



# NONPOINT SOURCE SUCCESS STORY

## Wisconsin

### Watershed Planning and Implementation Restores Cold Water Fishery in Little Hay Creek

#### Waterbody Improved

Excess sedimentation and nutrients from agricultural sources degraded water quality in Little Hay Creek. As a result, one segment of the creek (miles 0.0–1.8) was added to Wisconsin’s 1998 Clean Water Act (CWA) section 303(d) impaired waters list for low dissolved oxygen, degraded habitat and elevated water temperature. Control of pollutants from agricultural nonpoint sources through efforts headed by the Chippewa County Land Conservation and Forest Management Department led to water quality improvement. As a result, this nearly 2-mile-long segment of Little Hay Creek was removed from the state impaired waters list in 2008.

#### Problem

Little Hay Creek is a tributary to Duncan Creek (Figure 1). Assessments of Little Hay Creek in the 1980s and 1990s found that one segment of the stream did not meet its fish and aquatic life use. A 1980 fish survey conducted by the Wisconsin Department of Natural Resources (WDNR) at three sites along the stream found only three adult brook trout in segments totaling 2,200 feet, along with numerous forage fish. As a result, Little Hay Creek was not designated as a trout stream. The limited number of trout appeared to be the result of degraded fish habitat due to sediment deposition in the stream and lack of woody debris. Streambank erosion from excessive livestock pasturing along the stream and soil erosion within the watershed were the likely sources of the deposited sediment and associated increased phosphorus.

Another assessment by the WDNR in the early 1990s conducted as part of the planning for the Duncan Creek Priority Watershed Project found similar conditions. A fish survey at two of three previously monitored sites found only one brook trout in segments totaling 1,800 feet. Continuous dissolved oxygen monitoring in the summer of 1990 found dissolved oxygen concentrations well below the state’s water quality criterion of 5 milligrams per liter (mg/L) for five consecutive days, with levels as low as 2 mg/L for extended periods of time. An assessment of aquatic insects near the mouth of Little Hay Creek found 15 species and a Hilsenhoff Biotic Index (HBI) value of 4, which indicates very good water quality, but includes the possibility of slight organic pollution.

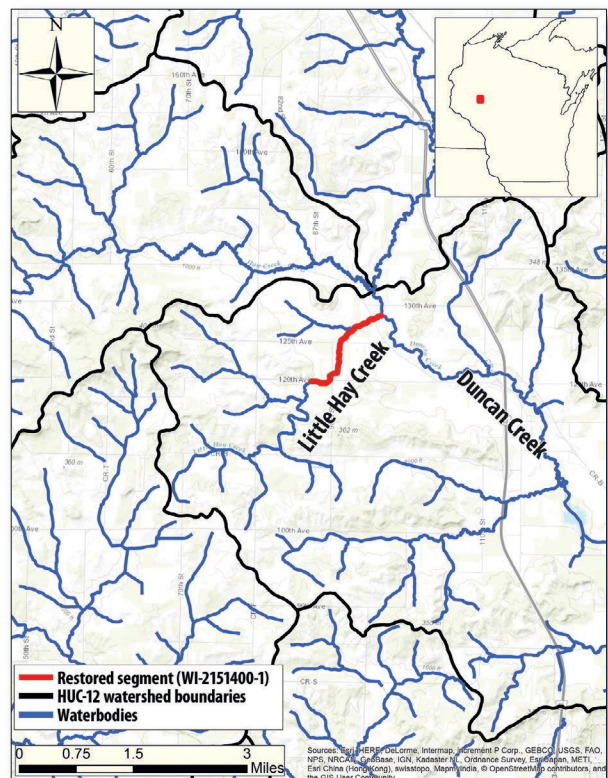


Figure 1. Little Hay Creek is in northwest Wisconsin’s Duncan Creek watershed.

As a result of these assessments, Wisconsin placed a 1.8-mile segment of the stream (segment WI-2151400-1) on its 1998 CWA section 303(d) list of impaired waters for low dissolved oxygen, degraded habitat and elevated water temperature.

