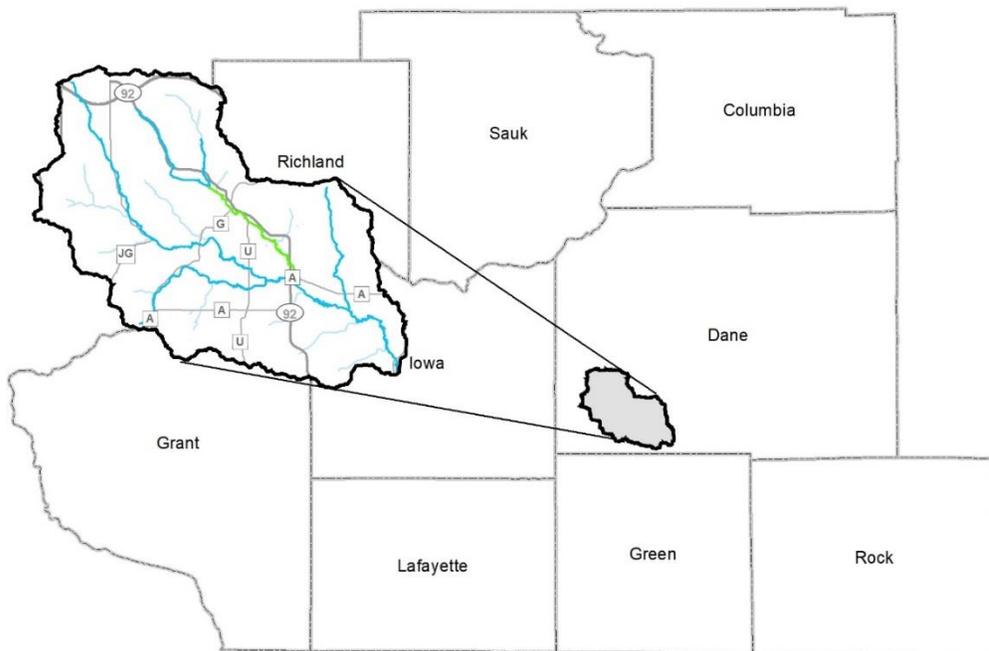


WISCONSIN DEPARTMENT OF NATURAL RESOURCES
Trout Stream Management And Status Report Of
The West Branch Sugar River Watershed
Dane County, Wisconsin 2020-2021



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Executive Summary

The West Branch Sugar River watershed is located west and south of Verona and contains nine trout streams. The West Branch Sugar River is a Class 2 trout stream and has been routinely stocked with brook trout. Mount Vernon Creek is Class 1 and is not regularly stocked, except for occasional adult brook trout. Deer Creek, Flynn Creek, Fries Feeder and Primrose Branch are Class 2 trout waters and have been stocked recently with brook trout.

We sampled trout streams in the West Branch Sugar River watershed using single-pass stream electrofishing following the suspension of stocking to assess natural recruitment and natural reproduction. We found fishable populations, evidence of excellent recruitment and moderate to high abundances of trout throughout the watershed. We documented abundant brown trout and high natural recruitment in Flynn Creek, Primrose Branch and Mount Vernon Creek, while the West Branch Sugar River had lower recruitment and reduced adult populations. Fries Feeder, Flynn Creek, Primrose Branch and unnamed WBIC 887300 are healthy, self-sustaining brook trout fisheries. Deer Creek is a mixed fishery with modest abundances of brook and brown trout. Milum Creek and its tributary (unnamed waterbody identification code [hereafter, WBIC] 7215113) contain brook trout but in very low abundances. Unnamed WBIC 5036972 and unnamed WBIC 886700 have modest abundances of trout.

Mount Vernon Creek is appropriately classified as Class 1 trout waters, and many of the streams we surveyed will be proposed for changes during the 2024 reclassification cycle. Currently, Class 2 trout waters of Deer Creek, Fries Feeder, Flynn Creek, Primrose Branch and the West Branch Sugar River should be upgraded to Class 1 trout waters while the unnamed tributary to West Branch Sugar (WBIC 887300), unnamed tributary to Mount Vernon Creek (WBIC 886700) and the unnamed tributary to Fries Feeder (WBIC 5036792) should be upgraded from unclassified to Class 1 trout waters.

A major threat to high-quality brook trout fisheries detailed in this report includes the steady increase of brown trout populations in streams managed for brook trout. In the early 2000s, it was rare to find a brown trout in Deer Creek, but our most recent survey in 2022 showed brown trout outnumbering brook trout in these streams by a wide margin. Without drastic interventions, we should expect similar patterns in southern Wisconsin brook trout populations as climate change results in trout streams becoming more conducive to brown trout and less so for brook trout. Once brown trout have displaced brook trout in small streams like Deer Creek, Primrose Branch and small unnamed tributaries, stocking is not expected to help brook trout regain dominance.

Management recommendations outlined in this report include: maintaining high-quality recreational fishing opportunities in Mount Vernon Creek, increasing adult trout abundances in West Branch Sugar River by investing in Trout Stamp habitat improvement projects, evaluating angler-use and harvest within the watershed using angler creel surveys, continuing targeted DNR Stream Bank Easement Outreach activities and evaluating Mount Vernon Creek special regulation in the lower reach.

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WATERSHED LOCATION

West Branch Sugar River Watershed, Dane County including West Branch Sugar River, Mount Vernon Creek, Deer Creek, Fryes Feeder, Flynn Creek, Milum Creek, unnamed tributary to Milum, Primrose Branch, unnamed tributary to Mount Vernon Creek, unnamed tributary to West Branch Sugar River and an unnamed tributary to Fryes Feeder.

PURPOSE OF SURVEY

DNR baseline trout rotation and trout potential surveys
Assess trout stream classification
Assess natural reproduction and recruitment
Assess current trout population abundance

DATES OF FIELDWORK

July 28, 2020 – Sept. 18, 2020 (Flynn Creek, Fryes Feeder, Milum Creek, unnamed tributary to Fryes Feeder, unnamed tributary to Mount Vernon, unnamed tributary to West Branch Sugar River)

June 22, 2021 – Aug. 5, 2021 (Deer Creek, West Branch Sugar River, Mount Vernon Creek, Primrose Branch, unnamed tributary to Milum Creek)

FISH SPECIES OBSERVED IN THE SURVEY

All fish encountered were collected and recorded including American brook lamprey, brook stickleback, brook trout, brown trout, central mudminnow, common carp, creek chub, green sunfish, johnny darter, largemouth bass, mottled sculpin, white sucker and yellow bullhead.

Introduction

SUMMARY OF THE WATERSHED

The West Branch Sugar River originates west of the town of Mount Horeb and flows southeast, where it joins the Sugar River upstream of the dam in Belleville. The entire stretch is Class 2 trout waters. Mount Vernon Creek is a large, Class 1 tributary of the West Branch and is formed by the junction of Deer Creek and Fries Feeder in the town of Springdale. Deer Creek (Class 2) forms the western tributary of Mount Vernon and runs along HWY 92 towards Mount Horeb, while Fries Feeder (Class 2) flows southerly along Town Hall Road. Flynn Creek (Class 2) crosses Fritz Road and flows south to meet the West Branch in the town of Montrose. Primrose Branch flows easterly from its headwaters along HWY G until it meets the West Branch Sugar River between HWY U and HWY A. Several unclassified streams were surveyed as trout potential streams in this rotation, including Milum Creek and its unnamed tributary (WBIC 7215113), a spring pond tributary to Fries Feeder (unnamed WBIC 5036972), an unnamed tributary to the West Branch Sugar River (joins West Branch downstream of HWY G) and an unnamed tributary to Mount Vernon (unnamed WBIC 886700) which runs along Spring Rose Road and crosses HWY 92.

Deer Creek, Flynn Creek, Fries Feeder, Milum Creek are designated DNR Exceptional Resource Waters, and Mount Vernon Creek is a designated Outstanding Resource Water which indicates these rivers provide outstanding recreational opportunities, support valuable fisheries and wildlife habitat and have good water quality.

The West Branch Sugar River watershed covers 66.74 square miles, and land use in the watershed is primarily agricultural (39.90%), grassland (33.80%) and a mix of forest (19.70%) and other uses (6.60%). This watershed has 1,567 stream miles, 10 lake acres and 1,132 wetland acres.

CURRENT STATUS AND MANAGEMENT HISTORY

Class 1 trout streams are those with high-quality habitat with sufficient levels of natural reproduction to sustain the fishery, and no stocking is required. Class 2 streams are those in which some natural reproduction occurs but not enough to utilize all available food and space, and stocking is required to maintain a desirable fishery. Class 3 streams are those in which trout habitat is marginal with no natural reproduction occurring and requires stocking of catchable-sized trout to provide a fishing opportunity. Mount Vernon Creek is the only Class 1 trout stream in this watershed, and all others are Class 2 or unclassified (Figure 1).

In 2015 it was decided to discontinue brown trout stocking in the watershed to promote brook trout and prevent competition between stocked brown and brook trout. The West Branch Sugar River was stocked with brown trout from 2003-2015, and

Primrose Branch was stocked with brown trout in 2003. Regular brook trout stocking has occurred in Deer Creek, Flynn Creek and Fryes Feeder (Table 1).

The Wisconsin Department of Natural Resources (DNR), Dane County and conservation organizations like the Southern Wisconsin Chapter of Trout Unlimited have long been active in acquiring easements and conducting habitat improvement projects in the watershed. For example, long stretches of Mount Vernon Creek, the West Branch Sugar River and Primrose Branch have had habitat improvement projects completed along publicly accessible lands. However, these projects were conducted in the early 2000s or later, and some of the structures have since degraded (e.g., wood additions no longer present, LUNKERS tipping over or filled in). Additionally, many of these streams could benefit from bank sloping to reconnect the floodplain and improve angler access as the stream has incised over time.

Mount Vernon Creek previously had a catch and release and artificial lure-only section from State Hwy 92 upstream to HWY U. This regulation was modified in 2016 to the current five trout under 12 inches regulation to continue to protect quality-sized fish (greater than 12 inches) from harvest but allow anglers harvest opportunities on smaller trout. The rest of the watershed is regulated under the standard county-wide 8-inch minimum, three daily bag limit for trout (Figure 2).

PUBLIC ACCESS

The largest swaths of DNR-owned lands in this area are along Mount Vernon Creek and are within the Mount Vernon Creek Fishery Area in the town of Mount Vernon. Donald Park is part of the Dane County Park system and adjoins the DNR Fishery Area and offers additional access to Deer Creek. Public access is excellent in this area, with four designated parking areas and several additional road-stream crossings in addition to several DNR and Dane County easements that provide angler access along the West Branch Sugar River, Primrose Branch and Deer Creek (Figure 3).

Methods

Understanding the natural reproduction and recruitment of a stream is critical to managing trout populations. In our fishery assessments, natural recruitment is defined by juvenile fish surviving to age-1. Natural reproduction is the presence of age-0 fish (young-of-year, YOY), and they are more difficult to accurately assess since their vulnerability to electrofishing gear is more variable than larger-sized fish. Additionally, YOY are not evenly distributed since they often occur upstream in nursery habitats and migrate downstream to adult and juvenile habitats later in life. Therefore, documenting the lack of natural reproduction does not mean there is necessarily a complete lack of natural recruitment.

To assess recruitment to age-1, all stocking of fingerling trout was suspended the year prior to these surveys. Our assumption was that all yearling (age-1) trout

observed are from natural recruitment somewhere in the watershed, and all YOY (age-0) trout are from natural reproduction. If previous stocking occurred, age-2 and older fish are assumed to be from mixed sources. High levels of natural reproduction, natural recruitment and several age classes without stocking indicate self-sustaining Class 1 waters. We infer put-and-grow stocking was effective if we observe an absence or low abundance of yearling trout but an abundance of adult trout and conclude a given stream should be classified as Class 2. Marginal waters where only stocked fish survive during early spring and summer with limited carry-over and no reproduction are Class 3.

COVID-19 safety precautions limited our fieldwork in 2020 and impacted our scheduled work in 2021. For this report, I used 2020 data for Flynn Creek, Fries Feeder, Milum, unnamed WBIC 5036972 (Spring Pond tributary to Fries Feeder), unnamed WBIC 886700 (tributary to Mount Vernon along Spring Rose Road) and the unnamed WBIC 887300 (tributary to West Branch Sugar River). I used 2021 data to describe Deer Creek, West Branch Sugar River, Mount Vernon Creek and the unnamed WBIC 7215113 (tributary to Milum Creek). We surveyed three stations in Fries Feeder, one in Milum Creek, one on the unnamed tributary to Milum Creek, two in the unnamed tributary to West Branch Sugar River, three in Flynn Creek, one in the unnamed tributary to Mount Vernon Creek, two in Primrose Branch, four in Mount Vernon Creek, five in the West Branch Sugar River and one in Deer Creek (see Figure 1 for map of sample locations). All 23 stream sites were surveyed with either a tow behind barge stream shocking unit or backpack electrofishing unit.

