WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Fisheries Survey Report for the Upper Clam River Watershed, Burnett and Polk Counties, WI 2024

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Executive Summary

A fisheries assessment was conducted in 2024 throughout the Clam River watershed which included the North Fork Clam River, Sand Creek and Spring Brook in Burnett and Polk counties. The main objective of these surveys was to assess the trout populations on these streams and compare to previous surveys.

A total of eleven sites were sampled throughout the Clam River watershed, which included nine sites on the North Fork Clam River and trend sites on Sand Creek and Spring Brook. Direct current (DC) backpack or stream shockers were used to sample each of the eleven sites. Trout were measured to the nearest 0.1 inch, however, when more than 200 trout were captured, those fish were counted and not measured because of increased risk of mortality. The entire fish community was indexed at two trend sites on the North Fork Clam River.

The relative abundance of North Fork Clam River brook trout was higher at upstream sites, while brown trout relative abundance was variable. There are six brown trout for every brook trout sampled overall in the North Fork Clam River. Both brook trout and brown trout have decreased in abundance and increased in average size. Average lengths for age-1 and older brown trout and brook trout were 9.4 inches and 7.4 inches, respectively. The Sand Creek age-1 and older brown trout CPUE was 553.2 fish/mile which declined since 2021 and is almost as low as 2015. Sand Creek brown trout average length was 8.6 inches, which was the longest average length observed since 2017. Brook trout have been relatively rare at this site. Spring Brook remains primarily a brook trout stream (average CPUE of 218.7 fish/mile). Brown trout abundance was low to moderate. Future management in this watershed will focus on restoring/maintaining brook trout densities.

Management recommendations are to: 1) continue monitoring trout populations at all trend sites, 2) implement additional brook trout habitat work to increase populations, 3) maintain brown trout regulations, 4) monitor changes to the brook trout population resulting from the future catch and release regulation, 5) increase flow to prevent warming water by removing beaver dams, 6) continue monitoring water temperatures to understand impacts on population characteristics, 7) pursue land acquisition opportunities to enhance water quality and improve public access 8) address fish passage barriers to enhance habitat and species diversity and 9) update the trout stream classification for Upper Clam River watershed where appropriate.

Introduction

The Upper Clam River watershed (UCRW) in Burnett and Polk counties consists of North Fork Clam River, Sand Creek and Spring Brook. These streams were surveyed in 2024 to assess trout populations throughout the watershed. Brown trout and brook trout are both present throughout classified trout waters of the UCRW. The upper reaches of the UCRW have abundant brook trout populations, whereas the lower reaches are predominately brown trout. We assessed population trends, average size and catch rates for age-0 and age-1 and older brown trout and brook trout. Recent management strategies include implementing more liberal size limits, improving trout habitat and increasing angler access within the UCRW.

STREAM AND WATERSHED CHARACTERISTICS

The North Fork Clam River is the largest tributary of the UCRW and a fourth-order stream. The North Fork Clam River includes Class 1 (4.9 mi), Class 2 (10.2 mi) and Class 3 (16.8 mi) trout water. Land cover in the North Fork Clam River watershed consists of forest (58.4%), wetland (15.6%), grassland (11.1%), agriculture (11.1%) and other (3.8%; WDNR 2017a). Sand Creek is a fourth-order stream and is composed of Class 1 (6.0 mi) and Class 2 (6.3 mi) trout waters. Land cover in the Sand Creek watershed includes forest (58.2%), wetland (13.3%), agricultural (13.3%), grassland (12.2%) and other (3.0%; WDNR 2017b). Spring Brook is a smaller, third-order trout stream. Spring Brook is a Class 1 trout stream (1.6 mi) and land cover consists of forest (58.2%), wetland (13.3%), agricultural (13.3%), grassland (12.2%) and other (3.0%; WDNR 2017c).

PUBLIC ACCESS

There is good public access to several parts of the Clam River watershed. The Clam River Fishery Area in Burnett County encompasses 2,323 acres of public land which includes stretches of both the North Fork and South Fork Clam rivers. In this property, there are 12 parking sites that provide access to the river. For more information on public access of the North Fork Clam River, please visit the Clam River Fishery Area website. In addition, the Sand Creek Fishery Area is also located in the UCRW and consists of 1,526 acres of state-owned property along Sand Creek.

STOCKING HISTORY

Trout stocking occurred on the North Fork Clam River between 1973-2011. During this period, a total of 14,132 yearling brown trout were stocked in the sections of Class 2 and Class 3 trout water (Roberts 2019). However, since much of this watershed has adequate natural reproduction of trout, stocking has not been needed to maintain trout populations.

FISHING REGULATIONS

The early catch and release trout season runs from the first Saturday in January at 5 a.m. to midnight on the Friday preceding the first Saturday in May. During this time,

only artificial lures may be used, and trout must be released immediately. The general trout season runs from the first Saturday in May at 5 a.m. through October 15th. During the general trout season, the North Fork of Clam River, Sand Creek and Spring Brook currently have a 5-fish daily bag limit with no minimum size limit. Beginning in 2026, brook trout angling will be restricted to catch and release only for the North Fork Clam River from Spring Lake Rd to County Highway H.

