Big Stone Lake Fisheries Update Through 2020

DNR Fisheries Ortonville Area Office

Big Stone Lake has been a good place to fish for numerous species including Yellow Perch, Bluegill, Largemouth Bass, Walleye, White Bass, Freshwater Drum, and most recently, Lake Sturgeon. MN DNR Fisheries and South Dakota Game, Fish and Parks have monitored fish populations in Big Stone Lake since 1971. Sampling has included seining, trapnetting, gillnetting and electrofishing. Fish populations fluctuate naturally due to many factors including changes in habitat, forage and weather. Probably the biggest impact to Big Stone Lake's fish populations during recent years has been a substantial increase in water clarity and the abundance of rooted aquatic plants. These changes in habitat have resulted in higher numbers of bass and panfish, and lower numbers of Walleyes.

Walleyes

Walleye catch rates have ranged from 3-150 fish per gill net (Figure 1), with a mean of 32. Walleye populations were high throughout much of the Midwest during the 1990s. This likely occurred because lakes were more productive due to high water levels and nutrient inputs during some very wet years. Another factor that likely favored an increase in the Big Stone Lake Walleye population was a die-off of White Bass in 1988, which resulted in less competition. The Walleye population has declined since the 1990s, likely due to an increased abundance of rooted plants and a resurgence of White Bass. Walleyes do better in shallow lakes that are turbid versus those that are clear. Shallow lakes that are clear tend to contain abundant plants, a habitat that favors bass, panfish and perch. However, even with the changed habitat, the Walleye population has remained good, with moderate numbers of fast growing Walleyes from a wide range of sizes present.

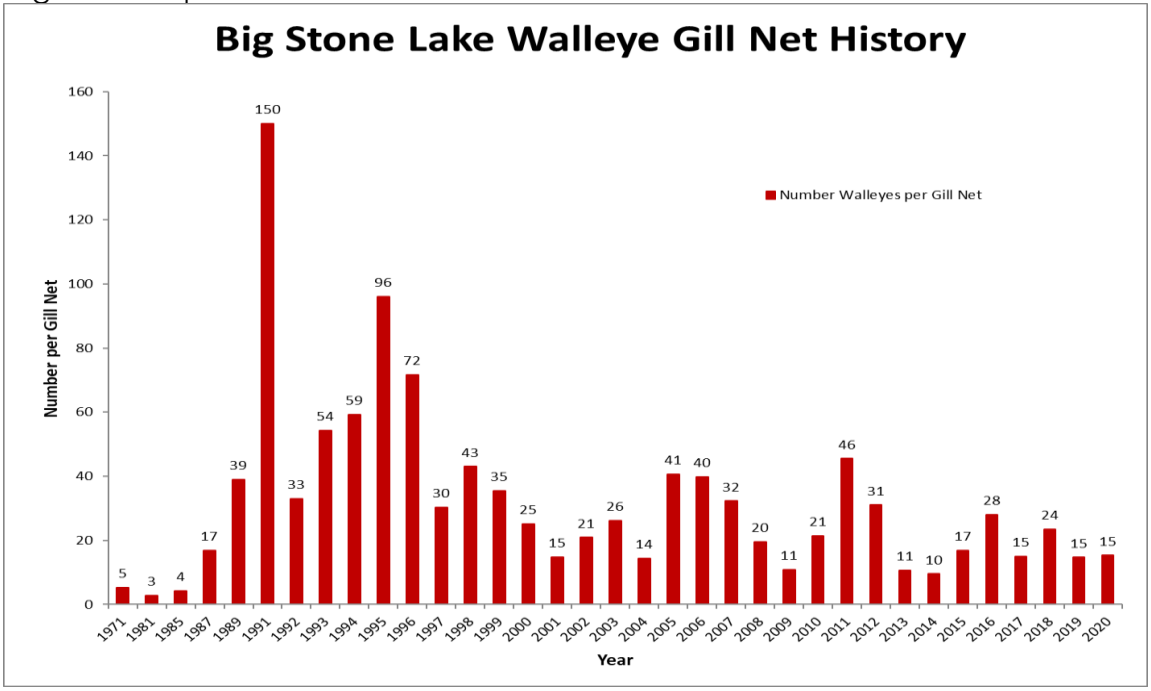

Figure 1. Big Stone Lake Walleye gill net catches.

Fish growth is often extremely variable and highly dependent on food availability, water temperatures and fish sex. Figure 2 displays the size and ages of Walleyes from the 2020 gillnetting. In the legend, an age 1+ fish would be two summers old, an age 2+ fish would be three summers old, and so on. Immature male and female Walleyes generally grow at similar rates until around age 3+. Note below that most two summer old Walleyes were 13-14 inches, which is good growth. More typical growth for two summers would be around 12 inches. Note that by age 4+ Walleyes range in length from 17 to 21 inches. The smaller age 4+ Walleyes are more likely to be males, whereas the larger ones are more likely to be females. Females grow faster than males once they reach maturity and therefore typically attain larger sizes. Overall, Walleyes in Big Stone Lake have been experiencing fast growth, an indication of readily available forage, which helps explain the slower Walleye bite during the past several years.