The number of fish sampling sites in a particular stream was dependent on the length of the stream following DNR Fish Management Handbook protocols. One sampling site is required for stream segments less than 1.5 miles, two sites for stream segments between 1.5-3 miles and one site every three miles on long rivers (minimum three sites). The length of each fish survey at a particular site is determined by stream width; thirty-five times the mean stream width on segments greater than 3 meters and 100 meters minimum for streams less than 3 meters wide.

For each sampling site, we calculated the catch-per-unit-effort (CPUE) by dividing the number of fish collected by the length of the survey yielding a number of trout per mile estimate. This procedure allows for straightforward analyses of catch rates within and among stream sites as well as standardized regional and statewide comparisons. Fish length data are analyzed by size classes and age groups of interest. These groups include the number of age-0 (YOY), age-1 yearlings and adult trout (age-2+). YOY are fish less than 4 inches in length, yearlings are between 4 and 7.9 inches for brown trout (between 4-7 inches for brook trout), and adults are considered greater than 8 inches for brown trout (greater than 7 inches for brook trout). Preferred-sized fish are often of special interest to anglers and are fish greater than 12 inches for brown trout (greater than 10 inches for brook trout).

All fish encountered during the survey were collected. We recorded the species of fish and total length (nearest tenth of an inch). Non-trout species were counted to calculate the cold-water index of biotic integrity (IBI) score (0-100). For added context, catch rates of mottled sculpin (less tolerant of poor water quality and a cold-water indicator species) and white sucker (tolerant of poor water quality and warmer water) were also evaluated as a proxy for water temperature profiles at each survey station. DNR Fisheries Management Handbook chapter 510 details each of the sampling protocols in greater detail. All fish were returned to the stream.

Water quality and habitat metrics were also collected at each survey site. Streamflow (cubic feet per second, CFS) was calculated at one cross-sectional transect at each site using a HACH FH950 handheld flow meter. Temperature, dissolved oxygen and specific conductivity and pH were also measured using a handheld YSI Pro 2030 meter. Stream habitat metrics were collected using a DNR qualitative habitat rating form. For streams less than 10 meters wide, ratings included riparian buffer width, bank erosion, pool area, width: depth ratio, riffle: riffle or bend: bend ratio, fine sediments and cover for fish. For streams greater than 10 meters wide, ratings included bank stability, maximum thalweg depth, riffle: riffle or bend: bend ratio, rocky substrate and cover for fish. All data was recorded digitally using weatherproof handheld Toughbook™ laptops and a custom software application.

Results

Brown trout were collected in all 23 sites we sampled (Figure 1, Table 2) and average catch rates for YOY brown trout (less than 4 inches) was 109 per mile, yearling (4-8 inches) 189 per mile, adult (greater than 8 inches) 168 per mile, preferred (greater than 12 inches) 55 per mile and fish ranged in size from 2 inches to 21 inches. YOY brown trout (natural reproduction) were observed in twenty locations (Figure 4). Yearling brown trout were observed in twenty-one locations (Figure 5), and adult brown trout were observed at nineteen sites (Figure 6).

Natural reproduction of brown trout across the watershed was patchy with a mix of high performing, poorly performing and moderately performing reaches. For example, 35% (8 of 23) of the stations had YOY catch rates exceeding the statewide benchmarks (Tables 6-7), but 13% (3 of 23) had no natural reproduction whatsoever. The remaining 12 sites had some natural reproduction but were below the statewide benchmark (Table 2).

Yearling catch rates for brown trout across the watershed followed a similar pattern as YOY, nine stations had catch rates which exceeded the statewide median, only two stations recorded zero yearling-sized fish, and the remaining twelve stations had some yearling production but were below regional benchmarks (Figure 5). The highest catch rates for yearling-size brown trout were at HWY G in Mount Vernon Creek (707

per mile), HWY 92 in Mount Vernon Creek (467 per mile), followed by HWY G at the West Branch Sugar River station (445 per mile, Table 2).

For adult brown trout, Fryes Feeder, Flynn and Mount Vernon creeks and West Branch Sugar River had stations with catch rates that exceeded the statewide benchmark (Table 2, Figure 6). The highest catch rates of adult brown trout over 8 inches were found at the HWY G station in Mount Vernon Creek (1201 per mile). The smaller, headwater streams generally lacked adult brown trout (e.g., Fryes Feeder at Town Hall Road, Milum Creek).

For fish larger than 12 inches, twelve stations exceeded statewide benchmark for catch rates in this size category. For example, Fryes Feeder, Flynn Creek, Primrose Branch, Mount Vernon Creek and West Branch Sugar River had stations with average catch rates that exceeded the statewide benchmark (Figure 7). The highest catch rates of adult brown trout greater than 12 inches were found in Mount Vernon Creek. Only the smallest tributaries and headwater reaches of larger streams lacked fish of this size class. Brown trout greater than 18 inches were observed in Fryes Feeder and West Branch Sugar River (Table 2).

Brook trout were observed in Fryes Feeder, Milum Creek, the unnamed tributary to West Branch Sugar River, Flynn Creek, Primrose Branch, the unnamed tributary to Milum Creek, Mount Vernon Creek, Deer Creek and West Branch Sugar River (Table 3). Fryes Feeder had the highest catch rates for brook trout, with mean catch rates of YOY at 285 per mile, yearling 90 per mile and adults at 72 per mile. The survey at Town Hall Road had the most fish and multiple year classes represented in the sample (Table 3).

Brook trout were observed in ten streams, but Fryes Feeder, the unnamed tributary to West Branch Sugar River, the unnamed tributary to Fryes Feeder and Primrose Branch had average adult catch rates exceeding the minimal fishable population of more than 50 adults per mile (Table 3, Figure 8). These four streams had excellent brook trout natural reproduction ranging from 209 to 531 per mile. Fryes Feeder, Flynn Creek and the tributary of West Branch Sugar River had yearling brook trout catch rates exceeding the statewide median, and all other stations were well below that mark (Figure 9). Fourteen of the sixteen brook trout sites had adult-sized fish greater than 7 inches represented in the sample, and four exceeded the regional benchmarks for this size category (Table 2, Figures 9-10). Fryes Feeder, Flynn, Primrose Branch, Mount Vernon and Deer creeks had brook trout over 10 inches recorded in the survey, but none of them exceeded the regional benchmarks.

The presence of cold-water indicator species like sculpin throughout all streams in the watershed indicates the stream temperatures are suitable and water quality sufficient to support increased trout abundances with habitat improvements. Mottled sculpin were observed throughout the watershed, and the highest abundances were in Milum Creek (981 per mile) followed by West Branch Sugar River (924 per mile),

Primrose Branch (773 per mile), Mount Vernon Creek (753 per mile) and Fryes Feeder (684 per mile). White suckers were observed in the larger, lower reaches of the watershed, with the highest abundances in the West Branch Sugar River and Mount Vernon Creek (Table 5).

ANNUAL TREND SURVEY STATIONS

The four annual DNR trend surveys in this watershed offer unique perspectives regarding the species composition and relative abundance of the trout streams in this region. Deer Creek at HWY 92 site is a small, coldwater stream that once was dominated by brook trout but has since transitioned to a lower abundance brown trout fishery despite brook trout stocking as recently as 2018 (Figure 12). Similarly, the Primrose Branch at HWY U trend site has experienced increased brown trout abundances while the brook trout population experiences variable recruitment (Figure 13).

With regular natural recruitment and all size classes of trout represented in our surveys, Mount Vernon Creek at HWY U continues to be a robust trout stream with total catch rates exceeding 1,000 fish per mile and most recently boasting a total catch rate of nearly 2,000 fish per mile (Figure 14). The West Branch Sugar River at HWY G trend site has experienced fluctuations in the trout population over the years, ranging from ~100 per mile to over 1,000 trout per mile (Figure 15).

COLDWATER INDEX OF BIOTIC INTEGRITY SCORES AND HABITAT QUALITY

Median coldwater IBI score across all sites in the West Branch Sugar River watershed was 80 (out of 100, with an average score of 75) and exceeded the statewide trout stream (60), Driftless Area trout stream (50) and Dane County (50) median scores. The average qualitative habitat rating for the watershed was 56 (out of 100), with all stations scoring as “Excellent,” “Good” or “Fair,” with two “Poor” scores. Average riparian buffer scores were excellent (12.4 out of 15). Bank erosion scores varied widely, and nearly all stations had some erosion issues (range 0-15 out of 15). Adequate habitats, defined as pool area, were rare, with a median score of 3 and a maximum score 10 (out of 15). Median scores for other physical habitat metrics showed similar heterogeneous patterns, including width: depth ratio (5 out of 15), riffle habitat (5 out of 15), fine sediments present (5 out of 15) and cover for fish (10 out of 15). The average temperature across all stations was 58.1°F (ranging from 51.8°F to 64.8°F). The average stream flow was 9.8 CFS (ranging from 0.71 – 40.97 CFS), with an average width of 3.5 meters (Table 4).

Discussion

With elevated catch rates across all size classes, Mount Vernon Creek and the West Branch Sugar River are providing excellent angling opportunities. The average catch rate for brown trout across the nine survey sites in these streams was 854 per mile. The highest catch rates in the watershed were 2,600 per mile at HWY G in Mount

Vernon Creek and 1,088 per mile at HWY G on West Branch Sugar River. Smaller tributaries of these streams are performing well too. For example, total catch rates in Fryes Feeder (375 per mile), Flynn Creek (528 per mile) and Primrose Branch (455 per mile) had average brown trout catch rates exceeding the minimum fishable population (50 per mile, adult sizes) and therefore, provide quality angling opportunities. There are brook trout highlights as well. For example, Fryes Feeder, the unnamed tributary to West Branch Sugar River, Flynn Creek, the unnamed tributary to Deer Creek and Primrose Branch all had total catch rates high enough to provide quality angling opportunities for brook trout.

We documented brown trout steadily outnumbering brook trout in two streams in this watershed. In the early 2000s, it was rare to find a brown trout in Deer Creek, but our survey in 2022 showed brown trout outnumbering brook trout by a 6:1 margin and the total number of fish has declined (Figure 12). At Primrose Branch, brook trout numbers have fluctuated with year-class strength, while we've seen a steady increase in brown trout. Though the overall trout abundances remain high, brook trout were outnumbered 10:1 by brown trout in our recent survey (Figure 13). Without interventions, we should expect similar patterns in southern Wisconsin brook trout populations as climate change results in trout streams becoming more conducive to brown trout and less so for brook trout. Once brown trout have displaced brook trout in small streams like Deer Creek and Primrose Branch, stocking is not expected to help brook trout regain dominance. Habitat improvement plans, including riparian corridor management actions, along brook trout waters should proceed cautiously. They should incorporate techniques designed to promote brook trout with more shade, pools and in-stream wood than what is typically prescribed for brown trout management.

Natural reproduction, yearling survival and total adult catch rates in Fryes Feeder, Flynn Creek, Primrose Branch, West Branch Sugar River and the unnamed tributary to West Branch Sugar River warrant upgrading to Class 1 trout water. Currently unclassified trout waters, the unnamed tributary to Mount Vernon Creek and the unnamed tributary to Fryes Feeder, have natural reproduction and sufficient adult abundances to classify them as Class 1 trout waters as well. Deer Creek is currently Class 2 trout waters but should be upgraded to Class 1 in the next reclassification cycle. No stocking is needed in the watershed to support a healthy trout fishery while providing reliable angling opportunities. Milum Creek and the unnamed tributary to Milum Creek do not currently support trout fisheries in high enough abundance (likely habitat limited) to warrant upgrading to classified trout water at this time.

In contrast to regional flooding in 2018 which likely decreased trout catch rates in previous years, the 2020 and 2021 data presented here indicate post-flood conditions, which have resulted in increased trout production and year-class formation in some locations. For example, Fryes Feeder, Flynn Creek, Primrose Creek, Mount Vernon Cree and West Branch Sugar River each had YOY production and yearling recruitment values well-above regional benchmarks. For example, Mount

Vernon Creek at HWY G station had a catch rate of YOY brown trout over five times greater than the Driftless Area benchmark. Future surveys will examine whether or not newly scoured spawning riffles and modified stream morphology as a result of the flooding will continue to produce strong year classes and whether or not contemporary elevated YOY production leads to increased adult trout abundances for anglers to target.

In contrast to high recruitment in most stream segments in the watershed, the West Branch Sugar River had lower brown trout recruitment than regional benchmarks in 83% of the sites we surveyed (all except HWY G location), resulting in a stream average of only 42 YOY per mile (Table 2). The abundances for larger-sized fish were improved, with most sites meeting or exceeding regional benchmarks but still lower than what the river could support given its flow and size. The habitat scores were generally acceptable, but the substrate was often silty with few pools and riffles. Revisiting old habitat improvement projects to ensure they are still functioning and implementing new ones to increase the amount of pool and riffle habitats, with overhead cover for adult fish, will likely result in increased fish abundances across all-size classes and improve the overall size structure in the process.

