Chapter Seven: Create a Linked System of Natural Areas and Parks

[Figure 7.1 in margin]

The site is to the region as the cell is to the body. If sites are the *cells* to the *body* of the region, streams and rivers are the *veins*. If we extend this analogy even further, the rooftops, driveways, lanes and streets of the urban landscape are the *capillaries* of the system. Capillaries take water to veins through a hierarchy of ever larger channels until this water reaches the sea. These capillaries and veins form a dendritic network common to all urbanized landscapes, no matter they be desert or rainforest.

Since the time of the Romans we have buried this network of rivulets, streams, and rivers under our cities. They are still there, they are just hidden in pipes. This is an expensive, ugly, and damaging strategy. Urban green space is too precious to hide. Absent exposure, children growing up in these districts are experientially impoverished. When all traces of nature have been sterilized from neighborhoods, a vital connection between nature and citizens has been closed.

It is far cheaper, far more beautiful, and far more healing to retain this network as is, and incorporate it as infrastructure; reveal it and use it as a system that works with, not against, nature.

From rooftop to yard to driveway to sidewalk to street, urban elements must behave like forest trees, understory plants, forest soils, and intermittent water channels. From lane, to street, to schoolyard, to park, to preserved natural areas, urban areas must emulate natural areas—the swale like the intermittent stream, the park like the wetland, the ball field like the flood plane, and the greenway like the river of the natural order.

These elements must be linked together in an ecologically functional chain—a linked system of natural areas and parks.

Linked natural areas and parks reduce GHG emissions. Stream systems, and their necessary forested buffers, can reduce heat island effects in even new neighborhoods, by the shade they provide and by the air-cooling they produce. Preserved stream-way forests also sequester carbon, a significant benefit, even though it takes 50,000 acres of trees, managed to sequester carbon for 100 years to sequester the average annual amount of carbon produced by one American.[1]

But perhaps of even more importance for our cities, linked parks and natural areas can connect urban districts for human purpose. Stream systems are inevitably dendritic, or "tree like", with branch tips reaching every corner of a watershed. A path system organized around the stream system will thus allow pedestrians and bikes to access every part of the urban district without using streets. Such paths can provide a comfortable and shaded way to travel long distances on foot or on small wheeled vehicles (such as electric scooters), and thus provide a logical and organic way to make walking and biking more pleasant and convenient than driving.

These insights are not new. We have a long tradition of designing cities around a linked system of parks and natural areas. This history is discussed in brief below.

Fredrick Law Olmsted and Urban Parks

The movement to design cities around a linked system of natural areas and parks begins with Fredrick Law Olmsted (1822 – 1902). Olmsted is best remembered as the designer of Central and Prospect Parks in New York, and of the Emerald Necklace in Boston

Olmsted was a product of the North American Transcendental Movement, a movement spawned by Ralph Waldo Emerson and Henry David Thoreau. Transcendentalism had a profound influence on the arts of the time. Not surprisingly, its influence on Landscape Architecture was especially strong. The profession of Landscape Architecture, started by Olmsted himself, may not have been born without the push that Transcendentalism provided.

Inspired by the cannons of Transcendentalist thought, Olmsted designed and built parks with one purpose; they were designed to feed the spirit of their users. It is often wrongly assumed that Olmsted set out to copy Nature; but he had a much more ambitious agenda. His intention was to create environments that provided a spiritual uplift, an epiphany, in the soul of the user.[2] He used the *materials* of nature, not to *replicate* nature, but as a media to create powerful works of *art*.

But Olmsted integrated other more practical objectives with the spiritual. He brought unprecedented sophistication in transportation planning, ecological systems restoration, real estate development, and recreational design into his work. The most brilliant example of this genius is The Emerald Necklace in Boston **[Insert Figure 7.2 in margin]**

The Emerald Necklace is North America's first linked network of natural areas and parks. Extending well over six miles, it is effective in so many ways: it accommodated many different ways of moving, from carriage way to wooded path; it provided a public realm armature for real estate development, insuring that the newly developing areas on both sides of the system would be much more valuable; it invented

an urban design strategy that put Nature at the center of civic life, instead of public buildings or traditional urban squares; it solved a host of ecological problems through radically reengineering the entire landscape for enhanced ecological function.

