South Branch Paw Paw River 2011 Survey Report

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Introduction

The South Branch Paw Paw River (hereafter referred to as the South Branch) arises in Mud Lake approximately 3 miles northeast of Decatur. The river flows northward for 7.2 miles before entering Briggs Pond and Maple Lake (Figure 1). Upon exiting Maple Lake, the South Branch flows northwesterly to its confluence with the mainstem Paw Paw River. The portion of the South Branch downstream of the Maple Lake dam is accessible to fish from Lake Michigan. There are no dams on the South Branch upstream of I-94. Upstream of I-94, agriculture (55%) and forests (25%) are the predominant land uses in the watershed (Land Development Solutions, Inc. 2008).

For this study, the area of interest was the South Branch upstream of Briggs Pond. The average stream gradient from Mud Lake to Briggs Pond is 4.6 ft/mile. Deposits of glacial outwash sand and gravel and postglacial alluvium cover most of the watershed. The upper South Branch flows through poorly drained, organic soils of the Houghton-Carlisle-Adrian series (State Soil Geographic Database 1994). Outside of the riparian corridor, well-drained sandy soils of the Coloma-Spinks-Oshtemo series are common. Darcy maps indicate strong groundwater inputs to the South Branch upstream of the confluence with the Lawton Drain. The South Branch and its tributaries are designated drains, and most stream reaches have been affected by dredging and channelization. In some instances, dredging and draining of wetlands has increased groundwater movement into the South Branch or tributary streams. As a result of the abundant groundwater inputs, the South Branch remains cold throughout the summer. Temperature loggers deployed during the summer of 2000 indicated that the mean July water temperature at 72nd Avenue and 60th Avenue was 60.9 ^{o}F at both sites.

For more than 75 years a stocking program has been used to create trout fishing opportunities in the South Branch, and the South Branch and its tributaries currently are classified as Type 4 trout streams. Brown trout, rainbow trout, and brook trout were stocked in the South Branch and tributary streams during the 1930s through the 1950s. In 1962, the upper South Branch and approximately 15 miles of tributary streams were treated with rotenone (a natural fish toxicant) in an attempt to reduce the abundance of "rough" fish such as white suckers and creek chubs. Brown trout and brook trout were stocked in the South Branch in 1963. Compared to pre-treatment surveys, the catch-per-effort of trout was significantly higher in 1963. The effects of the rotenone treatment apparently were short-lived. By October 1963, Fisheries Division staff observed that population densities of "rough" fish were approaching pre-treatment levels.

Aside from a brief hiatus from 1977 through 1980, brown trout have been stocked in the South Branch every year since 1971. Electrofishing surveys were conducted at multiple locations along the South Branch during 1972-1998. These surveys supported three general conclusions. (1) The population density of brown trout in the South Branch was low relative to many other populations in Michigan. Less than 10 trout were captured during most sampling efforts. (2) Growth of brown trout was above average. (3) The population was supported entirely by stocking. No young-of-year (i.e., wild) brown trout were captured during any of the surveys.

In 2002, the Michigan Department of Natural Resources (MDNR) began stocking Gilchrist Creek (GC) strain brown trout in the South Branch (Table 1). This strain was developed from a naturalized brown

trout population in northern Michigan. Wills (2006) found that GC fish exhibited higher survival after stocking than more domesticated strains, such as the Seeforellen strain that was stocked in the South Branch during 1995-2001. Fisheries managers anticipated that the trout fishery in the South Branch would improve after GC brown trout were stocked. Electrofishing surveys were completed in 2011 to assess survival and growth of GC brown trout in this system.

Materials and Methods

A stream shocker (250 V DC, 6 A, two probes) was used to capture brown trout at two 900 ft stations on the South Branch on September 15, 2011. Station 1 was immediately upstream of the 64th Avenue crossing. Station 2 was immediately downstream of the 72nd Avenue crossing. At each station, a single electrofishing run was completed while moving in an upstream direction. Total length was recorded for all brown trout captured. Scale or dorsal fin ray samples were collected from each brown trout for age determination, and growth indices were calculated according to the methods outlined by Schneider et al. (2000). The presence of other fish species was documented, but these fish were not measured or counted.

