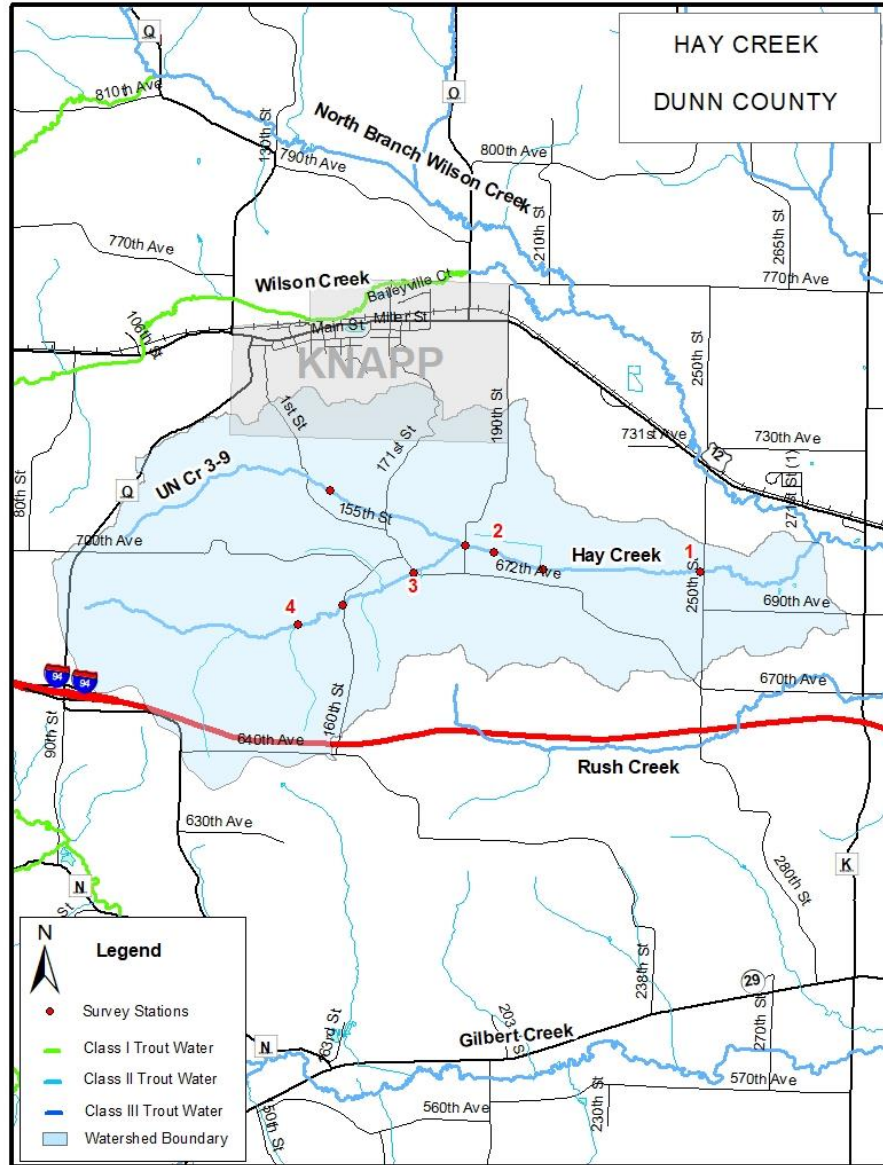


WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Fisheries Survey Report for Hay Creek, Lucas TWP, Dunn County, Wisconsin 2021

WATERBODY IDENTIFICATION CODE 2067000



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Introduction

Hay Creek is a small Class II coldwater tributary to Wilson Creek located in west-central Dunn County. The stream is 5.44 miles in length and currently, there is 5.26 miles of classified trout water. The watershed is largely composed of row crop and pastured agricultural land, with some grassland and forested land to a lesser extent.

Hay Creek is classified as Impaired due to high phosphorus levels. Non-point source pollution and bank erosion from overgrazing are prevalent within the watershed. The trout population within the stream is fully supported by natural reproduction. Hay Creek has one Class II tributary, Unnamed Creek 3-9, which flows into Hay Creek just upstream of 190th St.

Brook Trout were historically stocked annually from 1978 to 1999, when stocking was discontinued. Hay Creek is listed as a candidate stream within the Brook Trout Reserves program with a classification of Environmentally Resilient. A single Streambank Easement exists on the stream and is located upstream of 190th St. A trout habitat improvement project was completed on this easement in 2019 and includes the lower reach of Unnamed Creek 3-9 to the confluence with Hay Creek.