This last point is worth emphasis. Users invariably assume that the streams and ponds of the Emerald Necklace were always there. The construction photos of the period tell a very different story **[Insert Figure 7.3].** Olmsted radically reshaped the landscape and in so doing not only restored its ecological function but reimagined it. Because of Olmsted's aggressive reshaping of Nature, Robert Smithson, the earth artist who produced the Spiral Jetty in Utah, called Olmsted the "world's first earth artist".[3]

Olmsted's influence did not die with him. His son, his stepson, and Charles Eliot would carry it forward with plans produced at Olmsted, Olmsted, and Elliot. The most impressive and extensive of these plans was Charles Eliot's1893 plan for Boston's Metropolitan Park Commission. For the first time in North America, a group of independent municipalities collaborated in the creation of a linked system of natural areas and parks, a system that linked over twenty different cities and towns, and was intelligently organized around the armature of the region's system of rivers, streams, wetlands, and estuaries. The plan, now executed, did more than protect natural function and provide a growing city with recreation; it is in large part what makes Boston the city it is. The sense of place that distinguishes Boston from other east coast cities of similar size is a result of the landscape strategy of linked natural areas and parks.

Ian McHarg and the Greenway Revival

Yet by the beginning of the 20th century things had very much changed. The U.S. was emerging as a world power and Transcendentalism had been replaced by American Pragmatism. In the second and third decade of the 20th Century, the arts finally "broke free" of Romantic era canons, then to explore very different avenues of expression. Nature, previously the motivating concern for all arts, was replaced by more abstract notions of perception and being.

It remained for the counter culture of the 60s to revive the concept of a healing Nature, again promoting it as an antidote to the spiritual poverty of the city.[4] Into this cultural revival sweeps University of Pennsylvania Landscape Architecture Professor Ian McHarg (1920 – 2001), who was arguably the first 20th century figure to restore the authority of Nature as an urban and regional design informant. He was without a doubt the 20th century's most popular urban and regional designer, filling stadiums for his lectures and selling more than a quarter million copies of his seminal 1969 book, *Design with Nature*.

Design With Nature was released just before the first Earth Day in 1970. It provided timely solutions to what was widely recognized as a looming environmental crisis. McHarg introduced a way to heal the land, using a scientific, or what certainly seemed like a scientific, methodology. He invented way to map the individual attributes of large landscapes, each attribute mapped separately, then to layer these semi transparent maps one over the other. Through examining the transparent maps, one could determine areas of the landscape that were most sensitive, and thus exempt from urbanization, and others where urbanization might occur with the minimal damage. **[Figure 7.4 in margin]**

This kind of mapping, called sieve mapping (for the way it acts like a series of screens that limit uses from falling through where restrictions are greatest) is now in widespread use. McHarg's system communicated rationally what Olmsted had advanced poetically: that the most crucial elements of the landscape are its streams, river corridors, lakes, and wetlands. Thus, on the resultant composite maps, the architecture of a regional scale greenway system inevitably emerges, purely as a consequence of the rational assessment of the landscape's material and ecological capacities.

A few caveats are in order. What is lacking in McHarg's methodology is recognition that river systems, to remain healthy, must function naturally throughout the watershed, not just in stream zones. In this light the whole watershed is precious, not just the main stream and river arteries. Also lost in this process was a way to credit the spiritual value of Nature, a value that was central to Olmsted's earlier conception.