Results

Seventy-four brown trout were captured at Station 1. The total length range for these fish was 5-20 inches (Figure 2). Approximately 45% of the brown trout were of legal size ($\geq$ 10 inches). Six age classes were present, but no young-of-year fish were collected (Figure 3). The mean growth index was 0, which is indicative of average growth. Mean lengths-at-age were slightly above average for age 1-2 fish and slightly below average for older fish (Figure 4). Seven additional fish species were observed at this station (Table 2).

Thirty-eight brown trout were captured at Station 2. The total length range for these fish was 4-12 inches (Figure 2). Legal-sized fish composed 18% of the catch. Only yearlings (66% of catch) and age 2 brown trout (34% of catch) were collected at this station. The mean growth index for brown trout captured at this site was +0.9 (Figure 4). Nine other fish species were observed at Station 2 (Table 3).

Analysis and Discussion

The 2011 survey results indicate that GC brown trout have higher survival in the South Branch than the Seeforellen strain fish that were stocked during the 1990s. The catch-per-effort (CPE) at 64th Avenue was 8.2 fish/100 ft in 2011, compared to 0.8 fish/100 ft in 1998. Similarly, the CPE at 72nd Avenue was 4.2 fish/100 ft in 2011 and 1.4 fish/100 ft in 1998. The CPEs from the 2011 survey suggest that the brown trout population density at Station 1 is average relative to other Michigan brown trout populations, whereas the population density at Station 2 is slightly below average. The CPE of yearling and older brown trout at Station 1 was in the middle of the range recorded for brown trout streams surveyed as part of MDNR's Status and Trends fixed site monitoring program and the CPE at Station 2 was in the bottom third of the range (T. Wills, MDNR – Fisheries Division, unpublished).

No age 3 or older brown trout were captured at Station 2. Some older brown trout are removed through harvest; however habitat probably is the primary factor responsible for the lack of older trout in this stream reach. Overhanging vegetation provided cover for small trout, but large woody structure and deep pools were rare in this stream segment. Brown trout stocked at 72nd Avenue apparently emigrate downstream about the time they reach legal size. By contrast, age 3 and older brown trout composed 38%

of the catch at Station 1. Large woody structure was abundant and several deep pools were present at this station.

Growth of age 1-2 brown trout was similar at both sampling stations and was slightly above average. There are two plausible explanations for the apparent decrease in growth rate after age 2 (Figure 4). One possibility is that brown trout dietary needs change around age 2, and the food required by these older fish is scarce in the South Branch. Stauffer (1977) made the following observations regarding brown trout on the Au Sable River system.

> There was a marked shift between the diet of younger and older fish. Small food items such as Ephemeroptera and Isopoda which were so important to smaller fish were replaced in the diet of larger fish by higher amounts of Mollusca, Decapoda, Odonata, and especially more fish. [From Stauffer 1977]

We did not quantitatively assess macroinvertebrate populations in the South Branch. Qualitative observations suggest that abundance of Odonata and other large aquatic insects is low. Forage fish also were scarce in the sampling stations. The cold water temperatures in the South Branch restrict colonization by warmwater fish species, and the paucity of rocky substrates limits proliferation of sculpins, darters, and crayfish.

An alternative explanation for the observed growth pattern is that faster growing individuals are selectively removed from the population so primarily slow-growing individuals are left by age 3. In areas with substantial fishing pressure, fast-growing fish would reach the minimum size limit earlier and would be more susceptible to harvest. No creel data are available to facilitate estimation of fishing mortality on the South Branch. Natural mortality also could be higher for fast-growing fish. These fish may reach sexual maturity earlier, exposing them to spawning stress at a younger age.

The South Branch has not been declared navigable or non-navigable in court. There are four main road crossings where anglers could access this stream (Figure 1). Anglers have complained about the posting of “No Fishing” and “No Trespassing” signs at stream crossings on the South Branch. Signs were observed at one side of the road at 72nd Avenue and CR 358 and on both sides of the road at 64th Avenue. During the opening day of trout fishing season in 2012, vehicles were parked at all of the road crossings except 64th Avenue. Fisheries Division personnel have worked with a local landowner to resolve a public access concern at CR 358, but the ability of the public to access the South Branch at 64th Avenue is questionable.