Methods

The UCRW was sampled in 2024 following the DNR coldwater trout streams protocol (WDNR 2007). Nine sites were sampled on the North Fork Clam River (Appendix Figure 1). One trend site on each Sand Creek and Spring Brook were also sampled. Direct current (DC) backpack or stream shockers were used to sample each of the 11 sites from July 11 to August 13. The distance sampled at each site was 35 times the mean stream width. Trout were measured to the nearest 0.1 inch, however, at sites with high catches, the first 200 trout were measured and the rest were counted because of increased risk of mortality. The entire fish community was indexed at the Sand Rd and Rockaway Ln trend sites.

Catch per unit effort (CPUE) was calculated by dividing the number of fish by miles of stream sampled (fish/mile). Brook trout and brown trout ≥ 4.0 inches were considered age-1 and older. Trout < 4.0 inches were considered age-0. Catch rates were determined for both age-0 and age-1 and older trout. Only age-1 and older trout were used to determine average length. Species diversity through time was assessed at the Rockaway Ln and the Sand Rd trend sites.

Survey site water temperature was recorded with each survey concurrent with fish collection. In addition, HOBO temperature loggers were also placed near three crossings in the North Fork Clam River: Bakker Rd., County Highway H and Sand Rd. Continuous temperature data was collected from June to August. Maximum observed water temperature was recorded each day for comparison to Lyons et al. (1996).

Results

NORTH FORK CLAM RIVER

There were 1,125 brown trout and 174 brook trout captured for all sites on the North Fork Clam River. The CPUE was higher for brook trout at upstream sites, while brown trout CPUE was variable (Figure 1). The ratio of brown trout: brook trout was 6:1, which decreased compared to 2018, when the ratio was 9:1 (Roberts 2019). Brook trout abundance decreased and size structure increased from 2018 with more fish ≥ 7.0 inches (Figure 2). Brown trout catch rates from 2018 to 2024 also decreased by over 50%, but size structure increased (Figure 3). Average lengths for age-1 and older brown trout and brook trout were 9.4 inches and 7.4 inches, respectively.

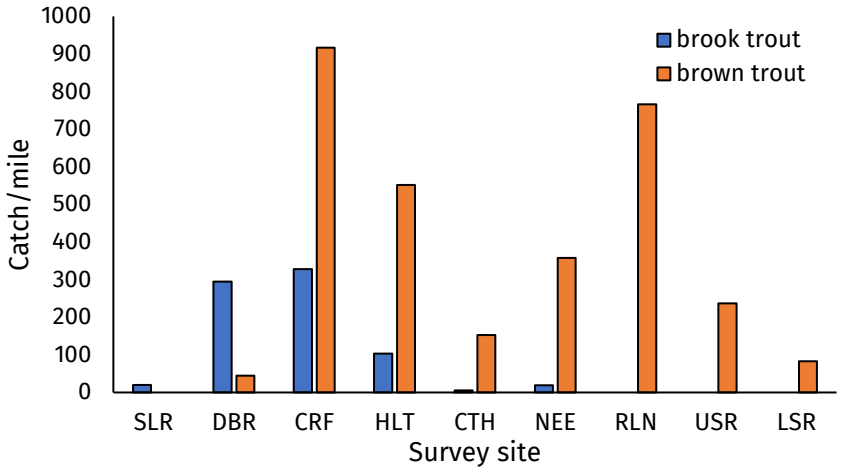

Figure 1. Catch/mile of age-1 and older (≥ 4.0 inches) brown trout and brook trout in 2024, on the North Fork Clam River from upstream-most site to downstream-most site (left to right on figure; See Appendix Figure 1).

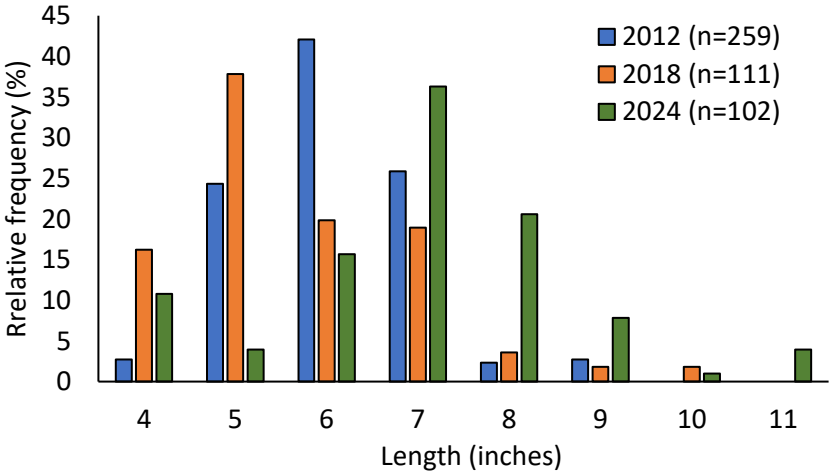

Figure 2. Relative length frequency of age-1 and older (≥ 4.0 inches) brook trout in eight sites on the North Fork Clam River during 2012, 2018 and 2024.

