Managing Surplus Manure
Laurelbrook Farm & Freund's Farm

2010

Connecticut Department of Environmental Protection,
79 Elm Street, Hartford, CT 06106-5127
Amey Marrella, Commissioner

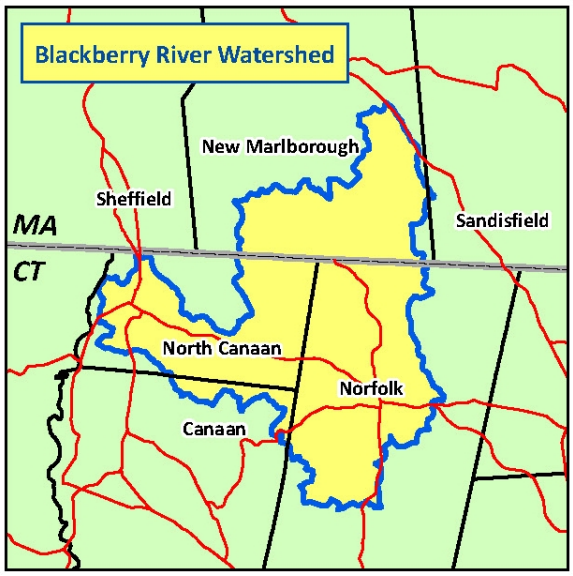
The Resource

The Blackberry River is a major tributary of the Housatonic River in Connecticut. Out of the Blackberry's approximate 47 square miles, 34 of those lie in North Canaan, Canaan and Norfolk, Connecticut. The remaining 12 square miles of the Blackberry River watershed fall in Massachusetts. Approximately 22,900 acres or nearly 78 percent of the watershed is in forest cover. Land Use – Percent land use distribution for the watershed is as follows: 19 percent open land, 78 percent supports some type of forest cover and 3 percent housing and roads. Dairy farming is the major agricultural enterprise. Cleared land above the floodplain is used mainly for hay and pasture. Cultivated land above the floodplain is also utilized principally for hay, pasture and some corn.

The Blackberry River originates in Norfolk and connects to the Housatonic in North Canaan. There are three major issues affecting downstream water quality of the Housatonic River: cultural eutrophication, low dissolved oxygen levels and PCBs. Cultural eutrophication and consequent low dissolved oxygen levels occur in three of the watershed's lakes, Lillinonah, Zoar and Housatonic. These provide popular recreational opportunities for residents who enjoy trout fishing, hiking, boating and swimming.

Environmental Problems

There are two categories of water pollutants, point and nonpoint sources. Pollutants are classified in these categories based on where they originate. For instance, point sources come from locations that are easy to identify



and monitor, like industrial factories and sewage treatment plants. Nonpoint sources (NPS) generally occur due to runoff and are harder to identify because they occur over broad areas. There are a variety of nonpoint sources including urban runoff, agricultural runoff, atmospheric deposition, and construction.

Agricultural runoff can have a variety of negative effects on water quality. The runoff often contains excess nutrients, including nitrogen and phosphorus that can upset the balance of marine ecosystems. One of the major outcomes of an abundance of nutrients is eutrophication. Eutrophication symptoms include the growth of algal mats in surface waterbodies. Environmental effects from algal blooms include decreased aesthetic value and water clarity. If algal growth is severe enough it can impede water flow and water travel of the waterway. In addition, algae consumes a large amount of dissolved oxygen from the surrounding waters, especially during the

process of decay. The decrease in dissolved oxygen can be detrimental for the fish and invertebrate species in the area, causing a decline in overall biodiversity. This process can be so intense that it can result in dead zones, where species that require oxygen can no longer survive.

In addition to excess nutrients, agricultural runoff can also pick up bacteria, pesticides, and sediments. If bacteria and pesticides accumulate, they can have negative effects on the marine life, as well as result in beach and shore closures in the case of bacteria. Sediments can bury natural marine habitats and clog drainage systems. One challenge with protecting water quality from any source of pollution is that when a pollutant enters a waterbody it can affect the downstream watershed or drainage basin as water flows through the system.

The three lake impoundments in the Housatonic River have experienced eutrophication-related problems primarily due to an increase in the concentration of phosphorus. Dairy farms located in the northwestern corner of Connecticut are one of the many sources of this phosphorus. Phosphorus enrichment has caused thick mats of blue-green algae to grow on all three lakes, decreasing recreational use and aesthetic value.

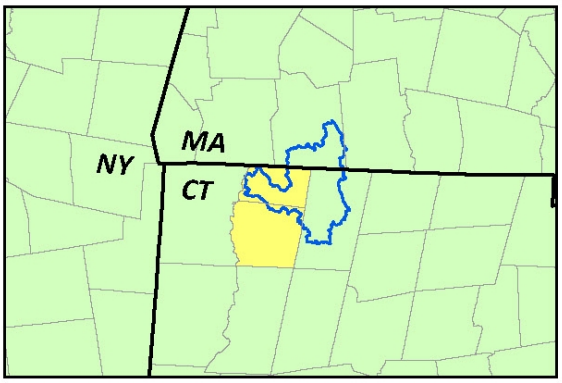
Sources and Solutions

Agricultural nutrient loading problems often occur after rain or snow, when runoff flows over the ground picking up solids and liquid waste from agricultural lands. The runoff can carry bacteria, nutrients and pesticides into the nearest surface waterbody. If left unchecked, farm fertilizer and manure can become a contributor to nonpoint source water pollution to the Blackberry River.

