

**SURVEY OF LAKE GASTON WALLEYE ANGLERS
IDENTIFIED THROUGH TAG RETURNS**

FINAL REPORT

PIEDMONT FISHERIES INVESTIGATIONS

**Federal Aid in Fish Restoration Project
Project F-23-S**

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A tagging study was used to determine the general magnitude, timing, and location of the walleye catch and harvest in Lake Gaston. A total of 500 walleye were collected by electrofishing and tagged. A monetary reward, ranging from US\$1 to \$100, was offered for the return of each tag along with a completed survey on angling effort, catch, and harvest. A total of 46 (9.2%) walleye tags were returned. Most of the tags were returned within 5 months of the initial tagging. The majority of walleye anglers fished during the day and harvested their catch. It appears that walleye exploitation is low, particularly during spawning migrations at Lake Gaston. However, we recommend further analysis of angler exploitation and natural reproduction before curtailing the walleye stocking program entirely at Lake Gaston.

Walleye *Sander vitreus* have been stocked into Lake Gaston by the North Carolina Wildlife Resources Commission (NCWRC) and the Virginia Department of Game and Inland Fisheries (VDGIF) since 1978 (Table 1). Recent electrofishing surveys of walleye during their spawning migration indicated numbers have been increasing and some natural reproduction is occurring. However, annual stocking may still be necessary to maintain the fishery. During a 1997 creel survey conducted by Dominion Power, no walleye were encountered (Dominion Power 1997). However, creel data were not collected in areas where walleye concentrate to spawn or at a time when anglers would be expected to target them.

In recent years the number of anglers targeting walleye in Lake Gaston appears to be increasing as evidenced by an increase in the number of inquiries concerning walleye. A recent television show highlighting the walleye fishery in Lake Gaston has also added to the increased interest. However, the size and timing of the current fishery is unknown. This study explored the level of angler interest and success for walleye in Lake Gaston. This baseline information will be valuable in defining future management activities for walleye. This information will also be helpful to biologists when responding to public inquiries on where, when, and how to fish for walleye in Lake Gaston. Beginning in 2007, NCWRC, with monetary assistance from Dominion Power, will be conducting a creel survey on Lake Gaston as part of the Federal Energy Regulatory Commission's re-licensing agreement. Information from this study will be used to facilitate the design of this creel survey to insure that walleye angling effort, catch, and harvest are adequately evaluated. The objectives of this study were to describe the general magnitude, timing, and location of the walleye catch and harvest in Lake Gaston and to determine the need and feasibility of further research on the walleye fishery.

Methods

In 2004, walleye were collected from the spawning grounds, in the tailrace of John H. Kerr Dam (Figure 1). Fish were collected using a boat-mounted electrofishing unit (pulsed DC; Smith Root 7.5 GPP) during a three night period in mid-March. A total of 500 fish were measured (TL, mm), weighed (g), tagged using FM-84 laminated internal anchor tags inserted below the lateral line at the tip of the pectoral fin, and released in the vicinity of their capture.

Each tag was individually numbered, marked with "REWARD", and provided the name and address of the NCWRC headquarters in Raleigh. A tag reward program was utilized to increase reporting. When anglers reported tags, they received a survey along with a return-postage-paid envelop by mail. Anglers who returned a completed survey and tag received a reward ranging from US\$1 to \$100 randomly assigned to tag numbers (Appendix 1). The angler survey included questions about the date of capture, approximate location in the reservoir, whether the tagged fish was harvested, the total number of walleye caught, number of anglers in the party, total time

fished, when fished (day or night), and species targeted (Appendix 2). Anglers who submitted tags were also provided by mail information on the tagged fish such as date tagged, tagging location, size of the fish when tagged, and sex.

To facilitate spatial delineation of captured walleye, Lake Gaston was divided into eight zones to which catch locations were assigned based upon angler descriptions (Figure 1). From the survey results, overall and seasonal calculations were made for catch rates, harvest rates, effort, and zones most often fished. A tag returned without a completed survey was assumed to count for one harvested walleye and was not included in the survey analysis. Effort was determined as the number of fishing trips and as the number of angler hours (number of anglers per trip multiplied by the hours fished) for each completed survey. Effort was further broken down based on effort directed towards walleyes or alternative species, time of day (day, night, or both), and day type (weekday versus weekend). Holidays were considered weekend days. Catch rates of tagged walleye were determined by dividing the number of returned tags by the total number of tagged fish. Harvest or exploitation rates were calculated in the same manner with the exception that walleye released after tag removal were omitted from the calculation.

