



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
- Avian Ecology



50 YEARS OF BIRDING



AUSTIN, TEXAS
Hornsby Bend
1959-2009

Natural History

Understanding whole organisms in context

Scientific - Ecological understanding shaped by cultural contexts

Literary - Cultural understanding shaped by ecological contexts



Natural History

"The idea of nature contains, though often unnoticed, an extraordinary amount of human history."

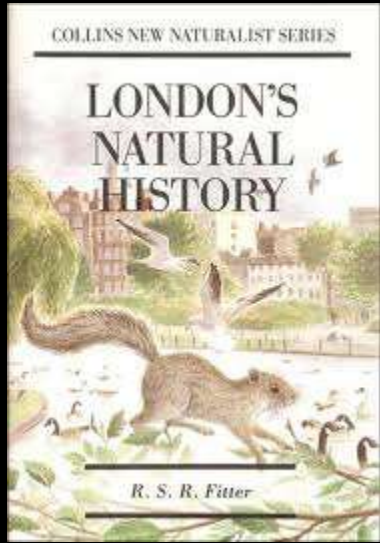
Raymond Williams, "Ideas of Nature"



Urban Natural History

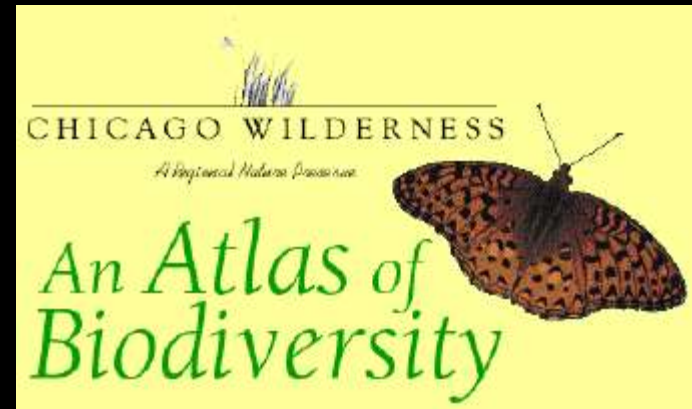
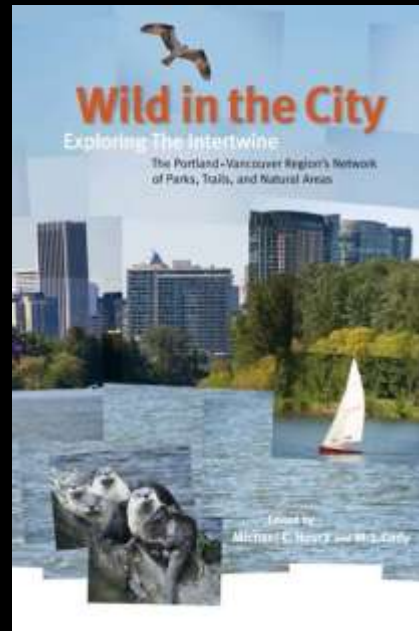
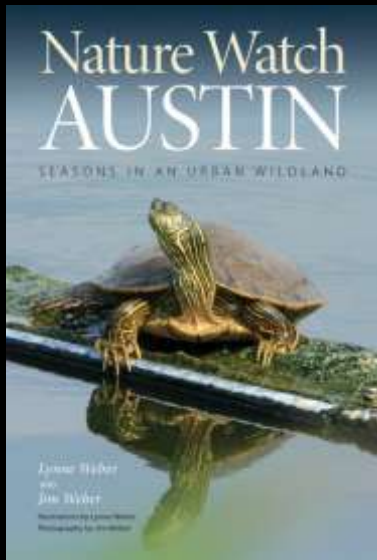
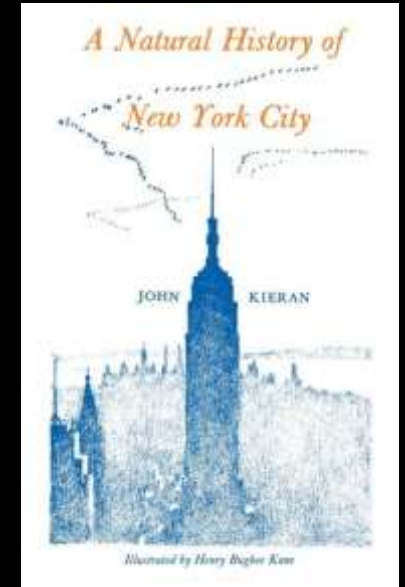
"The West of which I speak is but another name for the Wild; and what I have been preparing to say is, that in Wildness is the preservation of the world. Every tree sends its fibres forth in search of the Wild. The cities import it at any price."

