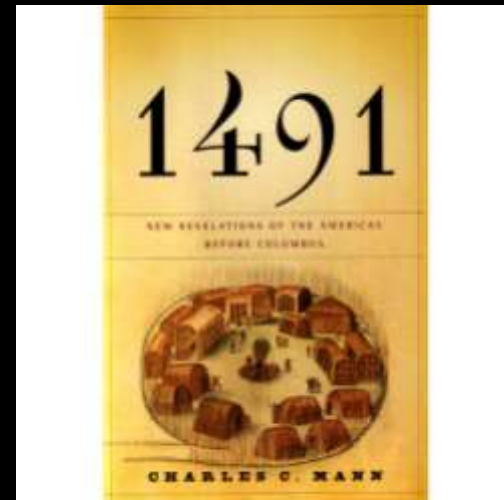
Reassessment of Wilderness and Pre-Columbian Landscapes

Much of the environmental movement is animated, consciously or not, by what geographer William Denevan calls “the pristine myth” – the belief that the Americas in 1491 were an almost untouched, even Edenic land, “untrammelled by man,” in the words of the Wilderness Act of 1964...

(new scholarship) has begun to fill in one of the biggest blanks in history: The Western Hemisphere before 1492. It was a thriving, stunningly diverse place, a tumult of languages, trade, and culture, a region where tens of millions of people loved and hated and worshipped as people do everywhere. Much of this world vanished after Columbus, swept away by disease and subjugation. So thorough was the erasure that within a few generations neither conqueror nor conquered knew that this world had existed.

Charles C. Mann, *1491: New Revelations of the Americas Before Columbus*, 2006.

Also by Mann, *1493: Uncovering the New World Columbus Created*, 2011.



Novel or Emerging Ecosystems

Novel ecosystems result when species occur in combinations and relative abundances that have not occurred previously within a given biome. Key characteristics are novelty, in the form of new species combinations and the potential for changes in ecosystem functioning, and human agency, in that these ecosystems are the result of deliberate or inadvertent human action.

Novel ecosystems: theoretical and management aspects of the new ecological world order” *Global Ecology and Biogeography*, (*Global Ecol. Biogeogr.*) (2006) **15** , 1–7

Emma Marris, *Rambunctious Garden: Saving Nature in a Post-Wild World*, 2011.



Urban Ecology – Designer ecosystems

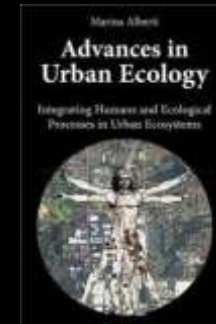
In 1997, the National Science Foundation funded two Long Term Ecological Research (LTER) sites in Baltimore and Phoenix. These LTER ecologists are studying the functionality of the urban ecosystems, but, in conjunction with social scientists, they are looking for relationships between human society and nature. Early on, the Phoenix researchers began to promote the idea of the city as a “designer ecosystem” to explain the differences that they were finding between Phoenix and the surrounding desert ecosystem.

<http://caplter.asu.edu/>

Hybrid ecosystems

a new understanding of the relationships between cities and the natural environment by looking at cities as hybrid phenomena that emerge from the interactions between human and ecological processes. Complex systems theory provides the conceptual basis and methodology for studying urban ecosystems to decode “emergent” phenomenon, such as urban sprawl, and devise effective policies to minimize their effects on ecosystem function.

Marina Alberti, ***Advances in Urban Ecology: Integrating Humans and Ecological Processes in Urban Ecosystems***. Springer, 2008.



Narrative of Embodied Urban Nature

Human Agency and the Agency of Nature

I like very much a little piece by Michel Callon which is about the problem with scallop fishing in Saint Briene Bay. It seems like a very conventional piece of sociological analysis talking about the various agents at work, until you come to the final agent, which is the scallops.

Now at that point most people freak out: they say 'scallops? Agents?!' Now this struck me too at first as strange, but then I thought, 'Yeah, he's right, he's dead right'. I mean why do we say that the scallops have no agency in this.

It does seem to me that one of the transgressive points that Donna (Haraway) feels very strongly about is to try to dissolve that divide between nature and culture, and I think I would want to try to do that too, although it's extremely hard to do and this is where the language comes back and gets you again and again. We don't have, as it were, the discursive strategies that allow us to talk freely about the production of nature...

I prefer to talk about socioecological projects in which it's not simply the social that's the activating unit but also, scallops and mice and all the rest of them.

- **David Harvey** "Nature, politics, and possibilities: a debate and discussion with David Harvey and Donna Haraway", *Environment and Planning D: Society and Space* 1995, Volume 13,

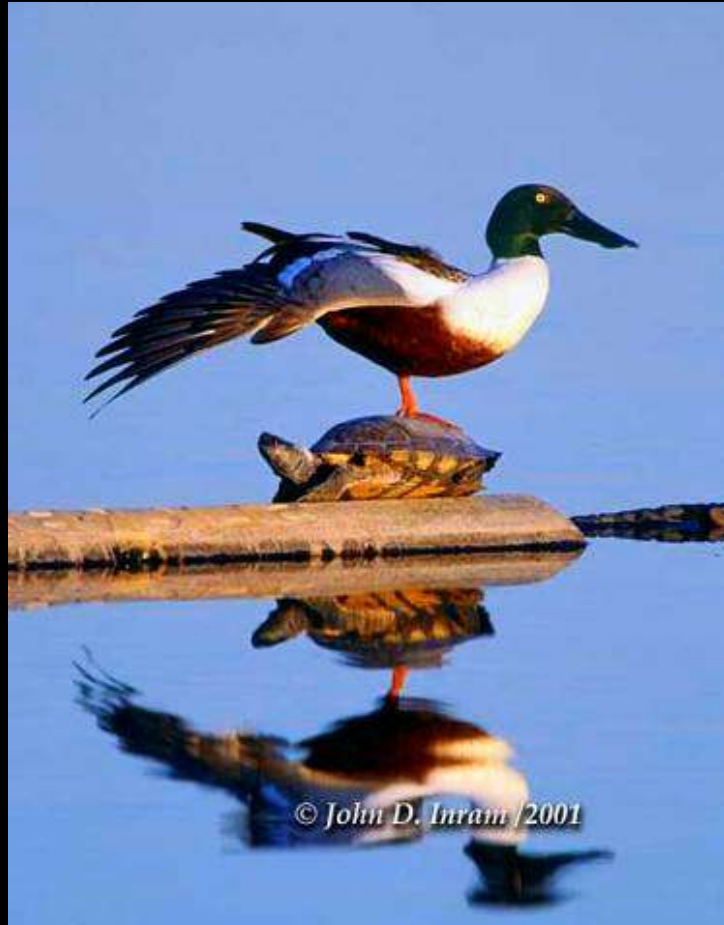
Animal Geography – Wolch, Philo, Whatmore, etc.



Agency of Nature

Non-humans do unexpected things and defy our expectations of what nature should be and how non-humans should behave

Wildness



Urban Ecology and the Agency of Nature

The urban lifeworld is subject to a range of interpretive ecological readings:

- A cosmopolitan community of uniquely adapted ruderal organisms
- A weedland community of inappropriate nature
- An invading force of alien species destroying the integrity of our homeland
- A hybrid ecosystem...

All point to the need to address *the issue of nonhuman agency*



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These metaphors valorize urban nature that is either deliberately cultivated in parks and gardens or formally protected as remnants of native landscapes obliterated by the creation of the city in preserves, sanctuaries, and refuges.





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Applause