Management Recommendations

Four management goals have been developed for the South Branch. Goal 1: Reduce sediment inputs to the stream. Goal 2: Improve brown trout habitat by leaving some large woody structure in the stream. Goal 3: Improve survival of stocked trout by modifying the stocking locations. Goal 4: Secure public access to the stream at as many locations as possible.

Due to the gradient and surficial geology of the area, gravel and cobble substrates always will be limited in the South Branch. However, human activities have greatly increased the sand bedload in this stream. Fisheries Division will work with the Michigan Department of Environmental Quality and other partners to identify erosion and sedimentation sites within the watershed. Once these sites have been identified, Fisheries Division and MDEQ personnel will meet with riparian landowners to discuss options for

reducing erosion and sedimentation and may assist landowners in securing funding to implement best management practices.

Because the South Branch is a county drain, large woody structure has been cleared from portions of the stream to facilitate rapid downstream movement of water. The removal of large woody structure directly affects trout by reducing habitat complexity and abundance of holding cover and affects trout indirectly by reducing abundance of macroinvertebrates. Fisheries Division will work with the County Drain Commissioner to develop options for retaining fish cover while meeting the needs of the adjacent landowners.

In recent years, brown trout have been stocked at the 72nd Avenue and 64th Avenue crossings. Cover is limited at 72nd Avenue and angler access is questionable at 64th Avenue. Beginning in 2013, yearling brown trout will be stocked at 60th Avenue (n = 1,500) and CR 358 (n = 1,300).

In October 2012, letters were sent to three riparian property owners who had posted "No Fishing" or "No Trespassing" signs on their property. This led to resolution of the angler access issue at CR 358. No responses have been received from the other property owners.

References

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Table 1.–Brown trout stocking in the South Branch Paw Paw River, 2002-2011. All fish were stocked as yearlings.

Year	Site	Strain	Number	Average length (inches)
2002	64th Avenue	Gilchrist Creek	1,530	4.92
	CR-358	Gilchrist Creek	410	4.92
	72nd Avenue	Gilchrist Creek	1,320	4.92
2003	64th Avenue	Gilchrist Creek	1,500	5.27
	CR-358	Gilchrist Creek	400	5.27
	72nd Avenue	Gilchrist Creek	1,300	5.27
2004	64th Avenue	Gilchrist Creek	1,500	4.91
	CR-358	Gilchrist Creek	400	4.91
	72nd Avenue	Gilchrist Creek	1,300	4.91
2005	64th Avenue	Seeforellen	1,500	5.85
	CR-358	Seeforellen	400	5.85
	72nd Avenue	Seeforellen	1,300	5.85
2006	64th Avenue	Gilchrist Creek	1,750	7.40
	CR-358	Gilchrist Creek	480	7.40
	72nd Avenue	Gilchrist Creek	1,440	7.40
2007	64th Avenue	Gilchrist Creek	1,420	7.28
	CR-358	Gilchrist Creek	370	7.28
	72nd Avenue	Gilchrist Creek	1,200	7.28
2008	64th Avenue	Gilchrist Creek	1,500	4.45
	CR-358	Gilchrist Creek	400	4.45
	72nd Avenue	Gilchrist Creek	1,300	4.45
2009	64th Avenue	Gilchrist Creek	1,665	4.46
	CR-358	Gilchrist Creek	450	4.46
	72nd Avenue	Gilchrist Creek	1,395	4.46
2010	64th Avenue	Gilchrist Creek	1,800	4.79
	CR-358	Gilchrist Creek	480	4.79
	72nd Avenue	Gilchrist Creek	1,500	4.79
2011	64th Avenue	Gilchrist Creek	1,350	4.86
	72nd Avenue	Gilchrist Creek	1,170	4.86

Table 2.–Fish species observed at the 64th Avenue sampling station on the South Branch Paw Paw River on September 15, 2011. Thermal classifications from Lyons et al. (2009).