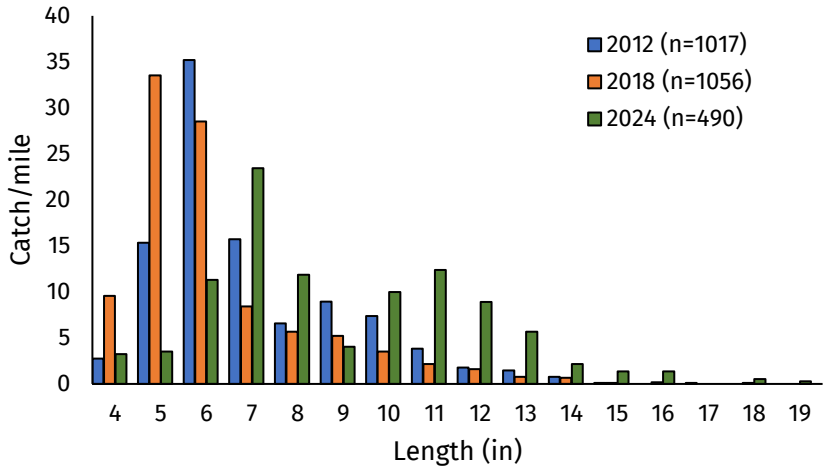

Figure 3. Length frequency of age-1 and older (≥ 4.0 inches) brown trout in eight sites on the North Fork Clam River during 2012, 2018 and 2024.

NORTH FORK CLAM RIVER TREND SITE – HEART LAKE RD

The age-1 and older brown trout and brook trout CPUE were 533.3 fish/mile and 77.7 fish/mile, respectively (Figure 4). Since 2011, brown trout averaged 9.4 times greater relative abundance than brook trout. The brown trout CPUE at Heart Lake Rd was positively correlated with water temperature (Figure 4; Appendix Figure 2) whereas brook trout CPUE was negatively correlated with water temperature (Appendix Figure 3). The 2024 age-0 brown trout CPUE was 555.5 fish/mile, which was considerably greater than previous years (Figure 5).

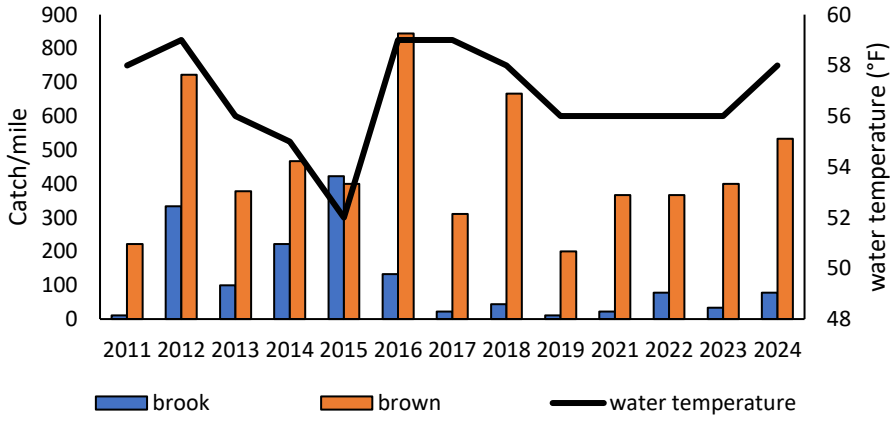

Figure 4. Catch/mile of age-1 and older (≥ 4.0 inches) brook trout and brown trout and water temperature (°F) for the Heart Lake Rd trend site on the North Fork Clam River, Burnett County, WI.

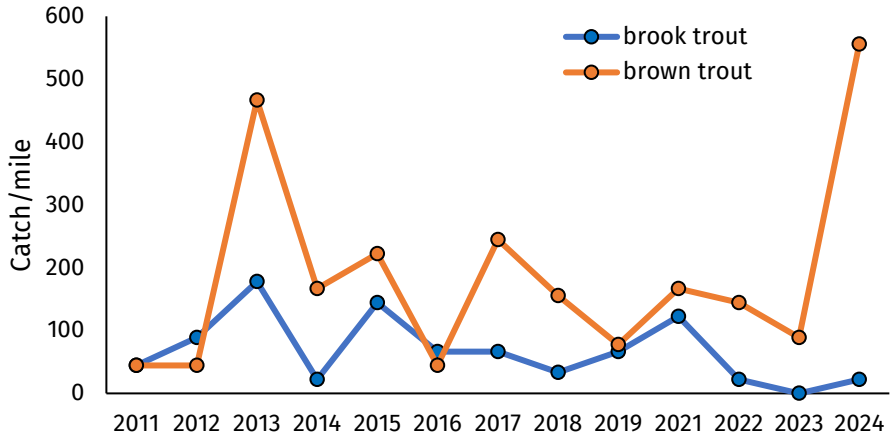

Figure 5. Catch/mile of age-0 (< 4 inches) brook trout and brown trout in the Heart Lake Rd trend site on the North Fork Clam River, Burnett County, WI.

NORTH FORK CLAM RIVER TREND SITE – UPPER SAND RD

The age-1 and older brown trout CPUE in Sand Creek was 242.1 fish/mile, which was the lowest observed since this site was established in 2011 (Figure 6). Age-1 and older brook trout were not captured during 2024. Brook trout have had low abundances for all sample years since 2007 (ranged from 0-42.1 fish/mile). Abundance of age-0 brown trout ranged from 57.8 fish/mile to 773.7 fish/mile over the same timeframe. The 2024 age-0 brook trout CPUE was 5.3 fish/mile (Figure 7). Brook trout natural recruitment has been low for all survey years (ranged from 0-11.8 fish/mile). There were 15 fish species captured in 2024, which was similar to previous years (Table 1).