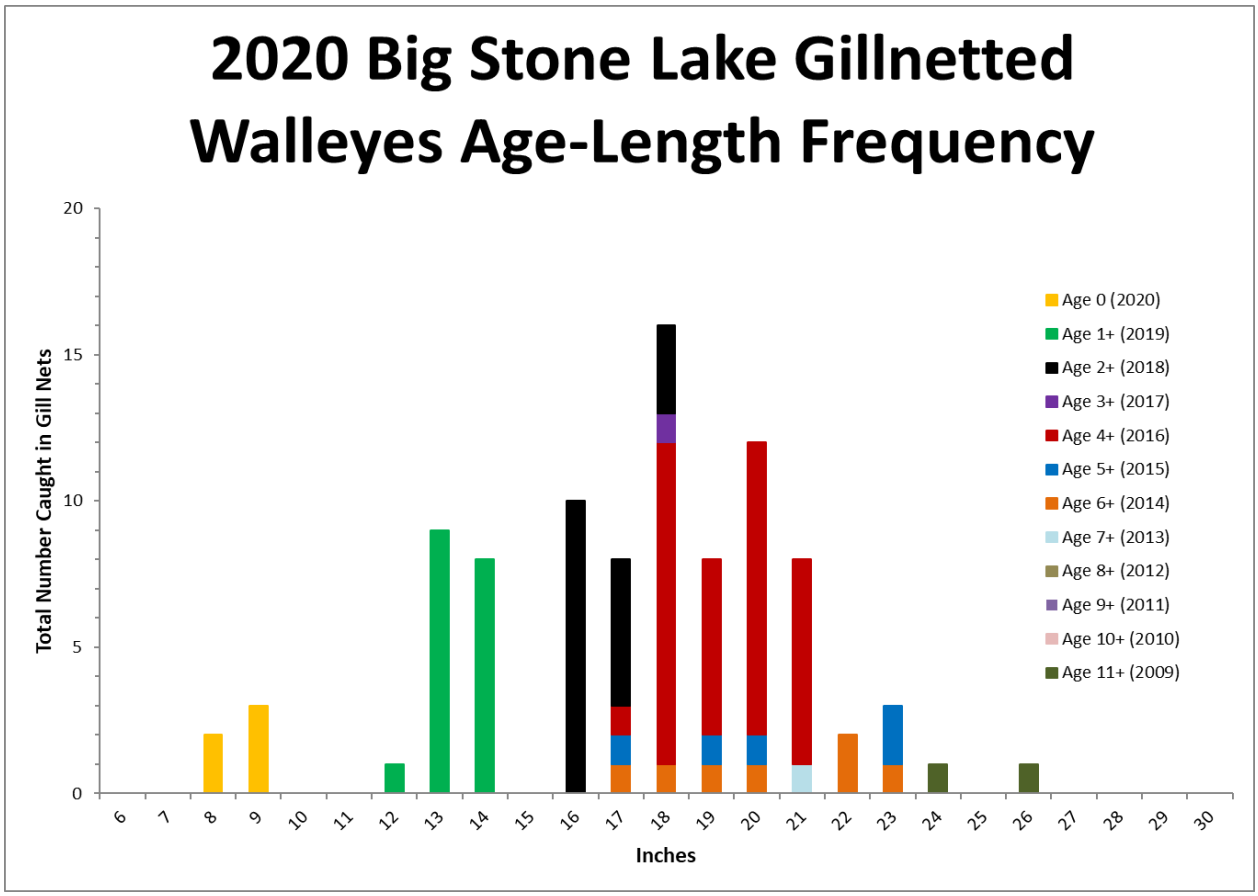

Figure 2. Ages and sizes of Big Stone Lake Walleyes from 2020 gill nets.

Figure 3 shows the strength of each Walleye year class using gill net catches as an index. This figure is different than Figure 1 since each bar only represents one year class of fish. The strength of each bar is an average of the catch of each year class when the fish were two summers (age 1+) and three summers old (age 2+). These aged fish gill net well and have been subjected to less angling harvest than older fish, so they make a good population index. For example, the 2009 year class was strong with a strength of 19. This number is the average of 13 and 26, the mean gill net catches of that year class at ages 1+ and 2+, respectively. The bar is primarily red which represents naturally reproduced Walleyes. A small part of the bar is black

which represents Walleyes that came from fry stocking. We know the contributions because the fry stocked in 2009 were marked with oxytetracycline (OTC), which allowed us to determine the source of the Walleyes. OTC marking wasn't used prior to 1998 or since 2014, and therefore some bars are purple because the sources of the Walleyes couldn't be isolated during fry stocked years. It is apparent that fry stocking and natural reproduction have both made important contributions to the Walleye population throughout recent history.

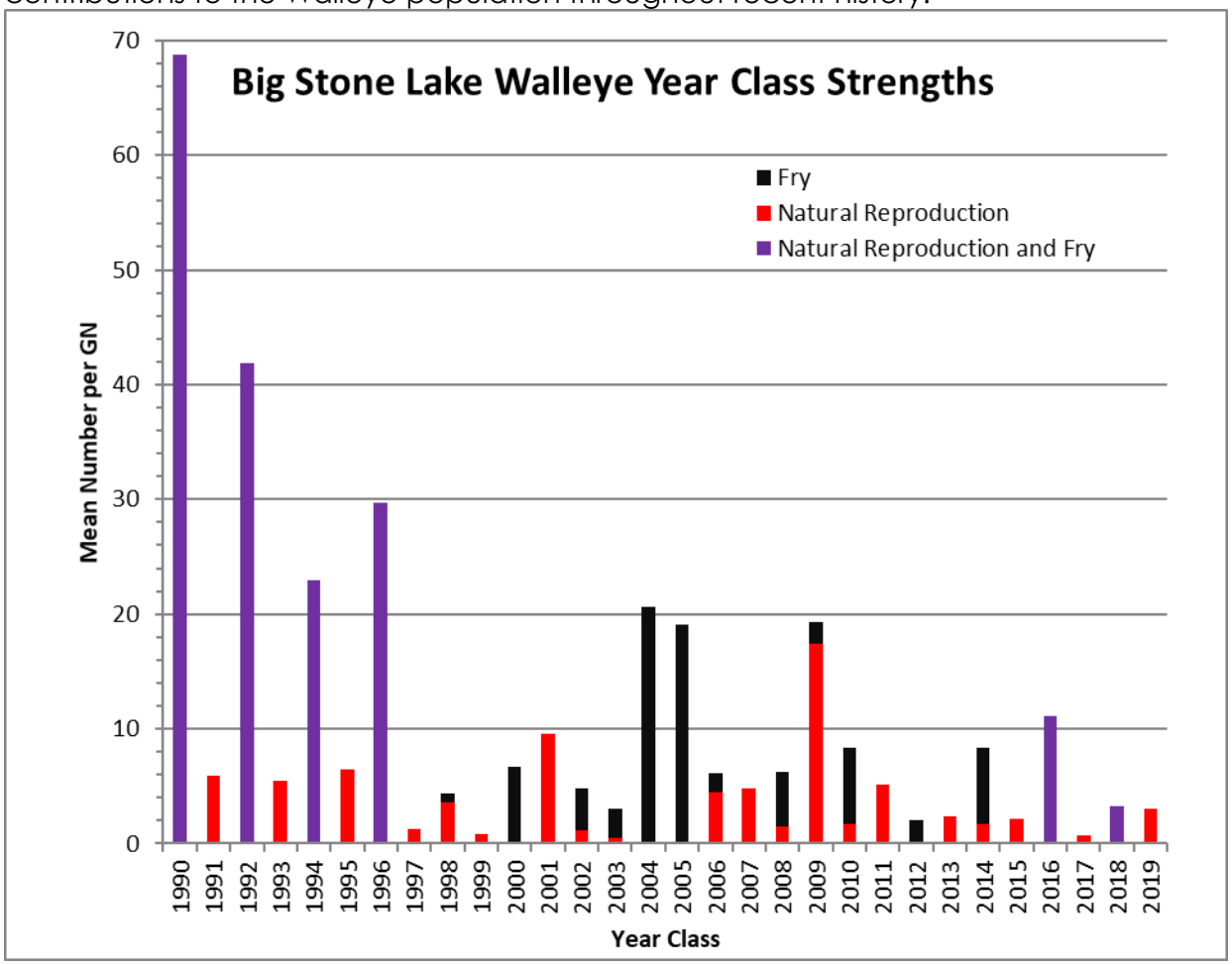

Figure 3. Big Stone Lake adult Walleye year class strengths.

Table 1 lists the number of Walleyes that have been stocked since 2000.

Table 1. Big Stone Lake Walleyes stocked since 1990.		
Year	Species	Number and Size
2018	Walleye	6,000,000 fry
2016	Walleye	6,000,000 fry
2014	Walleye	6,000,000 fry
2012	Walleye	6,021,775 fry
2010	Walleye	6,000,000 fry
2009	Walleye	6,051,303 fry
2008	Walleye	6,000,000 fry
2006	Walleye	6,000,000 fry
2005	Walleye	3,321,652 fry
2004	Walleye	6,150,000 fry
2003	Walleye	3,000,000 fry
2002	Walleye	6,000,000 fry
2000	Walleye	6,000,000 fry

Yellow Perch

Yellow Perch catch rates have ranged from 10-284 fish per gill net (Figure 4), with a mean of 128. The mean catch for lakes similar to Big Stone (e.g. Traverse, Hendricks, Big Kandiyohi, Lac qui Parle) is nine perch per net, hence Big Stone Lake has been an exceptional perch lake for many years. The highest catch that has been observed occurred in 2020, with 284 Yellow Perch per gill net.

