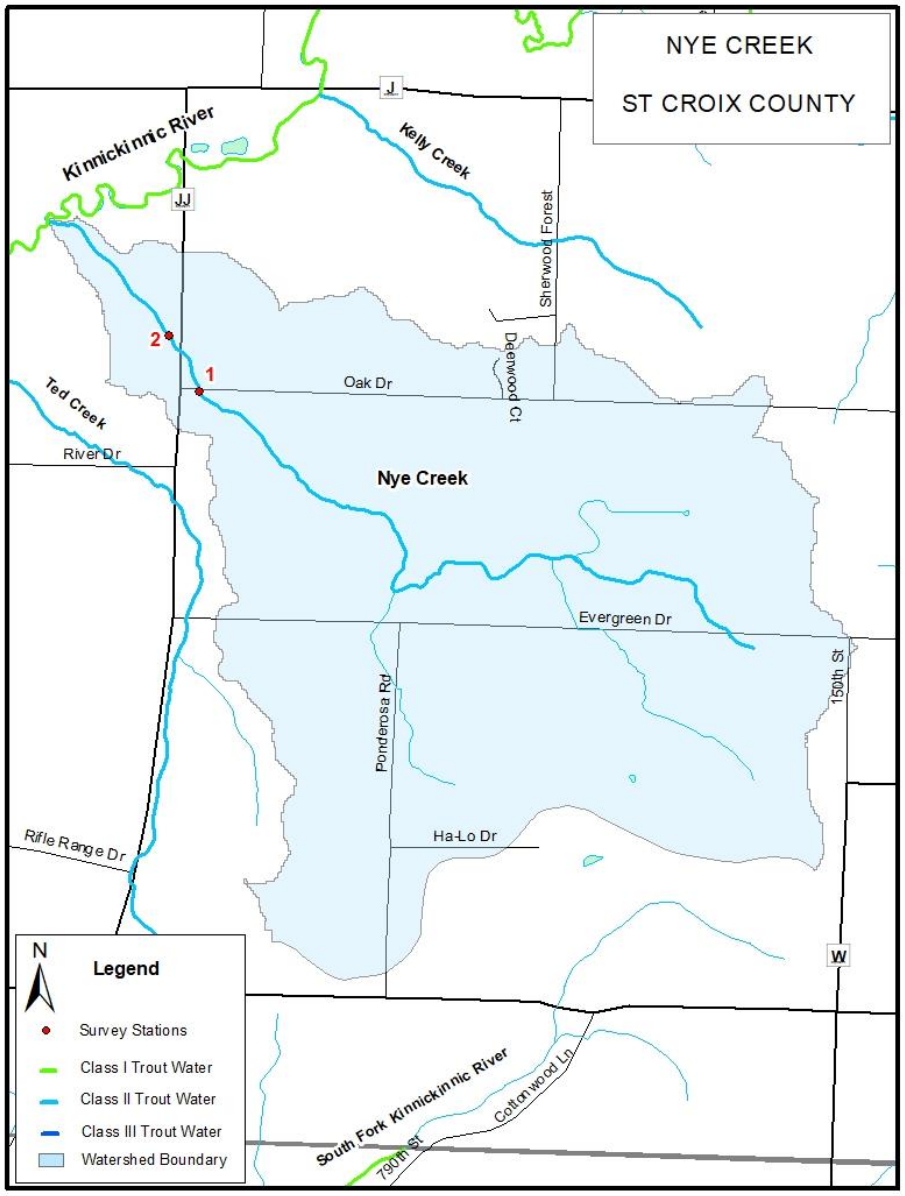
WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Fisheries Survey Report for Nye Creek, St. Croix County, Wisconsin 2021

WATERBODY IDENTIFICATION CODE 2604500



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Introduction

Nye Creek is a small Class II coldwater tributary to the Kinnickinnic River located in south-central St. Croix County. Currently, there are 3.35 miles of classified trout water. The watershed is largely composed of agricultural land with some grassland and forested land to a lesser extent. While the stream is not classified as impaired, 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. No stocking records exist for the stream.

