

**Wisconsin Department of Natural Resources
2024 Middle Branch Embarrass River
Watershed Fisheries Summary Report,
Shawano County**



Photo Credit: Elliot Hoffman

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Executive Summary

In 2024, the Wisconsin Department of Natural Resources (DNR) conducted electrofishing surveys on streams located within the Middle Branch Embarrass River watershed, located in Shawano County in order to provide insight and direction for the future management of these waters. Primary sampling objectives of these surveys were to characterize relative abundance and size structure for all trout and overall index of biotic integrity (IBI) based on all fish species present in the sampled stretches. The following report is a summary of trout metrics for all streams within the Middle Branch Embarrass River watershed and sites surveyed in 2024.

Gamefish Species Sampled

Brook trout (*Salvelinus fontinalis*) is the only stream dwelling trout native to Wisconsin, found predominately in central and northern Wisconsin. Brook trout reside in cold headwater streams and spawn by building a nest called a redd in the fall of the year around November.

Brown trout (*Salmo trutta*) are a predatory species found throughout Wisconsin, not native to the United States they were introduced in 1883. Typically, brown trout spawn in gravel, forming nests called redds, from October to December.

Rainbow Trout (*Salmo gairdneri*) has been introduced throughout Wisconsin, found primarily in stocking locations throughout the state to provide a fishing opportunity. However, there are a few streams in southern areas of the Upper Fox and Lower Wolf work unit where rainbow trout naturally reproduce.

Methods

Sampling Schedule

Trend survey sites are sampled biannually in Shawano, Marquette, Waupaca, and Waushara Counties. While rotation sites are sampled on a rotational frequency by watershed and will vary by each field office.

Gear

All sampling sites are electrofished with either a towed barge or backpack electrofishing unit depending on the depth and width of a stream. Both gear types were used for the surveys listed in this report.

Site Distances

Sampling distance is at least 35 times the mean stream width or a minimum of 330 feet (100 meters), whichever is greater.

Data Collected

All gamefish are identified to species, measured for length and examined for fin-clips. In at least one survey site per stream, all fish species are collected and counted. If multiple sites are designated for a stream, only one site needs to be sampled for all fish.

Metric Descriptions

Catch per unit effort (CPUE) is a method of quantifying fish population relative abundance. For all trout surveys, we typically quantify CPUE as the number of a given size class of trout captured per mile of stream. CPUE indexes are compared to other trout streams throughout Wisconsin by what percentile (PCTL) they fall in. For example, if a CPUE is in the 90th percentile, it is higher than 90% of the other CPUEs in the state. CPUE percentiles can also be used to categorize trout abundance as low density (<33rd percentile), moderate density (33rd - 66th percentile), high density (66th - 90th percentile) and very high density (>90th percentile).

Length frequency distribution is a graphical representation of the number or percentage of fish captured by half inch or one inch size intervals.

Index of Biotic Integrity (IBI) is a rating of environmental quality based on the fish assemblage. Scores of 90 - 100 indicate excellent stream quality, while scores less than 30 indicate poor stream quality. Our analysis utilizes the IBI for Wisconsin coldwater streams. Coldwater streams in Wisconsin are those in which the maximum daily mean water temperature is usually <22°C (71.6°F). A coolwater stream IBI may also be used when a stream doesn't fit the temperature criteria for a coldwater stream.

Survey Effort

During the 2024 survey season the Shawano work unit surveyed the Middle Branch Embarrass River including the following streams: Dent Creek, Elmhurst Creek, Logemanns Creek, Packard Creek, Simpson Creek, Wilson Creek and several unnamed tributaries.

Table 1. Survey site information for streams surveyed in the Middle Branch Embarrass River Basin by the Shawano work unit in 2024.

Stream	Site Location	Survey Date	Station Length (feet)	GPS (Start/Finish)	Gear (Dippers)
Dent Creek	Witt-Morr Townline Road	7/25/2024	344	44.80825, -89.10118 44.81169, -89.11054	Backpack Shocker (1)
Dent Creek	Fink Road	7/15/2024	344	44.80816, -89.04330 44.80859, -89.04505	Backpack Shocker (1)
Dent Creek	CTH J	7/15/2024	403	44.79513, -89.02346 44.78822, -89.03243	Backpack Shocker (1)
Dent Creek	Willow Road	8/13/2024	344	44.81097, -89.10988 44.81173, -89.11040	Backpack Shocker (1)
Elmhurst Creek	CTH Z	7/16/2024	350	45.01229, -89.14890 45.01297, -89.14881	Towed Barge Shocker (3)
Elmhurst Creek	Sugarbush Road	7/16/2024	564	45.00238, -89.14318 45.00332, -89.14416	Towed Barge Shocker (3)
Elmhurst Creek	Tamarack Road	7/10/2024	425	45.02299, -89.34078 45.02367, -89.16814	Backpack Shocker (1)
Logemanns Creek	Weasel Dam Road	8/9/2024	344	44.77498, -88.94507 44.77565, -88.94768	Backpack Shocker (1)
Logemanns Creek	Townline Road	8/9/2024	344	44.79823, -88.98226 44.79793, -88.98415	Backpack Shocker (1)
Logemanns Creek	Leopolis Road	8/13/2024	344	44.76853, -88.92432 44.76939, -88.92408	Backpack Shocker (1)
Middle Branch Embarrass River	Elm Road	7/16/2024	711	45.01617, -89.12802 45.01711, -89.12617	Towed Barge Shocker (3)
Middle Branch Embarrass River	CTH Z	7/16/2024	476	45.06790, -89.12805 45.00988, -89.12897	Towed Barge Shocker (3)
Middle Branch Embarrass River	Cherry Road	7/17/2024	928	44.97432, -89.12370 44.97631, -89.12239	Towed Barge Shocker (3)
Middle Branch Embarrass River	White Birch Road	7/29/2024	935	44.96514, -89.13824 44.96684, -89.13574	Towed Barge Shocker (3)
Middle Branch Embarrass River	Church Road	7/29/2024	1,046	44.94334, -89.14608 44.94566, -89.14597	Towed Barge Shocker (3)