It was at the Woodlands project, north of Houston Texas, that McHarg put his methodology into practice. **[Insert Figure 7.5 in margin]** It is a brilliant example of working with, not against, natural systems. A high water table and a table flat landscape made the site particularly sensitive to disruption, and almost impossible to develop using conventional means. The solution was to leave the natural systems armature in place, and to find ways to insert roads and houses with minimal disruption to that system. Thus the natural systems armature serves both as infrastructure, removing storm flows, and amenity, providing The Woodlands with a unique sense of place.

The Woodlands, while hugely significant for its achievement, also illustrates the dangers inherent to using only natural function and sensitivity to guide your design. The

deference to the wetland system leads naturally to a dendritic road system that functions for traffic no better than the worst sprawl subdivision.[5]

More Recent Progress

When the limits of McHarg's process became more apparent, Professor John Lyle (1934 – 1998) published *Design for Human Ecosystems* (1985). In it Lyle argued that the city is an ecosystem, and that humans were part of that system. Lyle called for a more nuanced appraisal than what sieve maps could produce. Like Olmsted, Elliot, and McHarg before him, John Lyle was reflective of his times. The 80s were a time when scientific certainty was under assault from many fronts. Building architects influenced, by post structuralist ideas then current, moved away from modernist self assured purity to more disrupted and incomplete forms. For Lyle this meant that humans and nature were no longer distinct categories and creativity and rationality are no longer opposed.

[Insert Figure 7.6 in margin]

Even more recent is Professor Julius Fabos. Fabos began his interesting public career by publishing Frederick Law Olmsted, Sr., Founder of Landscape Architecture in America (1970). Incredible as it may seem today, by 1960 Olmsted had been largely forgotten. Fabos, a young man at the time, acted on the insight that Olmsted's legacy and the profession he created, could be revived by creating a mythology around Olmsted's life and works, a mythology that is accepted as fact today. During the mature phase of his career Fabos advanced the concept that humans can create an intelligent relationship with regional natural systems, and that the core of that strategy is a region wide system of linked parks and natural areas. He has advanced this argument through his work on

implementing greenway policies at scales as large as the New England states, captured in Greenways: The Beginning of an International Movement. (1996)

But a complete picture of how urban functions can be completely integrated with natural functions has only recently emerged. The first published work to make this connection explicit is *Skinny Streets and Green Neighborhoods* (2005) by University of British Columbia Professors Cynthia Girling and Ronald Kellet. In this book Girling and Kellet document green community case studies, including the Stapleton project in Denver, Coffee Creek in Indiana, and Villebois in Oregon. Each is characterized by a green infrastructure concept that both influences the form of the community and functions all the way to the parcel.

Increasingly these sustainability strategies are making their way from isolated demonstration projects into broadly applied policy. Particularly noteworthy is the spread of what are called low impact development standards into city ordinances and bylaws - notably in Olympia, Washington.[6] Low impact development regulations have two main thrusts: first to insist that stream corridors be protected by very significant buffers (often greater than 200 feet), and second, that storm drain systems for streets and parcels emulate natural processes in their performance. These bylaws can, in time retrofit existing communities around an integrated and healthy green infrastructure system, making that system increasingly valuable for recreation and, as was learned in Boston with Olmsted's Green Necklace, a way to enhance property values in adjacent neighborhoods.

Progress on the Ground

There are no recent North American examples of a region wide system of linked parks and natural areas to compare to what Olmsted and Elliot accomplished in Boston, but plans are being adopted that could, in time, produce even more powerful results. Portland Oregon provides one example. In 1973, the Oregon legislature passed Senate Bill 100, which became known as the "land use law".[7] Oregon was the first, and until very recently the only, US state to pass a law giving the state authority over local land use decisions. The law is most famous for its inclusion of the "urban growth boundary" tool, and indeed this element has been the subject of much conflict within the state, and much publicity beyond. Much less well known are the specific goals included in the bill, goals that govern the actions of the state, as well as regional and local planning authorities. There are 19 goals in all, ranging from "Goal 1, Citizen Involvement", to "Goal 12 Transportation". Goal 5, 6 and 7 address water systems but in a disintegrated way, separating them into habitat (goal 5), water quality (goal 6), and natural hazards (including floodplains, goal 7).[8] In early decades, these goals were narrowly regulated, with no recognition that the region needed to understand streams and natural areas as a system, not as a set of unconnected attributes. What was previously seen as a mere regulatory problem became a problem of city form and integrated function. Mike Houck, director of the Urban Greenspaces Institute,[9] was the first to advocate for an integrated planning approach to what he called Portland's "greenfrastructure". What is now known as Title 13 Fish and Wildlife Habitat Plan (regulatory) and "Connecting Green" (non-regulatory parks trails and natural areas master plan) manifest this integration. Both are official documents of the Portland Metro Council regional government, and were