Methods

A total of two stations were sampled on Nye 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 Oak Drive and downstream of County Road JJ. All species were collected at both stations. All trout were identified to species and measured to the nearest 10th of an inch.

The Index of Biotic Integrity (IBI) was used to measure biological attributes that are influenced by human activities to assess the overall health of the stream. The index uses the species assemblage present to assess water quality and thermal regimes within a waterbody. Coldwater IBI scores range from 0 to 100, with a high score (90-100) interpreted as an Excellent Integrity rating and 10-20 interpreted as a Poor Integrity rating.

Study Site

Station 1 was located upstream of Station 2 in a heavily wooded corridor. Habitat was not evaluated during the surveys. Anecdotally, the stream was composed of riffle-pool sequences and featured substrates dominated by gravel, coarse sand and some cobble. Station 2 flowed through an abandoned cattle pasture. The stream corridor was mostly wooded with box elder and tag alder with openings to the pasture. Bank erosion was heavy, and the substrate was largely composed of gravel and coarse sand with small, deep pools, riffles and runs.

Results

A total of four species were captured among all stations, including Brook Trout, Brown Trout, Mottled Sculpin and Central Mudminnow. Brook Trout were the dominant salmonid at both stations and ranged in relative abundance from 1449 total fish per mile to 1481 total/mile, which is in the 95th percentile for Class II Brook Trout streams statewide (Table 1, Figures 2 and 3). 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 338/mile (75th percentile) at Station 1 to 1079/mile at Station 2 (95th percentile). The abundance of adult Brook Trout at Station 1 was 1111/mile and 402/mile at Station 2, which resulted in the 95th and 85th percentiles for adult abundances in Class II Brook Trout streams statewide (Table 1). The maximum size of Brook Trout at Station 1 was 10 inches, but only 7 inches long at Station 2 (Figure 1). Only 8% of adult Brook Trout at Station 1 were larger than 8 inches in length.

Brown Trout were less abundant than Brook Trout at both stations and ranged in total relative abundance from 322/mile (60th percentile) at Station 2 and 628/mile (80th percentile) at Station 1 (Table 2, Figures 2 and 3). Brown Trout natural reproduction, as evidenced by the presence of young-of-year (YOY) or juvenile Brown Trout (less than 5.5 inches), was also documented at both stations, with 145 YOY/mile (80th percentile) at Station 1 and 97 YOY/mile (75th percentile) at Station 2 (Table 2). Adult (fish larger than 5.5 inches) relative abundance ranged from 225/mile (55th percentile) at Station 2 to 483/mile (75th percentile) at Station 1. Only four Brown Trout larger than 10 inches were collected between both stations, and no Brown Trout larger than 12 inches were collected.

The coldwater IBI rating for both stations on Nye Creek resulted in a score of 90, or Excellent, with only four species collected between the stations and Brook Trout as the dominant salmonid species. Tolerant species were present but in very low abundance.

Discussion

The trout population within Nye Creek features a mixed fishery of Brook Trout and Brown Trout, with Brook Trout as the dominant species. Historically at Station 2, Brown Trout were the dominant species in the 2009 survey. Brook Trout then increased in abundance and surpassed Brown Trout abundances in the 2020 survey and then experienced a dramatic increase in the present survey. Abiotic conditions in 2020 were optimal for trout spawning, survival and subsequent recruitment, hence the increase in adult Brook Trout abundances in 2021. The spring of 2021 also featured stable spring conditions with very limited high-water events, which was likely the driving factor in trout hatch success and survival this year with the high abundance of juvenile trout. Adult Brook Trout abundance and size structure was higher at Station 1, with fewer juvenile trout present. This was potentially due to more larger pools present within the station that provided more preferred adult fish habitat.

