Introduction

Holloway Reservoir, a 1,973 acre impoundment of the Flint River, has been managed for walleye since the late 1970's. Initially, walleye management relied on semi-annual stocking but by 1992 natural reproduction was occurring and stocking was discontinued. Over the years, Holloway Reservoir has earned a reputation for being one of the better walleye fisheries in this area of the State.

Methods and Materials

This survey was in response to concerns expressed by Genesee County Parks and Recreation Commission on behalf of Holloway Reservoir anglers of a declining walleye fishery. In response, Fisheries Division conducted a single night electrofishing effort on the lower impoundment (downstream of Mt. Morris Rd.) following accepted guidelines for evaluating juvenile walleye recruitment.

Eight randomly selected ¼ mile stations were sampled (10 minutes/station) using a Smith-Root electrofishing boat. All walleye were netted and measured to the nearest inch group. Scale samples were extracted from a subsample of juvenile walleye for age and growth analysis.

Results

A total of 158 walleye were collected in 1.3 hours (2 miles) of electrofishing (Table 1). Young of the year (yoy) walleye accounted for 82% of the total catch. In addition, 44 yoy walleye were observed but avoided capture. Twenty-four walleye (15%) met or exceeded the minimum harvest size of 15 inches. Only one walleye >19 inches was collected.

Age and growth analysis indicated walleye were growing above State average having a mean growth index of +1.7 (Table 2). Four year classes (2011, 2009, 2008, 2005) were represented in this survey.

Discussion

Juvenile abundance and growth are important factors in determining walleye year class strength. In Michigan, a year class of average strength should produce 45-130 yoy walleye per mile of electrofishing (Schneider 2000). For growth, walleye should be 7 inches as they approach their first winter. In this survey, 65 yoy walleye averaging 9.0 inches were collected per mile of electrofishing. This indicates the 2011 walleye year class is of average strength and exhibits better than average growth. A comparison to previous juvenile recruitment surveys of Holloway Reservoir shows variation of year class strength and growth (Table 3). In 1999, yoy abundance was lowest (17/mile) but growth was highest (10.2"). In 2007 and 2011, yoy abundance was high (65/mile) but growth varied being considerably better in 2011 (6.1" vs. 9.0"). The abundance and growth of yoy walleye found in 2011 should result in good recruitment into the harvestable fishery. The data also implies the current fishing regulations for Holloway Reservoir are protecting a spawning stock sufficient to maintain a self-sustaining walleye fishery.

A concern expressed from some Holloway Reservoir walleye anglers is what is perceived to be a diminishing stock of larger fish. This concern is supported anecdotally from participants of an annual catch/release walleye tournament held in May for the period 1999-2010. Although participants consistently reported good catches of undersize (<15 inches) walleye, catches of large fish declined to the point the tournament was discontinued in 2011.

The 2011 single night electrofishing survey does not provide enough detail of the walleye size structure to determine if there has been a significant decline of larger fish. Historical data reflects the walleye size structure has always been dominated by an abundance of smaller fish. In 1995, an intensive netting survey during the spawning period captured 1,327 walleye. Of that total, 71% of the walleye captured were <15 inches. Sixty-four percent were in the 12-14 inch size range. Twenty-six percent were in the

15-19 inch size range and only 3% were ≥20 inches. Since the 1995 survey was conducted in April, it is reasonable to expect a significant portion of the 12-14 inch fish to grow and be available for harvest by mid-summer.

Historical data also indicates the walleye fishery of Holloway Reservoir has always been dominated by younger fish. Weighted age frequency of the 1995 survey indicated 85% of the total catch was either 2 or 3 years of age. Although not directly comparable to 1995, subsequent surveys of Holloway Reservoir confirm this trend. The walleye fishery is typically dominated by an abundance of 0-3 year old fish. Older fish are typically less abundant suggesting high mortality. High mortality is a combination of natural causes and angler harvest.

