

Applying an Ecological Systems Approach in Urban Landscapes

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“**CHICAGO** Wilderness”, the title of a new, rapidly growing conservation movement in the Chicago metropolitan area, would seem to be an oxymoron. If there is “wilderness” in Chicago, most people have missed it.

But in fact, there once was a vast wilderness in and surrounding the Chicago regions, and in fact, people do miss it! In the northeastern Illinois region, people miss the wild, natural open spaces so much that the region has become one of our nation’s hottest hotbeds for native landscaping and ecological restoration.

They miss it because Chicago presents a typical urbanizing landscape in which the ecological systems we once called wilderness have been replaced by a dominant “ecological system” that can fairly be called a biological desert. We call this dominant system of urban sprawl, lawn.

In the U.S., we’ve converted 30 million acres into lawns, which are landscapes by German definition “in the absence of trees”. We don’t usually look at lawns as ecological systems, but if we did, we’d see these systems are dominated by non-native plant and animal species. Kentucky bluegrass is from Europe and Asia. So are the common earthworms. So are dandelions and most other weeds.



Tallgrass savanna areas in urban environments.

We’ve placed many of these lawn systems in urban landscapes on glacial till clay soils, compacted by earthmovers during development so that we’ve essentially created million of acres of low-permeable lawnscape that is hydrologically similar to an impervious asphalt parking lot.

In urbanizing areas, we’ve surrounded ourselves with these non-native ecological systems which support few species. And to many people – even to people who don’t consciously think about it – these lawnscape are uninspiring. They’re especially uninspiring

compared to the diverse plant and wildlife species in the many native restorations springing up in the Chicago region.

In contrast to our biologically barren and high maintenance lawns, native ecological systems, such as wetlands, upland prairie or oak savanna are immensely diverse, productive systems. At one time,

the marshy Chicago region produced immense flocks of whooping cranes, sand hill cranes, huge flights of ducks and geese, and biological diversity we can only imagine today.

You can get a small sense of this unbelievable productivity by visiting remnants of the wilderness, such as one particularly high, dry hill prairie near Elgin that has survived because its soils were too rocky and dry for agriculture. Historically, when these types of prairies were blended with a mesic prairie featuring deeper, more well developed soil systems, the prairies supported 550 to 650 species of native vascular plants, perhaps thousands of associated insect species, and untold numbers of microfauna and micro-flora, bacteria and fungi. A lawn might have 10-15 plant species and far fewer associated organisms.

Complex Native Ecosystems are Highly Integrated

From wetlands to oak savanna, our pre-settlement native systems were seamlessly blended together on gradients of hydrology, topography, soil types and soil nutrition. The blended systems were also impacted by an area's fire history, grazing ungulates, insect infestation and a variety of factors that intersected on the landscape on an immense scale.

The interrelationships between systems is demonstrated in projects today where disturbances in upland grassland systems create erosion and sedimentation that degrades wet prairie and wetland systems at lower elevations. This can occur when there has been ineffective thinking about the relationship between the developed landscape and natural wetland areas.

What we do on the uplands drastically affects lowland environments. A coffee-colored river flowing into a lake system with algae blooms and large sediment swirls is characteristic of the landscapes we see through most of the upper Midwest today, while historically, our waters ran clear and at a much slower rate.

Hydrology, hydraulics, chemistry, biology and ecology must all be considered if we're to see the true picture of how we impact integrated natural systems at the boundaries where human and natural activities are also integrated.

Conservation Development – Another Oxymoron?

In November, the Wall Street Journal published a survey which showed what home buyers are looking for in today's urbanizing developments. At the top of the list was Natural, Open Space. Second was Walking and Biking Paths. Gardens with Native Plants came in third. Wilderness Areas was fifth, and Interesting Little Parks was eighth. Ninth and tenth were Tennis Courts and Golf Courses.

These rankings show that the need for "Conservation Development" is more compelling now than ever. People feel the need to interact with their natural environment, and conservation developments can help fulfill that internal desire.

Prairie Crossing in Grayslake, IL, is one of the best examples of a Conservation Development, in which an ecological approach to planning considered the needs of the natural areas equal to and integrated with the needs of developed space.