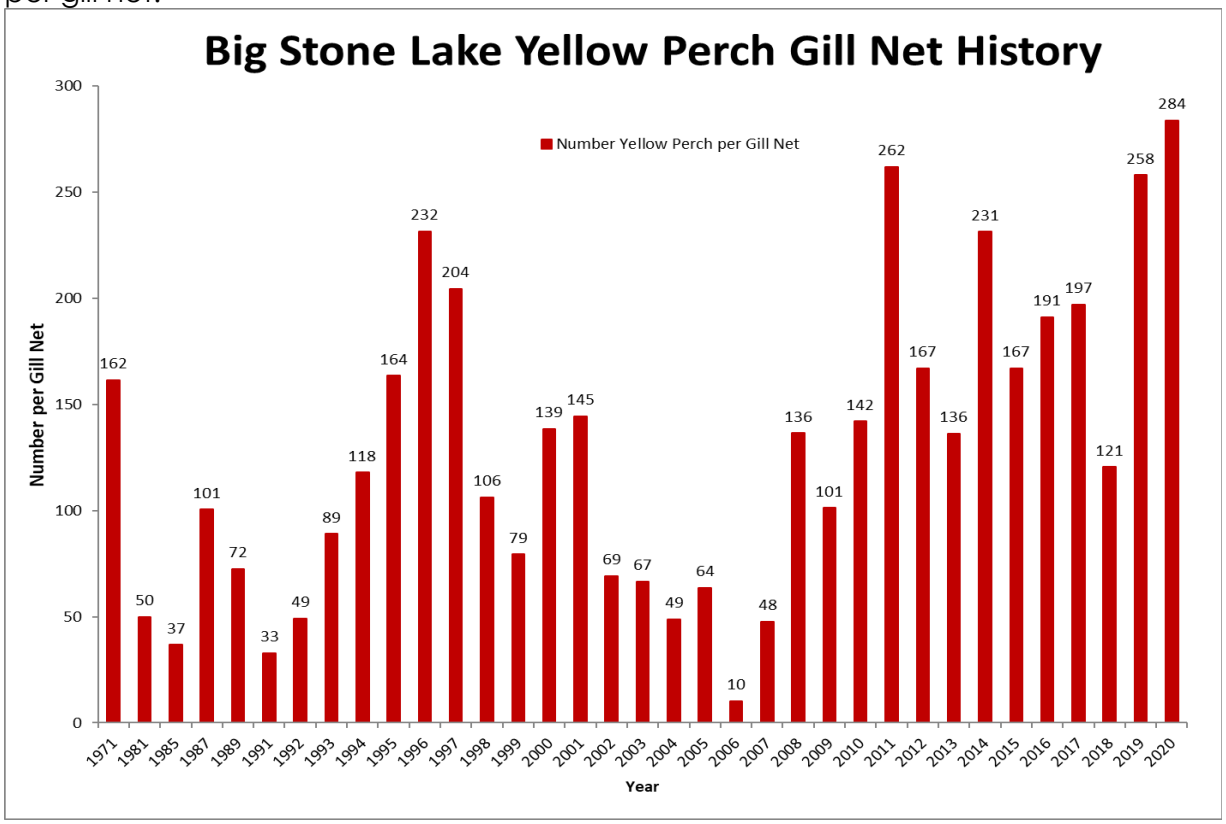

Figure 4. Big Stone Lake Yellow Perch gill net catches.

Figure 5 displays the age-length frequency of Yellow Perch gillnetted during the fall of 2020. The vast majority of the perch were less than ten inches. Perch typically are 5-7 inches after two summers (green bars, age 1+) and 7-9 inches after three summers (black bars, age 2+). Generally, perch growth rates have been good, even during periods of high abundance. Very few perch have been sampled that exceed six summers of age, and these fish would usually be 11-12 inches. Angler harvest clearly plays a role in perch mortality, however considering the very low number of perch that reach older ages, older perch are likely also dying from some form of natural mortality.

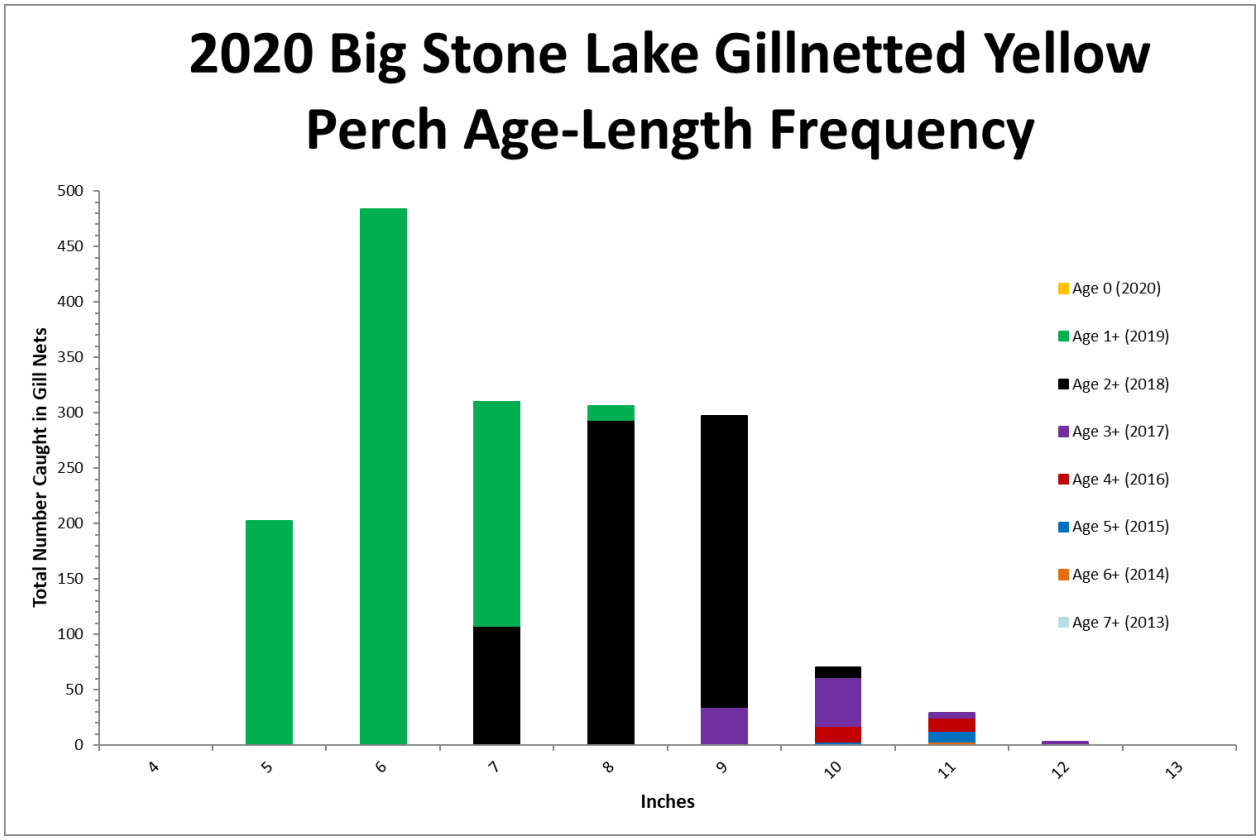

Figure 5. Ages and sizes of Big Stone Lake Yellow Perch from 2020 gill nets.

Perch size distributions have frequently "cycled" with larger fish being more abundant some years, and smaller fish more abundant other years. Figure 6 shows this variation for some of the historical gill net catches that included decent numbers of perch over nine inches. Note that one of the best years to catch larger Yellow Perch occurred recently in 2015.