Henry David Thoreau "Walking"



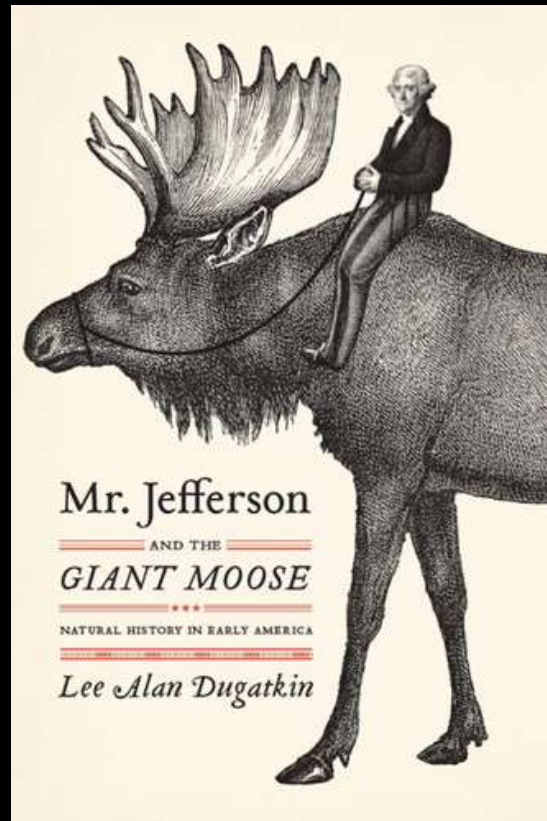
Urban Natural History

Urban Ecology and Urban Nature Encounter



The Theory of Degeneracy, Jefferson's Moose, and Thoreau

"The idea of nature contains, though often unnoticed, an extraordinary amount of human history."
Raymond Williams, "Ideas of Nature"



Comte de Buffon 1707–1788

French naturalist, mathematician, cosmologist, and encyclopedic author.

Buffon published thirty-six quarto volumes of his *Histoire naturelle* during his lifetime; with additional volumes based on his notes and further research being published in the two decades following his death.

In the course of his examination of the animal world, Buffon noted that despite similar environments, different regions have distinct plants and animals, a concept later known as Buffon's Law. [Biogeography and Evolution]

He was not an evolutionist, yet he was the father of evolutionism. He was the first person to discuss a large number of evolutionary problems.

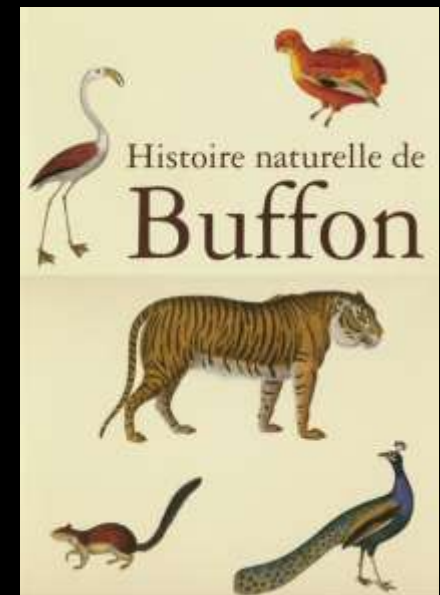
Theory of Degeneracy

“In his massive encyclopedia of natural history, Buffon laid out what came to be called the theory of degeneracy.

He argues that, as a result of living in a cold and wet climate, all species found in America were weak and feeble. What's more, any species imported into America for economic reasons would soon succumb to its new environment and produce lines of puny, feeble offspring.

America, Buffon told his readers, is a land of swamps, where life putrefies and rots.”

Dugatkin, 2009



The Theory of American Degeneracy (Environmental Determinism)

“There was no escaping the pernicious effects of the American environment - not even for Native Americans. They too were degenerate. For Buffon, Indians were stupid, lazy savages.

In a particularly emasculating swipe, he suggested that the genitalia of Indian males were small and withered - degenerate - for the very same reason that the people were stupid and lazy.