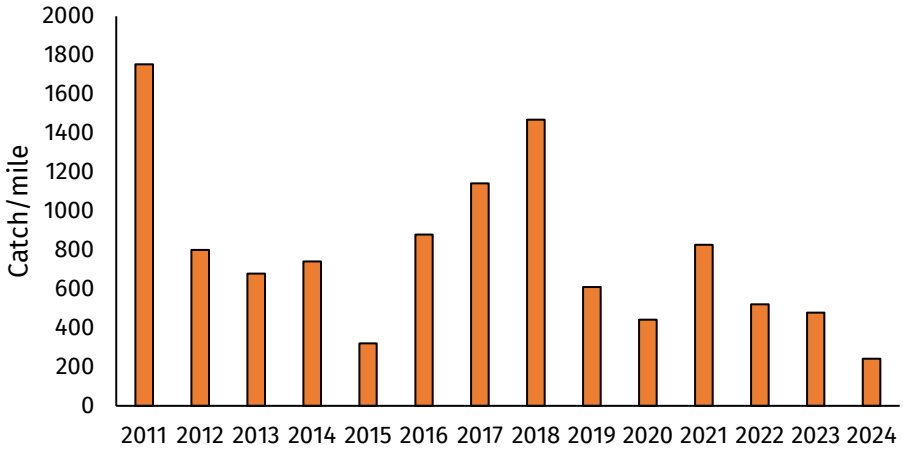

Figure 6. Catch/mile for age-1 and older (≥ 4.0 inches) brown trout for the Upper Sand Rd trend site on the North Fork Clam River.

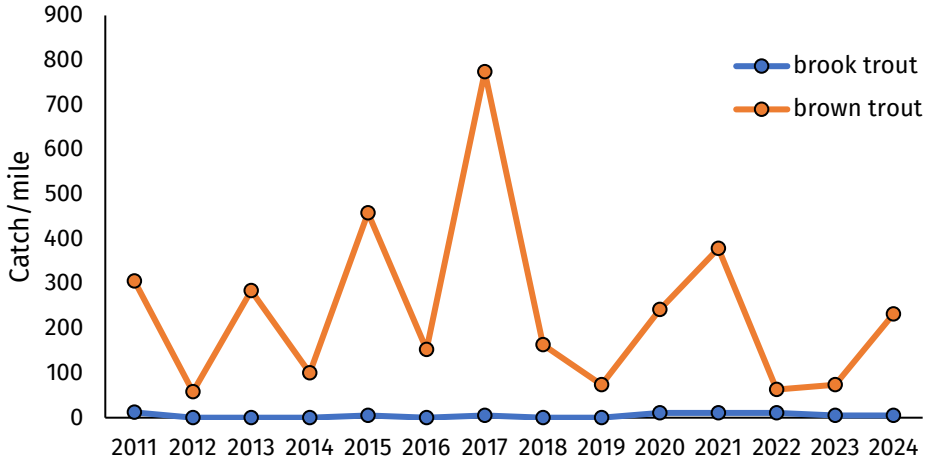

Figure 7. Catch/mile of age-0 (< 4.0 inches) brook trout and brown trout for the Sand Rd station on the North Fork Clam River.

Table 1. Species present (marked by x) at the Sand Rd trend site on the North Fork Clam River in 2011, 2018 and 2024.

Fish Species	2011	2018	2024
Brook trout	x		x
Brown trout	x	x	x
Brook stickleback			x
Brassy minnow	x	x	
White sucker	x	x	x
Northern hog sucker	x	x	
Common shiner	x		x
Hornyhead chub	x	x	
Western blacknose dace	x	x	x
Mottled sculpin	x	x	x
Longnose dace	x	x	x
Redbelly dace			x
Creek chub	x	x	x
Logperch	x	x	x
Chestnut lamprey/ammocetes	x	x	
Black bullhead	x	x	
Central mudminnow			x
Central stoneroller	x		
Finescale dace	x		
Largemouth bass	x		x
Smallmouth bass			x
Northern pike		x	x
Black crappie		x	
Yellow perch		x	

NORTH FORK CLAM RIVER TREND SITE – ROCKAWAY LN

The age-1 and older brown trout CPUE was 766.0 fish/mile and had an average length of 9.3 inches. There were no brook trout sampled. Brook trout were also not found in 2018 sampling efforts (Roberts 2019). There were six fish species observed in 2024, a decrease from 2018 and 2011 (Table 2).

Table 2. Species present (marked by x) for the Rockaway Ln trend site on the North Fork Clam River in 2011, 2018 and 2024.

Fish Species	2011	2018	2024
Brook trout	x		
Brown trout	x	x	x
Brassy minnow			x
White sucker	x	x	
Northern hog sucker	x		
Common shiner	x		
Hornyhead chub	x		
Western blacknose dace	x	x	x
Mottled sculpin	x	x	x
Longnose dace	x	x	
Creek chub	x	x	X
Logperch	x	x	
Chestnut lamprey/ammocetes	x	x	
Johnny darter	x		
Black bullhead	x		
Central mudminnow			X

SAND CREEK TREND SITE – CTH EE

The age-1 and older brown trout CPUE was 553.2 fish/mile. Brown trout abundance declined since 2021 and is almost as low as 2015 (Figure 8). Brown trout average length was 8.6 inches, which was the highest average length observed since 2017. Age-0 brown trout abundance ranged from 395.2 fish/mile in 2016 to 2,658.3 fish/mile in 2015, and varies year to year (Figure 9).The age-1 and older brook trout CPUE was 7.2 fish/mile. Brook trout have been found at low densities (0-28.7 fish/mile) during past surveys.