Brown Trout have remained in relatively stable abundances throughout the years at both stations, with the exception of the 2009 survey at Station 1, when Brown Trout densities increased from 48/mile in 2004 to 1207/mile in 2009. Causes for this increase are unknown but are likely influenced by abiotic factors or disturbances in the stream or watershed. According to historical data from a trout trend site on the Kinnickinnic River at County Road JJ, Brown Trout abundances and natural reproduction remained stable during the 2004-2009 period indicating that the increase in Brown Trout in Nye Creek during that time was somewhat localized. However, Brown Trout abundances declined to 627/mile in the present survey.

The surveys of both stations resulted in Excellent coldwater IBI scores indicating excellent water quality and thermal regimes for trout and little evidence of human impacts on the watershed. The current trout stream classification for Nye Creek is Class II. Based on the results of this survey, the stream could be reclassified to a Class I status because of the strong natural reproduction of both Brook and Brown Trout and the presence of multiple year-classes of trout with enough trout to fully occupy available habitat with Brook Trout total abundances in the 95th percentile and YOY abundances in the 75th to 95th percentiles.

Table 1. Relative abundance (catch per effort; number per mile) of Brook Trout at two stations on Nye Creek, summer 2021. (. Indicates no survey)

	ST. 1		ST. 2	
Year	**Juv.**	**Adult**	**Juv.**	**Adult**
1996	510	246	.	.
2004	2254	386	.	.
2009	1240	1240	182	64
2020	.	.	386	48
2021	338	1111	1079	402

Table 2. Relative abundance (catch per effort; number per mile) of Brown Trout at two stations on Nye Creek, summer 2021. (. Indicates no survey)

	ST. 1		ST. 2	
Year	**Juv.**	**Adult**	**Juv.**	**Adult**
1996	0	0	.	.
2004	48	48	.	.
2009	1207	676	405	35
2020	.	.	290	64
2021	145	482	97	225

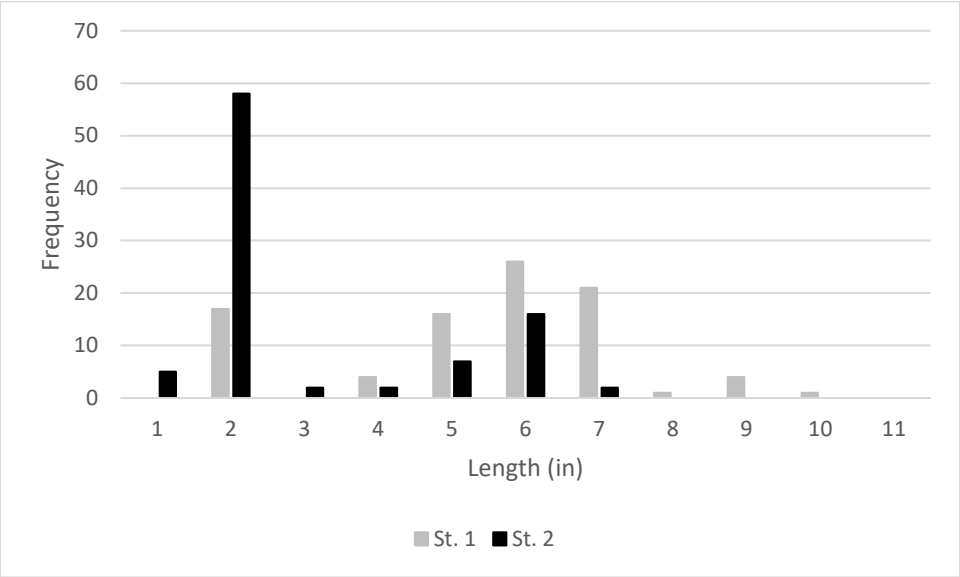

Figure 1. Length frequency distribution of Brook Trout at two stations on Nye Creek, summer 2021.