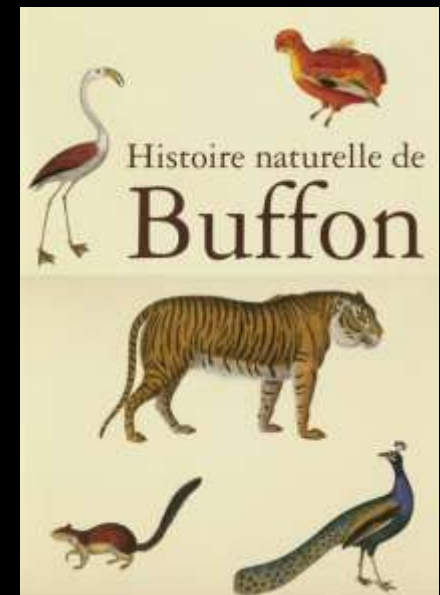
The environment and natural history had never before been used to make such sweeping claims, essentially damning an entire continent in the name of science.

Buffon's American degeneracy hypothesis was quickly adopted and expanded by men such as the Abbé Raynal and the Abbé de Pauw, who believed that Buffon's theory did not go far enough.

They went on to claim that the theory of degeneracy applied equally well to transplanted Europeans and their descendants in America.

These ideas became mainstream enough that Raynal felt comfortable sponsoring a contest in France on whether the discovery of America had been beneficial or harmful to the human race.”

Dugatkin, 2009



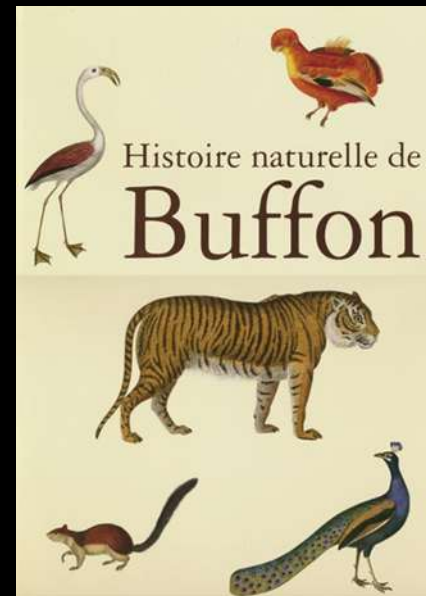
The Theory of American Degeneracy

Kant – the climate in America produced a race “too weak for hard work, too indifferent to pursue anything, incapable of culture” (1788)

Hegel – “America has always been and still shows itself physically and spiritually impotent.” and animals in the New World are “in every way smaller, weaker and more cowardly” This inferiority applied to domesticated animals as well as wild ones, “a piece of European beef is a delicacy” compared to American beef. American birds were mostly mute and would only sing when they lived in a land that no longer “resounds with almost inarticulate tones of degenerate men.” (1816)

Keats – *Lines to Fanny* (1819)

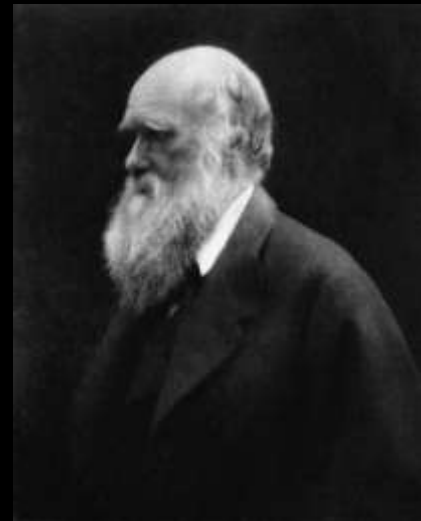
Where shall I learn to get my peace again?
To banish thoughts of that most hateful land,
Dungeoner of my friends, that wicked strand
Where they were wreck'd and live a wrecked life;
That monstrous region, whose dull rivers pour
Ever from their sordid urns unto the shore,
Unown'd of any weedy-haired gods;
Whose winds, all zephyrless, hold scourging rods,
Iced in the great lakes, to afflict mankind;
Whose rank-grown forests, frosted, black, and blind,
Would fright a Dryad; whose harsh herbag'd meads
Make lean and lank the starv'd ox while he feeds;
There flowers have no scent, birds no sweet song,
And great unerring Nature once seems wrong.