In addition to physical habitat stressors caused by urban and agricultural pressures, along with climate change, invasive species like New Zealand mudsnails continue to colonize Wisconsin's trout streams. Established populations have been found in Badger Mill Creek and the Sugar River. Research and monitoring are underway to determine any impacts new invaders like mudsnails pose to the trout fishery and ecology of the stream. Anglers and paddlers need to be mindful of transporting these organisms between the waterways they recreate in. Freezing gear or robust disinfecting protocols (Virkon™, steam) are the best ways to be sure your gear is free of aquatic invasive species between trips.

Management Goals and Objectives

- 1) **Goal** – Maintain high-quality recreational fishing opportunities for preferred-sized trout (greater than 12 inches) in Mount Vernon Creek
Objectives –
 - a. Maintain adult size trout (greater than 8 inches) CPUE >700/ mile (Driftless Area 75th percentile is 677/mile and current stream average is 714 /mile)
 - b. Maintain preferred-size trout CPUE >115/ mile (Driftless Area 75th percentile is 115/mile and current stream average is 139 /mile)**Strategy** – Maintain high quality trout habitats instream and along riparian corridor while promoting increased angler access to a feasible extent along public lands and easements
 - a. Collaborate with local landowners, conservation organizations and government agencies to acquire easements or lands to increase buffer

areas, encourage native vegetated riparian corridors, increase public access and implement habitat improvement projects where needed.

- 2) **Goal**- Increase adult trout (trout over 8 inches) abundances in West Branch Sugar River

Objectives – Increase adult catch rates of brown trout >330/ mile (Driftless Area 50th percentile is 330/mile and current stream average is 228/mile)

Strategy – Invest Trout Stamp habitat funds to conduct 1-2 miles of habitat improvement projects along publicly accessible lands and easements before the next survey rotation.

- a. Collaborate with local landowners to secure new easements and lands with willing partners in the watershed.

ADDITIONAL MANAGEMENT RECOMMENDATIONS:

- 1) Upgrade Class 2 trout waters of Deer Creek, Fryes Feeder, Flynn Creek, Primrose Branch and West Branch Sugar River to Class 1 trout waters in 2024 reclassification cycle
- 2) Reclassify the unnamed tributary to West Branch Sugar (WBIC 887300) unnamed tributary to Mount Vernon Creek (WBIC 886700) and the unnamed tributary to Fryes Feeder (WBIC 5036792) from unclassified to Class 1 trout waters in 2024 reclassification cycle
- 3) Evaluate angler-use and harvest within the watershed using angler creel surveys
- 4) Continue targeted DNR Stream Bank Easement Outreach to interested landowners and acquire new lands within Natural Resource Board acquisition boundaries.
 - a. Collaborate with Dane County to engage with interested landowners with expired stream bank easements to renew those agreements to extent feasible
- 5) Maintain harvest opportunities with current regulation of an 8-inch minimum, three daily bag limit throughout most of the watershed
 - a. Evaluate Mount Vernon Creek's special regulation daily bag limit of five trout under 12 inches for waters in between HWY U and HWY 92 in the next rotation, based on size structure data, angler preferences and angler harvest.

Tables and Figures

Table 1. Trout stocking in West Branch Sugar River Watershed 2015-2021.

Stream	Species	2015	2016	2017	2018	2019	2020	2021	2022
Deer Creek	Brook	1065	1000	450	500				
Flynn Creek	Brook	2027	1000	450	350				
Fryes Feeder	Brook	536	500	225	250				
Mount Vernon	Brook		60						
Primrose Branch	Brook	1103	1000	922	500		500		
West Branch Sugar	Brook	4000	4060	4000	2000				3000
	Brown	1271							

Table 2. Brown trout catch rates in for the West Branch Sugar River watershed. Catch per unit effort (CPUE) units are the numbers of fish per electrofishing mile of young-of-year (YOY), yearlings and adults of various sizes. Stream names shown in bold indicate survey data from 2020, all others are from 2021 surveys. Values shown in red indicate catch rate below Statewide median CPUE.

Stream	Station (ID)	N	Mean Length (In)	<4" YOY CPUE	4-8" Yearling CPUE	>8" CPUE	>12" Preferred CPUE	>15" Memorable CPUE	>18" Trophy CPUE	Total CPUE	
Fryes Feeder	Stream Average	20.67	7.22	69.74	108.63	197.14	60.35	13.41	5.36	375.51	
	Town Hall Rd. (44)	4	3.53	48.28	16.09	0.00	0.00	0.00	0.00	64.37	
	HWY 92 (46)	26	9.89	0.00	128.75	289.68	80.47	0.00	16.09	418.43	
	Near Weeping Willow Dr. (45)	32	8.24	160.93	181.05	301.75	100.58	40.23	0.00	643.74	
Milum Cr.	Fritz Rd. (49)	1	3.50	16.09	0.00	0.00	0.00	0.00	0.00	16.09	
Unnamed WBIC 887300	Stream Average	2.50	3.70	32.19	8.05	0.00	0.00	0.00	0.00	40.24	
	Rettenmund Rd. (61)	3	4.60	32.19	16.09	0.00	0.00	0.00	0.00	48.28	
	HWY G bridge (60)	2	2.80	32.19	0.00	0.00	0.00	0.00	0.00	32.19	
Flynn Cr.	Stream Average	33.67	5.34	253.66	179.33	95.28	36.53	5.11	0.00	528.27	
	HWY A (41)	23	4.77	245.23	76.64	30.65	30.65	15.33	0.00	352.52	
	Fritz Rd. (43)	48	6.84	209.21	354.06	209.21	48.28	0.00	0.00	772.49	
	North Fritz Rd. (42)	30	4.41	306.54	107.29	45.98	30.65	0.00	0.00	459.81	
Unnamed WBIC 886700	HWY 92 (58)	16	6.49	64.37	128.75	64.37	32.19	0.00	0.00	257.50	
Unnamed WBIC 5036972	HWY 92 (62)	3	6.33	0.00	35.76	17.88	0.00	0.00	0.00	53.64	
Primrose Br.	Stream Average	56.00	6.10	142.72	310.63	103.89	27.59	0.00	0.00	557.23	
	HWY U (55)	81	7.27	82.77	478.21	183.93	55.18	0.00	0.00	744.90	
	Primrose Center Bridge (56)	31	4.93	202.66	143.05	23.84	0.00	0.00	0.00	369.55	
Mount Vernon	Stream Average	217.00	8.47	202.75	425.23	714.45	138.77	13.95	0.00	1377.91	
	Park to HWY G (50)	454	7.24	695.47	706.96	1201.26	183.93	17.24	0.00	2609.44	
	HWY U (35)	294	8.10	143.69	597.76	816.16	143.69	0.00	0.00	1707.05	
	DNR South Lot HWY 92 (51)	186	8.20	132.81	468.74	835.92	164.06	7.81	0.00	1453.10	
	DNR North Lot HWY 92 (53)	97	8.50	32.84	236.48	361.28	59.12	0.00	0.00	637.17	
	HWY 92 (52)	54	10.32	8.94	116.23	357.63	143.05	44.70	0.00	482.80	
W.Br.Sugar River	Stream Average	38.80	9.56	42.23	228.72	228.12	66.01	17.76	6.66	502.13	
	Fritz Rd. (64)	17	11.45	6.07	12.15	85.02	36.44	18.22	12.15	103.24	
	HWY G (68)	71	7.73	183.93	444.49	444.49	61.31	0.00	0.00	1088.22	
	HWY U (63)	41	8.79	0.00	363.85	209.91	83.97	27.99	0.00	573.77	
	Primrose Center Rd. (69)	41	9.20	13.99	265.89	293.88	83.97	13.99	13.99	573.77	
	HWY 92 (70)	24	10.65	7.15	57.22	107.29	64.37	28.61	7.15	171.66	
Deer Cr.	HWY 92 (39)	6	8.25	16.59	16.59	66.36	0.00	0.00	0.00	99.55	
Statewide Median CPUE					119.00	199.00	206.00	48.00			537.00
Driftless Median CPUE					136.00	230.00	331.00	63.00			730.00

Table 3. Brook trout catch rates for the West Branch Sugar River watershed. Catch per unit effort (CPUE) units are numbers of fish per electrofishing mile of young-of-year (YOY), yearlings and adults of various sizes. Streams shown in bold indicate survey data from 2020, all others are from 2021 surveys. Values shown in red indicate catch rate below Statewide median CPUE.

Stream	Station (ID)	Number of fish	Mean Length (in)	<4" YOY CPUE	4-7" Yearling CPUE	>7" CPUE	>10" Preferred CPUE	Total CPUE
Fryes Feeder	Stream Average	27.50	5.41	285.66	90.53	82.48	10.06	458.66
	Town Hall Rd. (44)	47.00	3.82	531.08	160.93	64.37	0.00	756.39
	Near Weeping Willow Dr. (45)	8.00	7.00	40.23	20.12	100.58	20.12	160.93
Milum Cr.	Fritz Rd. (49)	3.00	3.57	32.19	16.09	0.00	0.00	48.28
Unnamed WBIC 887300	Stream Average	33.50	5.02	209.22	233.36	88.52	0.00	539.13
	Rettenmund Rd. (61)	47.00	4.41	386.24	273.59	80.47	0.00	756.39
	HWY G bridge (60)	20.00	5.63	32.19	193.12	96.56	0.00	321.87
Flynn Cr.	Stream Average	15.67	4.46	151.48	51.86	36.78	5.36	245.23
	HWY A (41)	1.00	4.20	0.00	15.33	0.00	0.00	15.33
	Fritz Rd. (43)	20.00	4.73	209.21	48.28	64.37	16.09	321.87
	North Fritz Rd. (42)	26.00	4.46	245.23	91.96	45.98	0.00	398.50
Unnamed WBIC 5036972	HWY 92 (62)	13.00	8.22	0.00	35.76	196.70	0.00	232.46
Primrose Br.	Stream Average	28.50	4.74	210.66	9.20	80.39	4.60	300.24
	HWY U (55)	29.00	5.46	147.14	18.39	101.16	9.20	266.69
	Primrose Center Bridge (56)	28.00	4.02	274.18	0.00	59.61	0.00	333.79
Unnamed WBIC 7215113	Peerless Rd.	4.00	6.88	21.46	0.00	64.37	0.00	85.83
Mount Vernon	Stream Average	7.00	9.01	0.00	9.86	31.61	9.45	44.75
	Park to HWY G (50)	3.00	9.67	0.00	0.00	17.24	5.75	17.24
	DNR South Lot HWY 92 (53)	11.00	8.34	0.00	19.71	45.98	13.14	72.26
West. Br. Sugar River	HWY G (68)	7.00	5.59	45.98	15.33	45.98	0.00	107.29
Deer Cr.	HWY 92 (39)	5.00	7.70	0.00	33.18	33.18	16.59	82.96
Driftless Median CPUE				132	86	85	18	219
Statewide Median CPUE				148	156	85	18	336

Table 4. Coldwater index of biotic integrity (IBI) scores, water temperature (Temp.), flow (cubic feet per second), stream width and habitat ratings for the West Branch Sugar River watershed. Streams shown in bold indicate survey data from 2020, all others are from 2021 surveys.

Stream	Station (ID)	IBI	Temp. (°F)	Flow	Mean Stream Width (meters)	Habita t Score
Fryes Feeder	Town Hall Rd. (44)	80	56	1.41	1.5	53
	HWY 92 (46)	70	55	5.65	2.9	53
	Near Weeping Willow Dr. (45)	80	52			
Milum Cr.	Fritz Rd. (49)	75	58	1.41	1.7	45
Unnamed WBIC 887300	Rettenmund Rd. (61)	50	51.8	1.41	2	73
	HWY G bridge (60)	80	54	3.18	1.6	43
Flynn Cr.	HWY A (41)	80	56	4.24	2.1	20
	Fritz Rd. (43)	80	57	4.24	1.8	72
	North Fritz Rd. (42)	80	58	4.24	2.9	43
Unnamed WBIC 886700	HWY 92 (58)	80	64	0.71	2.5	48
Unnamed WBIC 5036972	HWY 92 (62)	50	54			
Primrose Br.	HWY U (55)	80	60	4.94	2.6	53
	Primrose Center Bridge (56)	80	53.8	15.89	2.2	62
Mount Vernon	Park to HWY G (50)	80	59	36.02	5.7	57
	HWY U (35)	80	62.5	15.89	7.7	80
	DNR South Lot HWY 92 (51)	90	63	16.60	6.6	67
	DNR North Lot HWY 92 (53)	80	55.9	15.89	6.5	50
	HWY 92 (52)	80	57	18.36	5.5	62
W.Br. Sugar River	Fritz Rd. (64)	50	61	40.97	8.3	55
	HWY G (68)	80	62.7	8.12	4.2	57
	HWY U (63)	70	62.5	9.89	3.2	77
	Primrose Center Rd. (69)	80	60.6	8.48	4.2	67
	HWY 92 (70)	90	61.2	16.95	5.6	57
Deer Cr.	HWY 92 (39)	80	64.8	1.77	2	72
Unnamed WBIC 7215113	Peerless Rd.	50	58	1.06	1.75	43

Table 5. Total catch rates (CPUE; catch per mile) for mottled sculpin and white sucker, IBI scores, and predicted stream natural community categories for the West Branch Sugar River watershed. Streams shown in bold indicate survey data from 2020, all others are from 2021 surveys.

