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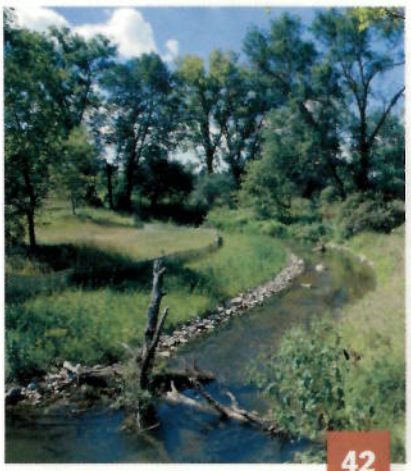

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Illustration: Zoe Danae Falliers

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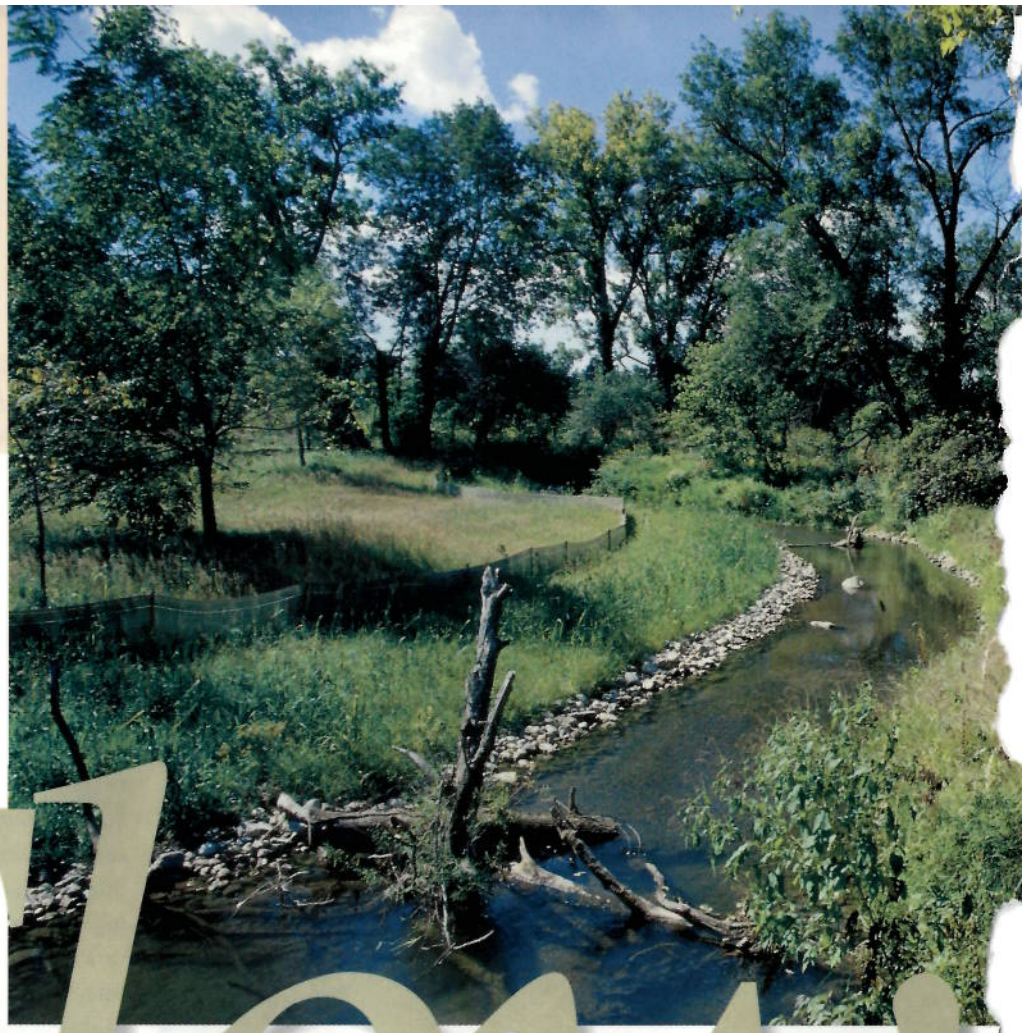
A new development in Chesterton, Indiana, is helping to restore the land's natural hydrological cycle.