Methods

A total of two stations were sampled on Hay Creek in 2021. Sampling was conducted between June 15 and Sept. 15 using a backpack stream shocking unit with a single electrode. The length of stations was determined by multiplying the mean stream width by 35. Stations were located upstream of 250th St (Station 1) and upstream of 190th St (Station 190th St). Only trout species were collected at both stations. All trout were identified to species and measured to the nearest 10th of an inch.

Study Site

Station 1 was located downstream of Station 190th St in a pasture. Habitat was not evaluated during the surveys. Anecdotally, the stream at Station 1 flowed through a pasture with heavily eroding streambanks. The substrate consisted of sand and silt. Small amounts of aquatic vegetation and woody debris were present. Station 190th St flowed through a restored section of Hay Creek. Trout habitat restoration was completed on this property in 2019 and included restoration of Unnamed Creek 3-9. While habitat was not evaluated quantitatively, habitat consisted of rocky riffles and small elongated pools created by installing channel constrictors (Elevated Riparian Optimization Structures, EROS). Overhead cover was present in the form of installed root wads and boulders. The stream corridor at this site is composed of grassland.

Results

Brook Trout were the only species of trout captured at both stations and ranged in relative abundance from 692 total fish per mile to 1304 total/mile, which is in the 90th and 95th percentiles for Class II Brook Trout streams within the Driftless Area (Table 1). Natural reproduction of Brook Trout was documented at both sites, and young-of-year (YOY) or juvenile trout (less than 4.5 inches) ranged in relative abundance from 16/mile (50th

percentile) at Station 1 to 225/mile at Station 190th St (80th percentile). The abundance of adult Brook Trout (larger than 4.5 inches) was 676/mile at Station 1 and 1079/mile at Station 190th St, which resulted in the 90th and 95th percentiles for adult abundances in Class II Brook Trout streams in the Driftless Area (Figure 1). The maximum size of Brook Trout at Station 1 was 11 inches, while only 9 inches long at Station 190th St (Figure 1). A total of 19% and 9% of adult Brook Trout at Station 1 and Station 190th St, respectively, were larger than 8 inches in length (Figure 1). Average trout densities post-habitat restoration have doubled from pre-project densities including increases in juvenile trout abundance (Figure 2).

Discussion

The Brook Trout population within Hay Creek features fish in moderate abundances with evidence of natural reproduction at both stations sampled. Brook Trout were historically stocked in Hay Creek annually due to a lack of natural reproduction. Fish were stocked as yearlings (6+ inches) after 1980. Therefore, natural reproduction was likely first detected in Hay Creek in the 1995 survey at Station 1. Natural reproduction may have occurred prior to this survey; however, no data is available for documentation. The beginning of natural reproduction of Brook Trout after stocking was likely due to improvements in the overall watershed health during the 1970s and 1980s with better land use practices and groundwater infiltration resulting in higher base flows and colder stream temperatures.

Natural reproduction is currently low at Station 1 and was much higher in Station 190th St. The total trout abundance was also much higher at Station 190th St. Higher densities of Brook Trout at this site are due to the improved habitat throughout this reach of Hay Creek and Unnamed Creek 3-9. Habitat restoration in 2019 consisted of removing the wooded stream corridor composed of box elder and invasive species, bank shaping, bank armoring, installing instream habitat and re-establishing a native prairie buffer. This has resulted in a reduction in instream sedimentation, improved instream habitat and increased stream productivity due to the removal of the closed canopy. Unnamed Creek 3-9 is an important tributary for spawning and nursery habitat and likely contributes to the population in Hay Creek and Wilson Creek. Conversely, the size structure at Station 1 was higher than at Station 190th St with more larger fish present. This is likely due to lower densities of fish at Station 1, which decreases intraspecific competition as well as slightly wider stream widths and overall larger stream size at the downstream location. However, adult and juvenile trout densities were much higher at Station 190th St relative to Station 1, likely due to the habitat improvements completed here. Trout densities have continued to increase post-project and are now double the densities present prior to project completion (2018).

Hay Creek is currently classified as a Class II trout stream which is correct based on this survey. Moderate to high amounts of natural reproduction was documented, and multiple year classes of fish are present indicating survival from year to year. Habitat throughout much of the stream is poor and heavily impacted by overgrazing and row cropping within the stream corridor. Easement acquisition and habitat improvement should continue to enhance and protect the Brook Trout fishery, given the importance and classification within the Brook Trout Reserves program and the potential for this stream to act as a coldwater refuge stream in light of a changing climate.

Table 1. Abundance (number per mile) of Brook Trout at two stations on Hay Creek, Lucas TWP, Dunn County.
 * indicates data taken from downstream of the 190th St. bridge which is similar habitat to St. 190th St prior to habitat restoration.

