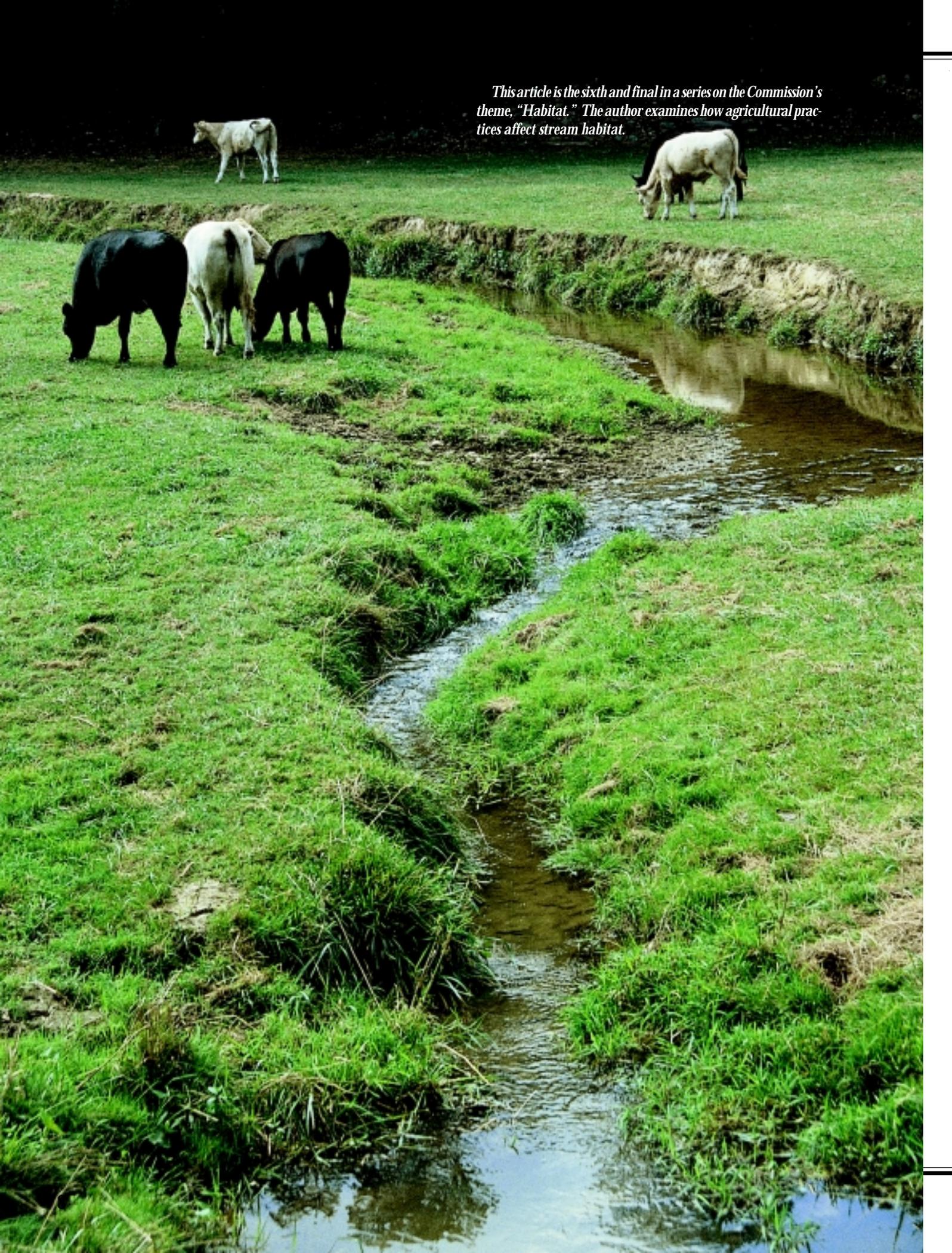


This article is the sixth and final in a series on the Commission's theme, "Habitat." The author examines how agricultural practices affect stream habitat.



A Fish and

by Karl J. Lutz, Area Habitat Manager

Livestock Tale

Slip into your swim fins and imagine yourself a wild brown trout in the headwaters of the Little Lehigh Creek in southeast Pennsylvania.

Just over six years ago you began life in these waters and have beaten the odds of growing into adulthood. Your 18-inch body now slides easily through the cold water as you move slowly upstream. Your journey is one of instinct and survival as you move into unfamiliar waters. You are in search of just the right niche to call home, because the last period of high water during the last few weeks swept the downed tree out of the pool you inhabited.