Species	Thermal classification
Bluegill	Warmwater
Brown trout	Coldwater
White sucker	Transitional
Grass pickerel	Warmwater
Green sunfish	Warmwater
Hybrid sunfish	Warmwater
Johnny darter	Transitional
Mottled sculpin	Coldwater
Central mudminnow	Transitional

Table 3.–Fish species observed at the 72nd Avenue sampling station on the South Branch Paw Paw River on September 15, 2011. Thermal classifications from Lyons et al. (2009).

Species	Thermal classification
Bluegill	Warmwater
Brown trout	Coldwater
Chestnut lamprey	Warmwater
Creek chub	Transitional
White sucker	Transitional
Grass pickerel	Warmwater
Johnny darter	Transitional
Lake chubsucker	Warmwater
Mottled sculpin	Coldwater
Central mudminnow	Transitional

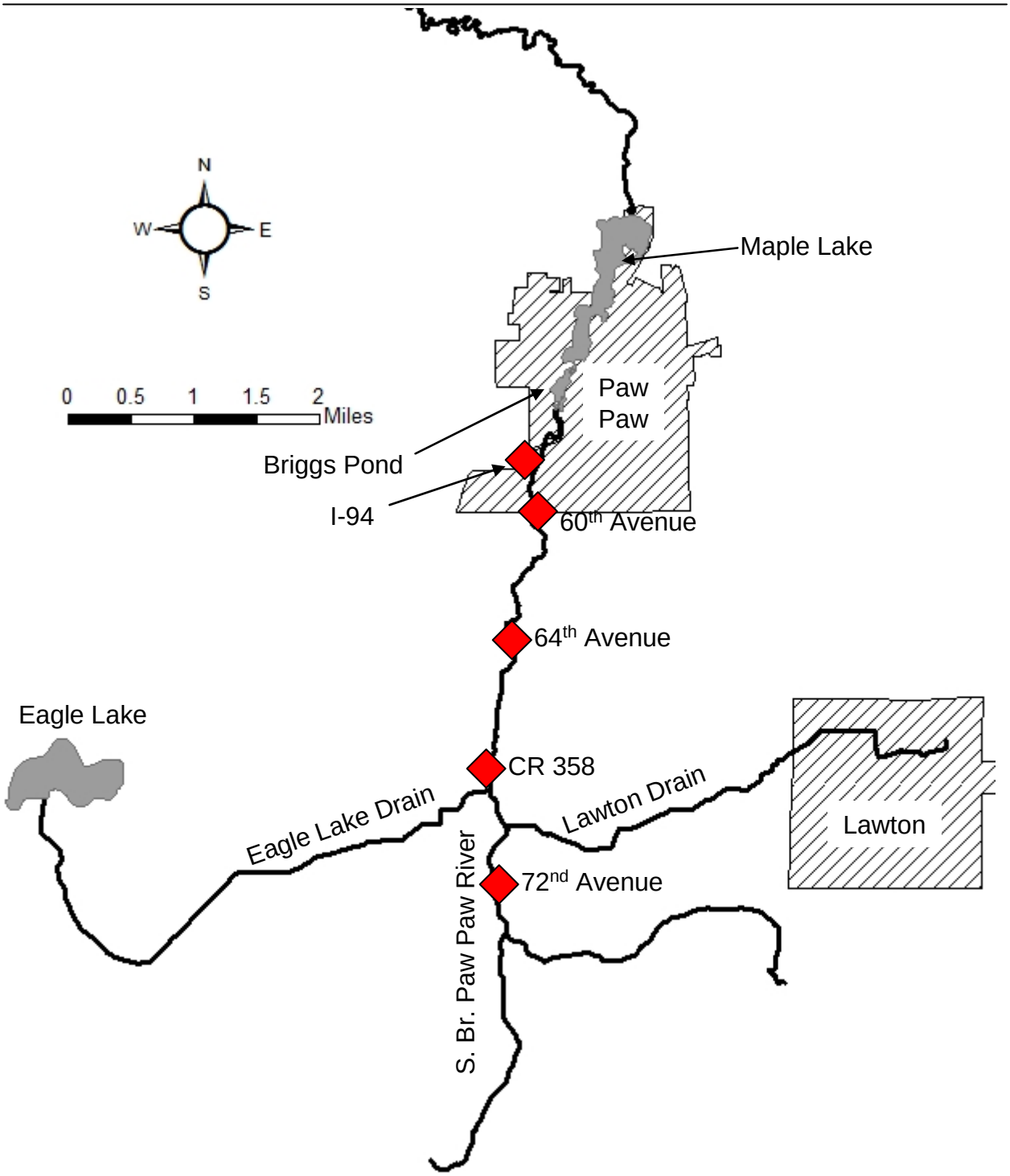
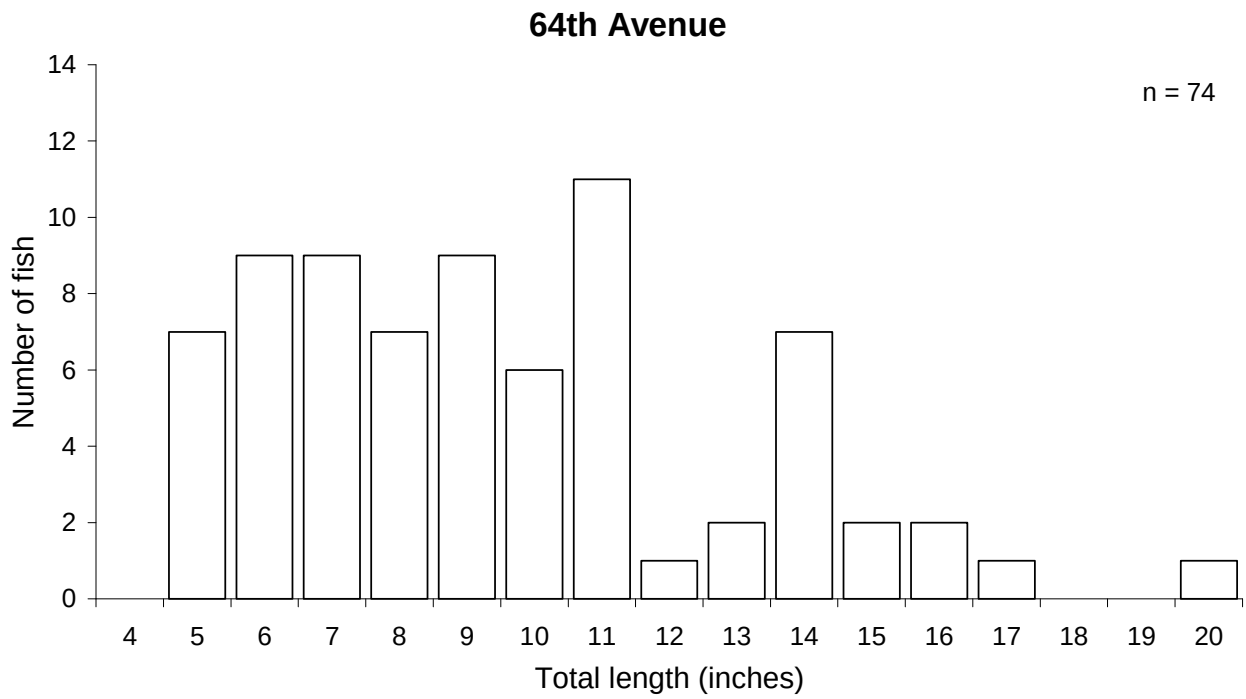


Figure 1.–South Branch Paw Paw River, Van Buren County.