produced during a period when Houck and his colleagues worked with and advised the Portland Metro Council. The overall vision, when accomplished, will create a bi-state interconnected system of neighborhood, community and regional parks, natural areas, trails and open spaces knitting together the entire urban region.

Case Study at the Regional Scale: The Damascus Design Workshop

A Portland-area plan that may, in time, realize the full potential of a linked system of parks and natural areas is The *Damascus Area Design Workshop* plan. For this project the organizers worked to reveal what a community would look like were it to be designed in complete conformance with the goals of Senate Bill 100, and especially its ecological goals.

Senate bill 100 makes comprehensive landscape scale planning possible in a way that is not possible elsewhere. Portland Metro Council is now managing the Portland area's largest ever urban growth boundary expansion: a 20,000 acre area in the southwest quadrant of the metropolitan region. Unique to US Metropolitan areas, the elected Portland area regional government, Portland Metro Council, must approve community development and servicing plans before affected municipalities can approve projects.

When this 20,000 acre Urban Growth Boundary expansion was first proposed, it raised many questions for regional officials and interested citizen groups. The most fundamental of them: Can such a large region be developed sustainably? To provide a partial answer to this question, two non-profit public interest groups, 1,000 Friends of Oregon and Coalition for a Livable Future, collaborated on a region wide charrette.

This charrette had a simple goal: to see what a community would look like if it lived up to 19 goals of Oregon's landmark senate bill 100.[10] Could you really do it all? Or would some of the goals be unachievable on the ground. Would the environmental protection goal be compromised by the transportation goal? Or the affordability goal? Only through an on the ground exercise where apparently competing goals were applied in design could you tell.

Finding a design that would protect natural areas while still being practical to build was the most difficult and most important challenge for the charrette team. Could it be done? The answer was yes, if you returned to many of the strategies that make Olmsted's Emerald Necklace scheme so successful. There Olmsted proved that Nature, real estate value and transportation need not compete. Correctly handled they can integrate in a synergistic way. The fundamental lesson learned from that project are several; first, use nature out front, not out back; second, use the seam between nature and the city for transportation of all kinds; third, integrate natural systems into the fabric of more formal recreation areas and civic spaces; fourth, expand the system indefinitely; and five, provide an alternative movement system. These lessons learned are generally applicable and worthy of explication below. **[Figure 7.7 here]**

Linked Parks Strategy 1: Plan for Nature out Front, Not out Back

Current regulations now typically require developers to preserve stream channels. But these channels are usually located, not at the edges of public ways, but along rear property lines. This is a waste of a valuable amenity. Such streams become the destination for stray shopping carts and a convenient dumping area for construction waste. Research has shown that protected and preserved nature contributes to increased

average property values many blocks away, but only if it designed as a visible and accessible public amenity.[11] The only way to truly make natural systems into a visible public amenity is to locate them on the "front door" of the community, not the back – abutting public rights of ways or parks, not abutting rear parcel lines. In practice this means using roads to put nature on one side of the street, and front doors of buildings on the other. Many developers who develop parcels next to protected stream corridors are loath to accept this principle. For them, a road with Nature on one side and houses on the other is a waste of money. They are "single loaded" and yield only half as many serviced lots to sell per unit length as do "double loaded" streets, they say. The lesson of Olmsted goes unlearned, the amenity ignored, the development diminished, and Nature hidden. Municipal district plans are seldom if ever specific enough to show and later require roads fronting Nature. Absent such requirements it is a rare developer who will provide it on their own.