Buffon influence on Charles Darwin

The Voyage of the Beagle 1831-36

“If Buffon had known of the gigantic sloth and armadillo-like animals, and of the lost Pachydermata, he might have said with greater semblance of truth that the creative force in America had lost its power, rather than that it never possessed great vigor”



Jefferson's Moose

In his *Notes on the State of Virginia* (1785) Thomas Jefferson responded to Buffon's claims. His evidence included comparative tables of weights of animal species from America and Europe, lists of species endemic to each part of the world (the American list was four times as long) and even an explanation of why cattle were smaller in the New World than in the Old (farming practices, not climate conditions). He also included a passionate defense of Native Americans.

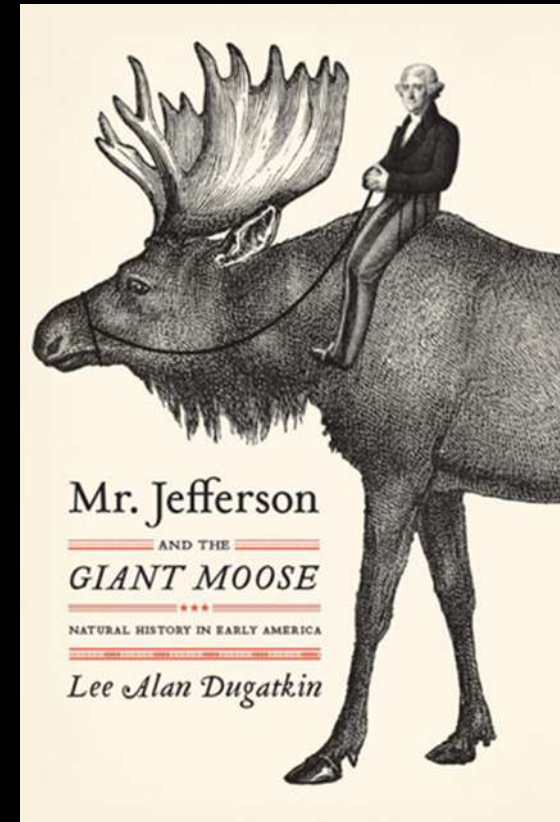
In addition, "Jefferson also wanted to present Buffon with tangible evidence...He tried with the skin of a panther, and then the bones of a hulking mastodon...but Buffon didn't budge.

Jefferson's most concerted effort in terms of hands-on evidence was to procure a very large, dead, stuffed American moose – antlers and all – to hand Buffon personally, in effect saying, "see."

This moose became a symbol for Jefferson – a symbol of the quashing of European arrogance in the form of degeneracy."

If the theory of American degeneracy took hold in Europe the long-term consequences could impact trade with and immigration too the United States.

Within six months of receiving Jefferson's moose, the Count was dead, and he never got to retract his degeneracy theory.



Cultural Impact of the Theory of Degeneracy on the Idea of American Nature

Henry David Thoreau, "Walking" (1862)

"This statement will do at least to set against Buffon's account of this part of the world and its productions."

"We go eastward to realize history, and study the works of art and literature, retracing the steps of the race, — we go westward as into the future, with a spirit of enterprise and adventure. The Atlantic is a Lethean stream, in our passage over which we have had an opportunity to forget the old world and its institutions."

"If the moon looks larger here than in Europe, probably the sun looks larger also.

If the heavens of America appear infinitely higher, the stars brighter, I trust that these facts are symbolical of the height to which the philosophy and poetry and religion of her inhabitants may one day soar.

At length perchance the immaterial heaven will appear as much higher to the American mind, and the intimations that star it as much brighter.

For I believe that climate does thus react on man — as there is something in the mountain air that feeds the spirit and inspires. Will not man grow to greater perfection intellectually as well as physically under these influences?"



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 fibres forth in search of the Wild. The cities import it at any price. Men plow and sail for it. From the forest and wilderness come the tonics and barks which brace mankind.

Our ancestors were savages. The story of Romulus and Remus being suckled by a wolf is not a meaningless fable. The founders of every state which has risen to eminence, have drawn their nourishment and vigor from a similar wild source.

Ben Jonson exclaims, —

"How near to good is what is fair!"

So I would say —

How near to good is what is wild!