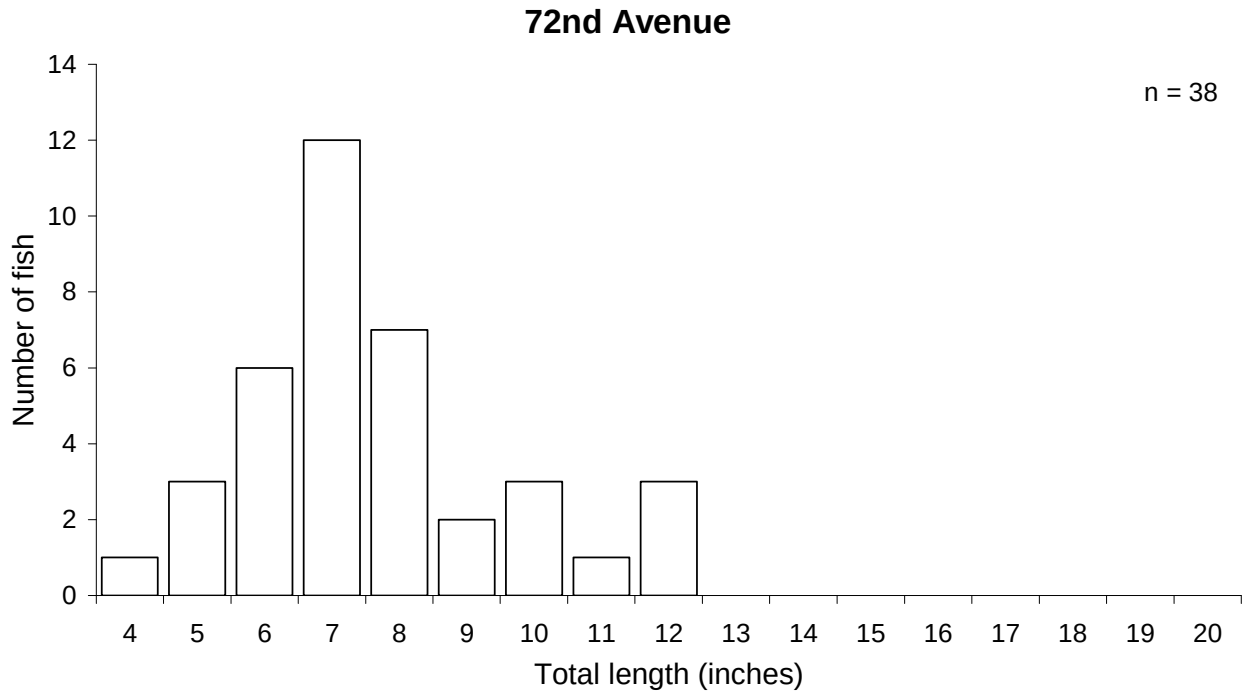
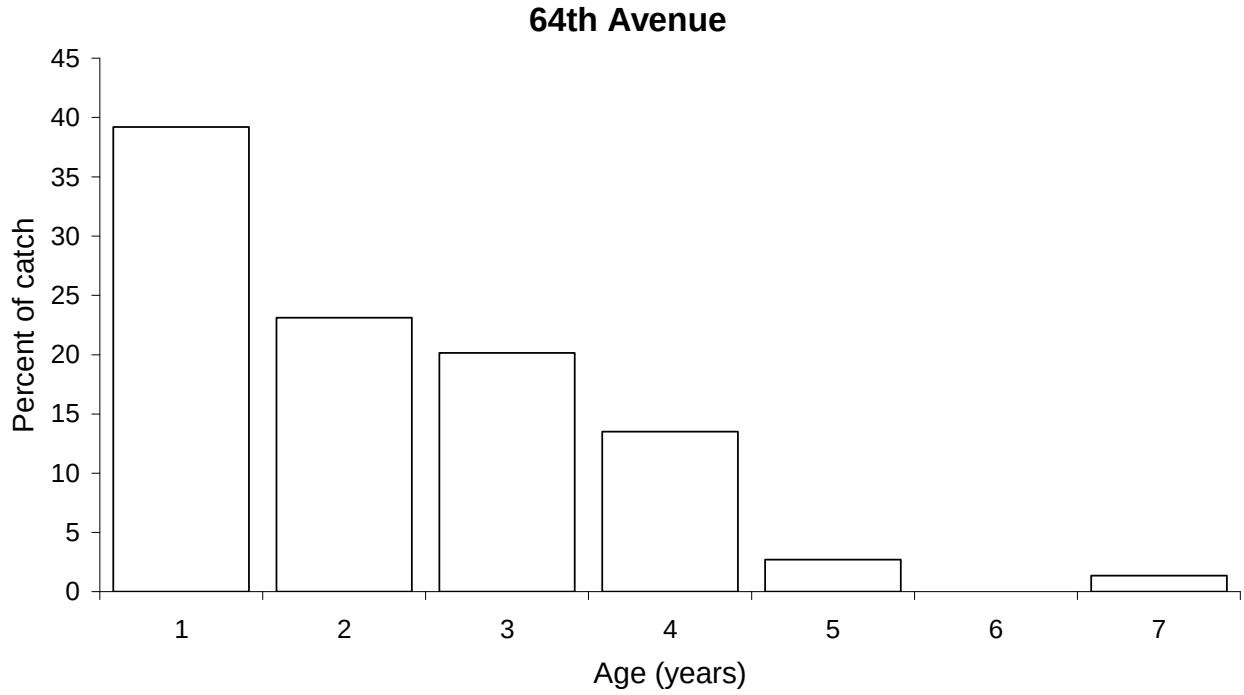