Stream	Site Location	Survey Date	Station Length (feet)	GPS (Start/Finish)	Gear (Dippers)
Middle Branch Embarrass River	Riverview Road	7/29/2024	1,092	44.90401, -89.14356 44.90615, -89.14151	Towed Barge Shocker (3)
Middle Branch Embarrass River	Witt-Morr Townline Road	7/22/2024	1,424	44.85604, -89.16460 44.85789, -89.16274	Towed Barge Shocker (3)
Middle Branch Embarrass River	Eland Road	7/22/2024	1,286	44.87083, -89.16906 44.87262, -89.16656	Towed Barge Shocker (3)
Middle Branch Embarrass River	CTH Q	8/23/2024	1,312	44.82980, -89.10298 44.82917, -89.10713	Towed Barge Shocker (3)
Middle Branch Embarrass River	Robin Road	8/23/2024	1,312	44.83741, -89.14344 44.83757, -89.14816	Towed Barge Shocker (3)
Middle Branch Embarrass River	Seneca Road	9/5/2024	1,312	44.78120, -88.98200 44.78498, -88.98367	Towed Barge Shocker (3)
Middle Branch Embarrass River	Weasel Dam Road	9/18/2024	1,312	44.76352, -88.94553 44.76568, -88.94893	Towed Barge Shocker (3)
Packard Creek	Bluebird Road	7/17/2024	396	44.90094, -89.17396 44.90136, -89.17303	Towed Barge Shocker (3)
Packard Creek	CTH N	7/17/2024	438	44.92868, -89.19160 44.92966, -89.19183	Towed Barge Shocker (3)
Packard Creek	Oriole Road	7/17/2024	361	44.88510, -89.18543 44.88573, -89.18490	Towed Barge Shocker (3)
Packard Creek	Eland Road	7/17/2024	682	44.87063, -89.17140 44.87146, -89.17348	Towed Barge Shocker (3)
Simpson Creek	Church Road	7/31/2024	344	44.78066, -89.02181 44.78091, -89.02247	Backpack Shocker (1)
Simpson Creek	Alberg Road	7/31/2024	330	44.78591, -89.03094 44.78663, -89.03084	Backpack Shocker (1)

Stream	Site Location	Survey Date	Station Length (feet)	GPS (Start/Finish)	Gear (Dippers)
Unnamed Tributary - 312000	Birch Lane	6/26/2024	344	44.84087, -89.13777 44.84147, -89.13670	Backpack Shocker (1)
Unnamed Tributary - 312700	Hemlock Road	8/29/2024	328	44.84155, -89.17529 44.84157, -89.17624	Backpack Shocker (1)
Unnamed Tributary - 311900	Schoolhouse Road	7/18/2024	330	44.85590, -89.09023 44.85625, -89.09095	Backpack Shocker (1)
Unnamed Tributary - 311900	Wilson Creek Lane	7/25/2024	344	44.84036, -89.09133 44.83987, -89.09146	Backpack Shocker (1)
Unnamed Tributary - 313700	Sugarbush Road	7/16/2024	438	44.98065, -89.14324 44.98065, -89.14448	Backpack Shocker (1)
Unnamed Tributary - 311700	River Road	7/25/2024	400	44.83423, -89.03363 44.83506, -89.03216	Backpack Shocker (1)
Wilson Creek	Witt Morr Townline Road	7/18/2024	330	44.85552, -89.11639 44.85583, -89.11605	Backpack Shocker (1)
Wilson Creek	Wilson Creek Lane	6/26/2024	400	44.84054, -89.09329 44.84037, -89.09313	Backpack Shocker (1)

Results

Table 2. Catch metrics per mile for brown trout on rotational sites surveyed in 2024.