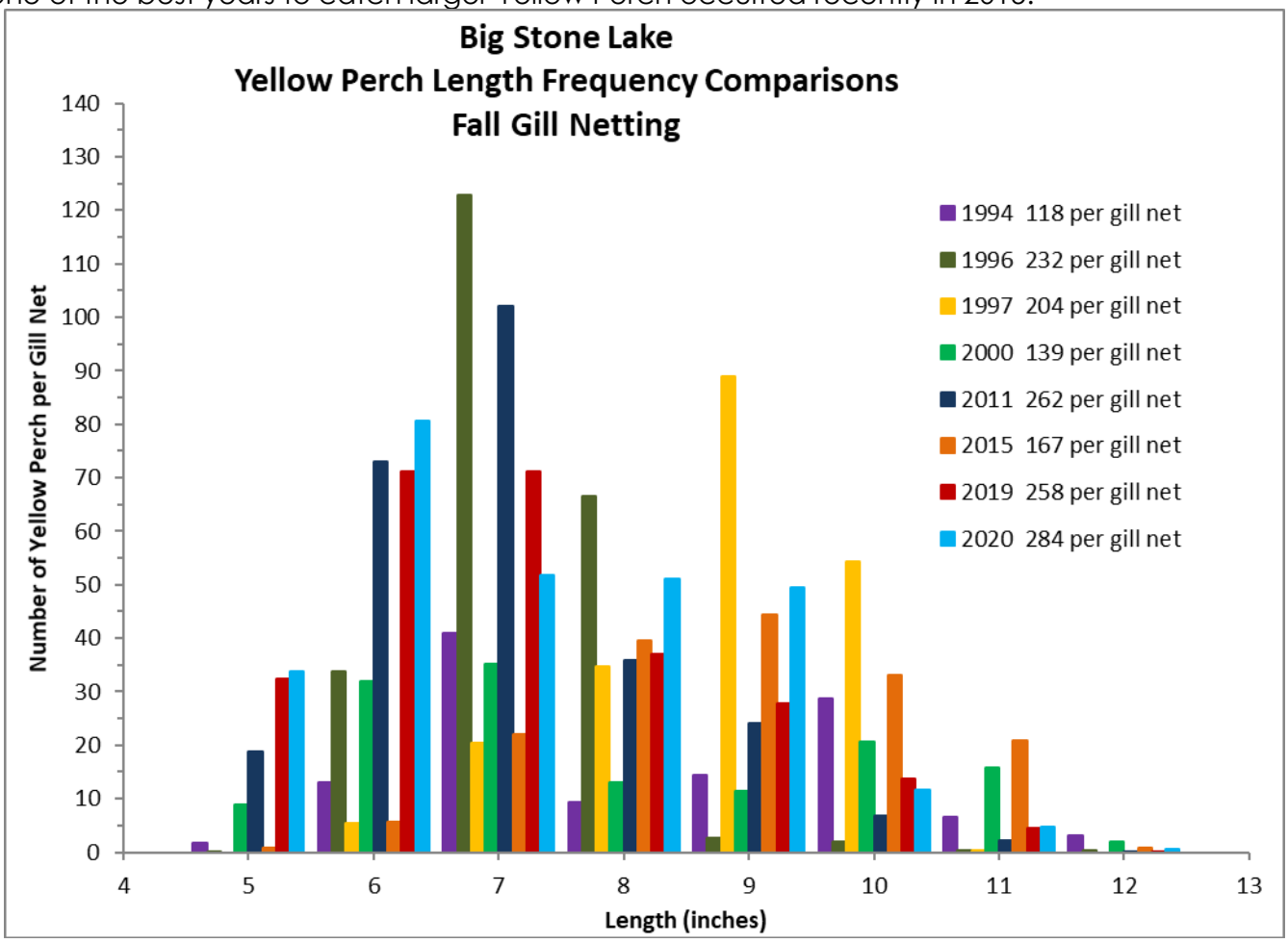

Figure 6. Size Comparison of Big Stone Lake Yellow Perch from select years.

Bluegills

Bluegill catch rates have ranged from 0-20 fish per gill net (Figure 7), with a mean of one. Bluegills have become considerably more abundant during recent years due to substantial increases in rooted plants, including curled pondweed. Rooted plants provide good habitat for Bluegills and many of their preferred food organisms. Bluegills can be expected to maintain good numbers as long as this habitat type persists.

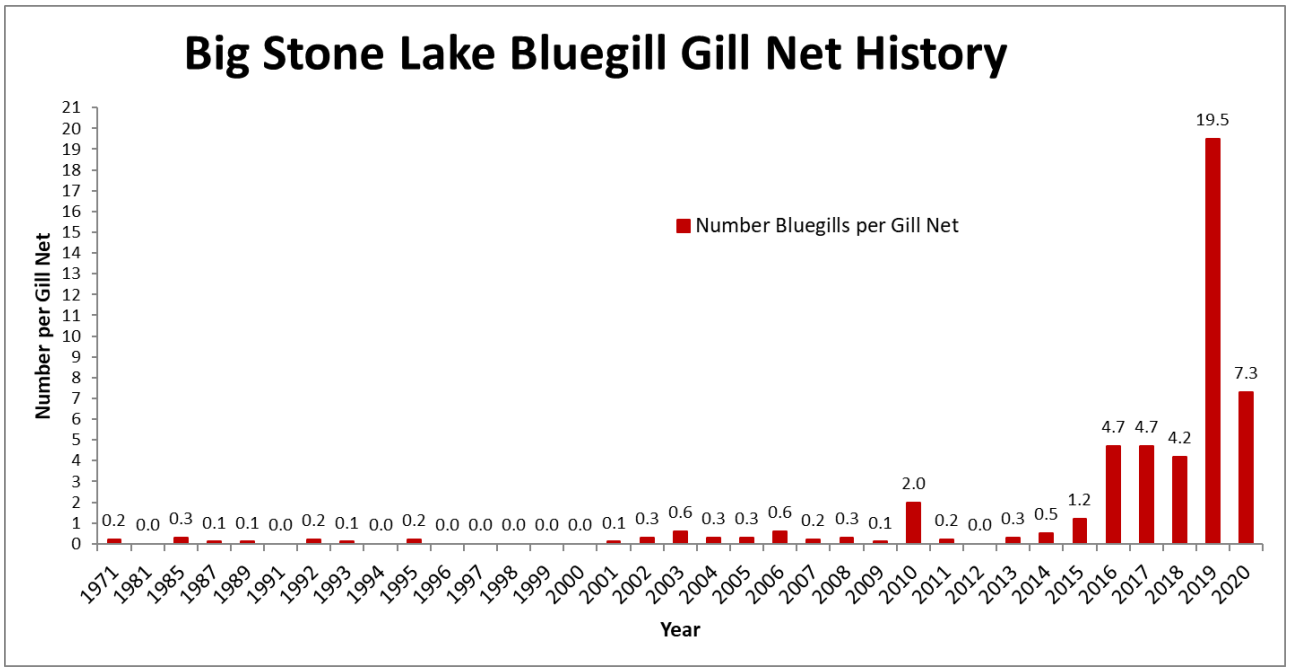

Figure 7. Big Stone Lake Bluegill gill net catches.

Black Crappies

Crappies frequently experience sporadic year classes and widely fluctuating populations in prairie lakes. Black Crappies were abundant at times prior to 1971 based on historical angler reports. Similar to bass and Bluegills, crappie numbers have increased during recent years likely due to changes in habitat (Figure 8). Anglers have been catching crappies more frequently since 2015.