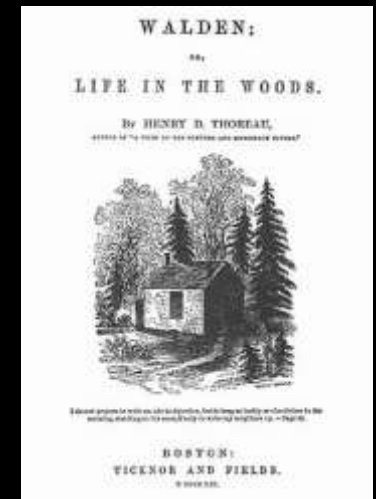
Life consists with Wildness. The most alive is the wildest. Not yet subdued to man, its presence refreshes him. One who pressed forward incessantly and never rested from his labors, who grew fast and made infinite demands on life, would always find himself in a new country or wilderness, and surrounded by the raw material of life. He would be climbing over the prostrate stems of primitive forest trees.

Hope and the future for me are not in lawns and cultivated fields, not in towns and cities, but in the impervious and quaking swamps. When, formerly, I have analyzed my partiality for some farm which I had contemplated purchasing,

Yes; though you may think me perverse, if it were proposed to me to dwell in the neighborhood of the most beautiful garden that ever human art contrived, or else of a dismal swamp, I should certainly decide for the swamp.

When I would recreate myself, I seek the darkest wood, the thickest and most interminable, and, to the citizen, most dismal swamp.

I enter a swamp as a sacred place — a *sanctum sanctorum*. There is the strength — the marrow of Nature. The wild wood covers the virgin mould, — and the same soil is good for men and for trees.



Published 1854

Environmental Perception of Nature and the City

The Sacred and the Mundane

Wilderness and the City

Natural vs. Artificial

Pristine vs. Degraded

Native vs. Non-native

Invasive
Non-native
Species



Once a rock
dove, now
the winged
rat of the city

Non-native species
and Biodiversity?

Urban Natural History – Sanctioned and Unsanctioned Nature

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

They are the foundational metaphors of American nature 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 “sanctioned” 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 or formally protected as remnants of native landscapes obliterated by the creation of the city in preserves, sanctuaries, and refuges.





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

Urban Wildlife – Sanctioned and Unsanctioned

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.





© 2010 Bakorny Releasing

Pale Male the famous red-tail hawk
Performs wingstands high above midtown Manhattan
Circles around for one last pass over the park
Got his eye on a fat squirrel down there and a couple of pigeons
They got no place to run they got no place to hide
But Pale Male he's cool, see 'cause his breakfast ain't goin' nowhere
So he does a loop t loop for the tourists and the six o'clock news
Got him a penthouse view from the tip-top of the food chain, boys
He looks up and down on fifth avenue and says "God I love this town"
But life goes on down here below
And all us mortals struggle so
We laugh and cry
And live and die
That's how it goes
For all we know
Down here below

Pale male swimmin' in the air
Looks like he's in heaven up there
People sufferin' everywhere
But he don't care
But life goes on down here below
And all us mortals, struggle so
We laugh and cry