Stream	Site Location	Average Length and (Range)	Total and (PCTL)	Young of Year (YOY)	>8" (PCTL)	>12" (PCTL)	>15" (PCTL)
Middle Branch Embarrass River	Robin Road	11.5	4 (2)	-	4 (15)	-	-
Middle Branch Embarrass River	Weasel Dam Road	13.8	4 (2)	-	4 (15)	4 (40)	-
Unnamed Tributary - 311900	Wilson Creek Lane	2.8 (2.4 - 3.3)	31 (42)	31	-	-	-
Wilson Creek	Wilson Creek Lane	5.7	13 (13)	-	-	-	-

Table 3. Catch metrics per mile for brook trout on rotational sites surveyed in 2024.

Stream	Site Location	Average Length and Range (Inches)	Total (PCTL)	Young of Year (YOY)	>8" (PCTL)	>10" (PCTL)
Dent Creek	CTH J	5.2 (2.0 - 8.9)	434 (68)	145	13 (43)	-
Dent Creek	Fink Road	6.1 (1.7 - 10.2)	1462 (92)	123	215 (96)	31 (92)
Dent Creek	Willow Road	5.1 (2.1 - 9.1)	646 (77)	323	77 (83)	-
Dent Creek	Witt-Morr Townline Road	5.4 (2.1 - 8.3)	723 (80)	154	15 (45)	-
Elmhurst Creek	CTH Z	6.5 (1.5 - 10.0)	1076 (87)	30	197 (95)	30 (91)
Elmhurst Creek	Sugarbush Road	5.3 (2.1 - 9.2)	673 (78)	131	65 (80)	-
Elmhurst Creek	Tamarack Road	4.2 (1.5 - 7.9)	375 (65)	188	-	-
Logemanns Creek	Leopolis Road	7.0 (6.2 - 7.6)	46 (25)	-	-	-
Middle Branch Embarrass River	Eland Road	7.8 (3.1 - 10.8)	279 (58)	8	107 (88)	25 (89)
Middle Branch Embarrass River	Cherry Road	6.2 (2.3 - 11.2)	949 (85)	80	153 (93)	6 (69)
Middle Branch Embarrass River	Church Road	7.5 (2.7 - 12.5)	581 (75)	35	217 (96)	51 (96)
Middle Branch Embarrass River	Elm Road	5.8 (1.9 - 10.1)	1170 (88)	148	82 (84)	7 (70)
Middle Branch Embarrass River	CTH Z	6.1 (1.8 - 12.0)	1233 (89)	156	144 (92)	33 (93)
Middle Branch Embarrass River	Riverview Road	6.6 (2.3 - 11.4)	556 (74)	87	150 (92)	19 (86)
Middle Branch Embarrass River	Robin Road	7.3 (5.0 - 10.1)	40 (23)	-	16 (47)	4 (64)

Middle Branch Embarrass River	White Birch Road	6.7 (2.4 - 11.1)	1102 (88)	96	333 (98)	34 (93)
Middle Branch Embarrass River	Witt-Morr Townline Road	6.7 (2.8 - 11.6)	248 (55)	30	70 (81)	4 (64)
Middle Branch Embarrass River	CTH N	7.1 (2.2 - 11.1)	476 (70)	88	132 (91)	20 (86)
Middle Branch Embarrass River	CTH Q	6.8	4 (1)	-	-	-
Packard Creek	Bluebird Road	5.5 (2.1 - 10.3)	1133 (88)	307	133 (91)	13 (79)
Packard Creek	CTH N	5.3 (2.2 - 10.1)	434 (68)	229	84 (84)	12 (78)
Packard Creek	Eland Road	4.7 (2.0 - 9.3)	1101 (88)	527	54 (76)	-
Packard Creek	Oriole Road	5.8 (2.0 - 11.6)	1177 (88)	353	221 (96)	74 (98)
Simpson Creek	Alberg Lane	6.0 (2.4 - 8.9)	333 (61)	79	48 (73)	-
Unnamed Tributary - 312000	Birch Lane	4.7 (1.4 - 8.5)	862 (84)	200	31 (62)	-
Unnamed Tributary - 312700	Hemlock Road	3.4 (3.4 - 6.5)	581 (75)	500	-	-
Unnamed Tributary - 311900	Schoolhouse Road	5.9 (2.4 - 7.5)	397 (66)	32	-	-
Unnamed Tributary - 311900	Wilson Creek Lane	3.7 (1.8 - 7.0)	492 (71)	323	15 (45)	-
Unnamed Tributary - 313700	Sugarbush Road	5.9 (2.6 - 9.1)	554 (74)	60	48 (73)	-
Wilson Creek	Witt-Birn Townline Road	5.3 (1.9 - 9.6)	1191 (89)	238	111 (89)	-
Wilson Creek	Wilson Creek Lane	4.9 (1.4 - 8.4)	526 (72)	145	53 (75)	-

Table 7. Catch metrics per mile for rainbow trout on rotational sites surveyed in 2024

Stream Name	Site Location	Average Length and Range (inches)	Total and (PCTL)	Young of Year (YOY) per mile	>8" (PCTL)	>10" (PCTL)
Middle Branch Embarrass River	Eland Road	9.4	4	-	4	-
Middle Branch Embarrass River	Robin Road	9.4 (8.5 - 10.4)	36	-	36	8
Middle Branch Embarrass River	Witt-Morr Townline Road	9.2 (8.9 - 9.5)	7	-	7	-
Middle Branch Embarrass River	CTH Q	9.8 (8.9 - 10.8)	20	-	20	8

Figure 1. Middle Branch Embarrass River length distribution for multiple trout species 2024.