The stretch of stream to which you are accustomed flows through a forested area where the water is cold and where there is abundant food and a variety of cover. However, as you round the next bend in the stream and move into an active livestock pasture, your surroundings change abruptly. The stream channel is wider and much shallower. There is little or no vegetation on the eroding streambanks. A thick layer of silt smothers the stream bottom, which leaves the area devoid of any aquatic insect life. The warmer water temperature in the slower-moving areas is noticeably uncomfortable to your sensitive skin. There is no

protective cover in sight. You consider turning downstream, but instinct pulls you farther into this hostile environment.

You avoid the cow's hooves in the stream and the great blue heron looking for an easy meal. Your dorsal fin is exposed to the air and hot summer sun as you struggle through the shallow riffles. It takes you several exhausting hours to traverse this quarter-mile stretch of damaged stream before reaching a friendlier stretch above the pasture. A few hundred feet more and you can finally relax as you slip under the tangled roots of a large tree growing on the streambank. This area will do nicely as you fall back into the routine of daily survival.

This fish tale is a common story in the agricultural regions of Pennsylvania. Many similar stories do not have such a happy ending. In fact, because of poor agricultural practices, many streams are no longer able to support a year-round or wild trout population. Pastureland streams seem to suffer the most. Overgrazing and repeated livestock use initiate the streambank erosion process. As the streambanks erode, the stream channel tends

to widen and become shallower. Silt bars and islands choke and divide the flow. A blanket of fine sediment eliminates habitat for aquatic insects and does not allow successful reproduction of many fish species. The absence of streamside vegetation lets the sun warm the water beyond the tolerance of many aquatic organisms. It also allows excess nutrients, pesticides, bacteria and other runoff to enter the stream system easily.



photos: Karl Blankenship

Stream ecosystems can have amazing recuperative powers and can often heal on their own once the disruptive activities of livestock are removed.

The negative effects can also have far-reaching social and economic threats. For the farmer's livestock and neighboring herds downstream, wet and muddy conditions increase the risk of infections, foot problems and diseases. Furthermore, livestock traveling on slippery, unstable streambanks are more susceptible to injury. Recreational activities, such as fishing and swimming, livelihoods dependent on water resources, and public water supplies can be threatened because of degraded water quality. The lack of a vegetative streamside buffer, on a watershed basis, can increase the frequency and severity of flooding and its associated damage to life and property.

From a trout standpoint, many historical trout streams in Pennsylvania have been lost because of poor agricultural practices and other disruptive land uses. These streams are now classified as warmwater streams. Other streams can support only a "put-and-take" trout fishery because of seasonally warm temperatures and loss of habitat. Some streams still support wild trout year-round, but they struggle to maintain their quality with the ever-increasing pressures they endure. The Little Lehigh Creek stretch, where you took your imaginary swim, typifies a stream in transition. A sampling of the fish in this stretch has shown the presence of both coldwater and coolwater minnow species. And even though there are wild trout nearby, none was found in this stretch. This information shows that the stream as a whole is still pretty good, but it is showing signs that the local environment is changing, and probably for the worse. A major factor in this trend is most likely caused by the collective loss of protective vegetation on the streambanks at this site and other sites nearby.

So at this point, you might be thinking this all seems very discouraging. But let's take a look at how these trends can be reversed and how farmland trout streams can be restored. By now you have probably guessed that one of the best things you can do for an agricultural stream is to establish a buffer of natural vegetation along the streambanks. In a pastureland situation, the best way to create this buffer is to build a streambank fencing system that restricts livestock from the stream channel and streambanks. The fence should be considered a permanent barrier and should be custom-made for the type of livestock it is meant to hold and the stream that flows next to it.

Of course, livestock may still need to get into the stream to drink or need to cross the stream to reach another pasture. If this is the case, a stable crossing area is a must. These crossings, or stream access ramps, can be installed using a stone design. Or better yet, they can be constructed with "cattle slats," rectangular, pre-cast concrete slabs made specifically for livestock traffic. An even better alternative might be to install an off-stream watering system, eliminating the use of the stream channel



entirely.

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However, as resilient as they are, in some cases they may need some help with the recovery process in addition to installing a fence. A good example of this is the eroded, vertical streambanks often found on the outside of meanders in many pasture settings. If steps are not taken to stabilize these problem streambanks, they will not readily vegetate, and will likely continue to migrate. This will, more than likely, make it necessary to move the fence after a few high-water events. In other situations, instream devices, made of logs and/or stone, can help restore a more natural stream corridor and replace depleted aquatic habitat much more quickly. In addition to fencing the stream corridor, it is also important to consider fencing wetland areas near the stream. These areas are usually marginal pastureland anyway, but they can provide additional benefits if allowed to function properly.