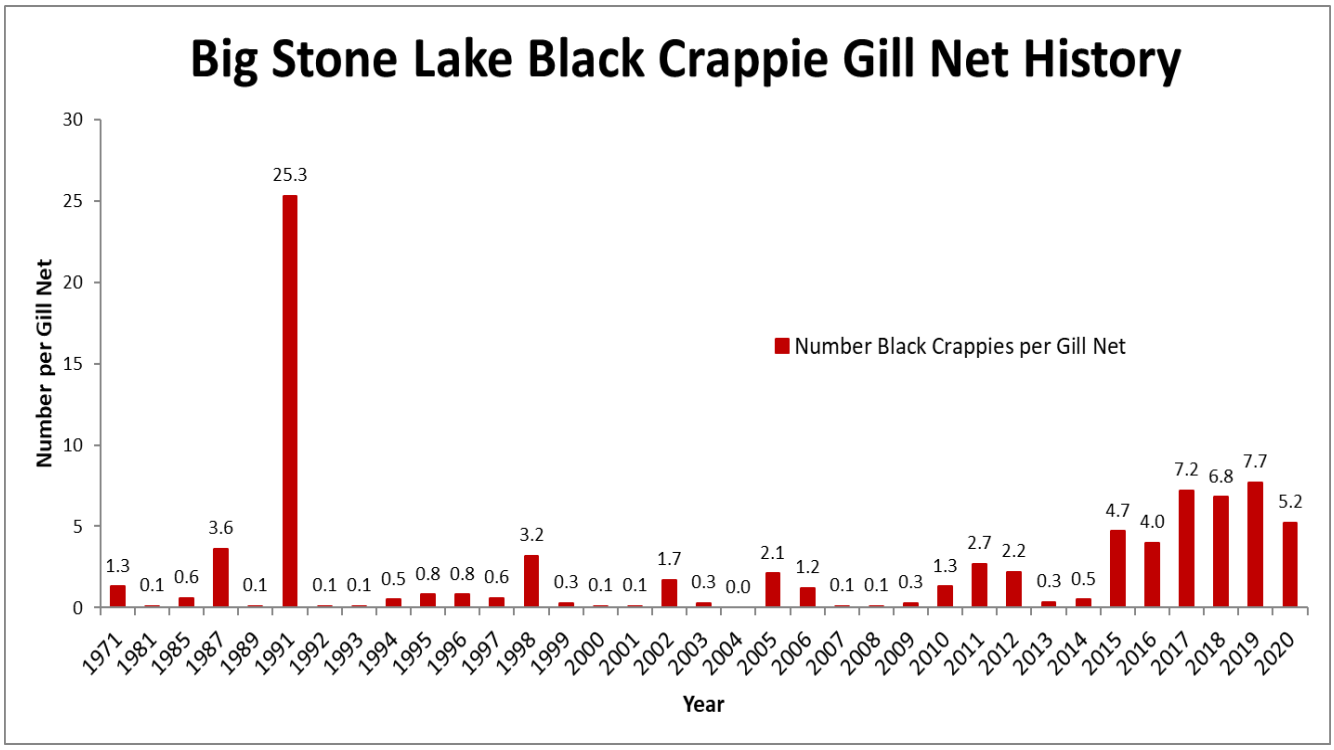

Figure 8. Big Stone Lake Black Crappie gill net catches.

Largemouth Bass

Largemouth Bass numbers have increased substantially during recent years. Bass, similar to Bluegills, do considerably better in lakes with an abundance of rooted plants and clearer water. Bass angling has become increasingly popular as their numbers have increased.

White Bass

White Bass catch rates have ranged from 0-44 fish per gill net (Figure 9), with a mean of 11. White Bass died-off during the fall of 1988 due to an unknown cause and the population remained low until the late 1990s. White Bass have frequently experienced good natural reproduction, but strong year classes have not always resulted. Anglers historically kept White Bass to eat, and during recent years White Bass have been regaining their popularity as table fare. Young-of-year White Bass are an important forage for Walleyes.

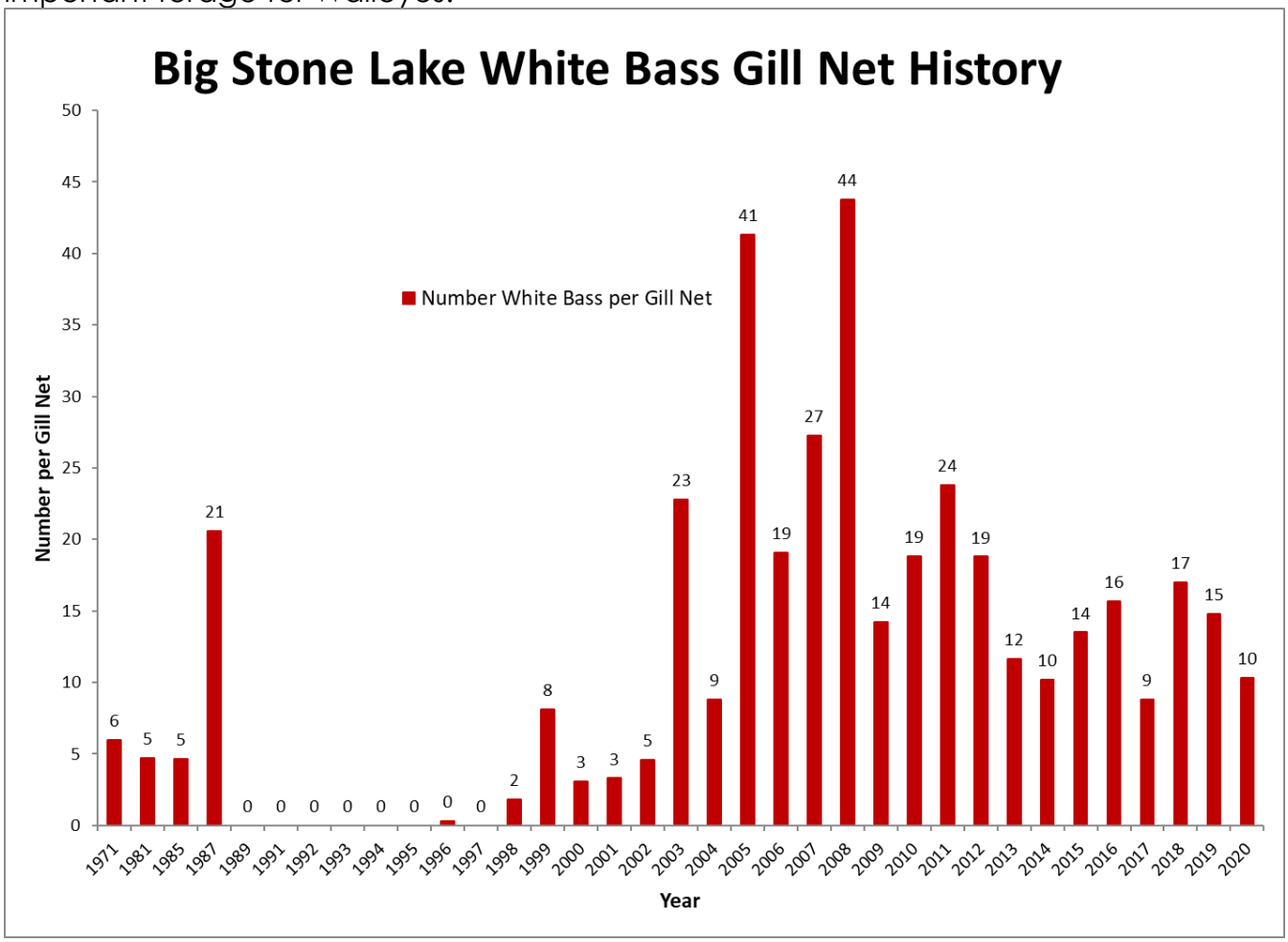

Figure 9. Big Stone Lake White Bass gill net catches.

