How did more than 1.4 million acres of Illinois habitat

Man vs. Wetla

"There's quicksand in her
swampy lands,
The milk-sick and the shakes;
But these are slight diversions
That do not spoil the joy
Of living in this paradise,
The State of El-a-noy."

—Undated, anonymous song lyrics

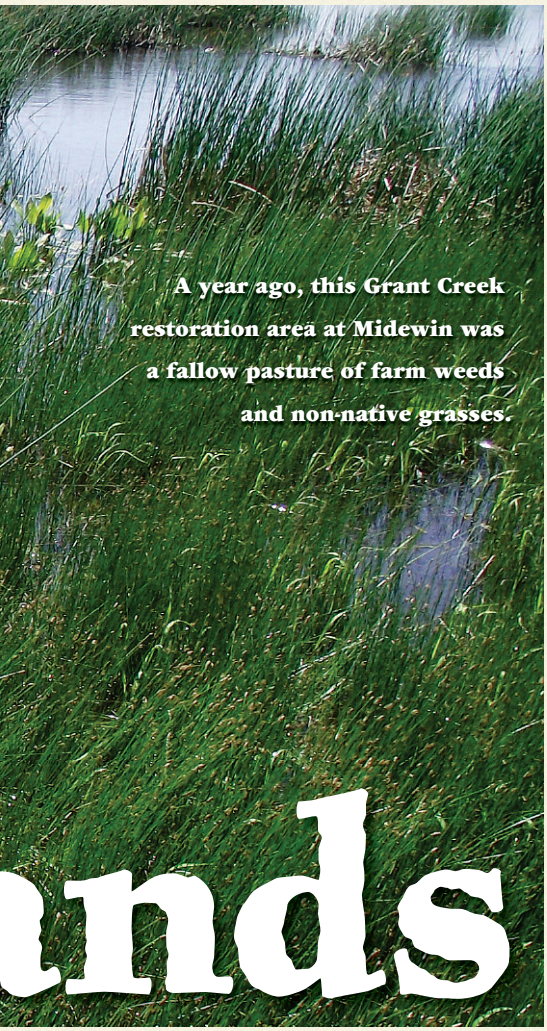
Story and Photos By Arthur Melville Pearson

Even early booster songs extolling the virtues of settling in the Prairie State acknowledged that primeval Illinois contained some distinctly un-Eden-like qualities. These included sucking swamps and swarms of mosquitoes that inflicted many with malarial "shakes."

Having literally wallowed in mud, muck and disease from its official founding in 1832, the City of Chicago eventually raised its streets and buildings from 4 to 8 feet above grade. This allowed for the establishment of a sub-street network of sewers to drain both storm and waste waters into the local drainage ditch—also known as the Chicago River—which was reversed to protect the supply of drinking water in Lake Michigan.

Out on the virgin prairies, pioneer farmers typically sank their plows first in higher, dryer lands. But it didn't take long for them to seek remedy for lands plagued, as they saw it, with unhealthy, impassable and—most importantly—non-arable wet areas. But rather than building up, they sought relief by digging down. The result was a sprawling system of drains and ditches that re-plumbed nearly a third of the entire state.

go down the drain?



A year ago, this Grant Creek restoration area at Midewin was a fallow pasture of farm weeds and non-native grasses.

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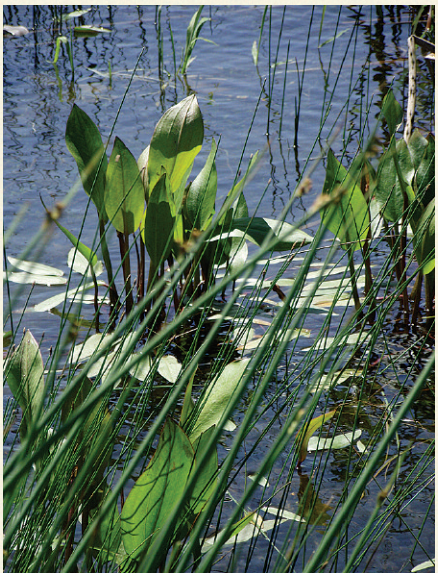
Prior to human settlement, much of central and northeastern Illinois was poorly drained because its natural system of plumbing lacked the complexity and scope of geologically older landscapes. Following the retreat of the last glacier about 14,000 years ago—a mere watch tick in geologic time—the low,



Harkening back to its roots, South Patrol Road Prairie at Midewin once again boasts about 400 acres of wet prairie, marsh and sedge meadow.

flat landscape impeded the widespread branching of rivers, creeks and related waterways, leaving significant stretches with little or no drainage at all.