Stream	Station (ID)	IBI Score	Natural Community Prediction	mottled sculpin CPUE	white sucker CPUE
Fryes Feeder	Town Hall Rd. (44)	80	Cool-Cold Headwater	32.19	0.00
	HWY 92 (46)	70	Coldwater	48.28	0.00
	Near Weeping Willow Dr. (45)	80	Cool-Cold Headwater	683.97	0.00
Milum Cr.	Fritz Rd. (49)	75	Coldwater	981.69	0.00
	Unnamed WBIC 887300	Rettenmund Rd. (61)	50	Coldwater	-
Flynn Cr.	HWY G bridge (60)	80	Coldwater	48.28	0.00
	HWY A (41)	80	Coldwater	429.16	0.00
	Fritz Rd. (43)	80	Coldwater	579.36	0.00
Unnamed WBIC 886700	North Fritz Rd. (42)	80	Coldwater	183.93	0.00
	HWY 92 (58)	80	Coldwater	0.00	177.03
Unnamed WBIC 5036972	HWY 92 (62)	50	Coldwater	0.00	209.22
Primrose Br.	HWY U (55)	80	Cool-Cold Mainstem	772.48	0.00
	Primrose Center Bridge (56)	80	Cool-Cold Mainstem	238.42	0.00
Mount Vernon	Park to HWY G (50)	80	Coldwater	752.94	252.89
	HWY U (35)	80	Cool-Cold Mainstem	727.70	111.95
	DNR South Lot HWY 92 (51)	90	Coldwater	695.29	398.42
W.Br.Sugar River	DNR North Lot HWY 92 (53)	80	Cool-Cold Mainstem	387.56	13.14
	HWY 92 (52)	80	Cool-Cold Mainstem	330.81	768.91
	Fritz Rd. (64)	50	Cool-Cold Mainstem	48.59	346.16
	HWY G (68)	80	Cool-Cold Mainstem	904.29	996.26
	HWY U (63)	70	Cool-Cold Mainstem	727.70	111.95
	Primrose Center Rd. (69)	80	Cool-Cold Mainstem	923.62	391.84
	HWY 92 (70)	90	Cool-Cold Mainstem	379.09	343.33
Deer Cr.	HWY 92 (39)	80	Coldwater	580.69	0.00
Unnamed WBIC 7215113	Peerless Rd.	50	Coldwater	-	-

Table 6. Brook trout CPUE (fish/mile) percentile breakdown for stream surveys conducted on Class 1 trout streams in the Driftless Area and statewide where at least one trout was collected, 2012-2021.

Percentile	CPUE total (All sizes)		CPUE age 0 (<4.0 inches)		CPUE age 1 (4.0-6.9 inches)		CPUE adult (≥7 inches)		CPUE preferred (≥10 inches)	
	Driftless	Statewide	Driftless	Statewide	Driftless	Statewide	Driftless	Statewide	Driftless	Statewide
10	15.1	22.9	16	16.1	12.4	16.1	12.8	15.3	6.5	5.7
25	53.0	96.6	46	45.3	30.5	48.3	30	32.2	11.1	10.3
35	107.1	174.7	68.6	72.4	44.9	80.5	47.9	48.3	14.3	12.8
50 (median)	219.9	336.8	128.7	145.3	80.5	149.2	80.5	80.5	16.1	16.4
65	402.3	579.7	209.2	241.4	150.9	257.2	124	129.4	29.1	27.5
75	590.1	772.5	321.9	365.5	234.2	366.7	177.7	185.2	37.5	37.4
90	1223.0	1488.4	787.1	812.3	548.7	662.7	347	344	64.4	64.4

Table 7. Brown trout CPUE (fish/mile) percentile breakdown for fishery surveys conducted on Class 1 trout streams in the Driftless Area and statewide where at least one trout was collected, 2012-2021.

Percentile	CPUE total (All sizes)		CPUE age 0 (<4.0 inches)		CPUE age 1 (4.0-7.9 inches)		CPUE adult (≥ 8 inches)		CPUE preferred (≥12 inches)	
	Driftless	Statewide	Driftless	Statewide	Driftless	Statewide	Driftless	Statewide	Driftless	Statewide
10	108.3	39.7	15.1	12.5	27.9	21	40.2	18.9	16.1	10.6
25	323.6	178.4	40.2	32.2	82.6	70.6	128.7	63.8	31.9	20.3
35	492.2	305.9	71.1	58.1	135.6	115	191.6	112.7	42.9	30.3
50 (median)	729.8	537.3	136.1	119.3	229.9	199.2	330.8	205.8	63.2	47.6
65	1121.4	880.6	256.1	247.5	383.2	337.2	509.7	341.9	85.8	72
75	1478.3	1241.7	405.4	402.1	518.8	482.8	677.6	479.2	115	91.4
90	2720	2203.1	856.7	933.5	877.1	836.6	1194.2	864.5	181.5	156.5

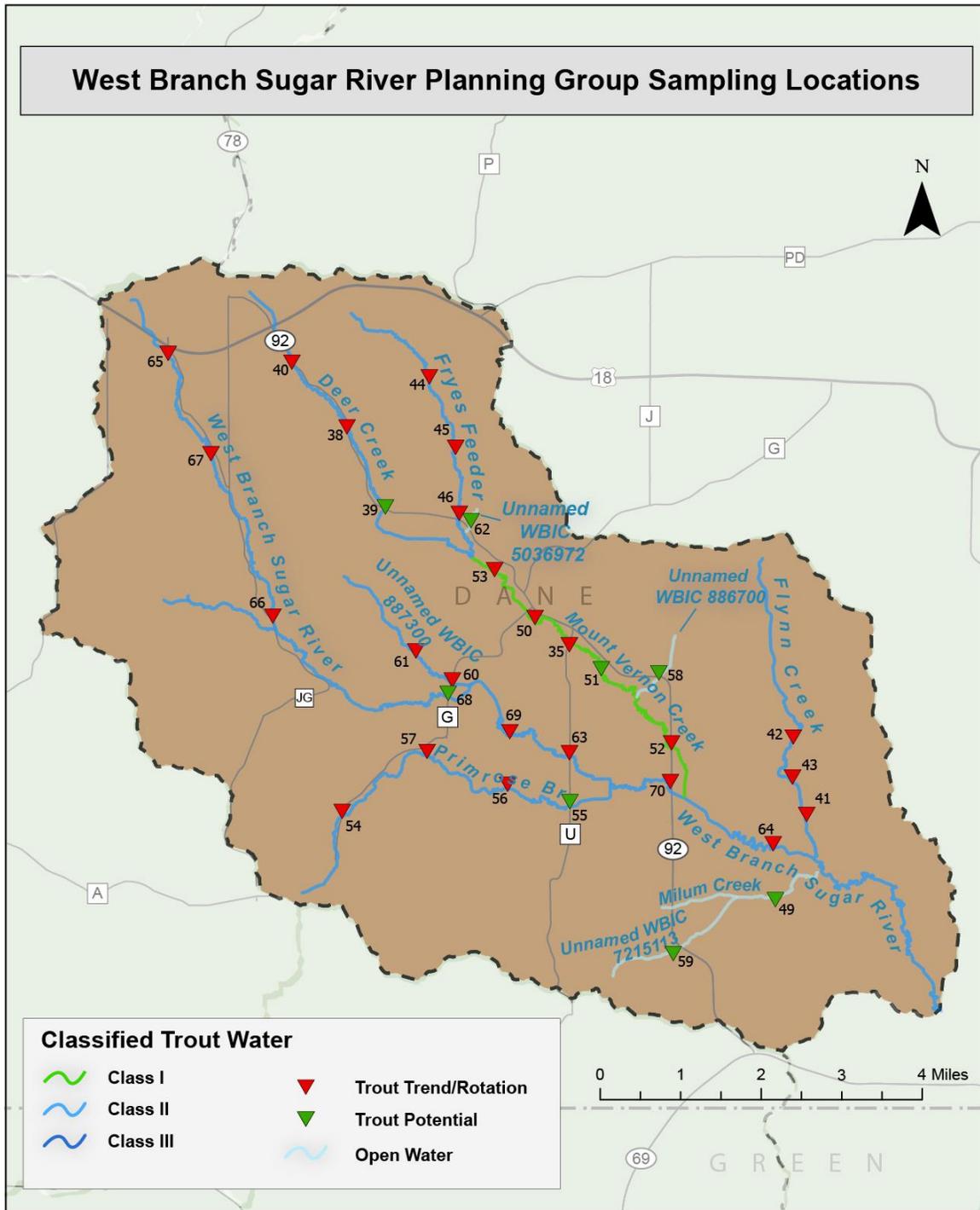


Figure 1. Stream classifications and fishery assessment survey sites within the Upper West Branch Sugar River watershed.

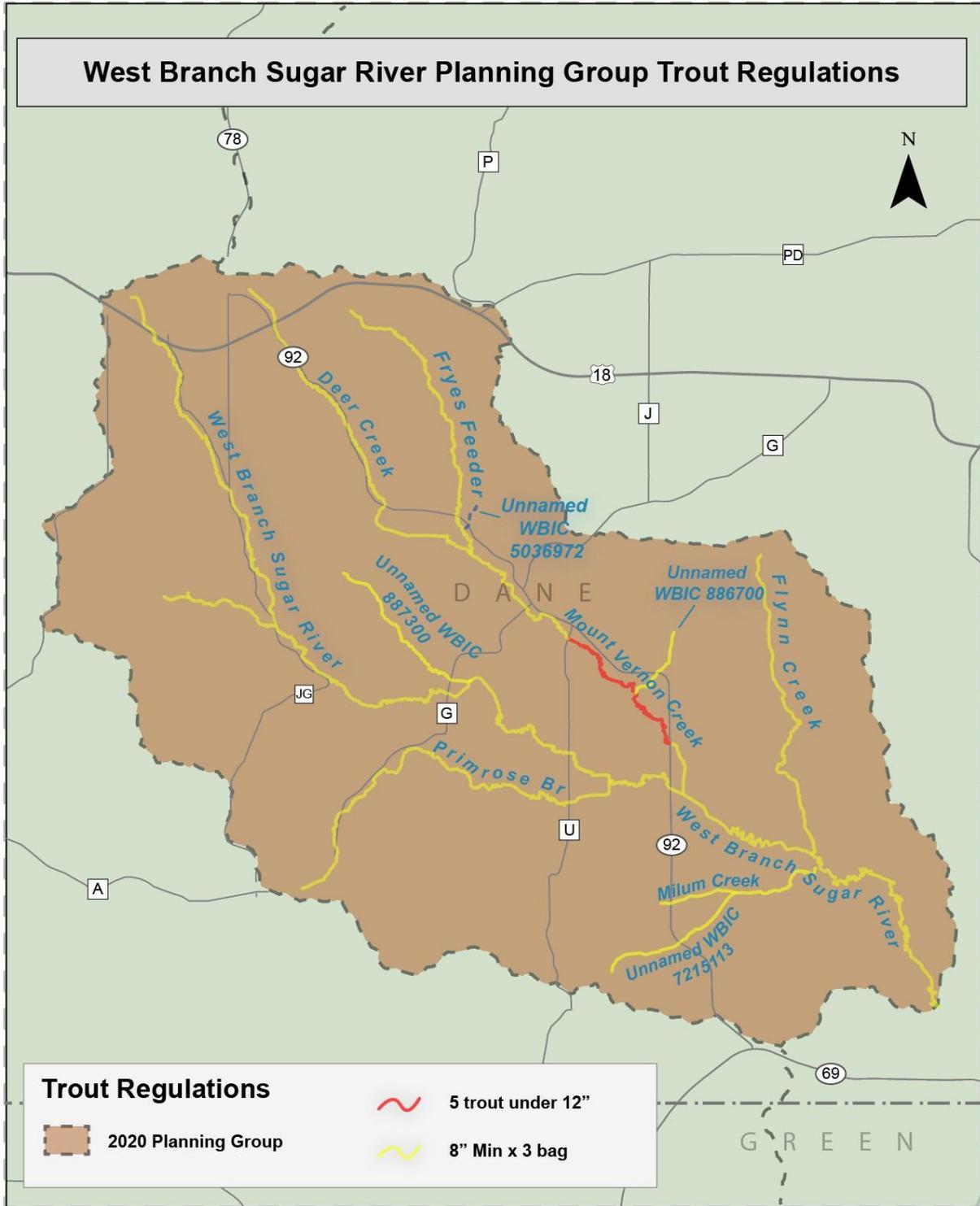


Figure 2. Upper West Branch Sugar River watershed trout streams are regulated under the county base 8-inch minimum length and three daily-bag limit.