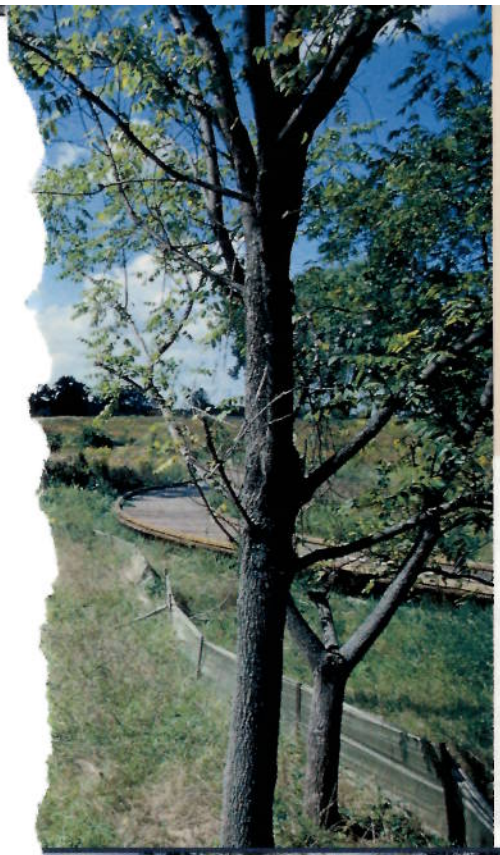
Let It Flow

ALAN P. MAMMOSER

A satellite passing over the Midwest region seven year ago photographed a previously unknown "sixth Great Lake," which had arisen some 300 miles west of Lake Michigan. The "lake" was in fact a huge mass of stormwater lying over the fields and farms of Iowa during the infamous floods of 1993. The immediate cause of the destructive flooding was a summer rainfall of a magnitude that might be expected to occur just once in a century. Yet many ecologists and landscape specialists saw a deeper cause, and laid the primary responsibility on human activity that over the past 150 years has totally reconfigured the Midwest's original landscape and hydrology.

Such a flood would not have occurred in the times before European settlement, not even during the occasional 100-year rains, insists Jim Patchett, a landscape architect with Conservation Design Forum (CDF), in Elmhurst, Illinois. "The storms were coming one after another, but after the first storm, the soils were saturated. It was like raining on concrete," says Patchett. Human activity, he argues, has deprived the land of its natural ability to absorb rain and carry water deep underground. The soil is now tiled and ditched and left with no vegetative cover during spring planting. The sixth Great Lake arose when the storm runoff overflowed the manmade channels and left the landscape hopelessly drenched with water.

Stormwater that fell on the upper Midwest in presettlement times was absorbed naturally by the deep-rooted plants and soils of the native prairie. It flowed underground in a slow process that allowed rivers and streams to remain at nearly constant levels throughout the year, in rainy seasons and dry. Development for agriculture and for urban uses has overturned this natural system by capturing rain and holding the water in channels and pipes on or near the land's surface. Water is now carried off as if it were a kind of waste product, gushing into streams and rivers with unnatural force during the spring rains. Yet tons of priceless topsoil flow away with water that is swept off the farmlands each year. In urban areas, the huge runoff from lawns, which absorb only a small amount of water, and paved



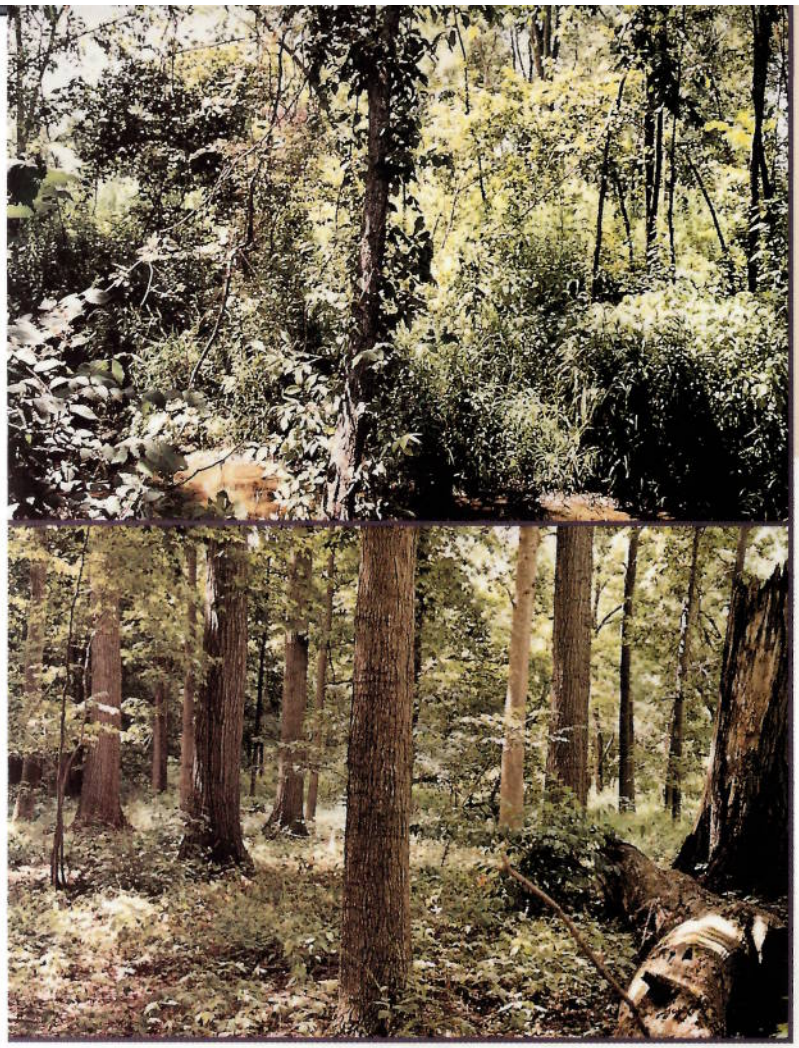
A small stream in the center of a 200-acre watershed preserve has been restored to its natural meanderings as a prairie stream (left) as it flows northward toward Lake Michigan. Level spreaders or "leaky pipes" have been laid across the land at one-foot intervals in elevation (below) to allow water to seep through and soak into the ground and to carry stormwater from the built areas of the site out into the restored prairie fields. The watershed preserve runs through the middle of 640 acres of former farmland (right)—a thread tying together commercial development on the one side with residential neighborhoods on the other.