Results

A total of 46 (9.2% of all tagged fish) walleye tags were returned from anglers catching walleye between 18 April 2004 and 22 October 2005 in Lake Gaston. Of these, only two tags were reported without anglers completing the survey. On two occasions, two tagged walleye were captured on the same trip, making for a grand total of 44 separate trips, of which specific data was available from 42 trips. Additionally, three individual anglers caught two tagged walleye, with one angler catching four tagged walleye, making a total of 38 different anglers reporting a tagged walleye. Walleyes were targeted by 47.6% of reported trips, followed by striped bass *Morone saxatilis* at 31.0%, and largemouth bass *Micropterus salmoides* at 21.4%. Overall, the majority of tags returned (79.5%) were from walleye captured in 2004. Furthermore, 75.0% of all tags were returned from walleye captured before September 2004, within approximately five months of the initial tagging. There was a similar pattern for anglers targeting walleye, with 86.4% of all tags returned from walleye captured before September 2004. Overall, day fishing was most popular with 84.1% of respondents reporting day fishing, followed by 11.4% reporting night fishing, and 4.5% reporting a combination of both. Weekdays produced slightly more tagged walleye comprising 56.8% of the reported day types. Trends were similar when comparing anglers specifically targeting walleye with those who weren't (Table 2). The only area with much difference were that anglers not targeting walleye reported a few trips (9.1%) in which they fished during both night and day, whereas no walleye specific anglers reported this pattern. All anglers combined averaged a total of 3.0 (SE = 0.4) walleye caught per trip, while anglers not targeting walleye averaged a total of 1.7 (SE = 0.3) walleye caught per trip, and anglers specifically targeting walleye averaged a total of 4.5 (SE = 0.7) walleye caught per trip. The overall average trip length was 5.2 (SE = 0.4) hours for all anglers combined, with an average trip length of 5.4 (SE = 0.6) hours for anglers not targeting walleye, and 5.0 (SE = 0.6) hours for anglers specifically targeting walleye. The overall average number of anglers per party was 2.0 (SE = 0.2) for all anglers combined, with an average number of 1.9 (SE = 0.2) anglers per party not targeting walleye, and 2.2 (SE = 0.3) anglers per party for those groups specifically targeting walleye.

The majority of trips producing tagged walleye occurred in July 2004, for all angler types (i.e., non-walleye and walleye specific anglers) (Figure 2). The majority of trips producing tagged walleye occurred in Zone seven followed by Zone six, for all angler types (Figure 3). As this pattern of temporal and spatial effort would indicate, the majority of anglers targeting walleye fished during July 2004 in Zone seven.

Overall, 76 walleye were captured, 10 released, and 66 harvested, based upon angler surveys. Out of the 500 tagged walleye 46 were captured for a catch rate of 9.2%, and of these, 43 were harvested for an exploitation rate of 8.6%. Overall harvest rates were 86.8%, while harvest rates of tagged fish were 93.5%.

Discussion

Walleye anglers often report success fishing deeper water at night during the warmer months of the year. Additional strategies seem to be directed toward spawning migrations. In a similar tagging study working with a similar species, sauger *Sander canadensis*, Pegg et al. (1996) found angler exploitation of saugers below Pickwick Dam, in the headwaters of Kentucky Lake, Tennessee, to be coupled with upstream spawning migrations. The overwhelming majority of walleye effort for Lake Gaston was during the day in July in Zone seven. There appeared to be a lack of concentrated effort targeting walleye during their spawning migration in Lake Gaston. This observation is based on the limited number of anglers targeting walleye on the presumed spawning grounds (Zone eight) during March of 2004 and February-March of 2005. There is the possibility of tag deterioration making tags difficult to decipher by 2005. However, the last tag reported, thus far, was from a walleye captured in October of 2005 in which tag information was rather legible, even after more than two years since initial tagging. Pegg et al. (1996) concluded that sauger populations below Pickwick Dam, with exploitation rates ranging from 32% in 1992 to 36% in 1993, to be subjected to high exploitation. These rates considered tag loss, yet not angler non-response. The Kentucky Lake sauger population was characterized by at least 10 year classes during the mid to late 1980s (Biagi 1989). However, by the early 1990s this population was made up almost exclusively of age 1 and age 2 fish (Churchill 1992; Thomas 1994). In contrast, walleye sampled below John H. Kerr Dam in the early 2000s were made up of fish from age 2 to age 10. This extensive range of ages, exploitation rates less than 9%, and a lack of effort during spawning concentrations suggests that walleyes are not highly exploited in Lake Gaston.