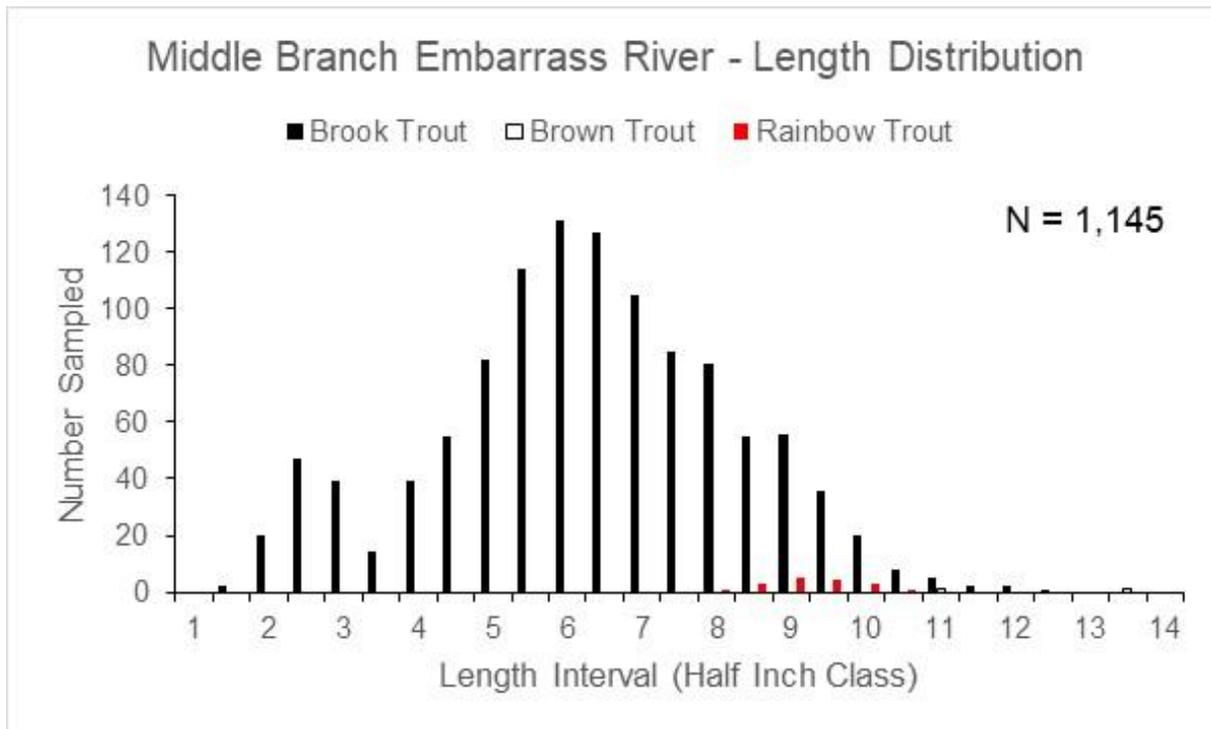


Figure 2. Wilson Creek brook trout length distribution 2024.

