



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Delaware

Collaborative Efforts by Poultry Integrators Reduce Bacteria Loads

Waterbody Improved

Runoff from agriculture operations and leaking septic systems contributed high levels of bacteria to the Little Assawoman Bay watershed, causing the bay to violate bacteria water quality standards. In response, the Delaware Department of Natural Resources and Environmental Control (DNREC) added the three-square-mile Little Assawoman Bay watershed to Delaware's Clean Water Act (CWA) section 303(d) list in 1996. Targeted education and best management practices (BMPs) implementation successfully reduced bacteria counts, allowing the bay to meet water quality standards. As a result, in 2006 DNREC removed Little Assawoman Bay from Delaware's CWA section 303(d) list of impaired waters.

Problem

The watershed drains an area that extends from the Assawoman Canal to its confluence with Little Assawoman Bay on the southeast coast of Delaware. Little Assawoman Bay—the smallest of Delaware's Inland Bays—is connected to Indian River Bay on the north by the Assawoman Canal and to Assawoman Bay on the south via a narrow channel. The Little Assawoman Bay watershed is an agriculture-dominated watershed with no influencing point sources. The area has a high concentration of poultry growing operations but is experiencing rapid conversion toward urban uses.

Excessive bacteria inputs from agriculture and failing septic systems prevented Little Assawoman Bay from supporting its recreational uses. Water quality monitoring data show that bacteria levels routinely exceeded the state water quality standard for primary recreation, which requires that a single sample value of *Enterococcus* bacteria must not exceed 104 colonies (col)/ 100 milliliters (mL) and that the geometric mean value must not exceed 35 col/100 mL. Because Little Assawoman Bay failed to meet standards, DNREC placed it on Delaware's 1996 CWA section 303(d) list of impaired waters for bacteria. DNREC developed a total maximum daily load (TMDL) for bacteria in 2004 that addressed the entire Inland Bay watershed, which includes the Little Assawoman Bay watershed.

Project Highlights

In 2001 the nonprofit Center for the Inland Bays (CIB) collaborated with Delmarva's major poultry integrators (Perdue Farms, Mountaire Farms and Allen's Family Foods); the Delaware Nutrient

Management Commission; DNREC's Nonpoint Source Program; and the Sussex Conservation District to develop the Little Assawoman Bay as a model watershed area. The project, known as the *Poultry Integrators' Nutrient Effort* (PINE), sought to accelerate compliance and certification programs mandated by Delaware's Nutrient Management Law. This comprehensive approach was developed to reduce nonpoint source pollution.

The Little Assawoman Bay watershed has one of the highest concentrations per land area of poultry growers in the state. The watershed has 27 active poultry operations consisting of 77 functioning poultry houses and one swine operation producing 1,500 hogs per year. Operators implemented numerous agricultural BMPs in the watershed, including dead bird disposal; heavy use area protection; manure conveyors and storage structures; nutrient management planning; cover crops; manure relocation and alternative use, wood chip, and vegetative riparian buffers.

The PINE project greatly increased BMP use in the watershed. For example, Dan and Iris Moore grow poultry for Perdue Farms in two tunnel ventilated poultry houses. Before the targeted PINE efforts, BMPs on the Moore farm included a dead bird compost and a manure storage structure. The Moores enrolled in the Conservation Reserve Enhancement Program with the Sussex Conservation District and had 54 acres of early succession pine and hardwood mix (Figure 1). The Moore's farm was selected for PINE because it is close both to wetlands and tributaries of the Little Assawoman Bay, as well as next to a new development of more than 1,000 homes. After an initial PINE consultation, plans were drawn up to increase the number of BMPs used on the property. New BMPs included pouring concrete



Figure 1. Conservation Reserve Enhancement Program planting at Moore Farm.

pads on the ends of the poultry houses for easy manure cleanup, installing vegetative buffers in front of tunnel fans to reduce the dust plume, adding an irrigated tree buffer along the property line adjacent to the new housing development (Figure 2), building a new truck route in and out of the farm, and digging a shallow wetland. PINE also suggested removing two old poultry houses along the road. The housing development company agreed to pay to remove the two old houses, install the irrigated vegetated buffer and build the new truck route.

Results

Monitoring data show that bacteria levels have dropped in Little Assawoman Bay, thanks to the efforts of the agricultural community. By the end of the monitoring assessment period in 2006, data from each of the measured monitoring stations show that the water meets water quality standards for bacteria (Table 1). On the basis of these data, DNREC removed the three-square-mile segment of the Little Assawoman Bay from Delaware's 2006 CWA section 303(d) list of impaired waters for bacteria. Monitoring



Figure 2. The PINE project included planting a tree buffer along the property line.

will continue at all Little Assawoman Bay stations to ensure that the waters continue to meet standards.

Partners and Funding

The PINE project was a partnership between the CIB; University of Delaware; Sussex County Conservation District; Delmarva's major poultry integrators (Perdue Farms, Mountaire Farms and Allen's Family Foods); and the Delaware Nutrient Management Commission.

The project used slightly more than \$100,000 in federal CWA section 319 funds to pay the salary of a Little Assawoman Bay watershed coordinator. Additional funding sources included the U.S. Department of Agriculture's Environmental Quality Incentives Program and Conservation Reserve Enhancement Program, Delaware Conservation Cost Share Program, and Americana Bayside Development Corporation. Because of the nature of the funding and enrollment procedures, much of the funding involvement is immeasurable.

Table 1. 2006 monitoring data show that Little Assawoman Bay meets water quality standards^a for *Enterococcus* bacteria

Monitoring station	Single sample value (col/100 mL)	Geometric mean value (col/100 mL)
Little Assawoman Bay Ditch at Rd. 58 Bridge	20	14
Little Assawoman Bay, Mid-Bay	20	8

^a Water quality standard: a single sample value of *Enterococcus* bacteria must not exceed 104 col/mL and the geometric mean value must not exceed 35 col/100 mL.



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