The revived "nature out front" rule is evident in the completed Damascus proposal. In no case is nature hidden in back at the rear edge of parcels. In all cases nature is edged with a two-lane parkway road and associated bike and footpaths. Beyond that begins the protected riparian corridor. In certain key areas, civic and formal recreation spaces and neighborhood schools are embedded in the natural fabric of the greenway. It is particularly important that natural areas not be designed as prisons for nature, protected areas where even pathways are forbidden. Environmental managers are justifiably reticent to allow any sort of recreational use in protected areas, given how few are protected and how fragile are these areas. But in a design as rich with protected areas as in this example, this logic does not pertain. For too long environmental regulators have

taken a myopic view of their charge. Absent a direct connection to Nature, neighborhood residents, a natural constituency for natural area protection, lose any vested interest in their preservation. In addition, the damage wrought on stream systems by recreational users is often exaggerated, especially compared to the damage done by humans to "hidden" urban streams, typically full of illegally dumped construction debris and shopping carts.

Developable areas of 20,000 acres close to a major city are extremely rare. Even more rare are sites this size owned by one entity. When large developable areas are under multiple ownerships, it then becomes the responsibility of the municipal and regional planning powers to insist that this "nature out front" rule be enforced. If a planning power did nothing more than require protected natural areas "on the front door and not the back," along with a requirement for a through road at increments no greater than 600 feet, most of the benefits described in this section would eventually accrue. As the years pass a continuous fabric of public parkways will emerge, as was the case in Minneapolis, where W.H.S Cleveland's Ring of Lakes took many decades to complete. Such a system will add greatly to the attachment felt by area residents to their neighborhood, as tax value maps from Minneapolis clearly indicate. **[Figure 7.8 in margin here]** Property values for similar houses on similar lots are highest right at the parkway edge, but also maintain a distinctly higher value for a number of blocks further into the neighborhood. This emphasis on property value does not indicate that available natural systems have only a pecuniary value; rather it suggests a quality of life value that is naturally reflected in the desirability of the area, and thus naturally evident in a financial premium for houses in the district when compared to other districts not so richly endowed.

Linked Parks Strategy 2: Use Natural Systems to Bound and Protect Neighborhoods

Comment: Heather. It has to be bound because the concept is boundary, not connection.

Accessible natural areas and park systems can certainly be the center of community life, but just as often serve as a containing edge. Linked park and natural areas automatically provide firm boundaries to neighborhoods, protecting and defining them. In “streetcar city” districts, natural areas that bound and protect neighborhoods can provide a real value. They interrupt what might otherwise be an unrelenting grid, and distinguish one part of the metropolitan fabric from the other. Olmsted understood this as his urban forms respond to the surrounding grid of the streetcar city in a way that gives additional power to both, providing both a place to recreate, but also a vivid and obvious boundary for neighborhoods astride it. The Damascus plan shows the application of this principle at the very large urban scale. Even a glance at the plan is sufficient to prove that even though the interconnected street strategy is applied universally, each district is placed in a distinct relationship with the natural system that bounds and protects it. It is the dialogue between the interconnected web of streets and the dendritic branches of the linked system on natural areas that produces “place”. Any concern that interconnected urban street networks are placeless should be allayed. This point of conjunction between the street system and the greenway system can express a neighborhood edge, or a neighborhood center, or even both. Many contemporary urban designers miss this opportunity for place making. By creating radial street systems to create points of emphasis they frustrate the easy flow of traffic. Civic buildings are most often proposed for these crucial central points, thus to create sense of place an obvious civic center for the district. While this strategy is not antithetical to what I suggest, for these designers the power of greenway systems to create distinct places, on a vast scale, is easily overlooked.