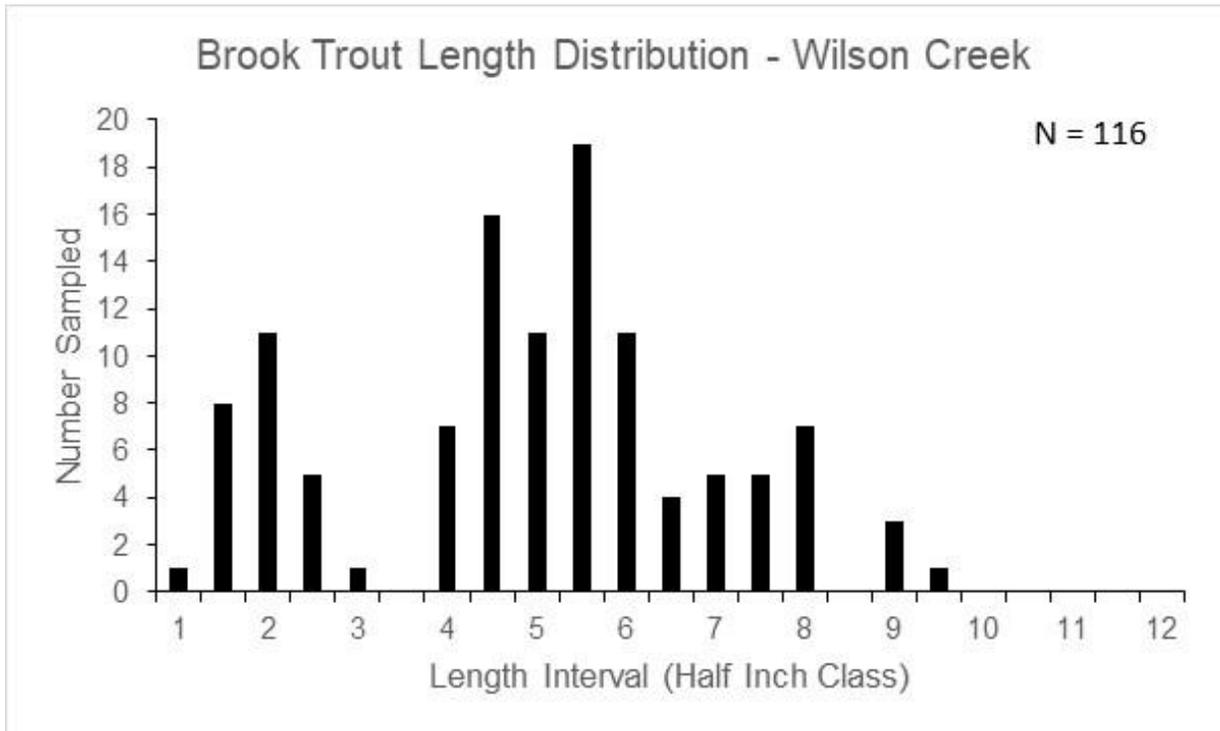


Figure 3. Elmhurst Creek brook trout distribution 2024.

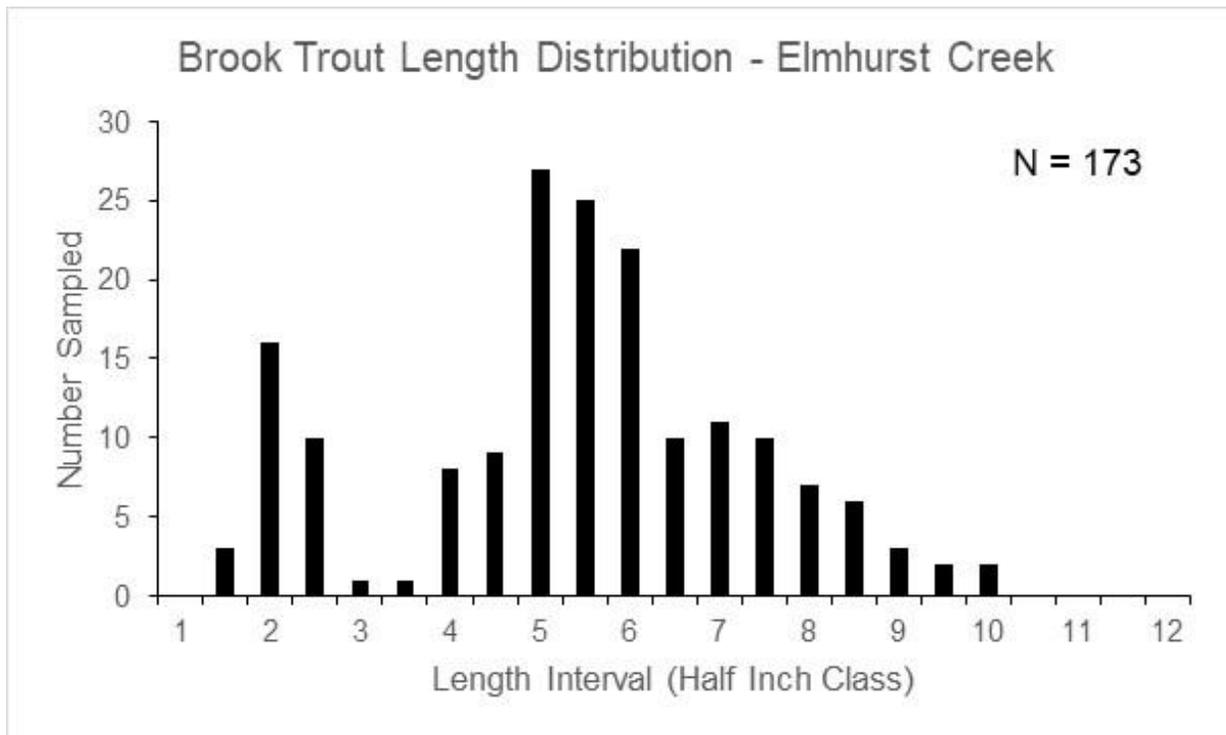


Figure 4. Packard Creek brook trout distribution 2024.