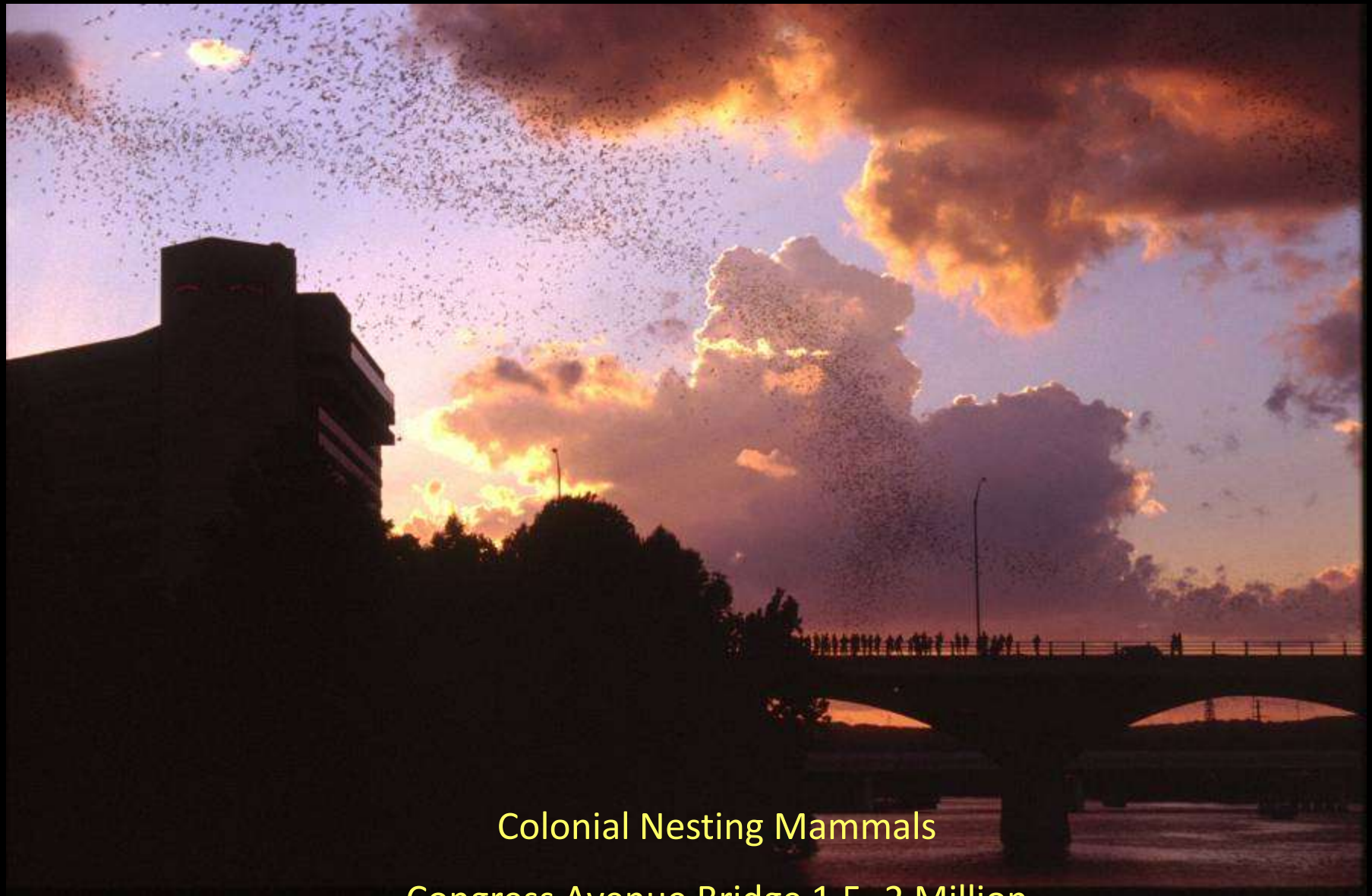


- Steve Earle, "Down Here Below", song on Washington Street Serenade (2007)

Ecological Understanding – Urban Ecology

What is a City?