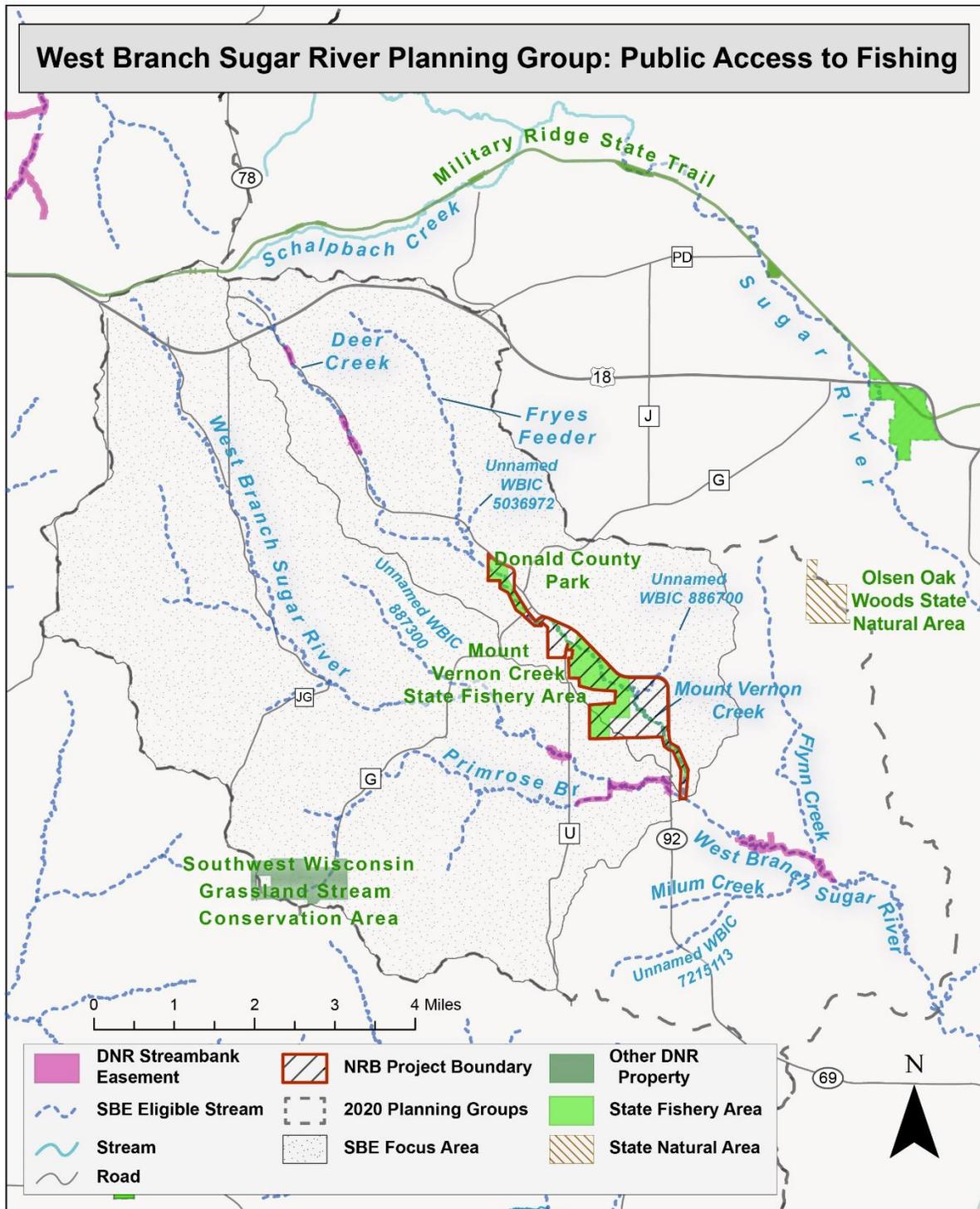


Figure 3. West Branch Sugar River watershed public access points and DNR Stream Bank Easement program eligible waters.

West Branch Sugar River Watershed YOY <4" Brown Trout Catch Rates

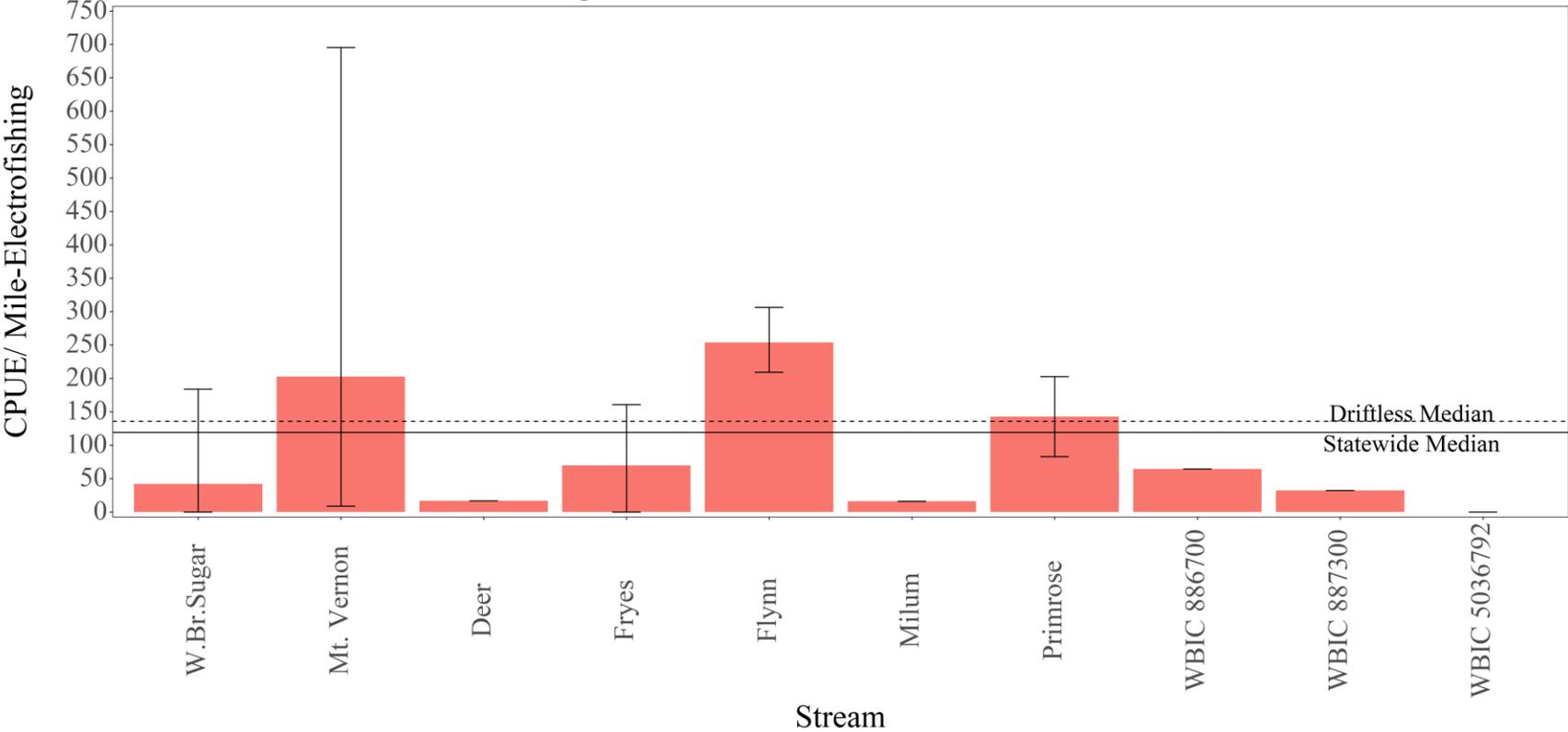


Figure 4. Average young-of-year (YOY; less than 4 inches) brown trout catch rates across all survey sites for each stream. Error bars represent minimum and maximum catch rates observed in each stream.

West Branch Sugar River Watershed Yearling 4-8" Brown Trout Catch Rates

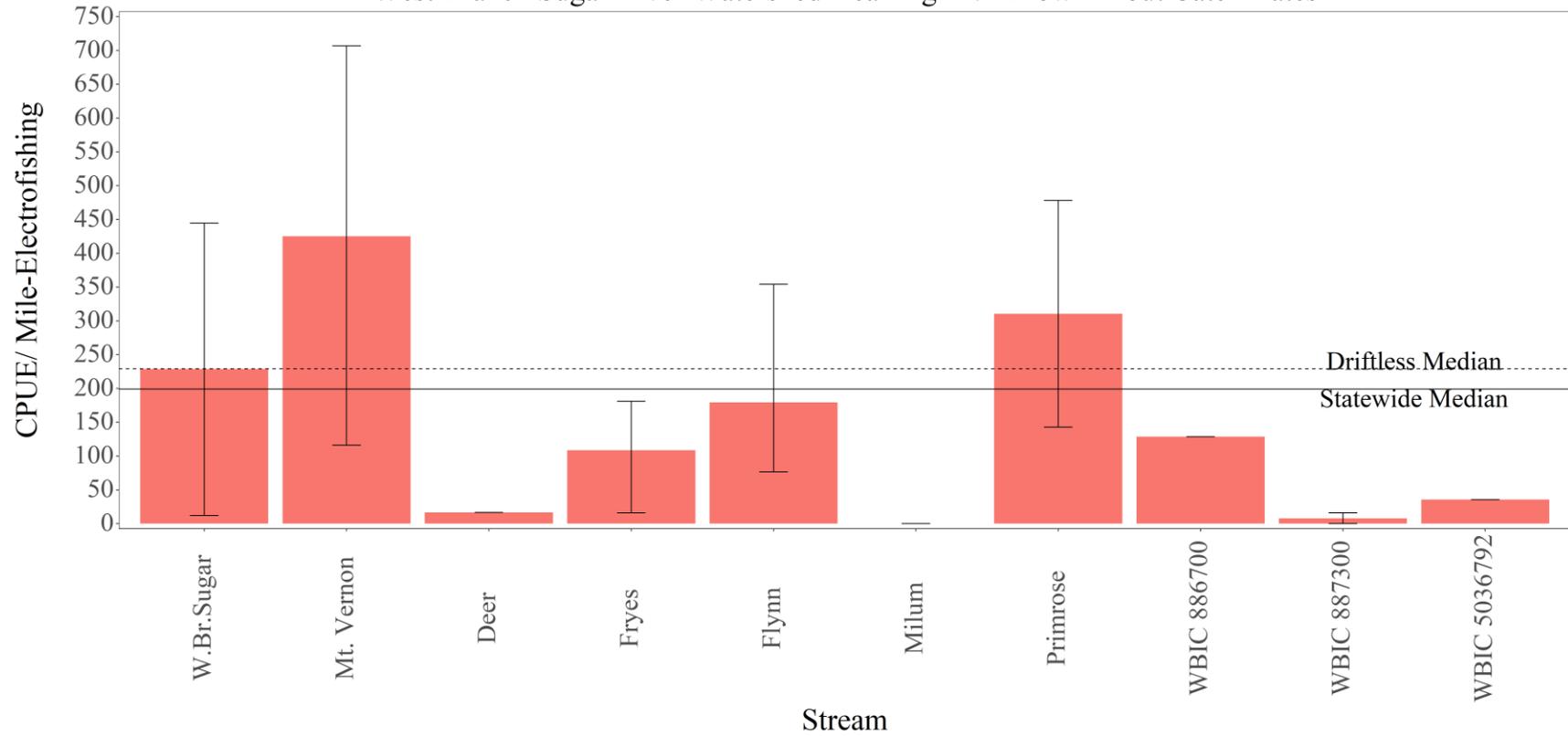


Figure 5. Average yearling brown trout catch rates (between 4 to 8 inches) across all survey sites for each stream. Error bars represent minimum and maximum catch rates observed in each stream.