Though the number of dairy farms in Connecticut is decreasing, the number of cows per farm is rising. As a result, each farm has to manage an increased quantity of manure with a limited land base for application as fertilizer. On average, a cow produces 100 pounds of manure and urine each and every day. However, there are some new practices and techniques that can help reduce the effects of agricultural runoff.

The Canaan Valley Agricultural Cooperative, a group of seven livestock farmers in Canaan and North Canaan, Connecticut have joined together to implement state-of-the-art manure management practices. One such innovation is the creation of products from the farm's manure, which can be sold for a profit and reduce the risk of over fertilization of crop land and resulting agricultural runoff. This will redistribute the nutrients over a larger area and possibly create a new source of revenue for the farms.

Location of the Canaan Valley Agricultural Cooperative



For example, the Laurelbrook Farm in East Canaan installed a roofed four-building complex to store and compost their surplus manure. The Laurelbrook Farm is in an excellent location to benefit from manure management practices because the Blackberry River divides the farm and has a high risk for agricultural runoff to be deposited directly into surface water. Before construction of the composting

complex, the farm had been producing compost for several years on a trial basis; however, the process was exposed to rain and wind. The roof now prevents rainwater from reaching the manure, minimizing the leaching of nutrients and their contribution to runoff.

Prior to composting, the manure is separated into liquid and solid portions. The liquid portion is stored in a slurry tank to be used as fertilizer for direct application to cropland. The solid portion is brought to the composting complex, where a windrow turner is used to mix and aerate the manure and create the compost. The Laurelbrook facility is in full operation, composting approximately 75 yards of manure each day. Laurelbrook's products currently include topsoil, garden mix, compost and mulch. All products are screened before they are sold to consumers. In its first year, the operation removed approximately 144,500 pounds of nitrogen, 45,990 pounds of phosphorous and 83,220 pounds of potassium from the farm.

A windrow turner and the roofed composting complex at the Laurelbrook Farm

Both components of this project- the roof to keep out rainwater and the compost products that remove the excess manure from the farm- will help protect water quality by reducing the occurrence of agricultural runoff.

A second project is underway for this farm, which involves installing a nutrient removal system onsite at Laurelbrook Farm. This system will concentrate the manure nutrients in the solid component, rather than the liquid portion of the separated manure. The liquid portion of the manure is used as a fertilizer, so this process reduces the possibility that runoff will pick up excess nutrients from the crop land. The goal of this initiative is to remove about 75,300 pounds of phosphorus every year from the Laurelbrook Farm, which is over 75% of their current production level. This project will be completed in 2011.

Another manure management program by the Canaan Valley Agricultural Cooperative is the production of CowPots by the Freund's Farm, which is also located in East Canaan, Connecticut in the Blackberry River watershed. Freund's Farm digests their dairy manure in a plug flow digester, separates the liquid and solid manure and then composts the solid manure. The composted manure solids are used to create an organic pot for planting. The plug flow digester decomposes dairy manure from lactating cows into value added products that are sold to off-set costs.

CowPots are a replacement for plastic and peat pots. Their benefits include the ability to plant them directly into the soil, they are biodegradable, they contain important nutrients and they are easy to use. During the summer months, when most of Freund's cows are in pastures, Laurelbrook Farm provides them with manure to ensure a steady year round production of CowPots. After separation, Freund's Farm returns the liquid component of the manure to

Laurelbrook to use as a fertilizer for their land.

The finished product

This cooperative venture reduces the amount of manure on the farms and turns a profit out of a former expense. In addition, the production of CowPots has the potential to reduce nutrient runoff and non-recyclable plastic pots while creating new jobs.

Consumers as well as professional growers have shown an interest in using CowPots. There is currently a line of pots in only a few shapes and sizes, but testing and development is underway to expand to larger sizes and more diverse pot shapes. It is estimated that around two million CowPots will be produced for the 2010 growing season, which is a substantial increase from the one million pots produced last year.

These projects all contribute to the reduction in nonpoint source water pollution. Since the projects are located in the Blackberry River watershed at Connecticut's northern tip of the greater Housatonic River watershed, they present an opportunity to improve water quality throughout a large downstream section of the river and its lakes. In addition to the environmental benefits, these programs will provide supplementary income for local farms, create more business for Connecticut-based industries and is replicable in other areas. The projects demonstrate that economic growth and environmental protection can occur simultaneously.

Program Partners and Funding

The Canaan Valley Agricultural Cooperative's dedication and hard work set the stage for success on these manure management projects. The Connecticut Department of Environmental Protection, as well as the US Environmental Protection Agency, provided oversight for the projects. The USDA Natural Resource Conservation Service and the Cooperative Extension System are jointly administering technical assistance to the farms. The Eastern Connecticut Resource Conservation and Development Area, Inc. (RC&D) worked closely with the farms on project management and helped receive federal funding through the Clean Water Act Section 319h Nonpoint Source Grant. Through the 319 grant, Laurelbrook Farm was awarded $144,796 for their composting project, as well as $115,204 for nutrient management. In 2010, they received $130,000 for the construction and installation of a nutrient removal system. In 2007, the DEP announced the availability of Supplemental Environment Project funds in the amount of $2,000,000 for the design and implementation of alternative manure management methods for dairy facilities. An advisory group composed of DEP staff, state and federal agencies and agricultural stakeholders selected Laurelbrook Farm and Freund's Farm to receive funding. Laurelbrook Farm received $1,124,343 for the construction and equipment needed for their roofed composting complex. Freund's Farm received $875,657 for the components necessary for the production of CowPots.

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