Recently, a few Holloway Reservoir anglers have suggested that special regulations (e.g. slot limits/reduced creel) would provide larger fish in Holloway Reservoir. Current regulations for Holloway Reservoir utilize a season closure to protect spawning stock, a minimum size limit (15") to allow for recruitment into the fishery, and a daily creel limit of 5 fish to equitably distribute the resource among users. The current regulations for Holloway Reservoir are widely accepted statewide and appear to be meeting their objectives. More restrictive regulations with an objective to increase numbers of larger fish would come at a cost of reduced harvest with no guarantee of size structure improvement. Since walleye is a highly desirable food fish, special regulations restricting harvest to improve size structure would likely be unacceptable to the general angling public and would not be prudent to pursue at this time.

The fish community of Holloway Reservoir is largely driven by predator-prey relationships. Channel catfish and walleye are abundant in the reservoir and are the primary predator species. Historically, gizzard shad have served as the primary prey species but their abundance had noticeably declined as noted in a 2008 survey. On the other hand, round gobies have become well established and may be serving as an alternative prey species. Although gizzard shad were not collected in the 2011 electrofishing survey, they were observed in high abundance indicating a resurgence which may prove favorable for the walleye fishery.

Recommendations

Fisheries Division recognizes the importance of the Holloway Reservoir walleye fishery and routinely receives favorable reports from anglers. The results of this survey indicate a very good 2011 walleye year class which should recruit into the harvestable fishery by mid-summer of 2012. This survey also found reasonably good numbers of walleye in the 15-18 inch size range. The presence of larger spawning walleye is evidenced by the continual observance of yoy fish in fall recruitment surveys. However, a clear understanding of what appears to be high mortality of larger fish is not readily apparent from numerous surveys of Holloway Reservoir. Angler harvest is a likely factor but without harvest data, it is not possible to determine the extent to which it influences the walleye size structure.

From a management perspective, the current regulations appear to be achieving their objectives and changing them is not warranted at this time. Although there may be a decline in numbers of large walleye, it is not uncharacteristic of the Holloway Reservoir walleye fishery. It is believed the majority of anglers prefer the opportunity to harvest higher numbers of smaller walleye versus restricting harvest through special regulations for the possibility of catching and harvesting fewer larger fish. The resurgence of gizzard shad observed in 2011 may result in larger walleye in coming years. Management recommendations are to more rigorously monitor the walleye fishery through fall juvenile recruitment evaluations for the next few years.

Table 1. Comparison of length frequency of fall electrofishing surveys on Holloway Reservoir walleye.

Survey year	1999	2007	2011
Effort measurement	4.0 hrs	3.33 hrs.	1.33 hrs.
CPUE (fish/hr.)	54	112	119
Inch Group			
0			
1			
2			
3			
4		78	
5		65	
6		47	1
7		44	25
8		22	63
9	17	4	39
10	48	3	2
11	4		
12	2	3	
13	25	12	
14	77	33	4
15	7	8	5
16	16	7	8
17	11	22	6
18	3	13	4
19	6	5	
20	1	3	
21			1
22		3	
23			
24			
25			
26			
27		1	
Total	217	373	158

Table 2. Age and growth analysis for walleye collected from Holloway Reservoir, September, 2011.

Age	Year class	No. aged	Length range (in.)	State avg. length (in.)	Weighted mean length (in.)	Weighted age frequency	Mean growth index
0	2011	12	8.4-10.3	7.1	8.96	81.89%	
2	2009	2	16.3-16.6	13.3	16.45	2.10%	
3	2008	7	14.3-18.4	15.2	16.76	15.22%	
6	2005	1	21.3-21.3	20.3	21.30	0.79%	
							+1.7

Table 3. Relative abundance and average size of YOY walleye from Holloway Reservoir.

Survey year	1999	2007	2011
CPUE (fish/mile)	17	65	65
Avg. size of YOY (in.)	10.2	6.07	8.96

Technical Notes:

Station	3	9	11	29	33	37	40	45
YOY collected	12	25	13	17	25	5	10	23
YOY missed	5	0	6	7	12	4	5	5
Non-YOY collected	2	2	2	7	3	4	2	6

References

Schneider, James C. (ed.) 2000. Manual of fisheries survey methods II: with periodic updates. Michigan Department of Natural Resources, Fisheries Special Report 25, Ann Arbor.