West Branch Sugar River Watershed Adult >8" Brown Trout Catch Rates

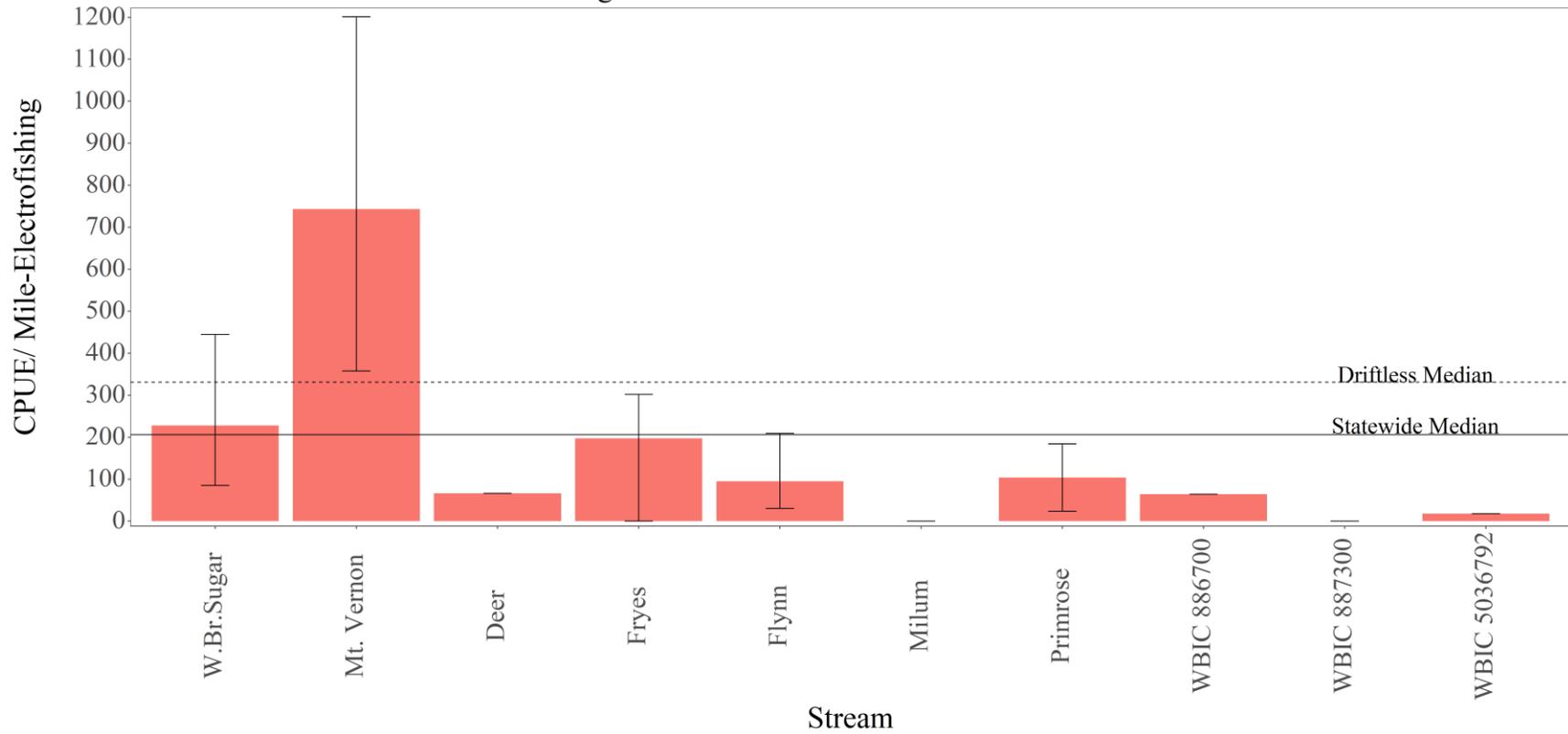


Figure 6. Average adult brown trout catch rates (greater than 8 inches) across all survey sites for each stream. Error bars represent minimum and maximum catch rates observed in each stream.

West Branch Sugar River Watershed >12" Brown Trout Catch Rates

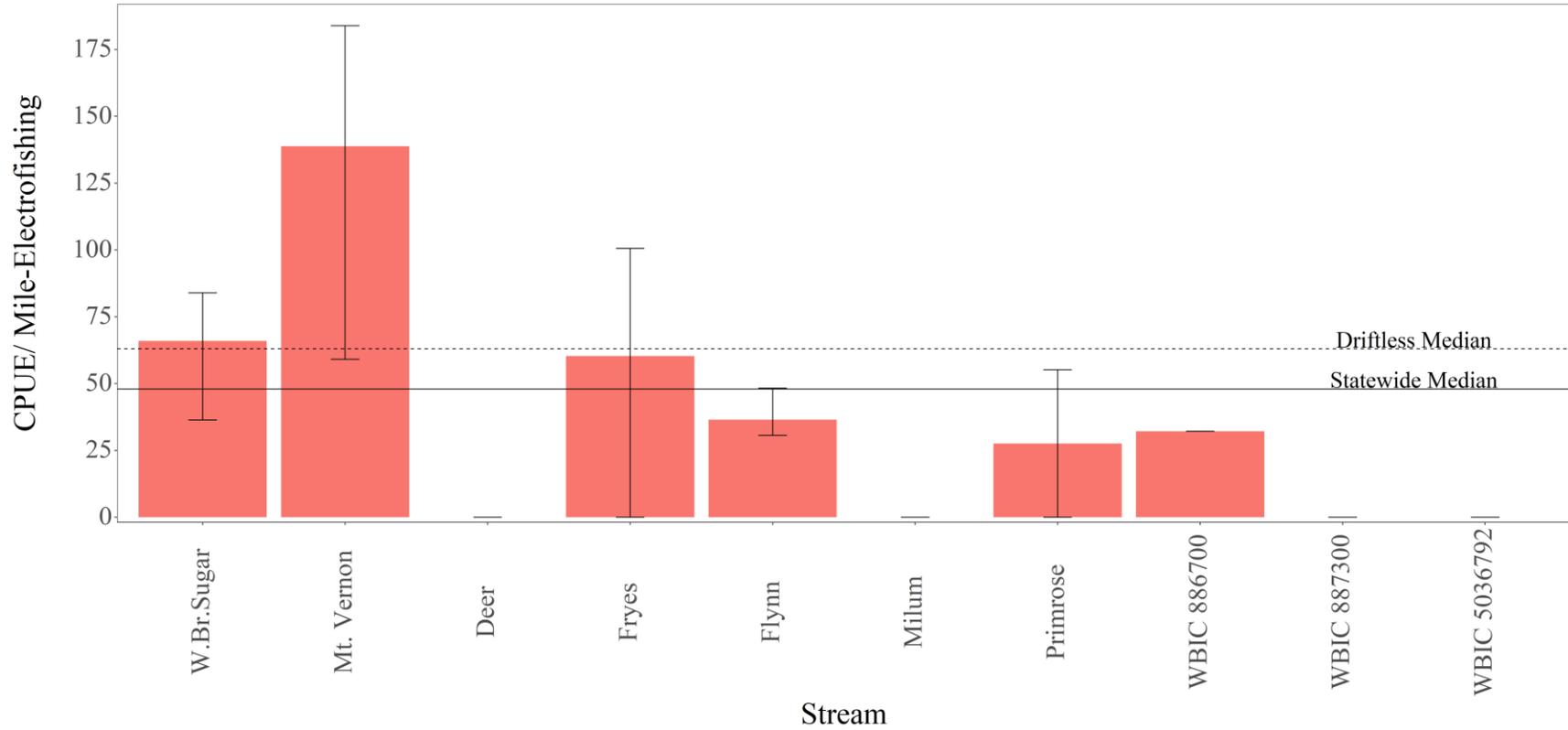


Figure 7. Average preferred brown trout catch rates (greater than 12 inches) across all survey sites for each stream. Error bars represent minimum and maximum catch rates observed in each stream.

West Branch Sugar River Watershed YOY <4" Brook Trout Catch Rates

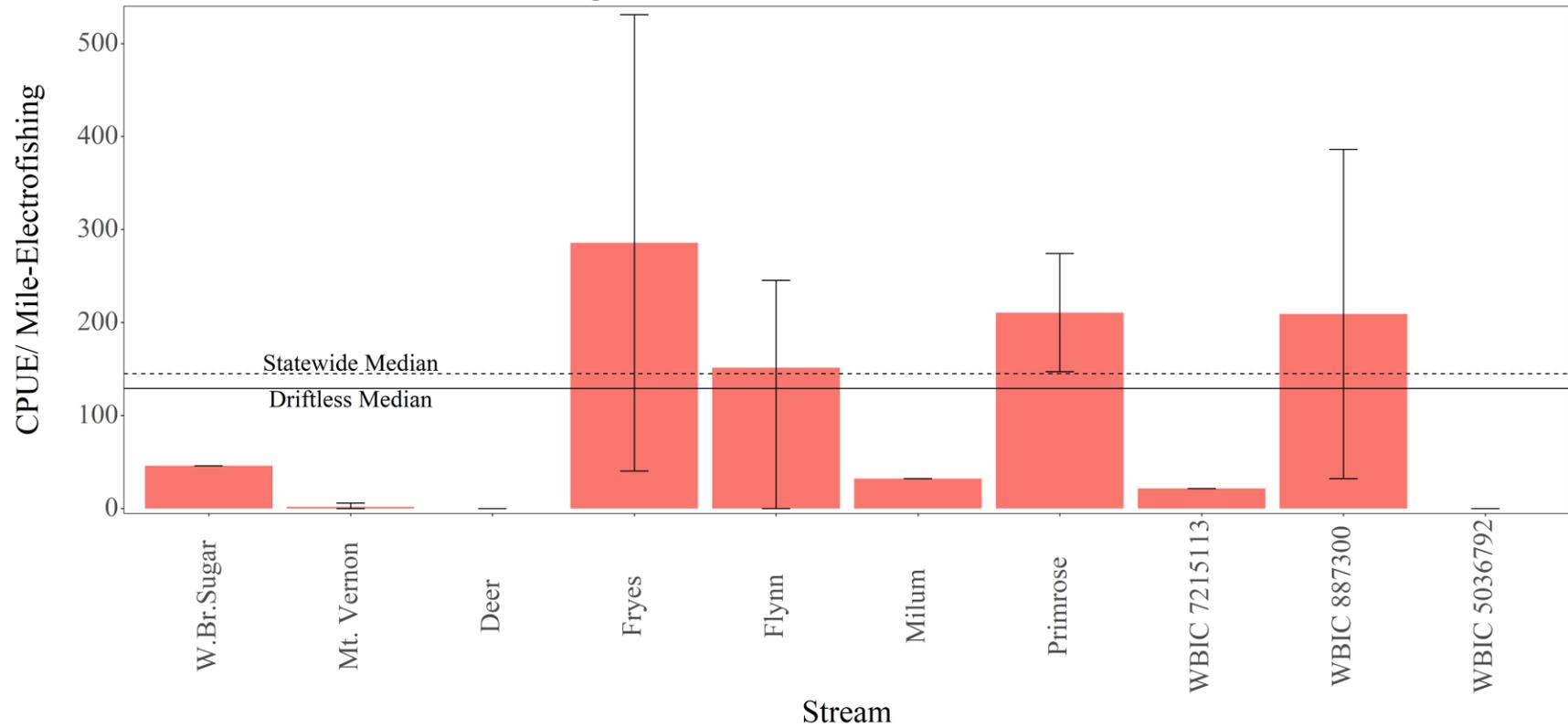


Figure 8. Average young-of-year (YOY; less than 4 inches) brook trout catch rates across all survey sites for each stream. Error bars represent minimum and maximum catch rates observed in each stream.