Lake Sturgeon

Lake Sturgeon were historically present in Big Stone Lake but had disappeared by around 1950 likely due to winterkill, summerkill and barriers to migration. Lake Sturgeon were reintroduced in 2014 and 4,000 fingerlings have been stocked annually since then, with the

exception of 2020. The stockings have been successful, and sturgeon are frequently being caught by anglers and in DNR sampling (Figure 10). Lake Sturgeon stockings will continue until a self-sustaining population has been reestablished.

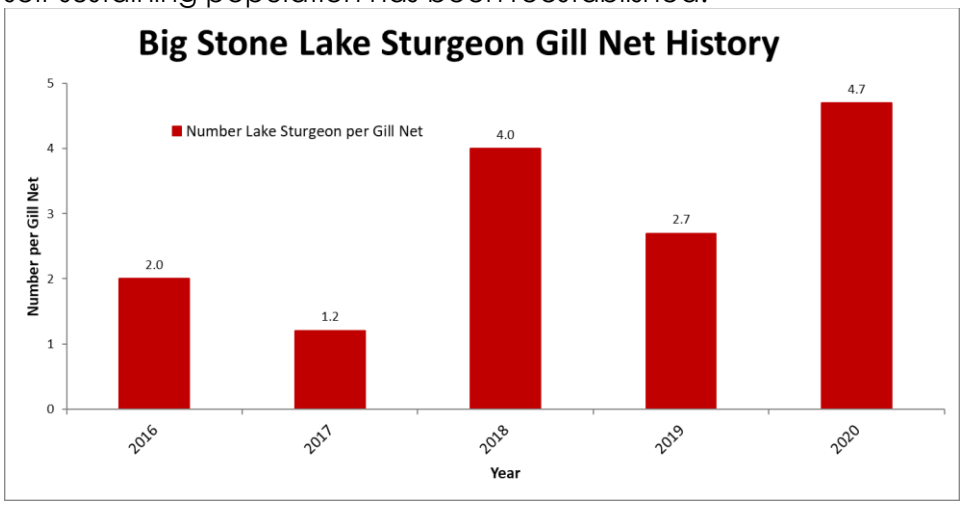

Figure 10. Big Stone Lake Lake Sturgeon gill net catches.

Northern Pike

Northern Pike catch rates have ranged from 0-4 fish per gill net (Figure 11), with a mean of one. Pike have typically grown very fast, but they have died young and few fish older than age five have been sampled. Pike spawning habitats include the Meadowbrook State Park wetlands and flooded areas along the Little Minnesota River. Some natural reproduction appears to occur every year. Pike can also migrate into Big Stone Lake from downstream when the gates at the outlet dam are open during high flows.

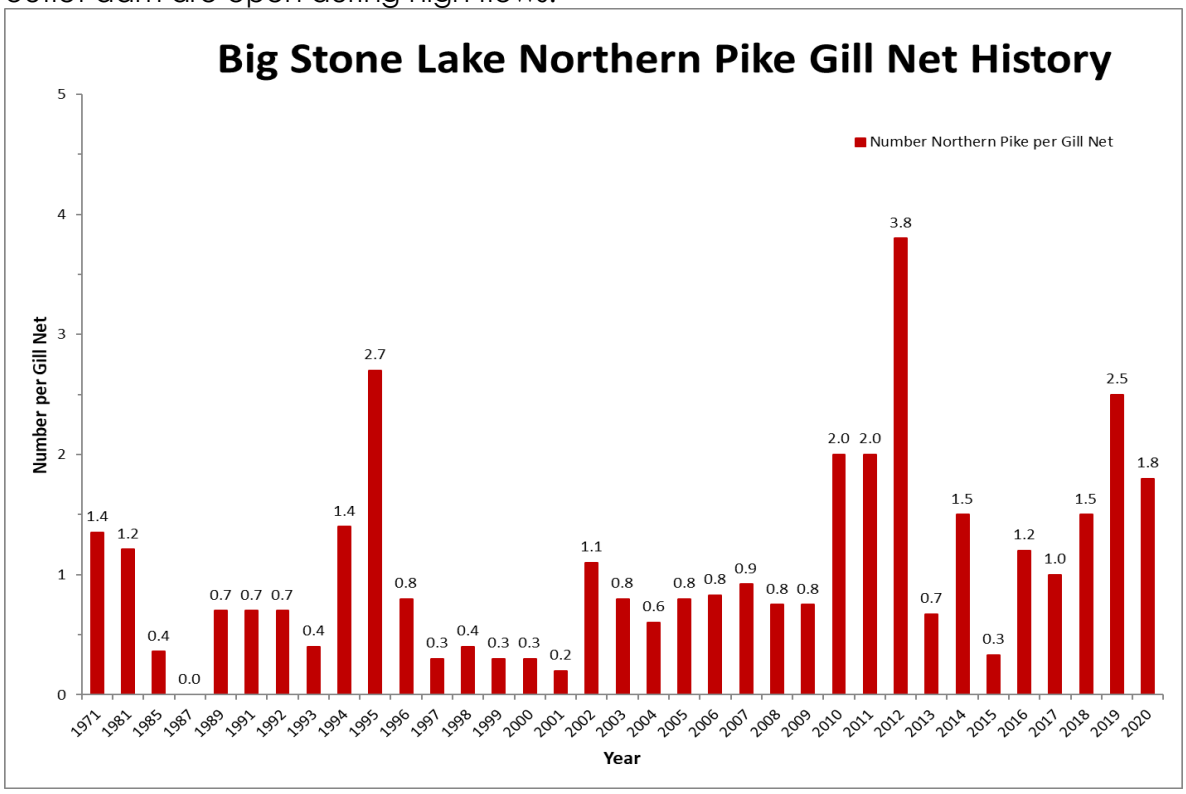

Figure 11. Big Stone Lake Northern Pike gill net catches.

Freshwater Drum

Freshwater Drum catch rates have fluctuated widely (Figure 12). High catches have usually contained high numbers of young-of-year. Drum frequently experience very good natural reproduction. Commercial fishermen have harvested high numbers of drum at times. Young-of-year drum are important forage for Walleyes. Although drum are fun to catch and good to eat, most anglers consider them an undesirable rough fish.