The Damascus project provides ample evidence of this potential, while Olmsted's Emerald Necklace suggests what this might be like in built form.

Linked Parks Strategy 3: Design the Ecological Parkway

An important feature of Olmsted's greenway is the boulevard. In his hands these wide boulevards were beautifully engineered and heavily planted with large trees, trees that are only now reaching their full majesty. But however green were his boulevards, they performed no ecological services. They were conventionally drained like the damaging storm drain systems discussed in chapter eight. With more current understanding of watershed function, urban boulevards can provide an expanded role, and their generous green spaces perform a myriad of ecological services. Medians can be designed to infiltrate water as discussed in chapter eight, while providing an ephemeral expression of Natures recent gifts, in the form of temporary reflecting pools that serve to retain and infiltrate storm water. A completely pipe free city, with no buried storm water pipes at all, is easy to build but requires a few new ways of thinking.

Linked Parks Strategy 4: Expand the System Indefinitely

The other worthy characteristic of the interconnected street and natural greenways system is that it is infinitely expandable. Streetcar cities conformed to simple rules. In the early part of the 20th century, the only planning that was done was street planning. City engineers knew that 7th avenue would go west until it ran out of land as would 51st street heading south. Every four long blocks the right of way was 30 feet wider for the eventual arterial and that was it. Zoning maps didn't exist but were not needed. Commercial uses filled the streetcar arterials and that was that. This fundamental planning power, the

power to predetermine street networks, has been relinquished in the past 50 years of almost universal “pod” style development and should be re-claimed. A two part strategy, where natural systems are protected and formed into linked natural areas and parks, then to be layered together with rational interconnected street is certainly as simple. But the contingencies of place, an automatic outcome of a revealed natural system, provides the potential for great beauty over the full extent of metropolitan scale urban landscapes.

Linked Parks Strategy 5: Provide an Alternative Movement System

Linked parks and natural areas, by their nature, should connect all parts of the district. In the Damascus plan, the continuous network of parks and natural areas includes avenues for various modes of travel, from bikes to walking paths, to “pleasure vehicles only” parkways, to rough walking trails that bring users closest to untrammeled Nature. This continuous system provides the potential for users to reach all parts of the district without using conventional streets at all. Such a secondary system can considerably reduce auto dependence and provide a resilient connective tissue capable of accommodating movement in future decades whatever the unfrozen constraints on auto ownership or fuel costs.

Case Study at the Neighborhood Scale: Sustainable Fairview and the Pringle Creek Community, Salem Oregon

[Figure 7.9 in margin near here] Modern built landscape scale examples of this strategy don’t yet exist. But certain places already under development give a sense of what such a region might feel like, notably the Pringle Creek Community project in Salem Oregon.[12]

The plan for Pringle Creek demonstrates in microcosm the five principles for a linked system of natural areas and parks: (1) in no case do buildings back onto natural areas. Streets are used to separate homes from nature insuring that nature is out front, a public amenity, (2) protected natural areas have multiple functions, one of which is to bound and protect neighbourhoods, (3) streets are conceived as "ecological parkways", providing natural avenues for heavy storms to migrate to natural discharge points, (4) the system of blocks and natural systems is infinitely expandable, an interconnected street network in a dialogue with dendritic natural systems, (5) an alternative movement system is incorporated into the stream and natural area system, allowing most parts of the site to be accessed off roads. **[Figure 7.10 in margin next to this paragraph]**

The Pringle Creek Community occupies a 30-acre portion of the much larger 200 plus acre plan for the Sustainable Fairview community**.** This master planned community, approved by the City of Salem, will incorporate the features discussed above: an interconnected street system and an extended green infrastructure system that, in this case reaches at least one end of nearly every block. Natural water function was one of the key determinants of urban form, in concert with the other six rules discussed in this book. The plan allows all water to flow through the site naturally and without any buried pipes for storm water.