Colonial Nesting Mammals

Congress Avenue Bridge 1.5 -2 Million

Mexican Free-tailed Bats

Colonial Nesting Mammals



Black-Tailed Prairie Dog



Colonial Nesting Mammals



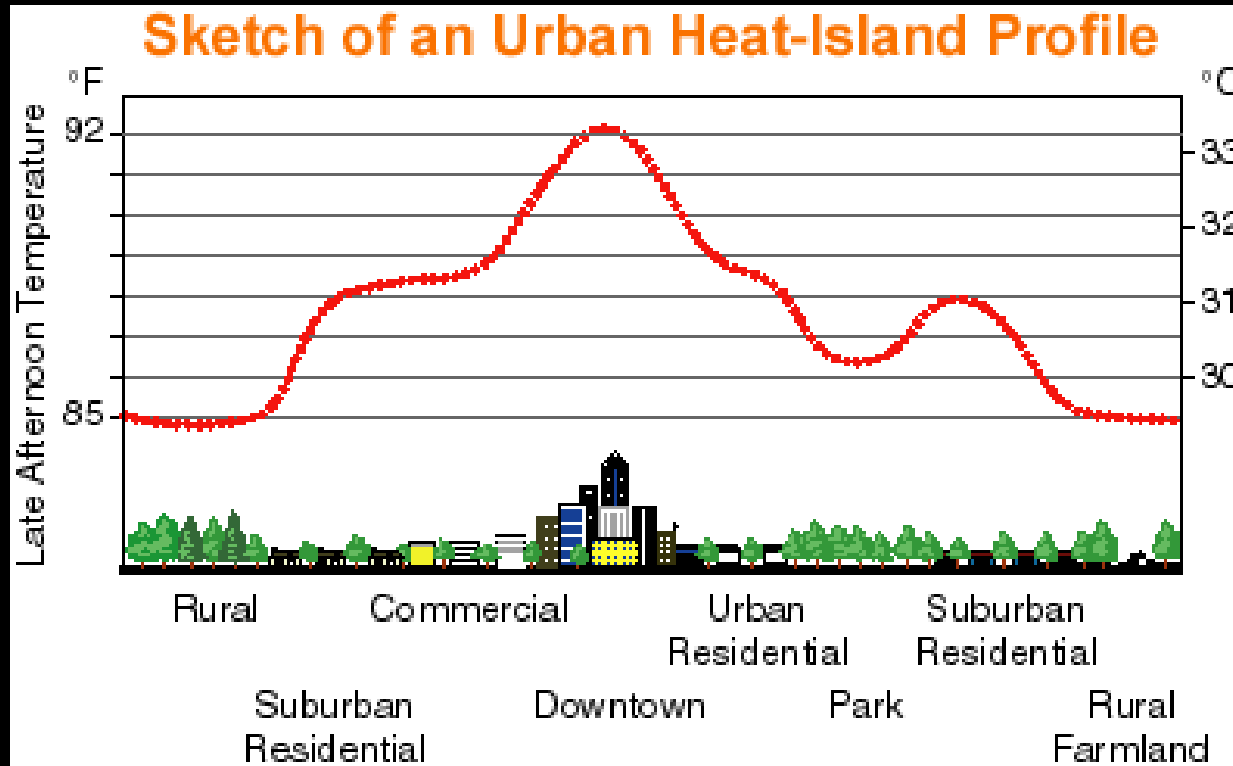
Characteristics of an Urban Ecosystem

- Temperature
- Water
- Soils
- Flora
- Fauna



Characteristics of an Urban Ecosystem

Temperature



Hardscape, reduction in vegetation

Increased Daytime and Nighttime Temperature

Reduced Air Quality

Characteristics of an Urban Ecosystem

Water



- Urban infrastructure
- Impervious cover
- Erosion
- Channelization
- Pollution



Characteristics of an Urban Ecosystem

Soil



- Compaction
- Low Organic Matter
- High pH
- Low water drainage
- Limited nutrient cycling
- Pollution
- High soil temperatures

Characteristics of an Urban Ecosystem

Flora

- Fragmentation
- Edges
- Disturbance
- Understory loss
- Non-native Species



Characteristics of an Urban Ecosystem

Fauna



- Generalists
- Predators
- Non-native Species

Monk Parakeets



Profound Ecological Changes





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, urban conservation biology, restoration ecology, and environmentalism 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 resulting in a bleak picture of urban ecosystems in America.