Held up as a national example of conservation development, Prairie Crossings is a 667-acre development that preserves 70% of its acreage as open space and allows only 30% of its land for residential and commercial development.



A young ecologist.

In the development, 175 acres of prairie and 18 acres of wetland were designed as a basic element for stormwater management, and greenway trails are looped throughout the property. Housing is clustered, and surrounding the clustered housing are prairie swale systems that passively filter water as it flows through 175 acres of prairie and ultimately into 18 acres of wetlands and 27 acres of lake.

By replicating the historic prairie to wetland ecosystem gradient, we've predicted that the majority of contaminants associated with urban land use can be bio-filtered and

assimilated within the prairie swales before reaching the wetlands and lake.

We wanted a healthy wetland system and healthy lake system and the deliver of high quality water to these systems was an important precursor to that performance-based outcome. In addition, because of the native vegetation and natural swale and wetland design, we've predicted a 60% reduction in peak stormwater discharge from storm events from this system, compared to the previous agricultural land use.

Because of the healthy, integrated ecological systems created at Prairie Crossing and the appeal of "living with nature", the walk-in rate at the sales office is substantially higher than conventional developments in the local area. Nature and quality-of-life aspirations are some of the products Prairie Crossings is offering. An in the urban areas, these products are selling.

Traditional Neighborhood Developments Integrated with the Ecological Approach

Because of the growing need to integrate human developments harmoniously with natural systems, Applied Ecological Services, Inc. (AES), Brodhead, WI, and Land Planning Services, Inc., St. Charles, IL, are planning to create a series of model projects that would illustrate how the concepts of conservation development can be integrated with traditional neighborhood development (TND). The model projects will be designed to show how, in urbanizing areas, an ecologically sound TND can fulfill the desires of a growing marketplace, in large part by preserving and restoring the health and integrity of nearby natural areas.

In a Traditional Neighborhood Development, houses are clustered closely together, with wide front porches, sidewalks, large curbside shade trees, narrow streets, garages built in back, mixed housing types for mixed income levels lots of public parks and open space, a corner grocery store – in short, a neighborhood as opposed to a suburb.

The TND offers the small-town or neighborhood environment that fits well with the needs of people looking for connections with other people as well as the natural world. The integration of ecological systems with the TND environment is expected to broaden the interest in "conservation development" begun by Prairie Crossing.

A Swamp in the Middle of Town?

Attempts to naturalize urban sites based on ecological function often lead to the creation of wetlands which were far more prevalent historically than they are today. In some areas, this will be a controversial decision, and controversy can sometimes prevent these projects from getting on the ground.

For this reason, it is crucial to involve people from all walks of life in the process of urban ecosystems restoration. Not only can local people provide support for a restoration project, but they can also contribute observations about the site, its historic land use, its ecological functions, etc.

In the suburban Chicago area, the Otter Creek Wetland Park, developed by Land and Water Resources, Inc. (LWR), Rosemont, IL, stands as the finest example of how to restore a healthy functioning wetland ecosystem within urban boundaries while gaining appreciation for an improved quality of life from local area residents.

At Otter Creek, LWR developed the first private wetland mitigation bank in the U.S. by restoring a 56-acre farm field to its historic wetlands condition. Since its creation in the early 90s, wetland mitigation credits have been sold to fund the project, and the restored property has contributed to passive recreational used as a popular public park under ownership of the St. Charles, IL, Park District.

Project team members LWR, Christopher B. Burke Engineering and AES designed the site as a passive recreation park by creating landscapes of prairies, wetlands, and riparian ecological systems. The park and design were keyed to use by school groups for outdoor and environmental education. Consequently, viewing areas, a trail system, and a special bridge to allow access for student projects – including stream water sampling opportunities – were integrated with the project plan.

Today, when student sampling shows the stream water to be clearer and cleaner than when it had been ditched to remove water quickly from the cropland, perhaps a young ecologist will recognize the biofiltration benefits of the upland swales.

And, perhaps, she will make a new discovery – one that will improve our restoration efforts in the future. One that shows us again, with new insight, how integrated our natural ecosystems are, and how connected our human systems can be functional natural systems. **L&W**

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