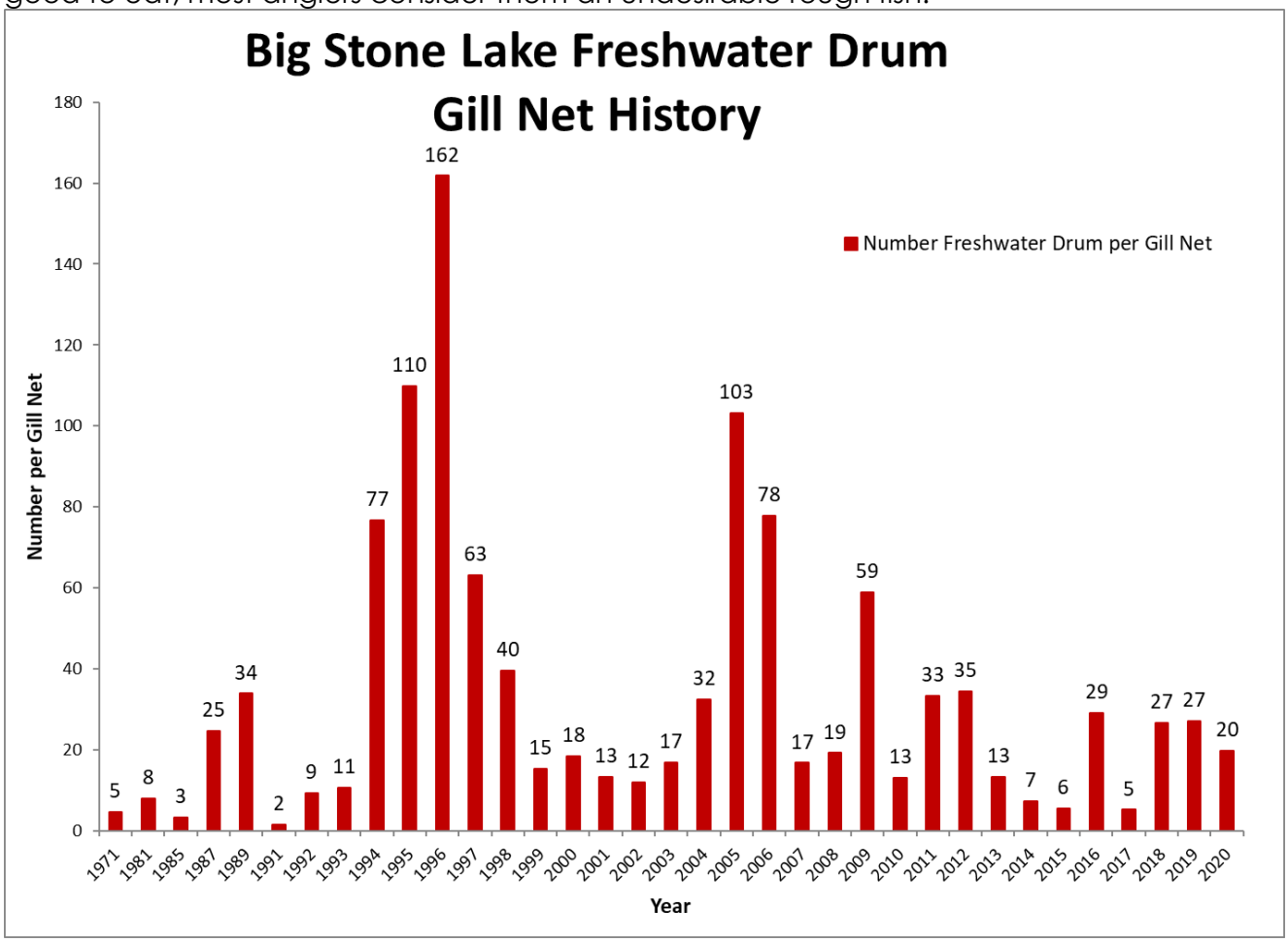

Figure 12. Big Stone Lake Freshwater Drum gill net catches.

Bullheads

Black, Brown and Yellow Bullheads are present in Big Stone Lake. Bullheads were abundant at times historically and readily sought by anglers. Bullhead numbers have been relatively low during recent years (Figure 13).

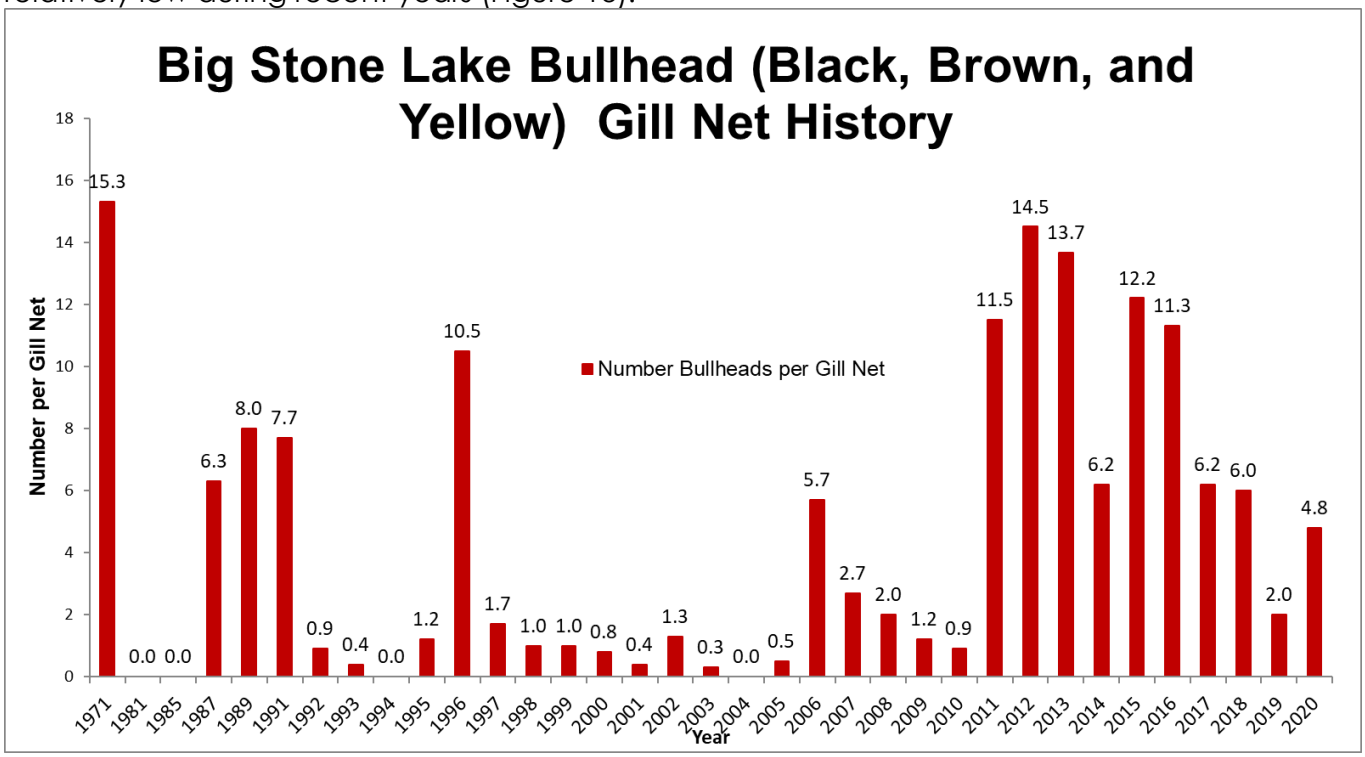

Figure 13. Big Stone Lake bullhead gill net catches.

Common Carp

Commercial fishing records suggest that Common Carp where historically more abundant in the early to mid-1900s. Common Carp numbers have been relatively low since 1971 (Figure 14), likely due to predation by and competition from numerous other fish species.