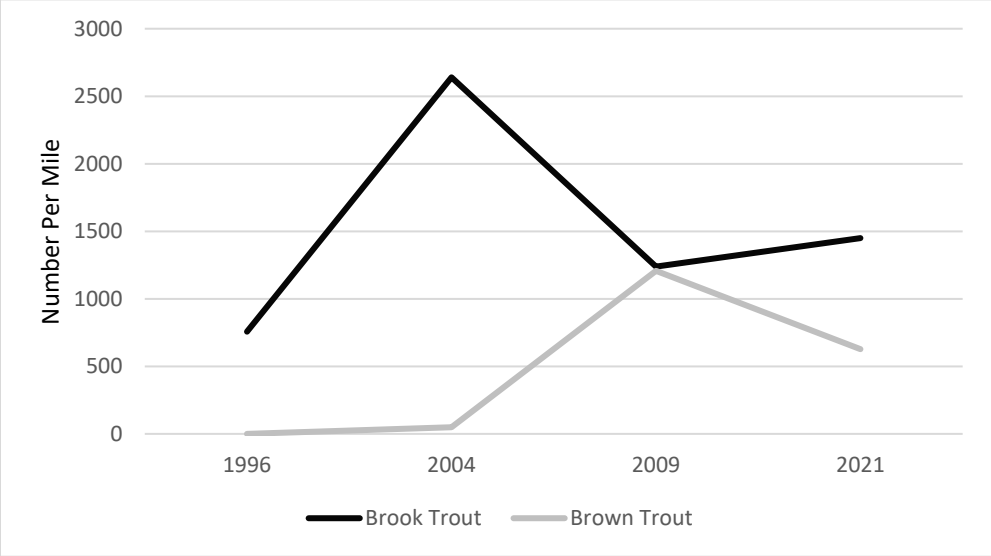

Figure 2. Relative abundance (Catch per effort) of Brook Trout and Brown Trout at Station 1 (Oak Drive) on Nye Creek from 1996 to 2021.

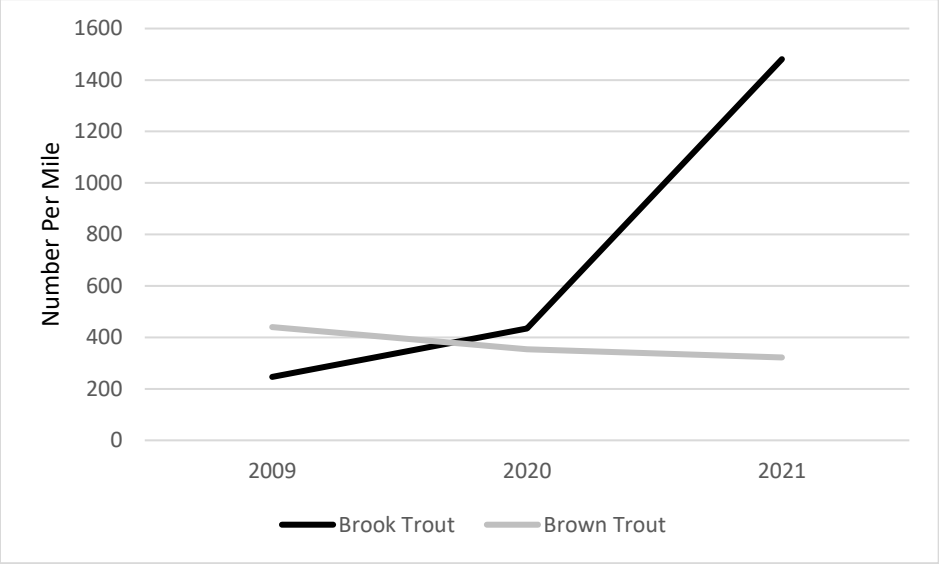

Figure 3. Relative abundance (Catch per effort) of Brook Trout and Brown Trout at Station 2 (County Road JJ) on Nye Creek from 1996 to 2021.