surfaces carries toxic pollutants into lakes and streams. The result, as seen across the midwestern states, is degraded and eroded land, polluted and severely channelized streams, and a landscape afflicted with intrusive nonnative plant species. Disruption of the land's natural water flow has caused a mounting series of interlocking problems leading to a tremendous loss of biodiversity. The profound disruption of the Midwest's original hydrology raises a serious question for proponents of conservation design: Can land be developed without such damage and loss of natural biodiversity?

Coffee Creek Center, a new development located in the town of Chesterton, Indiana, is trying to find a positive answer to that question by creating a conservation design on 640 acres of former farmland. The owner and developer, Lake Erie Land Co. (LEL), is a subsidiary of Nipsco Industries Inc., the northern Indiana utility company. Nipsco and LEL began the master planning in 1994, when LEL purchased the land with a commitment to build a new community in the utility company's service area, envisioning a development that would gain value through complete ecological restoration. Looney Ricks Kiss Architects in Memphis and William McDonough + Partners, of Charlottesville, Virginia, made contributions to the site's master plan for environmentally sensitive structures.

The square mile of land has been designed to hold 1,200 residential units and 1 million square feet of commercial and office space. Yet what primarily defines Coffee Creek Center is a natural asset quite common in the Midwest landscape—a small stream called Coffee Creek that flows northward through the center of the site toward Lake Michigan. The stream is centered in a 200-acre watershed preserve filled with restored prairie, woodlands, and unique wetlands. A restoration effort managed by land restoration professionals J.F. New & Associates of Walkerton, Indiana, and landscape designers at Conservation Design Forum has healed the stream's eroded banks and strengthened them with plantings of native grasses. Its channel, straightened by farmers and loggers years ago, has been returned in places to the natural meandering of a prairie stream. Open areas, just two years ago given to cow pasture, were replanted in the Midwest's deep-rooted grasses. Woods have been thinned and opened to sunlight so that stands of native maples, oaks, beech, and hickories will have a chance to flourish once again.

With restoration of the watershed preserve now nearly complete, LEL is moving ahead to fill in the east and west sides of the large site. Surrounding the preserve will be a community of residents and businesses. Large two- and three-story commercial buildings accommodating retail on the ground floors topped by office and residential space will be constructed just west of the preserve, along a newly laid brick street called Village Point Road. Although intended to form a regional commercial center, the buildings will face inward toward the preservation area and away from nearby



Non-native species that were crowding out sunlight in the woods around Coffee Creek were cleared to allow sunlight to touch the forest floor and nourish the young seedlings of the native oak trees.

Highway 49, thereby strengthening the commercial center's connection with the local community. Areas east of the preserve will contain a series of residential neighborhoods laid out in traditional street grids, each with a mix of single-family detached homes, town homes, and multiunit buildings.

The master plan designates space for structures to serve a community of all ages, with an elementary school and small stores in the neighborhood areas. A corporate campus and hotel will be located along the east edge of the watershed preserve. The commercial area, corporate complex, and neighborhoods will be linked to large public spaces on the site's northern end, where a broad turf lawn will unfold before a multiuse pavilion and a spacious outdoor amphitheater will be set into the landscape above a restored pond. A gradual transition is made from the public areas around the pond to trailheads that lead southward into the woods and clearings of the watershed preserve.