West Branch Sugar River Watershed Yearling 4-7" Brook Trout Catch Rates

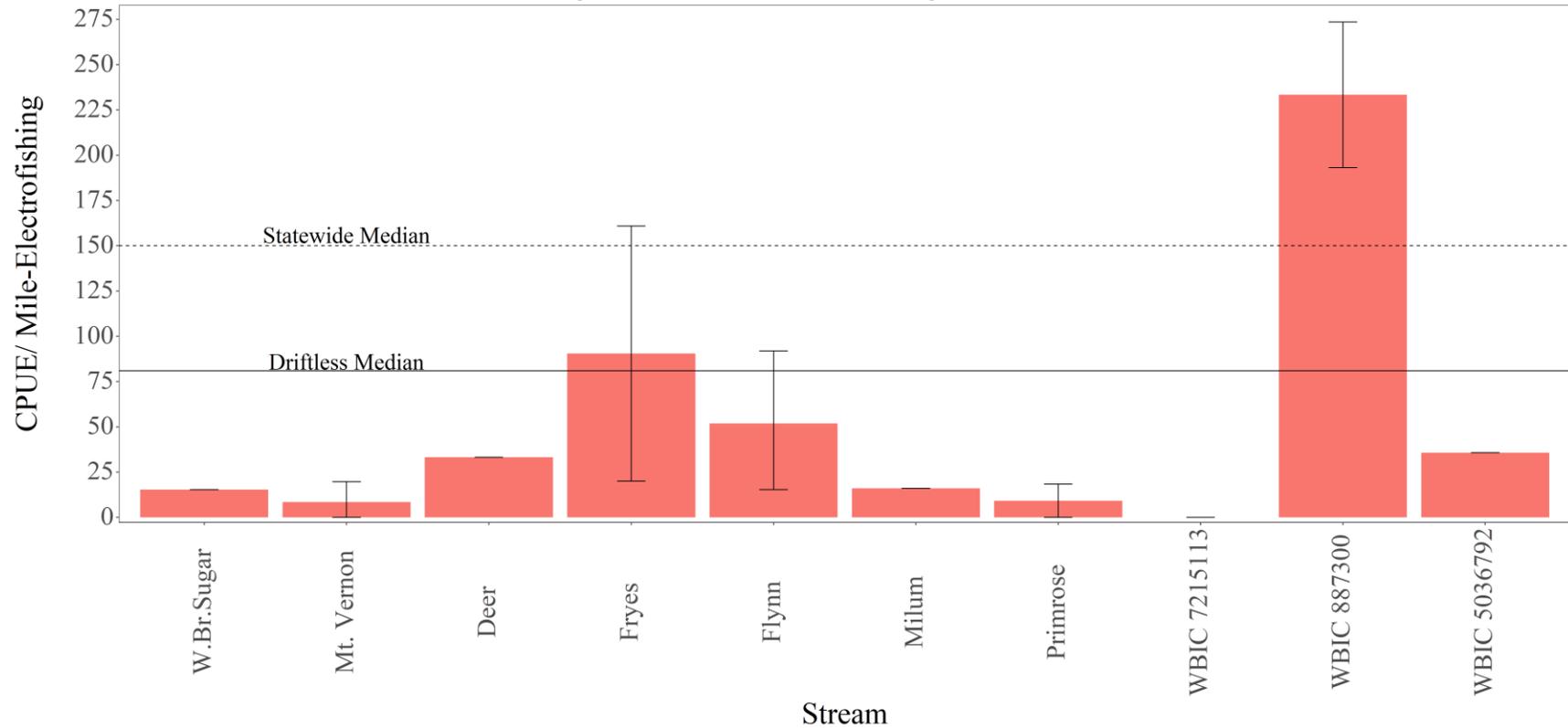


Figure 9. Average yearling brook trout catch rates (from 4 to 7 inches) across all survey sites for each stream. Error bars represent minimum and maximum catch rates observed in each stream.

West Branch Sugar River Watershed Adult >7" Brook Trout Catch Rates

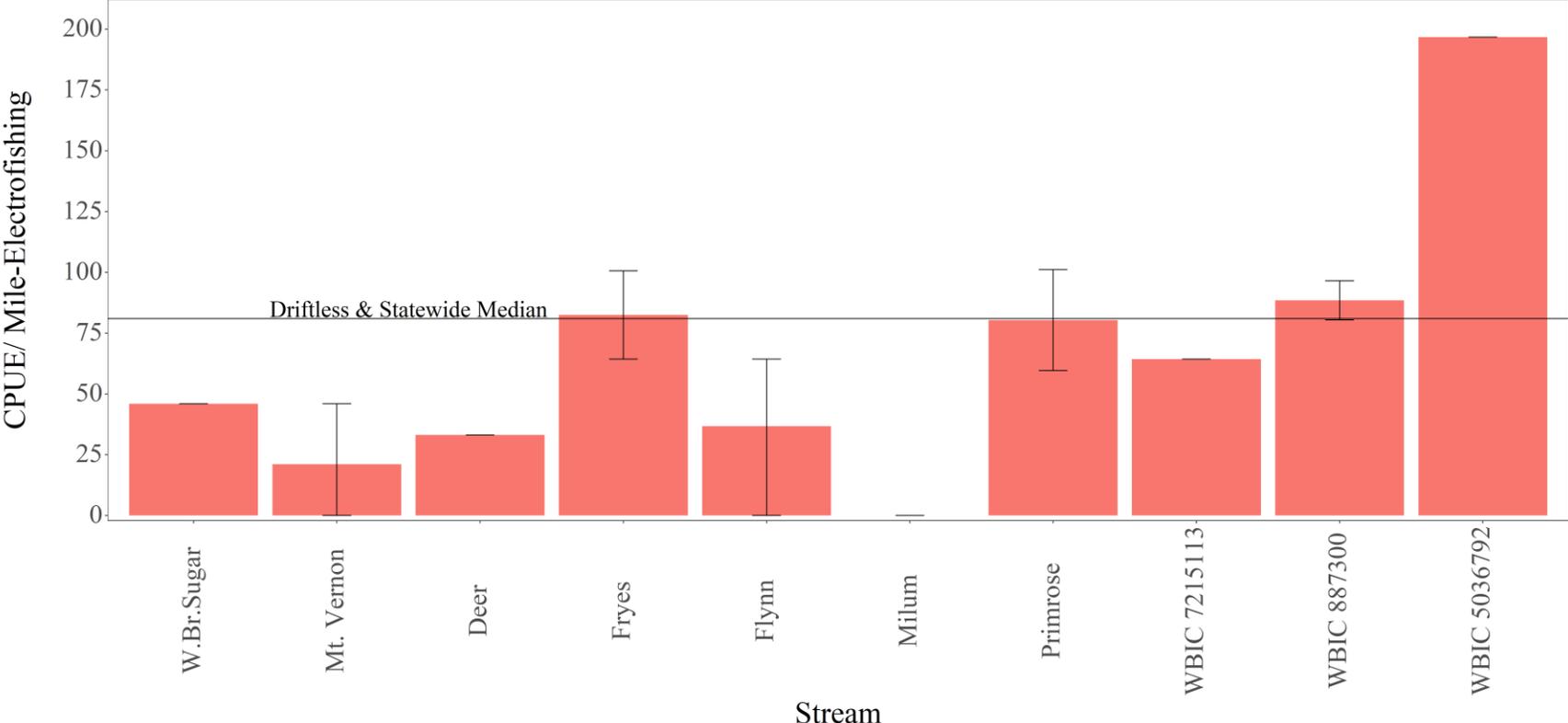


Figure 10. Average adult brook trout catch rates (greater than 7 inches) across all survey sites for each stream. Error bars represent minimum and maximum catch rates observed in each stream.

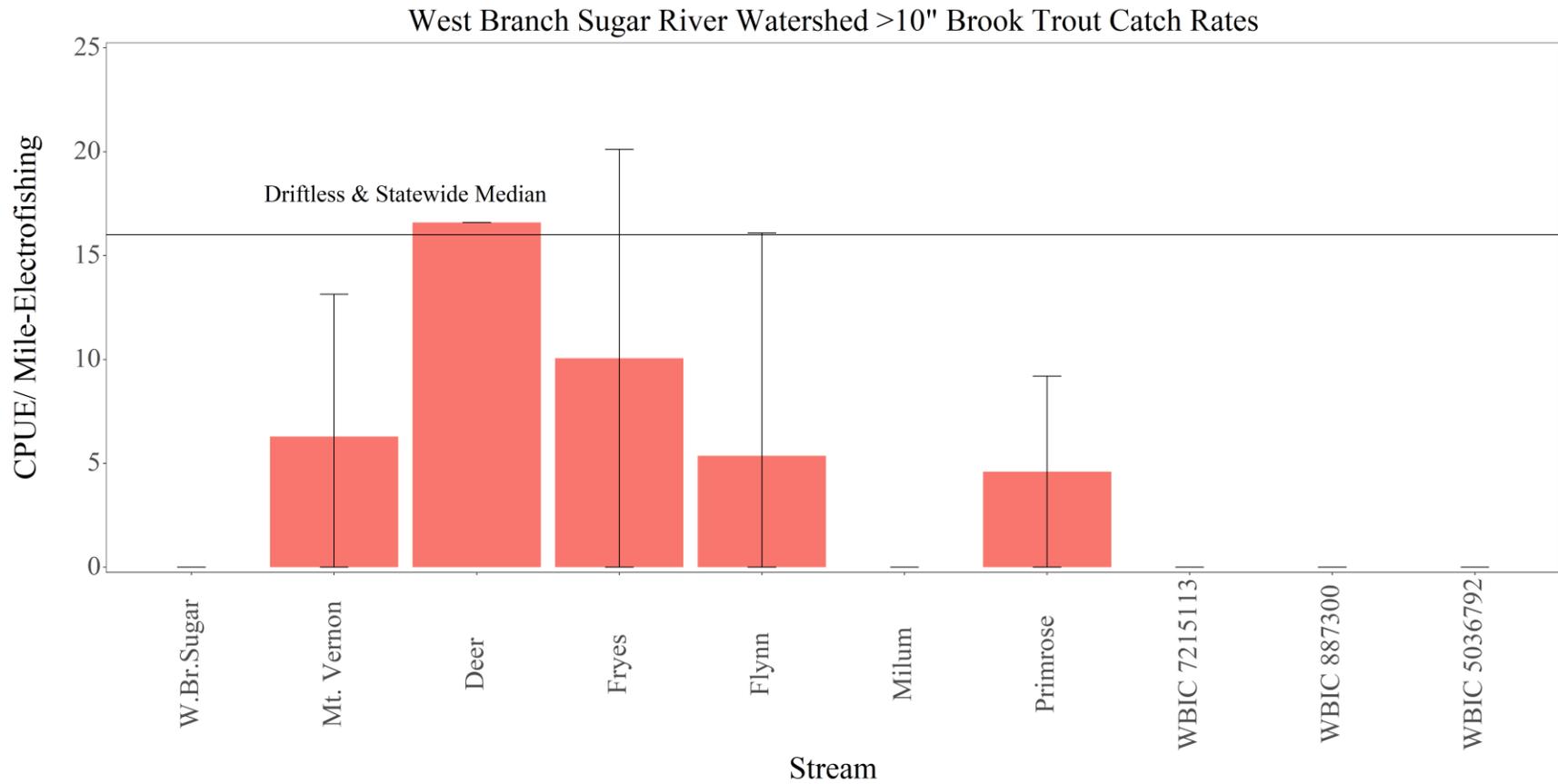


Figure 11. Average preferred brook trout catch rates (over 10 inches) across all survey sites for each stream. Error bars represent minimum and maximum catch rates observed in each stream.

Deer Creek @ HWY 92

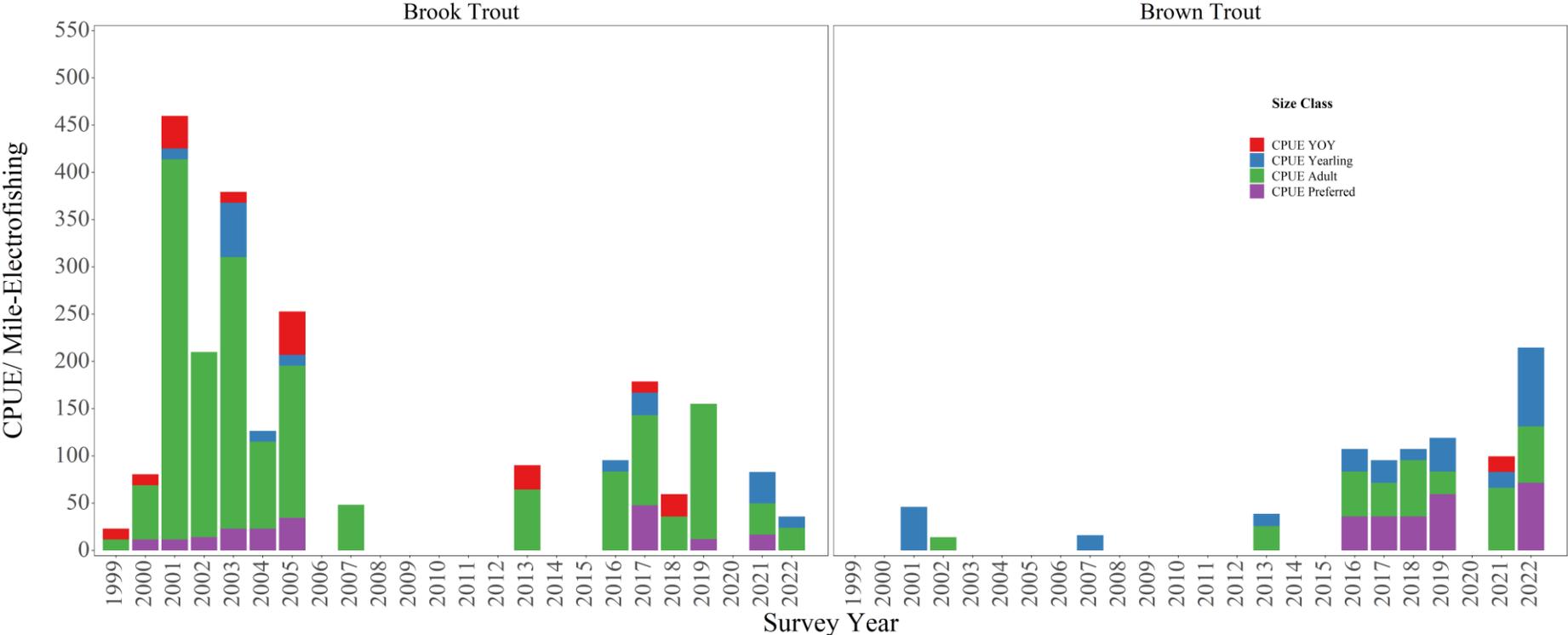


Figure 12. Size specific catch rates for brook and brown trout at the Deer Creek HWY 92 trend site (COVID-19 precautions prohibited surveys in 2020 and no fish surveys were conducted in 2006, 2008-2012 and 2014-2015). YOY=young-of-year (fish less than 4 inches).