The site is shaped like a large upturned hand with the spaces between the “fingers” dramatic declivities where water naturally flows. In the palm of the hand is the center of the community, where roads lead naturally to this central watershed point. The central green functions in the same way as the park spaces in Scottsdale Arizona, with

green space doubling as water storage and infiltration on large storm event days. All other water is absorbed on parcels or in the street cross section.

As of the date of this writing, one portion of the Sustainable Fairview plan is complete, the 30-acre Pringle Creek Community. This plan contains in microcosm all of the features discussed in preceding chapters. Thus the function and feel of these sustainable strategies are visible and palpable on this site.

The Pringle Creek Community is North America's largest residential area application of pervious streets (see chapter 8). But the other elements of the plan are equally significant. First there are no pipes at all in the plan. Water is carried naturally from the centerline of the site, which is only slightly higher than the two edges. Most water is absorbed by the streets, but on the very rare days when the capacity of the streets is overwhelmed, or in very unusual circumstances when the water table rises within inches of the surface, a series of roadside swales begin to perform, conveying water to Pringle Creek via a system of naturalized artificial streams and wetlands circling the site. These wetlands and streams operate ephemerally only after large rains, animating the site in response to climatic phenomena. Even on this small site the principle of "front door to nature" is adhered to, with a large percentage of street length "single loaded" as a result. Thus all natural areas are clearly within the public realm. While the streets are pleasant enough to walk on, with sidewalks on both sides of all streets, the site also includes a system of pathways convenient for a more shaded and convenient walk to the center. The commercial center is within an easy five-minute walk of all homes, although it will likely not be self-sustaining until the other 2,000 homes are built in the larger Fairview site to the south.

At the center of the community is a more formal square. This square performs a water holding function as well, holding three inches of water across the surface after large storms, turning the whole plaza into an ephemeral reflecting pool for a day or two before infiltrating into the ground. Bringing this ephemeral reflecting pool to the heart of the Pringle Creek community is of course intentional and motivated by reasons that go beyond simple flow control. Water is at the heart of this sustainable community plan and it would be wrong to physically exile it from its very center.

Conclusion

At the heart of a healthy urban region is water, water that moves through the veins and arteries of the urban watershed. While the fight to reduce our GHG footprint is now at the height of urgency, reducing our water footprint remains crucial as well. Just as the atmosphere, the air itself, may not support human life as we know it unless we acknowledge our role in its destruction, so too are we as a species on the point of irreversibly corrupting the other life support system of the planet, its water. A system of linked natural areas and parks is easily the most cost efficient and effective means of reversing the corruption to natural systems caused by cities.

Using a natural areas and parks strategy to manage the environmental consequences of city building has a corollary with the creation of neighborhood quality, its “sense of place”. Neighborhoods bounded and protected by Nature provide children with ready access to natural areas, and to the explanation for how their world works. This is beyond price. Not only does a linked system of natural areas and parks put Nature at

our doorstep, but it also provides verdant avenues for moving through the landscape – a way of traveling that is both safe and delightful.

The benefits of a system of linked natural areas and parks are thus manifold. But, like all sustainability issues, it is a fatal mistake to focus on just one element of the puzzle at the expense of all others. The secret lies in designing for all of the sustainability issues at the same time. A societal paradigm shift is required, one where it becomes commonplace to work collaboratively and holistically, rather than boxing ourselves into narrow technical, environmental, or economic silos. When this happens, when a community is designed in an integrated way, water will inevitably be at its heart. And when that collaboration occurs, you can expect to find it expressed in physical form in a linked system of parks and natural areas. This North American planning tradition, too long moribund, can and should be revived. It is now foolish to ignore the myriad of benefits – social, economic, and ecological – that accrue.