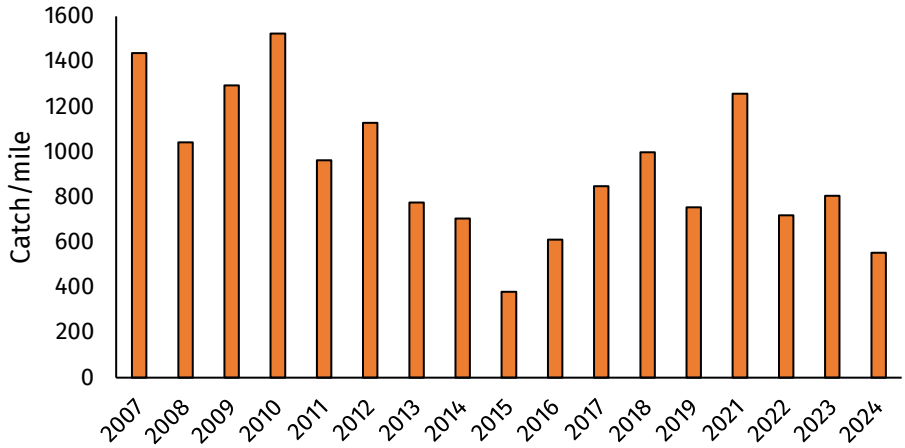

Figure 8. Catch/mile of age-1 and older (≥ 4.0 inches) brown trout at the CTH EE trend site in Sand Creek, Burnett and Polk counties, WI.

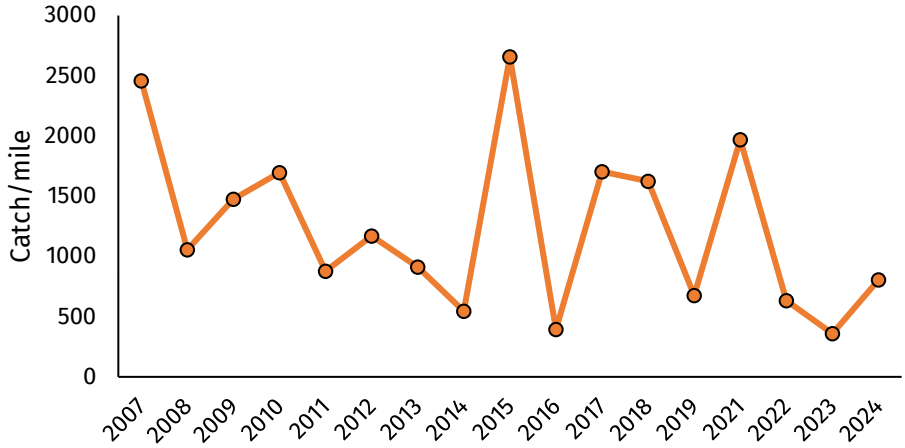

Figure 9. Catch/mile of age-0 (<4.0 inches) brown trout at the CTH EE trend site in Sand Creek, Burnett and Polk counties, WI.

SPRING BROOK TREND SITE – PINE VALLEY LN

The 2024 age-1 and older brown trout CPUE was 64.4 fish/mile, which was below the average of 82.2 fish/mile (Figure 10). Brook trout were more abundant and had a CPUE of 160.9 fish/mile. Spring Brook remains primarily a brook trout stream (average CPUE of 218.7 fish/mile). Brown trout abundance has been low to moderate (0-177.0 fish/mile). The brook trout population in Spring Brook seems to be increasing while the brown trout population has fluctuated but decreased overall. During 2024, average size for brown trout was 6.7 inches and brook trout was 6.2 inches, which were comparable to past surveys. Since 2008, age-0 brook trout and brown trout catches have varied considerably, but brook trout have typically maintained higher recruitment (Figure 11).

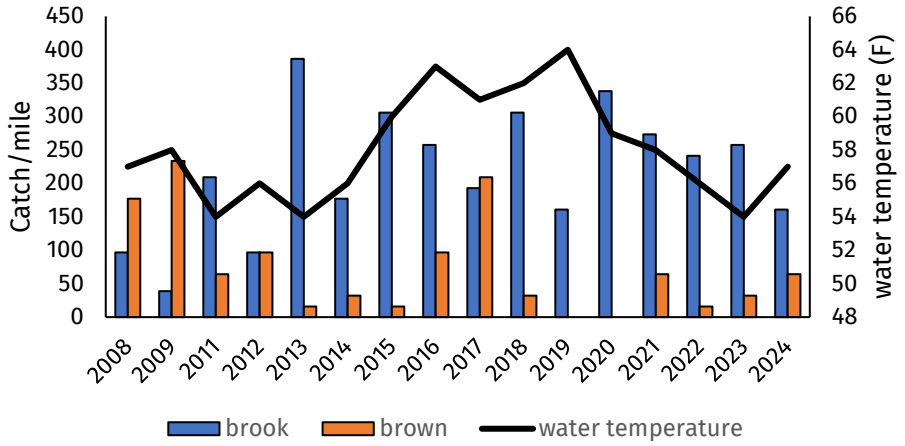

Figure 10. Catch/mile of age-1 and older (≥ 4.0 inches) brook trout, brown trout and water temperature (°F) for the Pine Valley Ln station on Spring Brook, Burnett County, WI.