## Project Highlights

Through the Nonpoint Source Control Plan for the Duncan Creek Priority Watershed Project (1990–2005), the Chippewa County Land Conservation and Forest Management Department accelerated their efforts to work with agricultural producers in the watershed, including those in the Little Hay Creek subwatershed. Department staff members assessed the nonpoint sources of pollution in the watershed and guided implementation of best management practices (BMPs). The plan was consistent with EPA's "nine key elements" for watershed-based planning. WDNR provided cost-sharing grants and WDNR and Wisconsin Department of Agriculture, Trade and Consumer Protection (WDATCP) provided local assistance grants to Chippewa County to lead and administer the project. The BMPs implemented in the Little Hay Creek subwatershed include:

- Reduced tillage – 294 acres
- Nutrient management – 357 acres
- Rotational grazing – 346 acres
- Barnyard runoff management, including diversions – 5 barnyards
- Green manure crop – 9 acres
- Stream crossing – 1 crossing
- High residue management – 1,731 acres

## Results

After stakeholders installed BMPs within the Little Hay Creek subwatershed, the WDNR conducted another set of water quality assessments. In July 2004 the continuous dissolved oxygen monitoring found no exceedances of the dissolved oxygen criterion. Fish surveys in 2005 at all three of the stations found 41 brook trout in 900 feet of stream. The brook trout found consisted of multiple year classes, including young of the year, indicating natural reproduction. High numbers of mottled sculpin, a species intolerant of low dissolved oxygen levels and requiring cold water, were also found. Aquatic insect metrics also showed improvement: the HBI value decreased to 3.5 (scores ranging from 0.0 to 3.75

are considered "excellent"), and the number of species increased to 25.

Based on the evaluation monitoring results, the WDNR removed the segment of Little Hay Creek from the CWA section 303(d) list of impaired waters in 2008 for all impairment causes (dissolved oxygen, habitat and temperature). In addition, WDNR staff recommended that the designated use subcategory be changed from a warm water forage fish community to a cold water fish community. Per this recommendation, in 2013 WDNR identified Little Hay Creek as a Class I trout water (Figure 2).

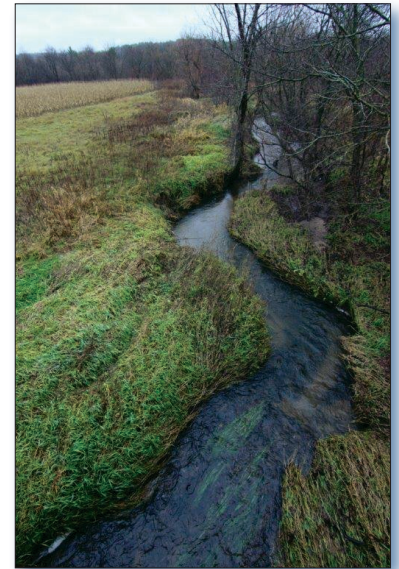


Figure 2. Little Hay Creek was designated as a Class I trout water in 2015, thanks to watershed restoration efforts that improved water quality.

## Partners and Funding

The restoration of Little Hay Creek was supported by programs for BMP implementation including the (1) Duncan Creek Priority Watershed Project funding (through WDNR), (2) Wisconsin Farmland Preservation Program cross-compliance requirements and the Wisconsin Farmer's Fund (both through WDATCP), (3) Chippewa County Animal Waste Ordinance compliance, (4) U.S. Department of Agriculture (USDA) Farm Service Agency's Conservation Reserve Enhancement Program, and (5) USDA Natural Resource Conservation Service's Environmental Quality Incentives Program. The total cost of BMPs implemented in the Little Hay Creek portion of the Priority Watershed Project was \$180,065. U.S. Environmental Protection Agency CWA section 319 grant funding, awarded from 1991 to 2005, helped to cover the cost of WDNR Nonpoint Source Program staff, BMPs and monitoring costs associated with the project.



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