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[1] In a forest ecosystem, carbon sequestration occurs in the soil, trees, forest floor and understory vegetation. The total amount sequestered in each part varies greatly depending on the region and type, age and quality of the forest. Generally the soil holds roughly 60%, the above-ground parts of the trees hold an additional 30% and the rest is mostly in the forest litter (9%) and understory vegetation (1%) (Haile et al. 2008). At this rate it would require 2,500 acres of forest, managed for carbon sequestration, for 100 years to offset 1 metric ton of CO2 equivalent emissions (EPRI, 2007). To put this in perspective,

the total U.S. greenhouse gas equivalent emissions in 2007 were 7,179.7 million metric tons, or approximately 23.8 metric tons per person per year (EPA, 2008).

[2] According to Fisher (1986) the organic principle for Olmsted led to a philosophy of art tied to purpose, beauty reflecting utility, and form organized by function. Olmstead believed that organic unity was achieved in its highest form through the creative action of the artist, whose unconscious processes of work simulate the work of God. The result is art. That art is perceived by the observer whose own unconscious transforms its beauty into spiritual freedom. Fisher argues that Olmsted viewed Planning as both a rational and unconscious process that could be used to offset the deleterious side effects of urbanism and industrial progress and ultimately provide an avenue for spiritual transcendence. (See: Fisher, I.D., 1986, Frederick Law Olmsted and the City Planning Movement in the United States. Ann Arbor: UMI Reserarch Press, 58-59.)

[3] In: Smithson, Robert. 1979. Frederick Law Olmsted and the Dialectical Landscape. The Writings of Robert Smithson: Essays with Illustrations, NY: NY University Press.

[4] Charles A Reich wrote “The Greening of America” (published by Random House) in 1970, a canonic piece in it’s time.

[5] Girling, Cynthia and Ronald Kellet. 2005. *Skinny Streets and Green Neighborhoods*. Washington, DC: Island Press.

[6] Ordinance #6140 was adopted July 12, 1994. More information can be found on the City of Olympia’s website available online at: http://www.olympiawa.gov/citygovernment/codes/omc/

[7] Senate Bill 100, adopted in 1973 established the Land Conservation and Development Commission (LCDC) to establish new state-wide goals and guidelines. In 1974, the LCDC adopted 19 goals (listed below) that had been developed through extensive public review. Goal 5addresses the protection of resources including riparian corridors, wetlands, wildlife habitat, federal wild and scenic rivers, state scenic waterways, groundwater resources, approved Oregon recreation trails, natural areas, wilderness areas, mineral and aggregate resources, energy sources and cultural areas. Oregon's State-wide Planning Goals and Guidelines are available at: http://www.oregon.gov/LCD/goals.shtml#Statewide_Planning_Goals

[8] Oregon's Statewide Planning Goals. Goal 1: Citizen Involvement; Goal 2: Land Use Planning; Goal 3: Agricultural Land; Goal 4: Forest Lands; Goal 5: Natural Resources, Scenic and Historic Areas, and Open Spaces; Goal 6: Air, Water and Land Resources Quality; Goal 7: Areas Subject to Natural Hazards; Goal 8: Recreational Needs; Goal 9: Economic Development; Goal 10: Housing; Goal 12: Transportation; Goal 13: Energy Conservation; Goal 14: Urbanization; Goal 15: Willamette River Greenway; Goal 16: Estuarine Resources; Goal 17: Coastal Shorelands; Goal 18: Beaches and Dunes; Goal 19: Ocean Resources.

[9] Urban Greenspaces Institute (http://www.urbangreenspaces.org/index.htm)

[10] The charrette report is available online at: http://www.jtc.sala.ubc.ca/Damascus/Final%20Report.htm

[11] Bolitzer and Netusil (2000) conducted a study on the influence that open spaces, such as public parks, natural areas and golf courses have on the sale price of homes in close proximity to them. They found that proximity to open space and open-space type can have a positive, statistically significant effect on home's sale price. Homes that were within one-half block of any type of open space were estimated, on average, to experience the largest positive effect on their sale price.

[12] Pringle Creek Community is a project of Sustainable Development Incorporated of Salem, OR. More information obtainable at http://www.pringlecreek.com/