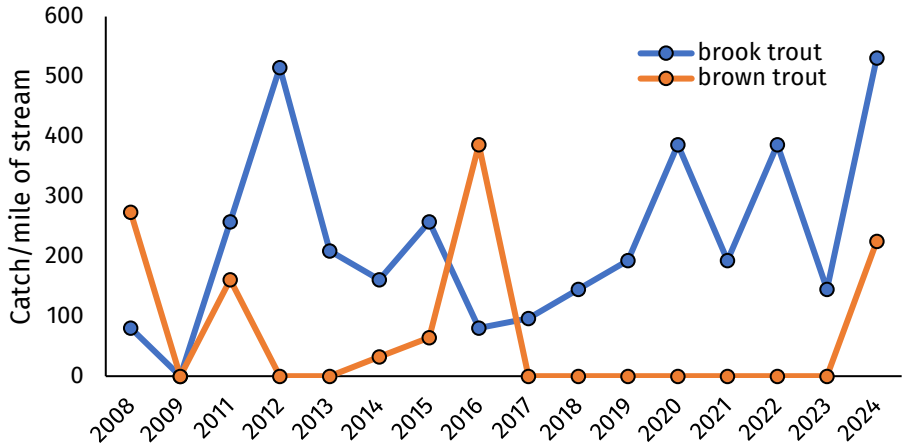

Figure 11. Catch/mile of age-0 (<4.0 inches) brook trout and brown trout for the Pine Valley Ln station on Spring Brook, Burnett County, WI.

Discussion

The UCRW remains an excellent trout fishing destination with respectable populations of brook trout and brown trout. Depending on location within the watershed, there is variation in both species abundance and size structure. We will discuss: 1) trends in brook trout and brown trout abundance, 2) trends observed in Rockaway Ln after trout habitat improvement and 3) recruitment success.

The brown trout: brook trout ratio varied by site location. In general, downstream locations primarily consist of brown trout and upstream locations consist of brook trout. Areas with high brown trout abundance are likely caused by warmer water temperatures and interspecific competition. Warmer water affects brook trout to a greater extent in Wisconsin streams, as Mitro et al. (2019) predicted there will be a

68% decrease in suitable habitat for brook trout and a 32% decrease in suitable habitat for brown trout in Wisconsin streams between the late twentieth and mid-twenty-first century due to global warming trends. Some of our trend sites such as Heart Lake Rd corroborate this, where brown trout abundance was positively correlated with water temperature. However, the maximum water temperatures at Bakker Rd have been similar or warmer than County Highway H downstream of the Heart Lake Rd trend site (Appendix Figure 4), yet the Bakker Rd site has a higher brook trout relative abundance than downstream sites. All three sites with HOBO temperature loggers had an average maximum water temperature colder than <22 C (<72 F) recommended in Lyon et al. (1996) from 2021 - 2024. In addition to the effects of warm water, the increased brown trout populations likely cause lower brook trout abundance. In southwest Wisconsin streams, the removal of brown trout has led to increased brook trout biomass regardless of water temperature (Olson et al. 2024).

Brook trout and brown trout populations have declined in the North Fork Clam River since 2018. A possible reason for this decline is more liberal fishing regulations that went into effect at the beginning of the 2016 trout fishing season. Between 2003-2016 the UCRW was managed with a 12-inch maximum size limit and 5-fish bag limit. In 2016, the regulations were changed to a no minimum size limit and a 5-fish bag limit (Roberts 2019). Without a size limit, harvest may have increased, thus lowering the abundance of both species. However, harvest trends are unknown since there has not been an angler creel survey for the North Fork of Clam River. A catch and release only trout regulation for brook trout on the North Fork Clam River will be implemented in the 2026. The overall goal for this regulation change will be to improve native brook trout densities while allowing harvest of prevalent brown trout.

Size structure of brook trout and brown trout in the UCRW have improved in recent years, which may be due to the decreased abundance. The number of brown trout captured in 2024 was less than half of what was captured in 2018. With fewer trout present, there is less competition for resources, allowing faster growth. The maximum lengths of fish collected in the North Fork Clam River have also increased from previous years

Rockaway Ln had a trout habitat improvement projected completed in 2012. The main goal of this project was to increase adult trout habitat. This work included adding cover structures, boulder clusters, riprap for stabilizing banks, root wads, boulder revetments and plunge pools (Roberts 2019). The habitat improvement near Rockaway Ln may have increased brown trout size structure as the 2024 survey had a 2.8-inch increase in average size of brown trout from 2018. However, the brown trout CPUE also decreased from 1,603 fish/mile to 766 fish/mile from 2018-2024. Therefore, the improved size structure could be due to lower abundance or the habitat improvement. In Rockaway Ln, species diversity has decreased every survey since the habitat work and to a greater extent than observed at the Upper Sand Rd Crossing trend site (approximately 0.6 mile downstream of the Rockaway Ln site). These sites

are in close proximity yet have different species diversity and abundances of trout. This may suggest our habitat work at Rockaway Ln benefited adult brown trout but did not increase diversity. We also observed a drop in temperature at the Rockaway Ln site from 60°F to 58°F between 2018 and 2024, which may indicate this section of North Fork Clam River has gotten colder, which often promotes lower species diversity.