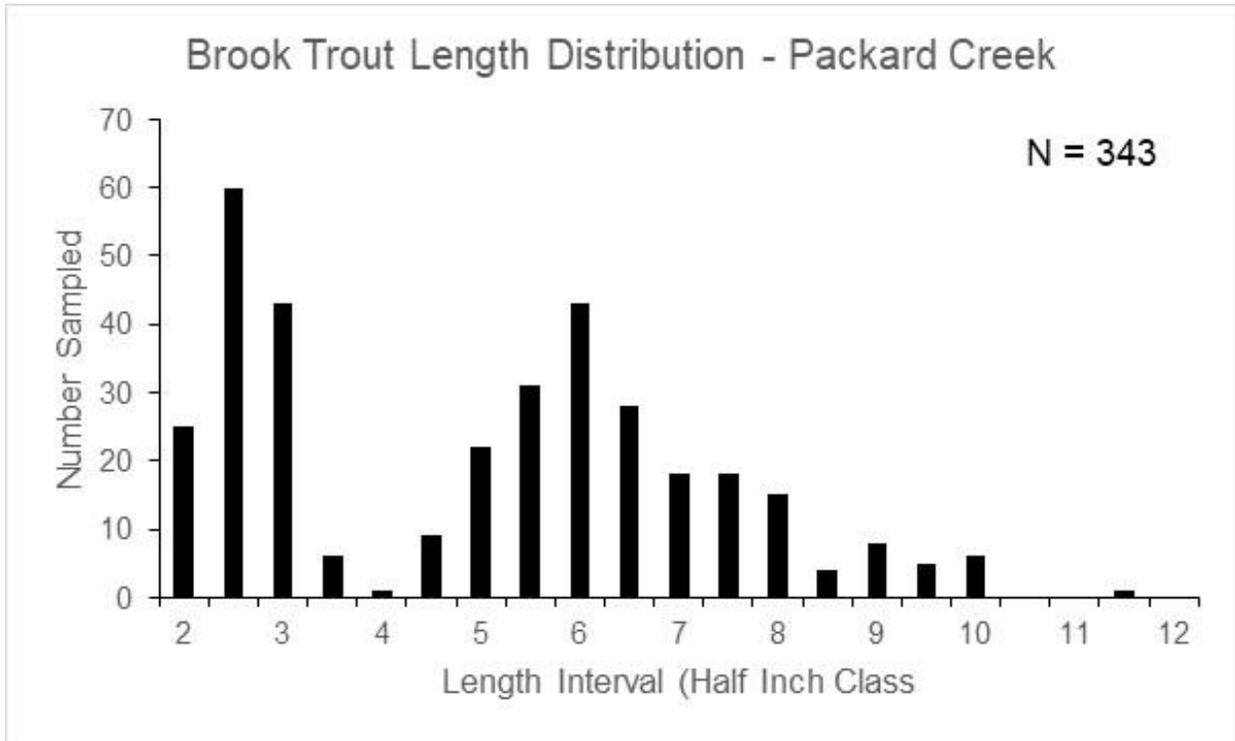


Figure 5. Dent Creek brook trout distribution 2024.