Primrose Branch @ HWY U

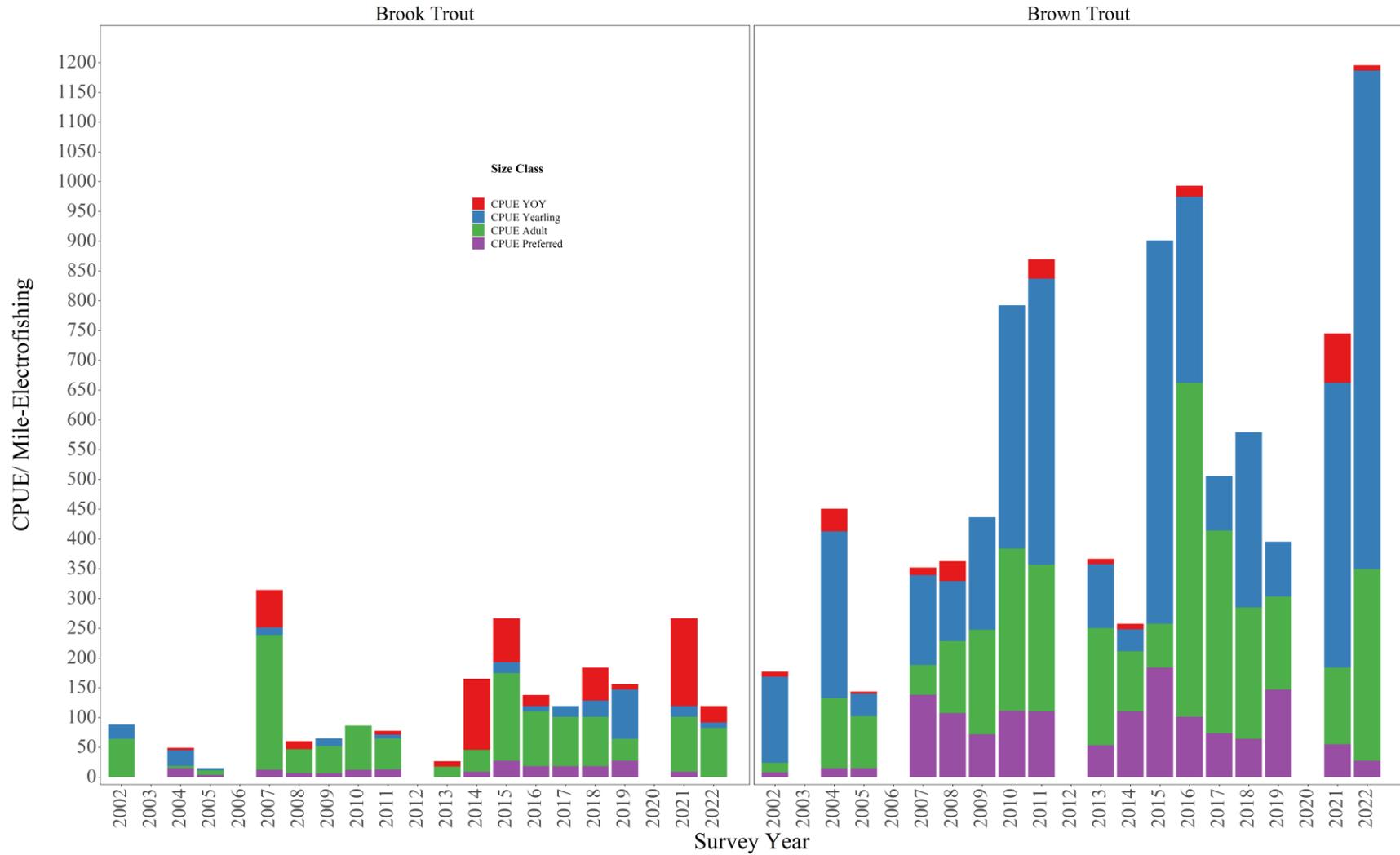


Figure 13. Total catch rates for brook and brown trout at the Primrose Branch at HWY U trend site (not surveyed in 2003, 2006, 2012 or 2020). YOY=young-of-year (fish less than 4 inches).

Brown Trout CPUE for Mount Vernon Creek @ HWY U

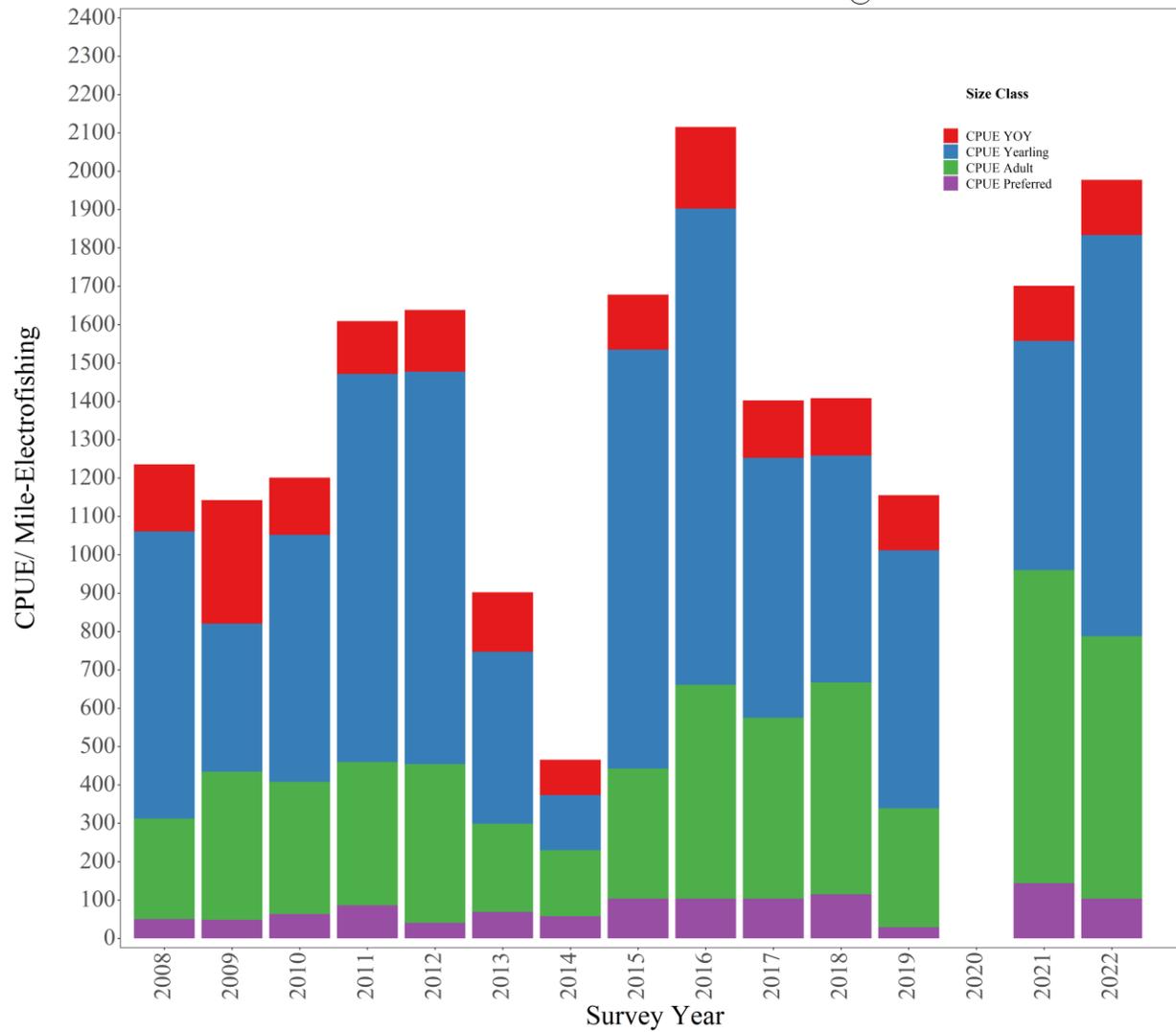


Figure 14. Size specific catch rates for brown trout at the Mount Vernon at HWY U trend site (COVID-19 precautions prohibited surveys in 2020). YOY=young-of-year (fish less than 4 inches).

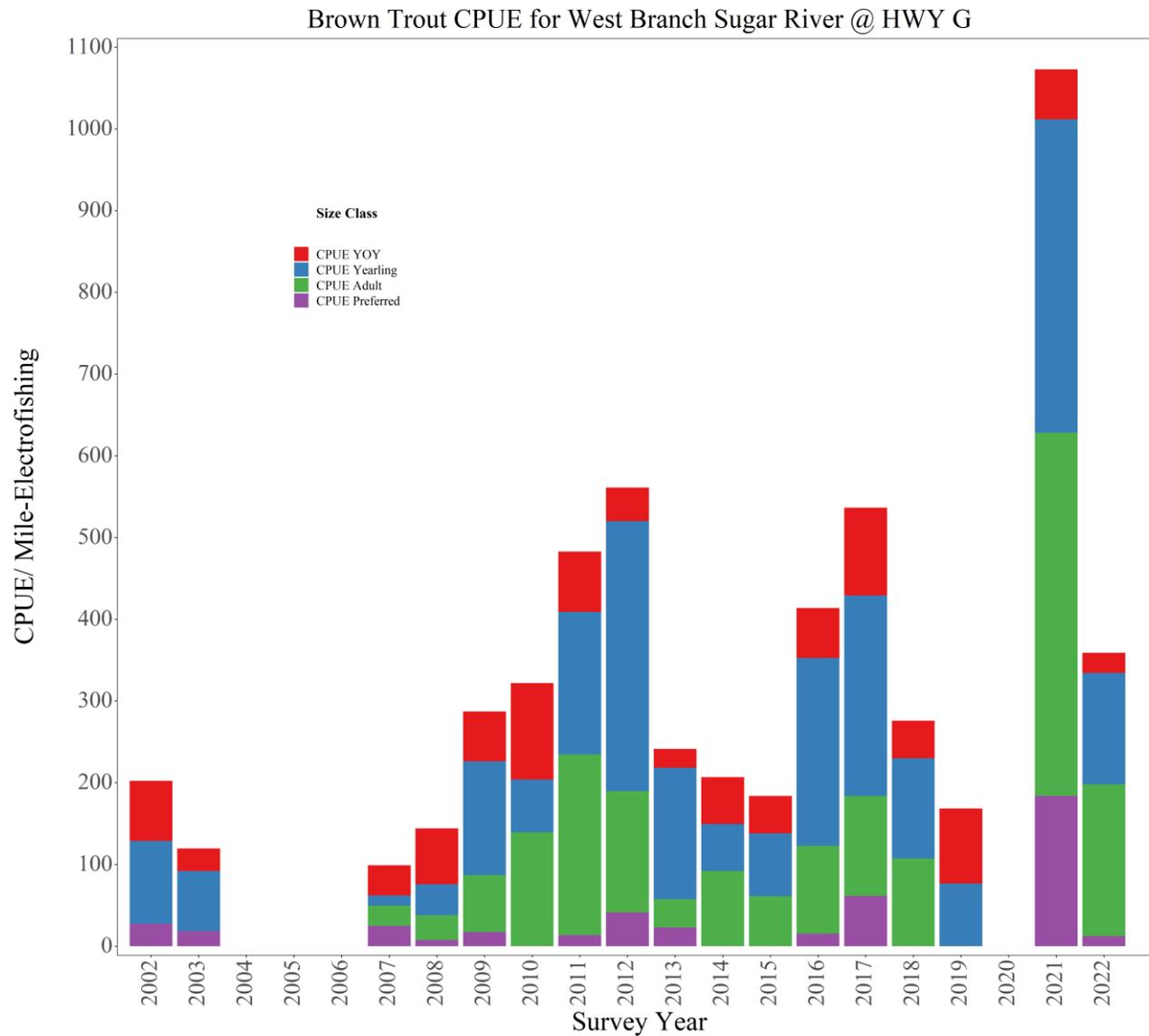


Figure 15. Size specific catch rates for brown trout at the HWY G trend site (not surveyed in 2004-2006, and COVID-19 precautions prohibited surveys in 2020). YOY=young-of-year (fish less than 4 inches).