There is a complete absence of infrastructure to hold stormwater or to remove it from the site—no retention ponds, no big drainage pipes or other conduits to move water off. Water that falls on this square mile of land will flow again as it flowed before development—underground—absorbed through the native prairie grasses. In the prairie, water penetrates the ground through long-rooted grasses to enter deep seams and vents in the earth, where it remains or slowly seeps into wetlands and streams.

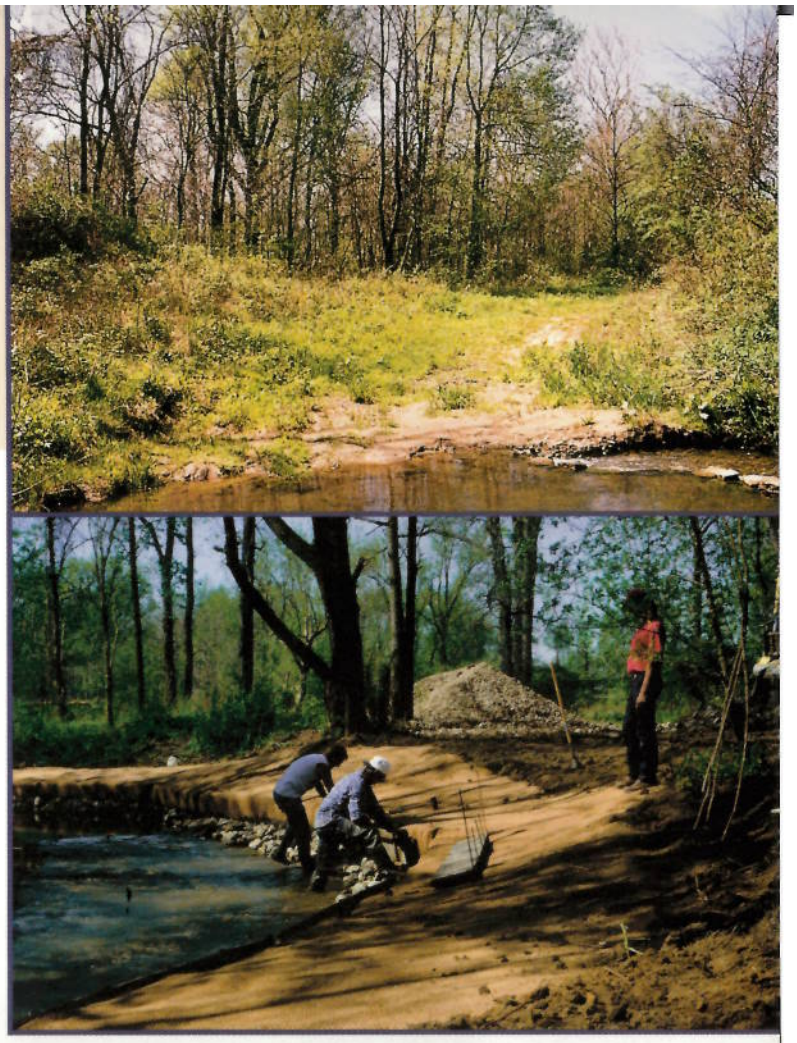
The designers of Coffee Creek Center intend to get this natural system working again by combining restoration expertise with special technologies. The restored swales and deep-rooted prairie fields will absorb rainwater that falls not only in the preservation area, but even in developed areas. In the developed sectors east and west of the watershed preserve, water will regain much of its natural underground flow by use of level spreaders: 12-inch-diameter perforated pipes that allow water seepage, running for hundreds of yards from the developed areas into the restored prairies, just below the surface of the ground. A pipe is placed along each 1-foot contour in land elevation, spaced closely in steep areas and further apart in more level sections of the terrain. In heavy rainfall, the pipes will fill with water and release it through the perforations; water will flow evenly over the land until it is absorbed or falls into the next spreader. Each pipe in turn will carry more water until reaching capacity, and the process will continue until all water is absorbed in the prairie and wetland areas. The prairie restoration and spreader activity will help to reestablish the natural hydrological cycle.