As a result, the landscape was pocked with an array of wetland types, including bogs, fens, sedge meadows, seeps, shrub swamps, vernal ponds, floodplains and flatwoods. Together, they supported a cornucopia of plants and animals almost beyond measure. Of the Calumet marshlands in 1822, a young officer stationed at Fort Dearborn recalled:

The wildfowl was so incalculably numerous that it is scarcely possible to give you an adequate idea of their numbers…At times [the flocks] absolutely obscured the sun…As this cloud of game passed each officer fired and then took another of his guns to repeat his shot until all his guns had been discharged…Then followed the picking up and collection of game. I dare not name the number we would then collect of a morning least you might doubt the accuracy of my memory.

Beyond the handful of species that could be harvested for sport and commercial gain, a growing nation had little interest in the complete ecological worth of wetlands. Between 1849 and 1860, Congress passed several iterations of a Swamp Land Act, which granted nearly 65 million acres of wet areas to 15 states for the expressed purpose of draining them for settlement and development. Illinois received more than 1.4 million acres—more than 20 times the total number of natural area acres currently included in the vaunted Forest Preserve District of Cook County—and in 1852 passed an "Act to dispose of the swamp and overflowed lands and to pay the expenses of selecting and surveying the same."

Even at 10 cents an acre, such lands were worthless to the farmer without improvement. What farmers needed first was an efficient and affordable means of draining water from the land. Since Cato and Pliny first wrote about the subject in 200 BC, farmers throughout the world have been enterprising hydrologists. Some of their earliest efforts involved laying boards, stones or clay roof tiles in the bottom of dug trenches to help speed the runoff of water. In the early 19th century, innovators shaped roof tile into half moons, which proved even more effective. Eventually, with advancing machine

(Photo courtesy River Valley Photographic Resources.)

(Photo by Adele Hodde.)

Indian plantain (*Cacalia plantaginea*, above) and great blue lobelia (*Lobelia siphilitica*) are among the showiest of the nearly 200 species of wetland plants once again flourishing at Midwin.

technologies, it became possible to mold clay tiles into complete cylinders, still called drain tiles to this day.

As one Midwestern agriculture historian has noted, prior to this simple innovation, "…the war on the wet prairie… [was] little more than skirmishes." By 1880, the war was on in earnest with nearly 1,200 tile factories operating in Illinois, Ohio and Indiana, alone. Governments passed laws to encourage widespread drainage. Bankers extended credit to farmers for the cost of laying tile. And related farming industries, which stood to reap even greater profits from more land coming under cultivation, pitched in with how-to drainage manuals that included no small amount of subtle encouragement:

The tragedies of wet land would make a volume larger than the dictionary. There would be chapters of disappointment…sorrow…bankruptcy…foreclosures and lawsuits…fights and family quarrels…teams mired, harness broken, wagons stuck, loads unloaded and reloaded …cultivation delayed…belated crops, drowned crops, blistered crops and no crops at all…returning no income, giving the country a dejected appearance, menacing the health of every citizen for miles around.

Farmers seldom needed such doomsday scenarios to encourage them to lay tile. Common sense rather dictated that not even the self-scouring steel moldboard plow—a pivotal innovation by Will County resident John Lane that allowed farmers to slice through the tangle of prairie plant roots and mucky Midwestern soils—could turn a furrow in water. And so, they mapped the wet areas of their fields then dug strategically-placed trenches to a depth of between 2 and 3 feet—deep enough to allow crop plants to grow healthy roots. Many early farmers dug their trenches by hand. In time, ditching machines powered first by horse or mule, then steam, then diesel, became the norm. Depending on conditions, farmers would lay tile ranging from 4 to 36 inches in diameter, with an average "fall" or slope of 2 inches for every 100 feet of tile line. After the trenches were backfilled, water would percolate through the soil and enter the tile lines through the uncemented gaps between the 1-foot sections of tile. Lines typically drained to outlet channels, which ranged from 15 to 35 feet wide across the top and frequently extended for several miles through neighboring properties, eventually emptying into some creek or stream and then into the Mississippi River.

By 1915, enough drain tile had been laid in Illinois to circle the earth nearly six times. The resulting increase in farmland is a big part of the reason that Illinois long has been an agricultural giant, helping to feed the nation and the world. Illinois farmers consistently rank as the number one or two producers of corn and soybeans in the nation. Combined with other agricultural commodities, today they generate in excess of $9 billion annually.

Beginning in the late 1960s, however, laws and regulations began to be established to protect remaining wetland areas. As part of an expanding environmental awareness, wetlands came to be better understood for the ecosystem services they provided. In addition to flood control and pollution abatement, wetlands also were determined to be vital to sustain populations of numerous wetland plant and animal species that

The remains of a pioneer-era schoolhouse stand witness to the returning wetlands of Midwin.

Clay drain tiles (left) excavated at Midewin have measured 4 to 24 inches in diameter. Paul Botts, executive director of The Wetlands Initiative, and Bill Glass, ecologist at Midewin, plant wetland plugs at the Grant Creek restoration area (right).

had become rare, threatened or endangered for lack of basic habitat.