Figure 2.–Length frequency distributions for brown trout captured at the 64th Avenue and 72nd Avenue sampling stations on the South Branch Paw Paw River on September 15, 2011.



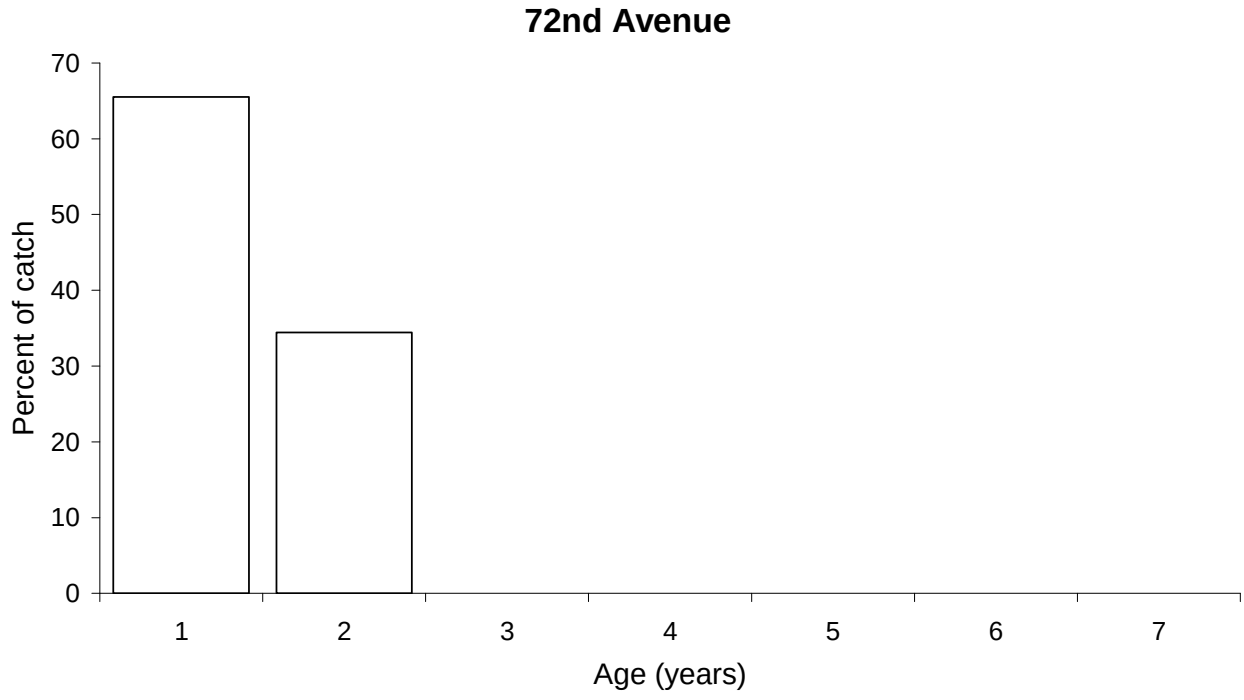


Figure 3.–Age frequency distributions for brown trout captured at the 64th Avenue and 72nd Avenue sampling stations on the South Branch Paw Paw River on September 15, 2011.