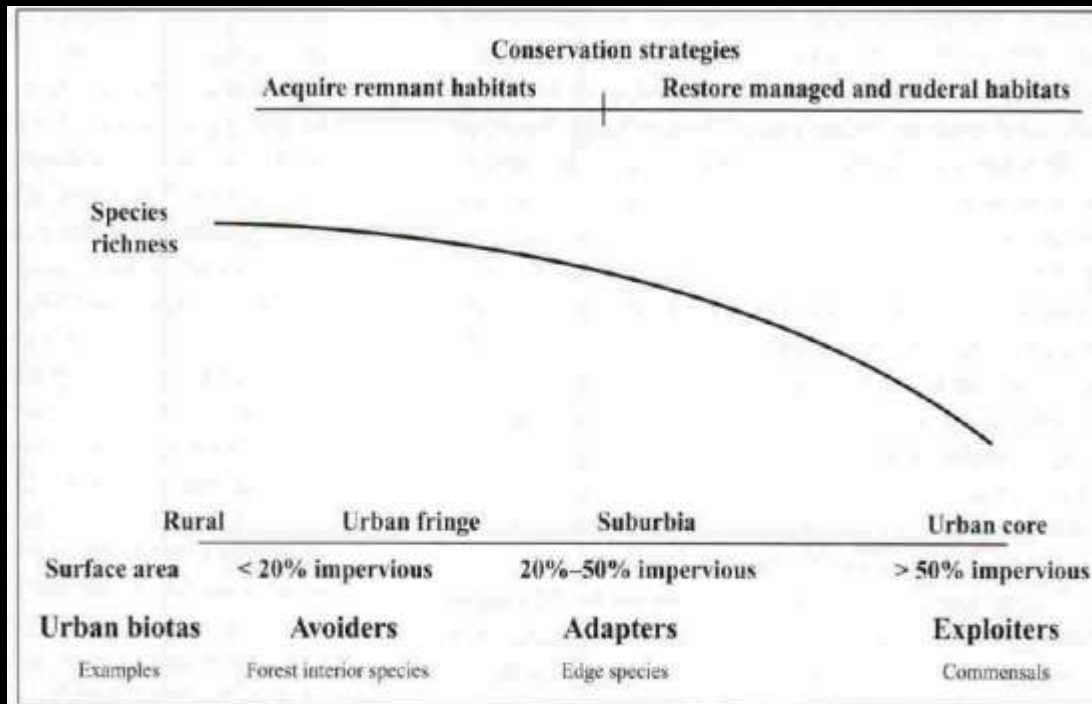


Figure 2. Urban–rural gradient. This is a very generalized and simplified depiction of changes in surface area, species richness, and composition, as compiled from a number of sources discussed in the text. Two basic conservation strategies with respect to urban sprawl are shown at the top.

McKinney, “Urbanization, biodiversity, and conservation”. *Bioscience* (2002)

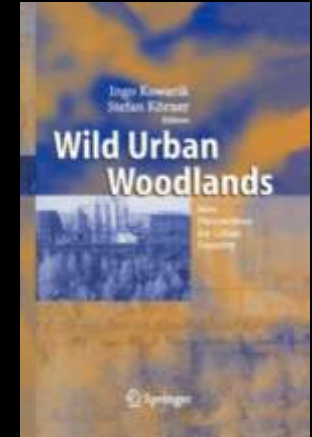
European Urban Ecology

... 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)



Perceptions of European Urban Ecologists

Unsanctioned Urban Nature - A cosmopolitan community of uniquely adapted ruderal organisms

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

For Sukopp, wastelands 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)



Unofficial Urban Nature - Marginal Nature

Wastelands - whole patches

- Vacant lots
- Dumpsites
- Industrial Wasteland
 - Brownfields
 - Greenfields
 - Quarries and Gravel Pits
- Urban Infrastructure Land
 - Power plants
 - Water treatment plants
 - Reservoirs
 - Wastewater treatment plants
 - Sewage ponds
 - Constructed wetlands
 - Stormwater retention structures
- Unusable Land - bits and pieces
 - Slopes, gullies, corners, fragments

Margins – edges and ledges

- Urban waterways
- Canals, drainage channels
- Utility corridors
- Waysides
 - road waysides
 - railway verges
- Alleys – paved, unpaved, grass
- Walkways and pathways
- Fencelines
- Walls and ledges
- Pillars and bridge abutments





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>

European Urban Natural History

Unofficial Countryside

I have called it the unofficial countryside because none of these places is in the countryside proper, nor were they ever intended to provide bed and board for wildlife... This is a scrappy definition, I know, covering everything from a planned suburban playground to the accidentally green corner of a city-centre parking lot.

Yet I think all these places do have one quality in common, and that is that, in them, the labels 'urban' and 'rural' by which we normally find our bearings in a landscape, just do not apply.

It is not the parks but the railway sidings that are thick with wild flowers

Richard Mabey, *Unofficial Countryside* (1973)



At times like this I would find in myself an affection for these grubby landscapes that I could never have predicted and would be hard put to excuse. Visually, they were without exception ugly. Although the healing processes of natural growth were everywhere in evidence (they were what I had been looking at the whole year), each one of these habitats represented an assault upon some green country. They had none of the restful predictability of ancient countryside, that feeling of seasoned flow and stability that you find in downland and forest.

Yet it is the disorder and incongruity that I find so exciting and irresistible.

Unofficial Countryside p. 154



Urban Nature

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)



American Natural History - finding bearings in a disorienting landscape

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



Urban Nature as 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)



Meaning of Urban Nature

What do shreds and scraps of the natural scene mean, after all, in the shadow of the citified whole?

What can one patch of leftover land mean to one person's life, or to the lives of all who dwell in the postindustrial wasteland?

Robert Michael Pyle, *The Thunder Tree: Lessons from an Urban Wildland* (1993)



Environmental Perception of Nature and the City

The Sacred and the Mundane

Wilderness and the City

Natural vs. Artificial

Pristine vs. Degraded

Native vs. Non-native

Invasive
Non-native
Species



Once a rock
dove, now
the winged
rat of the city

Non-native species
and Biodiversity?

Urban Natural History

Ecological understanding shaped by cultural contexts

Cultural understanding shaped by ecological contexts





Applause!

Questions?