Most people can readily see the benefits of these conservation practices. However, many studies have been conducted on streamside fencing projects. The results of the following three case studies are presented in very general terms.

- A Penn State study of three agricultural basins in Centre County measured sediment loading, trout density and the number of stream-bottom organisms. The study determined that on the streams with eroded banks, more than twice as much sediment flowed into the stream. In addition, the non-eroded stream hosted more than a five-fold increase in the number of trout and more than twice as many stream-bottom organisms.

- Another Penn State study examined wildlife resources on streamside farms in Dauphin, Indiana and Lancaster counties.

photo: Karl Blankenship

On the sites where the streambanks had been grazed to the water's edge, the only birds found were grackles and starlings. On those stretches that were fenced and had a good growth of natural vegetation, 89 different bird species, including several game species, could be observed nesting, feeding or using the habitat as cover.

● A study conducted by Iowa State University showed a 90 percent removal of nutrients and an 80 percent removal of sediment to the stream channel with a native grass buffer only 20 feet wide.

Proper stream corridor management is surely beneficial to farm animals, people and wildlife. But what about the costs? Installing a good-quality, high-tensile fencing system can be quite expensive. However, cost does not have to be a concern or an excuse. There are several cost-share or free fencing programs administered by private organizations and government agencies:

● The Department of Environmental Protection can install a free fencing system that includes one livestock crossing.

● The U.S. Fish & Wildlife Service, through its Partners for Wildlife Program, can provide a free fencing system and crossings.

● A joint effort by the Chesapeake Bay Foundation and Ducks Unlimited can provide a free fencing system with a minimum 15-foot buffer. As the buffer width is allowed to increase, credits are earned to pay for crossings or other specific improvements.

● The Conservation Reserve Program (CRP) and the Conservation Reserve Enhancement Program (CREP) are administered by the Natural Resource Conservation Service. These programs provide the opportunity for a farmer to remove environmentally sensitive lands, including stream-side buffers, from production in exchange for a per-acre rental rate. Cost-share funds are also available for installing the fence and crossings.

Each of these programs has its own guidelines and may be limited to specific areas of the state. For more complete details about any of these programs, contact the administering organization. If none of these programs suits your needs or you are not eligible, there is also the possibility of applying for grant money from a variety of private and government agencies.

Stream corridor management and streamside fencing are not new concepts. They have been around for a decade or more and are now well-established conservation practices with proven benefits. Many farmers have taken advantage of the various fencing programs or have installed fencing on their own, but there are still many streams and watersheds where streambank fencing could be a huge step toward restoring wild trout.

One of the most important things to remember is that the stream, its associated riparian flood plain and nearby wetlands are all one ecosystem and should be managed as one. In fact, we should focus our attention not only on small stretches of stream but on the entire waterway and all of its tributaries as well....in other words, manage the stream on a watershed basis.

As for the disrupted stretch of the Little Lehigh Creek where you swam as a trout, things have changed for the better. A cooperative effort has been forged to restore this stretch to a more



photo Barry & Cathy Beck

natural ecosystem. Participants include the landowner, the Wildlands Conservancy, the Fish & Boat Commission, the U.S. Fish & Wildlife Service, Trout Unlimited, Ducks Unlimited, the Natural Resource Conservation Service, the Delaware River Keeper Network, the city of Allentown, the Berks and Lehigh County Conservation districts and the Berks County Conservancy.

Fencing and livestock crossings have been installed to limit the "beefers" use of the stream channel and banks. A selection of native trees and shrubs has been planted in the buffer area to supplement the natural growth of vegetation. Instream structures were designed and installed to help restore the natural meander of the stream channel, to provide streambank stabilization and to replace the diversity of aquatic habitats. Periodic assessments of the physical habitat, fish life and water quality will be performed to document the status of the restoration process. Things will ultimately take time to recover, but maybe in the near future, you can slip into your swim fins again and explore this renewed environment. ☐

Resources

* **DEP Fencing Program (Susquehanna Drainage only).** Contact your local DEP regional office under the state listings in the blue pages of the phone book.

* **U.S. Fish & Wildlife Service, Partners for Wildlife Program.** Contact the PA field office in State College at 814-234-4090.

* **Chesapeake Bay Foundation/Ducks Unlimited (CBF), Habitat Stewardship Program (Susquehanna Drainage only).** Contact the CBF office at 717-234-5550.

* **Natural Resource Conservation Service (NRCS), CRP Program (statewide) & CREP Program (20 counties in the southcentral and southeastern PA).** Contact your local USDA-NRCS office under federal listings in the blue pages of the phone book.