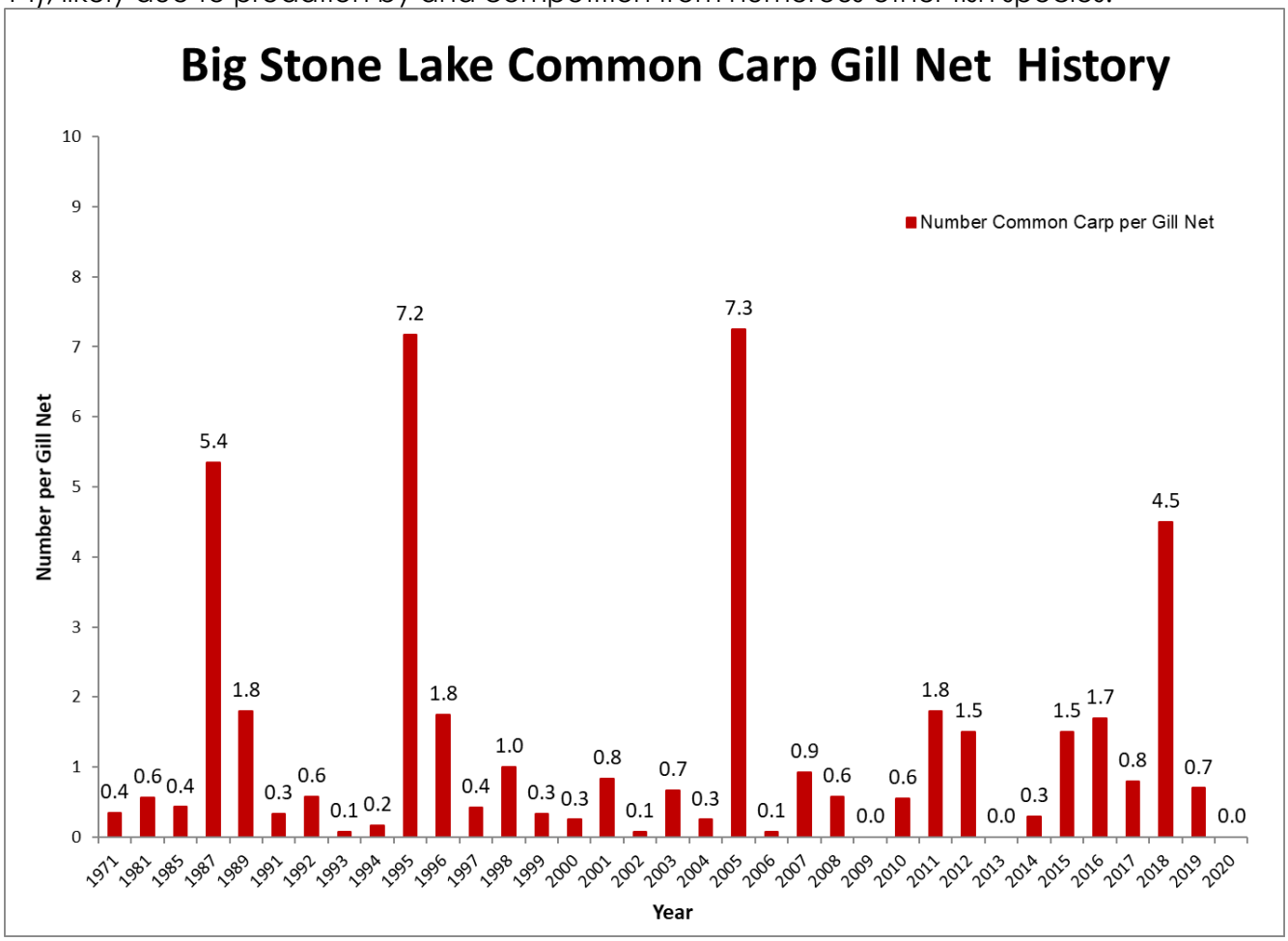

Figure 14. Big Stone Lake Common Carp gill net catches.

Channel Catfish

Channel Catfish were stocked occasionally from 1976 through 1999. The stockings usually resulted in slightly higher gill net catches, however catches have been very low overall (Figure 15). The present population is the result of natural reproduction since catfish haven't been stocked for many years.

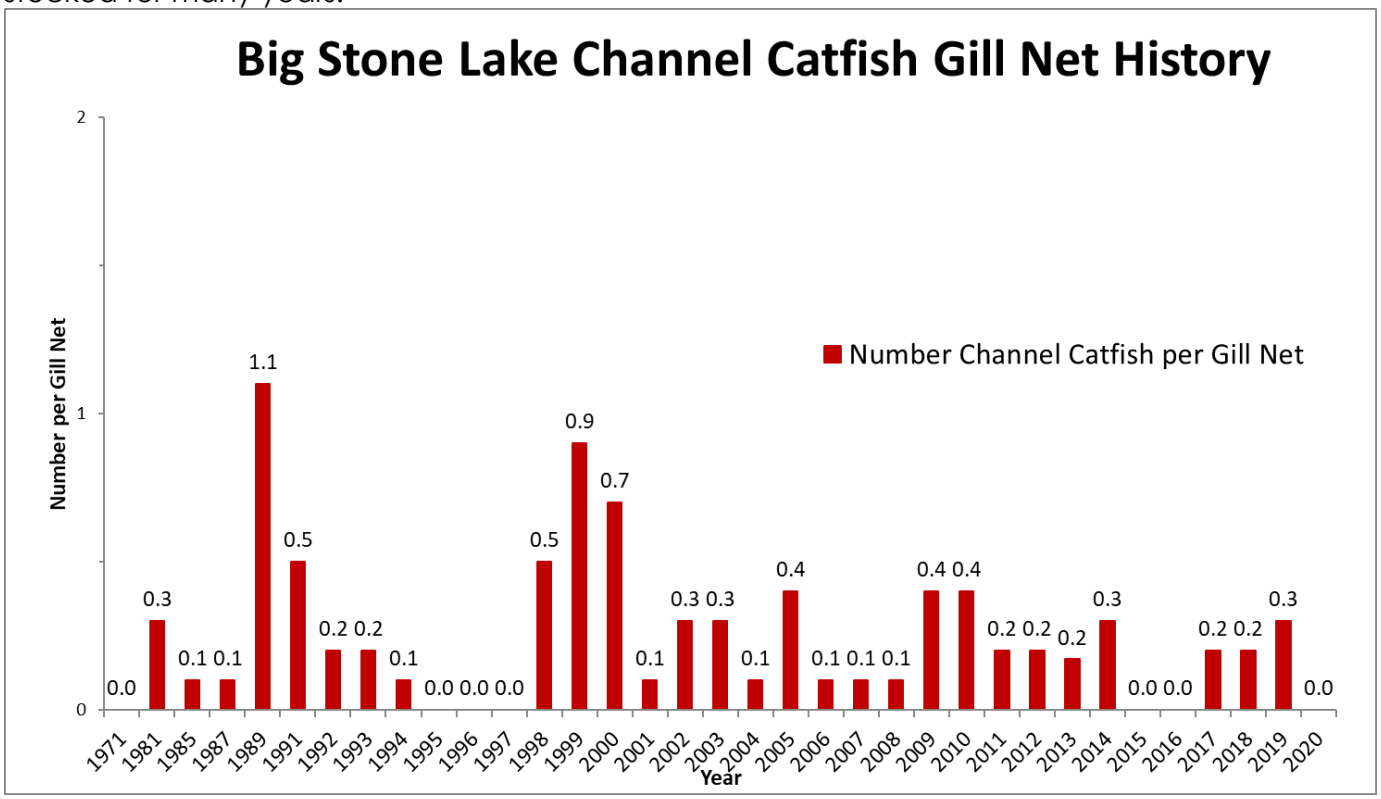

Figure 15. Big Stone Lake Channel Catfish gill net catches.