Today, throughout the Chicago Wilderness region, a number of major wetland restoration efforts are under way. Many are historic wetlands turned farm fields, where the first restoration steps include the removal of drain tiles. One of the biggest challenges in removing tile is first finding it. According to Bill Glass, ecologist at Midewin National Tallgrass Prairie, farmers may have installed a lot of tile over the years but they didn't necessarily keep good records. At Midewin—whose 20,000 acres of former farmland/former Joliet arsenal represents one of the largest habitat recovery efforts in the country—Glass and his team have used a combination of aerial photos, ground-penetrating radar, ground probes, slit trenches and field surveys looking for blowouts; areas where tile lines have broken, sending small gushers to the surface.

Once tile lines have been located, there are a number of ways to disable them. Echoing the installation process of a century or more ago, the best method typically involves digging trenches. Clay tile generally may be crushed in place. Newer, PVC tile must be removed. To date, nearly 30,000 feet of tile has been removed from several restoration areas at Midewin. But that's only the start. Glass estimates there remains 770,000 feet—or 145 miles—of tile left to remove. And that's not counting the tile that must remain in place. In accordance with U.S. Army Corps of Engineers regulations, the USDA Forest Service, which operates Midewin, must keep certain drain tiles and outlet ditches clean and operable so as not to have a negative effect on surrounding farm and residential land.

Following tile removal, typical farmland-to-wetland restorations require the removal of hedgerows of Osage orange trees, honeysuckle and cottonwoods, and non-native grasses and farm weeds. Restorations at Midewin also require the removal of arsenal-era relicts, such as paved roads, raised rail beds and ammunition bunkers built of reinforced steel concrete. Final steps include re-grading the topography to approximate original conditions and re-planting with mixes of native plant seeds and plugs tailored to the subtle gradations of wet and dry areas.

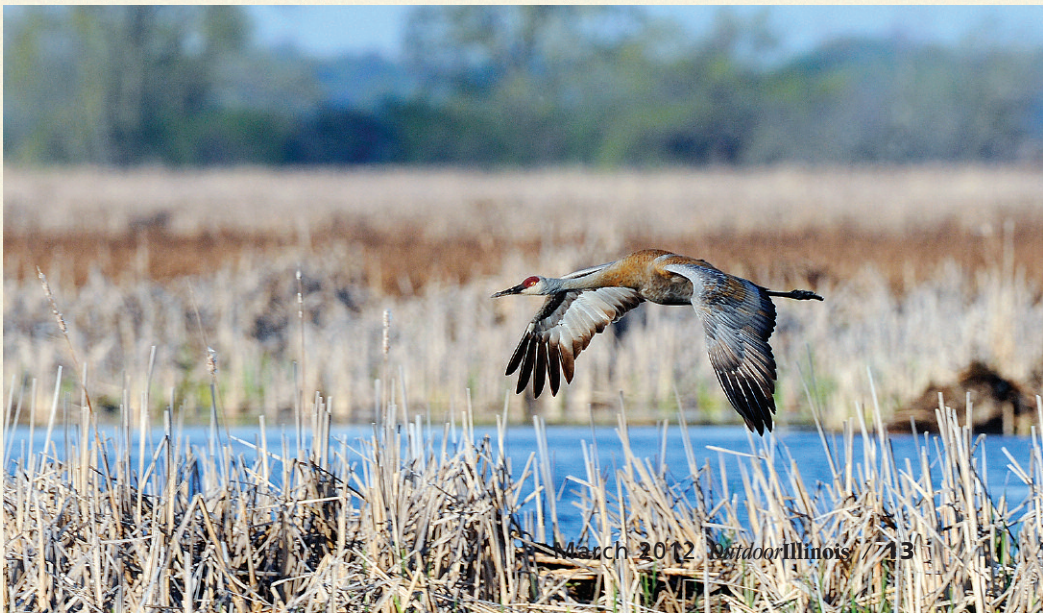
Gary Sullivan, senior restoration ecologist for The Wetlands Initiative, which has partnered with the Forest Service on several wet prairie restorations at Midewin, explains that it can take a year for a site's hydrology to recover, and several years for plant and animal communities to re-establish themselves—and even then, only with ongoing maintenance to keep both native and non-native invasive plant species at bay.

But at Midewin, so far so good, as evidenced by the recovering populations of beavers, nature's plumbers, which have dammed several drainage ditches to help keep more water on site.

And now there are, once again, sandhill cranes, geese and other waterfowl, "so incalculably numerous that it is scarcely possible to give you and adequate idea of their numbers."

Arthur Melville Pearson is the director of Chicago Programs for the Gaylord and Dorothy Donnelley Foundation and blogs about his volunteer restoration experiences at www.midewinrestoration.net.

(Photo courtesy Steve Patterson.)



Sandhill cranes are among the many wetland-dependant birds regularly sighted at Midewin during migration.