The restored hydrology is expected to work even in Coffee Creek Center's most intensively used public area—the commercial corridor along Village Point Road, where the unabsorbed stormwater will flow to a large cistern below a main parking area. When it is full, water will continue flowing under the nearby road to a pond—once choked with weeds and polluted from the erosion of surrounding pasture—that has been cleaned and restored. A plaza built of Wisconsin stone will cover the bank of the pond along Village Point Road, serving as a small park; its two small waterfalls will naturally aerate and cleanse the water. When the pond rises in wet seasons, excess water will flow under a small stone bridge, a "weir bridge," that allows it to pass out to the prairie grasses and the creek. The entire system will maintain the pond at a natural, consistent level throughout the year, while providing a public amenity surrounded by the water plaza, the outdoor amphitheater, and the restored prairie fields.

"What is impressive about this development is the hydrology of the site," says LEL president Jerry Mobley. "Water is usually treated as waste. Here water is treated as an asset and an amenity to be taken care of in a conservation design that uses stormwater management to restore the land's original water flow."

Plans also call for wastewater recycling on the site in the most northerly area, above the amphitheater and across a small road in a constructed wetland. While Coffee Creek Center is required by the town of Chesterton to be connected to the municipal wastewater treatment system, the developers intend to gradually implement the on-site natural system and hope to eventually reach capacity of 150,00 gallons per day.

The ecological restoration and hydrological reengineering of the site have been underway for two years; the first model homes are just now getting started. Such acute concern for conservation de-



Disruption of the natural subsurface water flow resulted in the erosion of the stream's banks; the banks were repaired and planted in native grasses that will take root and help prevent further erosion.

sign creates significant upfront costs and raises questions of financial viability. This is a development where prairie grasses have been planted to take root well before construction begins, where bridges are set across the creek by helicopter to avoid soil compaction, and where pedestrian bridges and boardwalks are built of sustainably harvested California redwood to prevent toxins from pretreated lumber contaminating the soil, in addition to a host of other subtle environmental factors that have been taken into account. The question then is, "How can this development make money?"

"Nipsco Industries Inc. was willing to provide funds up front, with a cash contribution to let us prove that this project can be profitable," says LEL's Mobley. The developers foresaw a 15-year buildout, with a first phase of 225 homes and a retirement facility coming on the market late this year. To sell the homes, LEL will draw on a market area that falls within the far-reaching commuter shed of Chicago. With an average price of $200,000, the homes should appear a bargain to metropolitan commuters. Despite past hardships of the steel industry in nearby Gary, the regional economy is expected to resume moderate growth during the next 20 years. These market factors would encourage many developers to proceed, especially if backed by a corporate investor willing to wait on returns.

The real long-term value offered at Coffee Creek derives from the conservation design itself. LEL has reversed the usual development paradigm and has proposed not privatizing the best areas, the premium spaces, but keeping them open for access by all. According to Mobley, there are no intentions to enhance profits by making the site a reserve of luxury homes. LEL, he says, will span the market, from pricey manor homes to townhouses, condominiums, rentals, and seniors' housing. A few of the manor homes will border on the preserve, with views of the woodland and stream, while the rest are well away in neighborhoods buffered from the preservation area by restored prairie fields. "This kind of development will be common one day," says Mobley. "It is what we're all looking for."

The 200-acre preservation area is designed to define the community by serving as its center and by linking all components of the community together. As founder of the Coffee Creek Watershed Conservancy, a nonprofit group dedicated to monitoring and managing the preserve and the whole creek watershed, Mobley says he is making sure that the community retains its quality far into the future. Ownership of the watershed preserve was deeded to the Watershed Conservancy, whose membership includes leaders from local and national environmental foundations. Special guidelines call for its management according to the most current understanding of the region's native ecology. A Coffee Creek property owners' association fee will pay for common area maintenance.

More than just providing funding, residents will be encouraged to join in the management effort and to discover in the creek watershed ways to continually increase their understanding and appreciation for the land. All local residents will be invited to enjoy the watershed preserve and to develop a sense of stewardship for their town's natural resources; they may form councils or associations to educate users of the preserve and to encourage participation in caring for the land. Special covenants, conditions, and restrictions (CC&Rs) that emphasize volunteerism and community involvement have been devised by Wayne Hyatt, a consulting lawyer for the Coffee Creek development.

Residents of Chesterton can enjoy the preservation area on their doorsteps and witness the Coffee Creek Watershed Conservancy's continual management efforts, says Conservation Design Forum's Patchett. They will live atop a restored hydrological system, with their water system closely linked to the nearby wetlands and prairie fields. They can walk trails leading through prairie and woodlands, discovering in the preserve an inexhaustible source of learning. Designers of Coffee Creek Center say they are seeking to realize a central principle of conservation design: good preservation is not protection of untouched and uninhabited nature, but a mutually beneficial relationship in which people strengthen and are strengthened by the natural world. ■

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