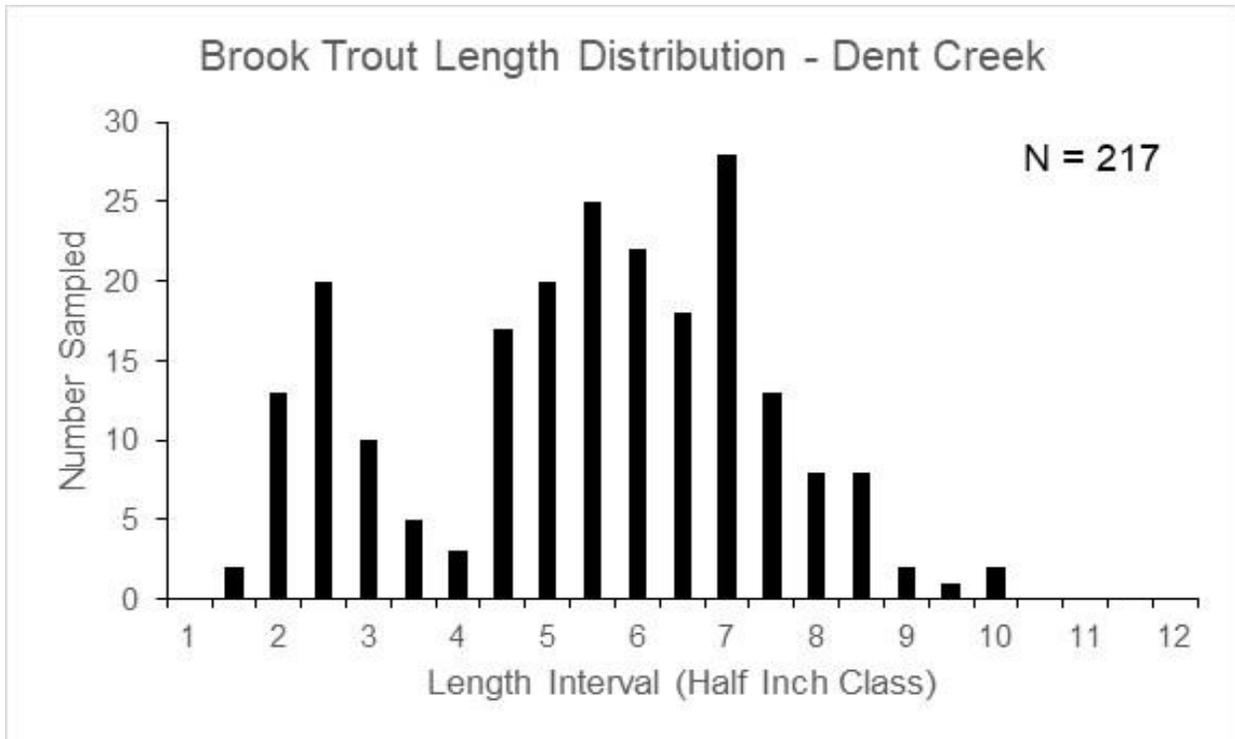
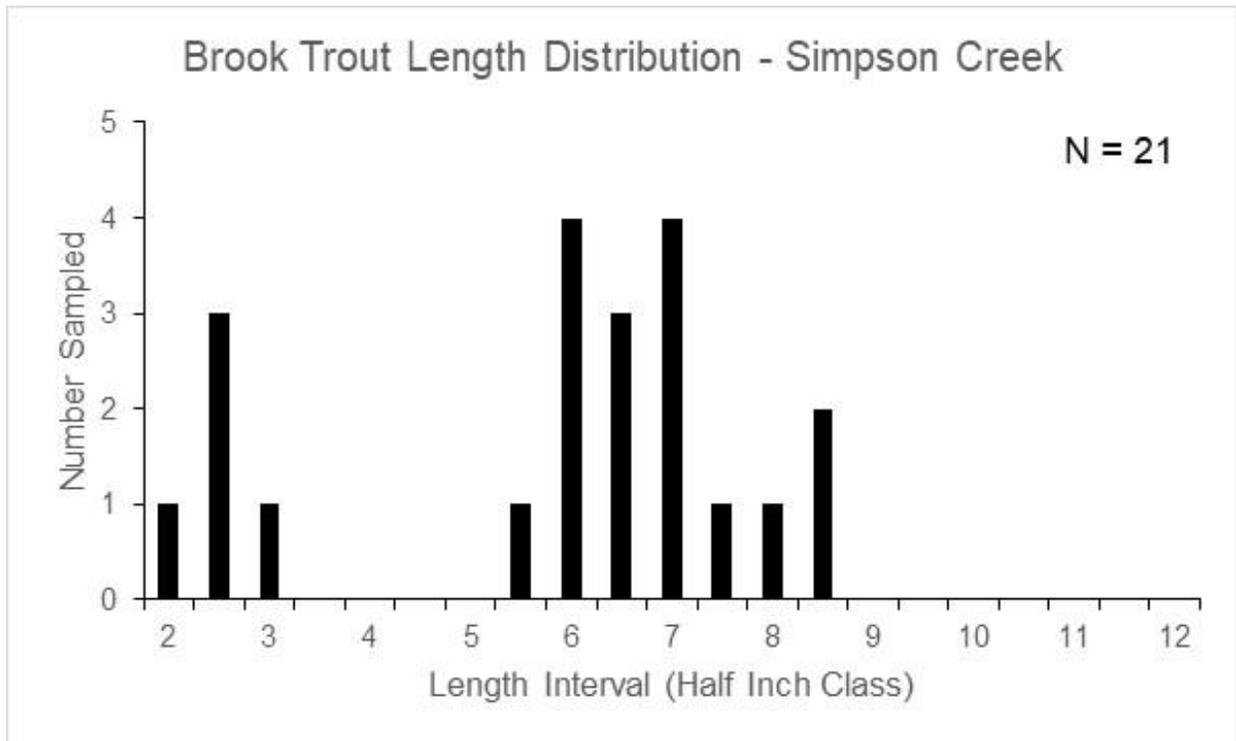


Figure 6. Simpson Creek brook trout distribution 2024.



Discussion/Summary

The Middle Branch Embarrass originates in Langlade County and flows through Shawano County before converging with the South Branch Embarrass River at the Caroline Millpond, which is created by an impoundment. Homme Pond, which is also an impoundment near the Village of Wittenberg, creates another barrier for fish species within the Middle Branch Embarrass watershed. The Middle Branch Embarrass River consists of 16.3 miles of Class II trout water, 23.2 miles of Class I trout water and is supported by many other tributaries. Roughly 30% of land use within the Middle Branch Embarrass River consists of agriculture, while the remaining landscape consists of wooded or wild landscape. Fishing access on the Middle Branch Embarrass consists of 28 road crossings, along with 76 acres of public land near the headwaters.

Higher water temperatures $> 68^{\circ}\text{F}$ downstream of the Homme Pond during summer months are not conducive to healthy trout populations. Smaller cold water tributaries provide refuge, spawning habitat, and nursery areas for trout which are supported by three main tributaries below Homme Pond. Dent Creek, a 7.4 mile Class I trout stream has the highest densities of YOY (Young of Year) brook trout downstream of the Homme Pond dam. Wilson Creek, a cold water resource downstream of Homme Pond dam produces above average numbers of YOY brook trout along with several other year classes of adults. Wilson Creek, a 5.5 mile tributary, is over 40% wooded landscape and has added conservation efforts with Shawano County owning 95 acres. Within this 95 acres, 1.7 miles of stream flows through the public land. Habitat projects done by the WDNR have been completed in recent years to help preserve the brook trout populations in Wilson Creek. Simpson Creek, a 4.3 mile Class I trout stream also has several

year classes of brook trout. Simpson Creek habitat has been degraded over the years from run off events, and erosion.