Year	ST. 1		ST. 190TH ST	
	Juv.	Adult	Juv.	Adult
1953	0	0	.	.
1961	0	0	.	.
1975	0	12	158*	79*
1979	0	76	53*	194*
1995	59	23	0*	24*
2003	0	160	.	.
2010	0	0	.	.
2018	.	.	96	350
2020	.	.	64	563
2021	16	676	225	1079

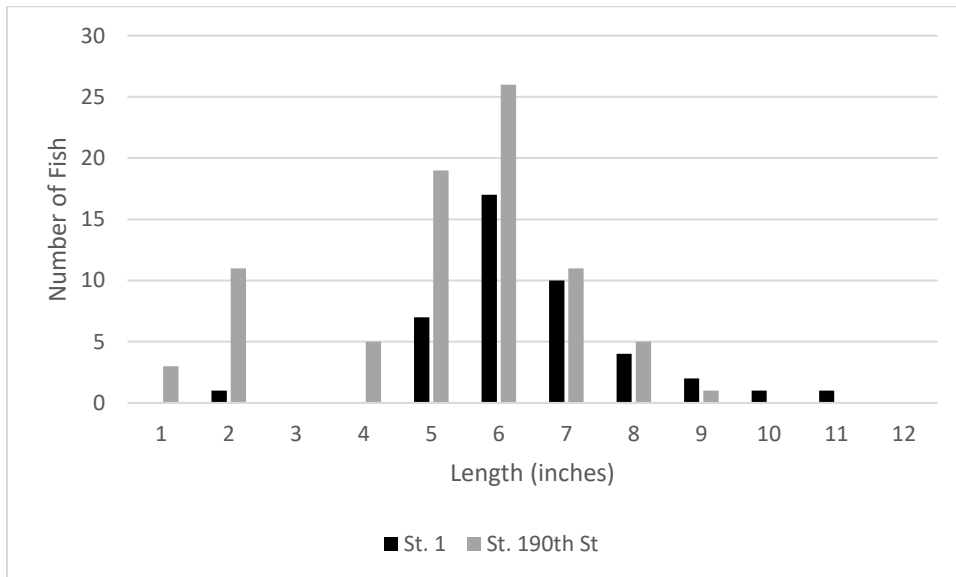


Figure 1. Length frequency distribution of Brook Trout collected from two stations on Hay Creek, Lucas TWP, Dunn County in summer 2021.

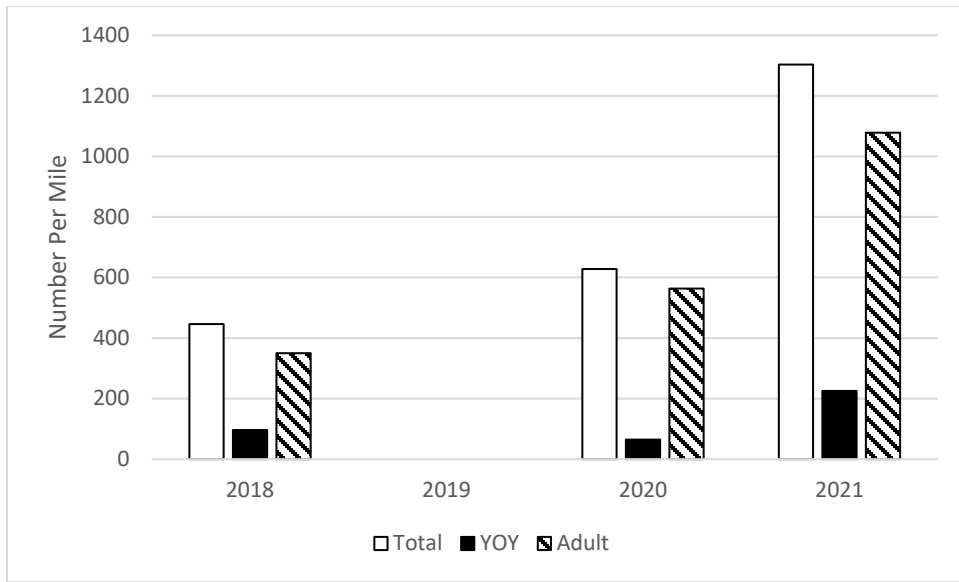


Figure 2. Relative abundance of Brook Trout prior to habitat restoration (2018) and post-habitat restoration (2020-2021) at Station 190th St on Hay Creek, Lucas TWP, Dunn County from 2018-2021. Habitat restoration was completed in 2019.