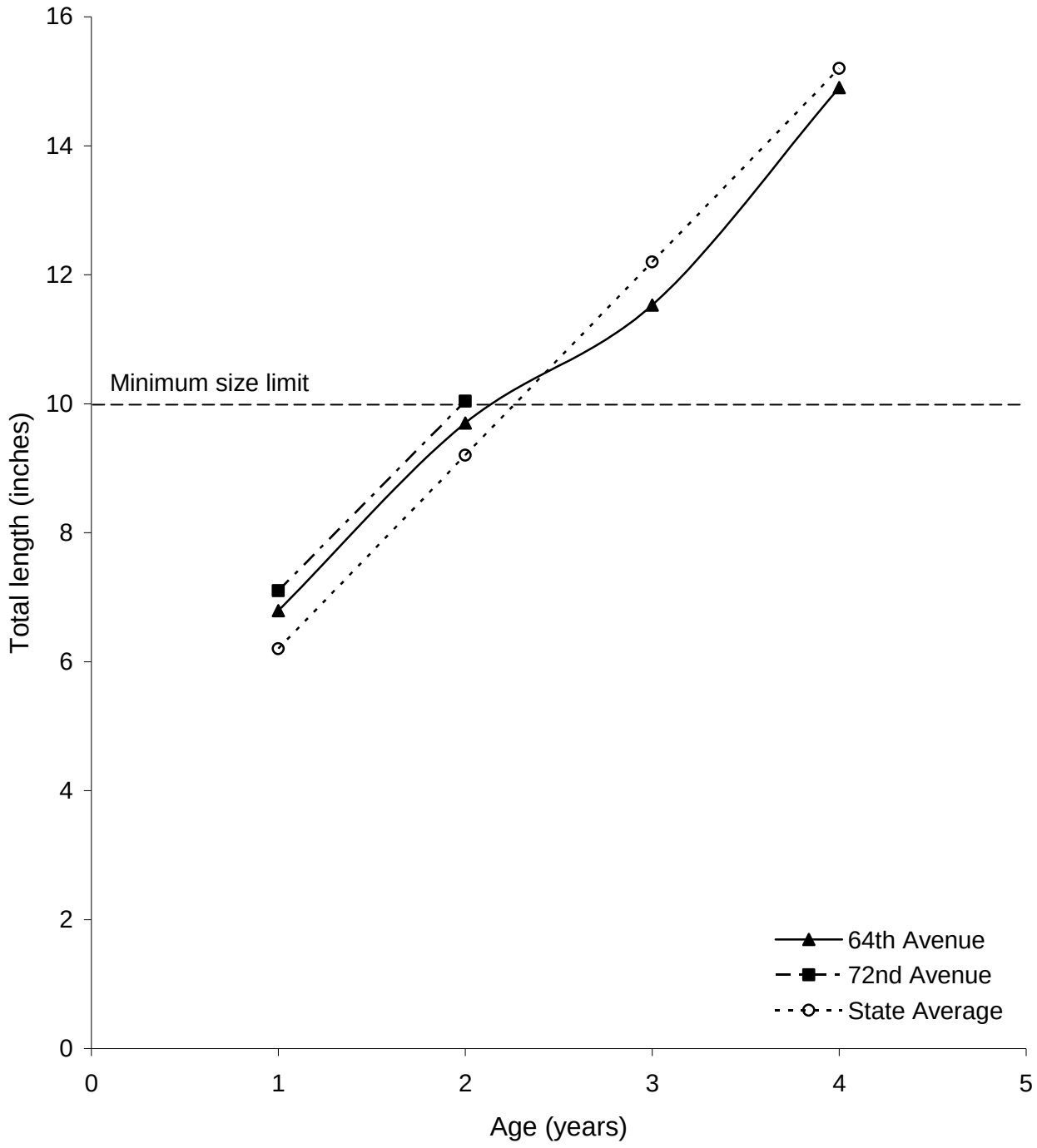


Figure 4.–Growth of brown trout in the South Branch Paw Paw River, as determined from scale and dorsal fin ray samples collected at the 64th Avenue and 72nd Avenue sampling stations on September 15, 2011. State average lengths for August-September are from Schneider et al. (2000).