The Middle Branch Embarrass River upstream of Homme Pond consists of 23.2 miles of Class I trout water. Packard Creek, a 10.3 mile Class I brook trout stream provides cold water, excellent habitat for all year classes of trout, and contributes the highest densities of brook trout in the upper reaches of the Middle Branch Embarrass River watershed. Elmhurst Creek, 6.0 miles of Class I trout water, is the most upstream tributary to the Middle Branch Embarrass River.

Elmhurst Creek consists of cold water, gravel substrate, and suitable habitat for several year classes of brook trout. Many other smaller unnamed tributaries contribute to the Middle Branch Embarrass River watershed. Management concerns for the watershed and the trout populations consist of land use, runoff events, erosion, perched culverts at road crossings and protection of the riparian corridor.

Middle Branch Embarrass River brook trout densities with total CPUE at seven of the nine sites above the Homme Pond dam being higher than the 70th percentile, when compared to statewide data. Four out of the nine sites showed an increase in total CPUE when compared to the 2018 surveys. CPUE for >10.0 inch brook trout were above the 80th percentile at six of the nine sites above the Homme Pond dam. Overall, the CPUE of brook trout >10.0 inches has increased since the 2018 surveys in the Middle Branch Embarrass River. YOY densities of brook trout were highest in the two most upstream sites, CTH Z and Elm Road. Temperature ranged from 59 - 64 F° upstream of the Homme Pond dam, during the months of July. Temperatures ranged from 60 - 66 F° downstream of the Homme Pond dam. Very low densities of brook trout were sampled during the survey period of the Middle Branch Embarrass River downstream of the Homme Pond dam. Lack of suitable habitat and higher water temperatures are likely dispersing brook trout to colder tributaries such as Dent Creek and Wilson Creek.

Two main tributaries which flow into the Middle Branch Embarrass River upstream of the Homme Pond dam are the Packard Creek and Elmhurst Creek. Packard Creek, which is the larger of the two tributaries, showed an increase in total CPUE for brook trout at the CTH N and Oriole Road sites when compared to previous surveys conducted in 2012. CPUE of brook trout >8.0 inches remained stable since surveys conducted in 2012. Total CPUE of brook trout in Packard Creek were between the 68th and 88th percentiles when compared to brook trout populations across the state. Furthermore, brook trout CPUE >10.0 inches in Packard Creek were between the 78th and 98th percentiles when compared to statewide populations. Elmhurst Creek, which is located near the headwaters of the Middle Branch Embarrass River, is an excellent spawning and nursery area for brook trout. Since surveys conducted in 2012 on Elmhurst Creek, there has been a slight increase in brook trout >8.0 inches. Also of note is the increase in brook trout YOY densities during that time frame. The CTH Z - Elmhurst Creek sampling site shows that brook trout densities >8.0 inches are higher than 95% of other streams sampled throughout the state.

Dent Creek, Simpson Creek and Wilson Creek are three contributing tributaries to the Middle Branch Embarrass River downstream of the Homme Pond dam. Dent Creek has shown an increase in total CPUE and >8.0 inch brook trout since surveys conducted in 2014. Total CPUE of brook trout on Dent Creek range from 68th - 92nd percentile when compared to other brook trout streams throughout Wisconsin. Wilson Creek, which was last surveyed in 2013, has shown an increase in total CPUE, while there was a slight decline in brook trout >8.0 inches. Although there was a slight decline in brook trout >8.0 inches, the two sampling sites were still in the 75th and 89th percentile when compared to other brook trout waters in the state. Simpson Creek

nearly doubled in total CPUE since sampling brook trout in 2015. Simpson Creek is above average in brook trout densities compared to statewide brook trout streams, but has lower densities than Dent and Wilson Creeks.

There is a very low brown trout population within the Middle Branch Embarrass River watershed downstream of the Homme Pond dam. Along with the low density brown trout population, there is a put and take rainbow trout population which has been supported through DNR stockings for many years. Based on the excellent brook trout populations throughout the Middle Branch Embarrass River watershed, protection of genetic integrity and budgetary reasons those stocking will be discontinued.

Middle Branch Embarrass River and its connected tributaries have above average brook trout densities and provide an action based angling opportunity. Opportunities to capture brook trout up to 12.0 inches are possible. Warming water temperatures, impassable barriers and habitat degrading over time are concerns for brook trout in the lower reaches of the Middle Branch Embarrass River and its' tributaries. Impassable barriers, whether they are dams, or perched culverts can have a negative effect on brook trout populations. Connectivity within watersheds is important for brook trout to allow them to migrate and find colder water, which is critical for brook trout survival.