Recruitment success of brook and brown trout had high year-to-year variation among these sites. Overall, brown trout had greater recruitment than brook trout in the UCRW except at Spring Brook. Multiple variables may impact juvenile brook and brown trout recruitment, but water temperature has been found to be most important for brook trout, while habitat was most important for brown trout (McRae and Diana 2005). In the Heart Lake Rd trend site, both species appeared to simultaneously experience highs and lows in age-0 populations, which may be explained by fluctuations in water temperature and other environmental conditions.

Recommendations

1. Continue to monitor the annual trend surveys within the UCRW on the North Fork Clam River, Sand Creek and Spring Brook. Another watershed assessment is tentatively planned for 2030.
2. Implement trout habitat projects that benefit brook trout in areas where water temperatures favor brook trout.
3. Maintain the current regulations on brown trout to encourage harvest, increase size structure and lower interspecific competition between brown trout and brook trout.
4. Monitor changes to the brook trout population from the catch and release regulation that will be implemented in 2026.
5. Continue to remove beaver dams in the UCRW to maintain free-flowing conditions and help prevent warming water.
6. Monitor water temperatures using HOBO temperature loggers in sampling sites and continue to compare population characteristics with temperature trends.
7. Pursue land acquisition opportunities in the Clam River watershed. Land acquisition allows for public access, protection of groundwater sources and provides bank protection and enhancement.
8. Fish passage barriers should continue to be evaluated and improved. Eliminating these barriers can improve habitat diversity and availability.
9. Pursue updating the trout stream classification for Upper Clam River watershed where appropriate.

Acknowledgements

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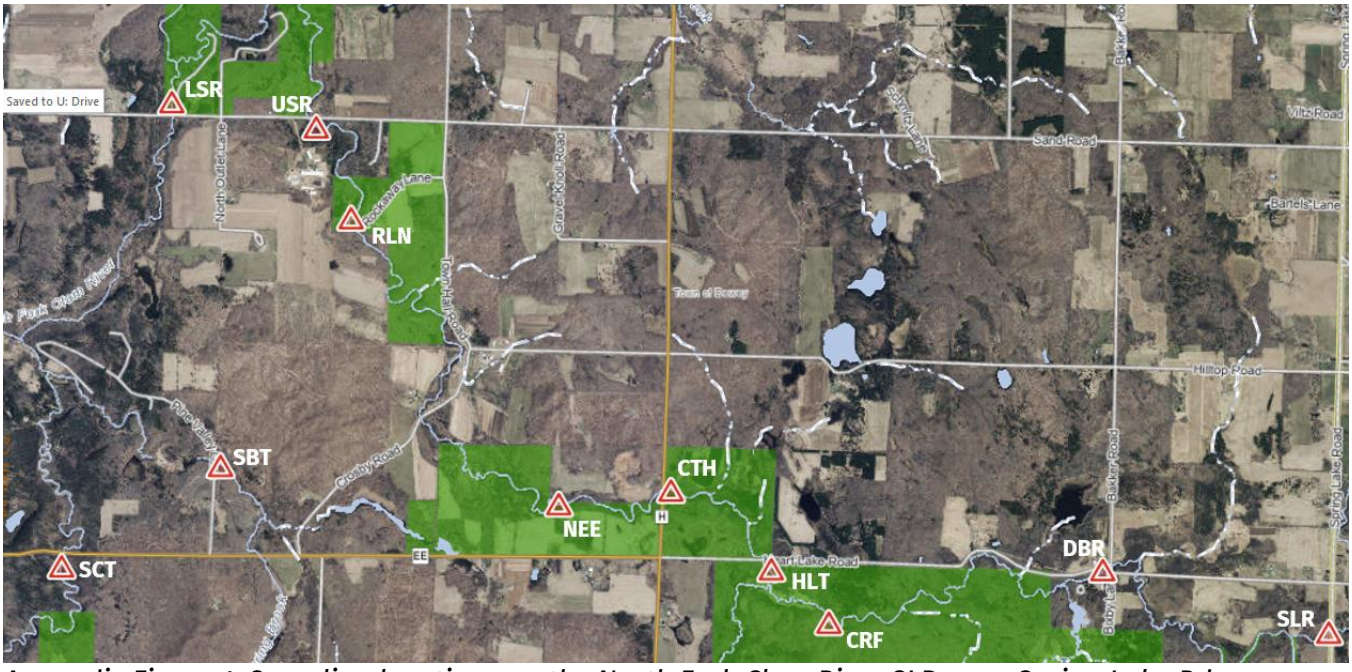
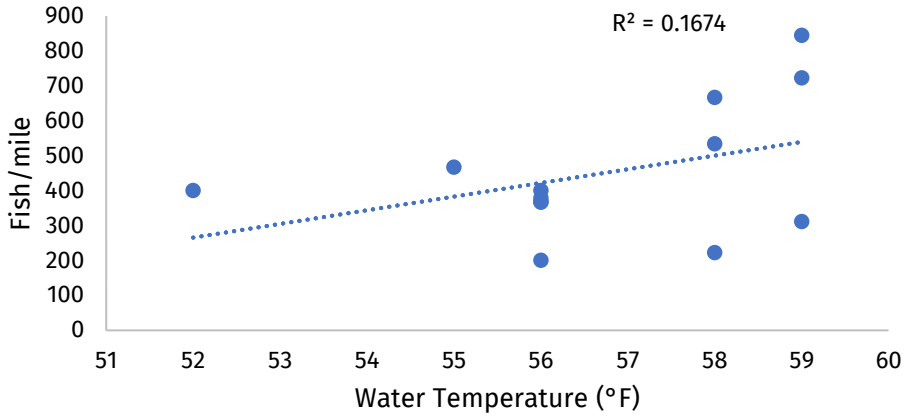
WDNR 2017b. Wisconsin Department of Natural Resources-Water Detail. Sand Creek: WBIC 2659400. Water Detail – Sand Creek, North Fork Clam River Watershed (SC13)

