

Ohio's history is linked to drainage

Ohio's early settlers may have a reputation as rugged individualists, but for much of the state, creating productive homesteads out of wilderness took more than individual efforts. It took drainage, and drainage required cooperation with other landowners.

The first land settled was ground that drains well naturally, but more than half of the state's land was too wet to be farmed productively. Some land was barely habitable because stagnant water never drained away. Reports from settlers describe a persistent odor of decay, mold-encrusted belongings, and vicious biting insects, including mosquitoes that carried malaria. Even so, early Ohioans saw new possibilities in the rich soil of the state's wetlands.

At first, some landowners tried digging their own ditches, and this worked for those who could connect directly with a creek or river. But most poorly drained land had no outlet for excess water. Eventually, groups of landowners began working together to build drainage systems. Then starting in the 1840s, the State Legislature began passing drainage laws to guide the construction and financing of drainage projects that would benefit multiple landowners. By 1884, an estimated 20,000 miles of ditches had been built, draining 11 million acres or over 40% of Ohio's land.

Today, Ohio's drainage infrastructure includes open ditches as well as buried tile lines and streams that have been reshaped to enhance drainage. At least half the state's land is affected by this public drainage infrastructure

Ohio's drainage laws have been updated many times as the state has grown and developed. And drainage systems that were originally built to enhance agricultural production have also made former wetlands suitable for communities, home sites and industrial development.

Today, municipalities manage water with their own set of drainage laws, but most rural drainage projects involving multiple landowners are organized under Ohio's Petition Ditch Law (Ohio Revised Code 6131) or Conservation Works of Improvement (Ohio Revised Code 1515). While there are important differences in how these two legal processes work, both fund projects with assessments on affected landowners and require that the financial benefits of a project exceed its cost.

Unfortunately, one flaw in the early ditch laws was that they didn't include provisions for ongoing maintenance. In 1957, legislation was passed requiring maintenance provisions for new drainage projects, but many of today's rural land uses depend on the drainage infrastructure constructed a century ago or even earlier. As older projects continue to age, many of them will need to be re-constructed to continue providing the drainage landowners and homeowners rely on.

Just as the early settlers did, today's Ohioans must manage drainage to make ground suitable for land uses that will meet the state's goals for the future.

The value of drainage

Despite the old saying, the value land isn't based only on location, location, location. Its value is also greatly affected by drainage, drainage, drainage. And unless land is set aside as preserved wetland, saturated soils or standing water hurt the value of the property.

Over the years, rural Ohio landowners have invested in developing their farmland with drainage structures such as sod waterways and subsurface drainage lines. Meanwhile rural homeowners have invested in household sewage treatment systems. To work, both field drainage systems and household septic systems need an outlet for the water moving through the systems. Even though they might not be aware of it, these landowners depend on ditches or subsurface drainage lines to carry water away from their property to rivers or streams. The drainage channels might be miles away, but if they didn't function, water would back up throughout the watershed.

For farmers, drainage is critical to good yields. Research conducted by Ohio State on north central Ohio's very poorly drained soils shows that a combination of surface and subsurface (tile) drainage can double average yields. It also reduces yield variability, allows earlier planting and increases the number of days soils are suitable for fieldwork. While the benefits of drainage vary, much of Ohio's most productive crop ground could not be farmed economically without man-made drainage.

The difference shows up in both land prices and rental rates, notes John Boblenz, a realtor based in Delaware County. "Land goes for 25 to 30 percent more if you have good drainage," he explains. "It also makes a difference in how quick a farm sells."

For homeowners, drainage problems can affect not only the value of the home but also the well being of the residents. For instance, a chronically wet basement can result in mold growth, stagnant water in a yard can breed mosquitoes, and saturated soils can cause leach beds to fail. Generally, Boblenz says, the difference in the selling price of a poorly drained home site compared to a well-drained one is the cost of correcting the problem. In some cases, though, drainage problems can't be solved easily because the property doesn't have a drainage outlet.

Unfortunately, many of the drainage systems landowners rely on have deteriorated over time and are no longer working as they once did. Unless they are reconstructed, the value of the farmland and rural homes they drain will suffer.

The secret life of a drainage ditch

Ohio's drainage ditches were not originally intended to provide habitat for aquatic animals, but that hasn't kept aquatic organisms out of the state's drainage channels. While people were using the ditches to drain water away from their land, nature was finding ways to use those same ditches as a home for various invertebrates, fish, amphibians, and other aquatic animals.

Over the years, some ditches have developed habitat features similar to those in streams, such as meandering curves, riffles, pools, and trees that shade the water. Generally, as the habitat within a ditch becomes more diverse, the life within the ditch becomes more diverse as well.

The benefits of healthy ditch ecosystems extend beyond the ditches themselves to downstream rivers and lakes. For example, plants in ditch beds and microorganisms in the water can help remove excess nitrogen and other pollutants from the water as it travels downstream. Using conservation practices such as filter strips and integrated pest management within a watershed can also help reduce the amount of nutrients and pesticides transported downstream.

Scientists with the USDA-ARS, Soil Drainage Research Unit in Columbus, Ohio are evaluating the influence of conservation practices by examining aquatic habitat features and fish communities within ditches. Preliminary results suggest that fish communities are influenced greatly by the width of the water, water depth, twists and turns in the channel, and the width of the riparian zone adjacent to the ditch. Other factors in the watershed may also affect the life in a ditch. For instance, high erosion rates in a watershed can make it necessary to clean out ditches more frequently, disturbing the aquatic habitats.

In some cases, stream-like ditches still provide adequate drainage for the surrounding watersheds. However, in other areas the present land uses rely on channelized ditches that can drain away large volumes of water quickly after a rain. Curving channels, uneven ditch beds, and logjams caused by falling trees can slow the flow and may cause water to back up on the land.

The good news is that healthier ditch habitats and good drainage are not mutually exclusive. Modern ditch designs, maintenance methods and conservation practices may help enhance ditch habitats while still providing needed drainage for surrounding watersheds.

Comment [PS1]: Insects are one group of invertebrates. You could use insects here or invertebrates. I would go with invertebrates because it encompasses a larger number of animals but your audience may more readily identify with insects.