WDNR 2017c. Wisconsin Department of Natural Resources-Water Detail. North Fork of Clam River: WBIC 2659500. Water Detail -Spring Brook, North Fork Clam River Watershed (SC13)

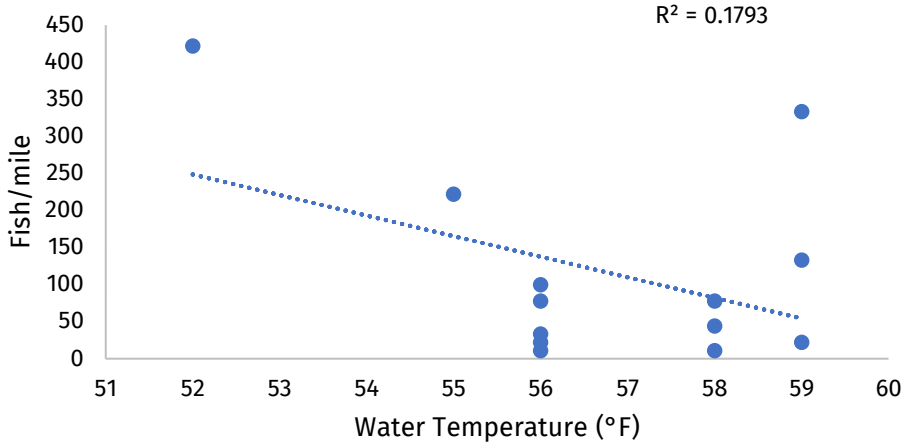
Appendix



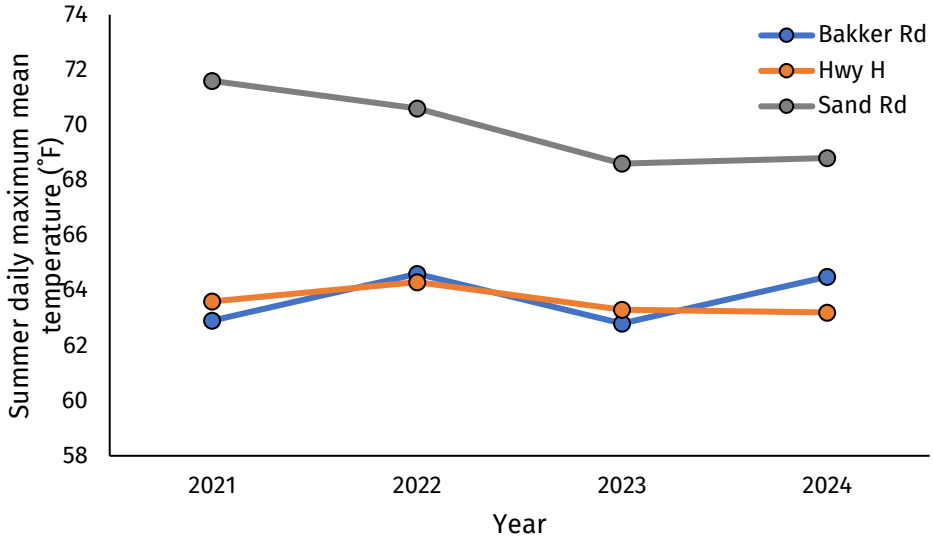
Appendix Figure 1. Sampling locations on the North Fork Clam River SLR-near Spring Lake Rd, DBR- Downstream of Bakker Rd, CRF – near Clam River Ford, HLT – Heart Lake Rd trend site, CTH – near County Highway H, NEE – near EE parking lot, RLN – Rockaway Ln, USR –Sand Rd east bridge, LSR – Lower Sand Rd west bridge), Spring Brook trend site (SBT) and Sand Creek trend site (SCT). Green shading denotes public land within Clam River Fishery Area and Sand Creek Fishery Area.



Appendix Figure 2. Regression of water temperature (°F) and fish/mile of age-1 and older brown trout for the Heart Lake Rd trend site during 2011-2024.



Appendix Figure 3. Regression of water temperature (°F) and fish/mile of age-1 and older brook trout for the Heart Lake Rd trend site during 2011-2024.



Appendix Figure 4. Average daily maximum summer water temperatures for the Bakker Rd, Hwy H and Sand Rd stations of the North Fork Clam River, Burnett County, WI.