Tag loss and angler non-response could cause exploitation rates to be underestimated. We did not estimate tag loss or non-response for this survey. Studies which did account for tag loss, using similar tags (Floy anchor tags) found annual tag retention rates to range from 75% (Muoneke 1992) to greater than 96% (Hale et al. 1985). Pegg et al. (1996) reported Floy tag retention rates of 96% during a five month period, essentially the same effective time frame in which the majority of our tags were reported.

Angler non-response is improved, yet not eliminated by offering a reward (MacRitchie and Armstrong 1984). Studies accounting for non-response often found non-reporting rates to be approximately 30%. Zale and Bain (1994) determined non-response to be 36% in Alabama and 33% in Oklahoma from postcards using a cap as a reward, whereas Garner (1987) reported non-response to range from 29 to 31% for monetary rewards equivalent to ours (\$1 to \$100). If we assume, based on similar studies, tag loss to be 4% and non-response to be 30%, walleye exploitation at Lake Gaston would have been approximately 43%. Pegg et al. (1996) found

populations to have an exploitation rate of just over 30% and by assuming a 30% non-response rate, speculated exploitation to be just over 60%, which was considerably higher than exploitation rates found for walleye at Lake Gaston. However, more in-depth tagging studies, accounting for tag loss and angler non-response specific to Lake Gaston, would be necessary before truly assessing the level of walleye exploitation at Lake Gaston.

In 2002, VDGIF discontinued stocking of walleye in Lake Gaston until NCWRC can determine the level of natural reproduction and angler exploitation. It is difficult to determine natural reproduction during recent years, based on the limited catch of walleye less than age 3 with electrofishing methods currently employed at Lake Gaston. The level of natural reproduction will become more apparent following additional analysis of the age composition of the spawning stock. Additionally, the level of walleye exploitation will become more apparent during the 2007 creel survey. Although levels of exploitation appear to be low and previous age data suggest some walleye reproduction during the off-stocking years of the mid 1990s, we cannot be certain of the extent of walleye reproduction and angler exploitation without further analysis. This study has provided essential information, with respect to walleye and other fish species, which can be used in the design of the Lake Gaston creel survey scheduled to begin during September, 2007.

Management Recommendations

1. Further evaluate the level of walleye exploitation during the 2007-2008 Lake Gaston creel survey.
2. Continue to assess natural reproduction by walleye, via age specific data collected during annual electrofishing methods currently employed at Lake Gaston.
3. Make a walleye stocking recommendation soon after analysis of the 2007 spawning stock age composition and condition factors.

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TABLE 1.—Year, number, and size of walleye stocked into Lake Gaston by the North Carolina Wildlife Resources Commission (NCWRC) and Virginia Department of Game and inland Fisheries (VDGIF), 1978-2001. No walleye have been stocked since 2001.

Year	Number	Size	Agency
1978	91,460	Fingerling	VDGIF
1979	143,740	Fingerling	VDGIF
1980	230,250	Fingerling	VDGIF
	5,000,000	Fry	NCWRC
1981	198,980	Fingerling	VDGIF
	4,000,000	Fry	NCWRC
1982	202,000	Fingerling	VDGIF
	4,000,000	Fry	NCWRC
1986	36,124	Fingerling	VDGIF
1988	459,920	Fry	VDGIF
	51,201	Fingerling	VDGIF
1989	45,670	Fry	VDGIF
	195,807	Fingerling	VDGIF
1990	300,000	Fry	VDGIF
	100,000	Fingerling	VDGIF
1991	4,000,000	Fry	VDGIF
1992	112,008	Fingerling	VDGIF
1993	70,603	Fingerling	VDGIF
1996	765,608	Fry	VDGIF
	123,869	Fingerling	VDGIF
1998	383,628	Fingerling	VDGIF
1999	59,051	Fingerling	VDGIF
2000	150,000	Fingerling	VDGIF
2001	246,296	Fingerling	VDGIF

TABLE 2.—Characteristics of all anglers, non-walleye anglers, and anglers specifically targeting walleye in Lake Gaston, 2004-2005. Standard errors are in parenthesis, where applicable.

Characteristic	All anglers	Non-walleye anglers	Walleye anglers
Mean trip length (h)	5.2 (0.4)	5.4 (0.6)	5.0 (0.6)
Mean party size	2.0 (0.2)	1.9 (0.2)	2.2 (0.3)
Weekday effort (%)	56.8	59.1	60.0
Weekend effort (%)	43.2	40.9	40.0
Time of day fished (%)			
Day	84.1	77.3	90.9
Night	11.4	13.6	9.1
Both	4.5	9.1	0.0
Mean # walleye caught/trip	3.0 (0.4)	1.7 (0.3)	4.5 (0.7)

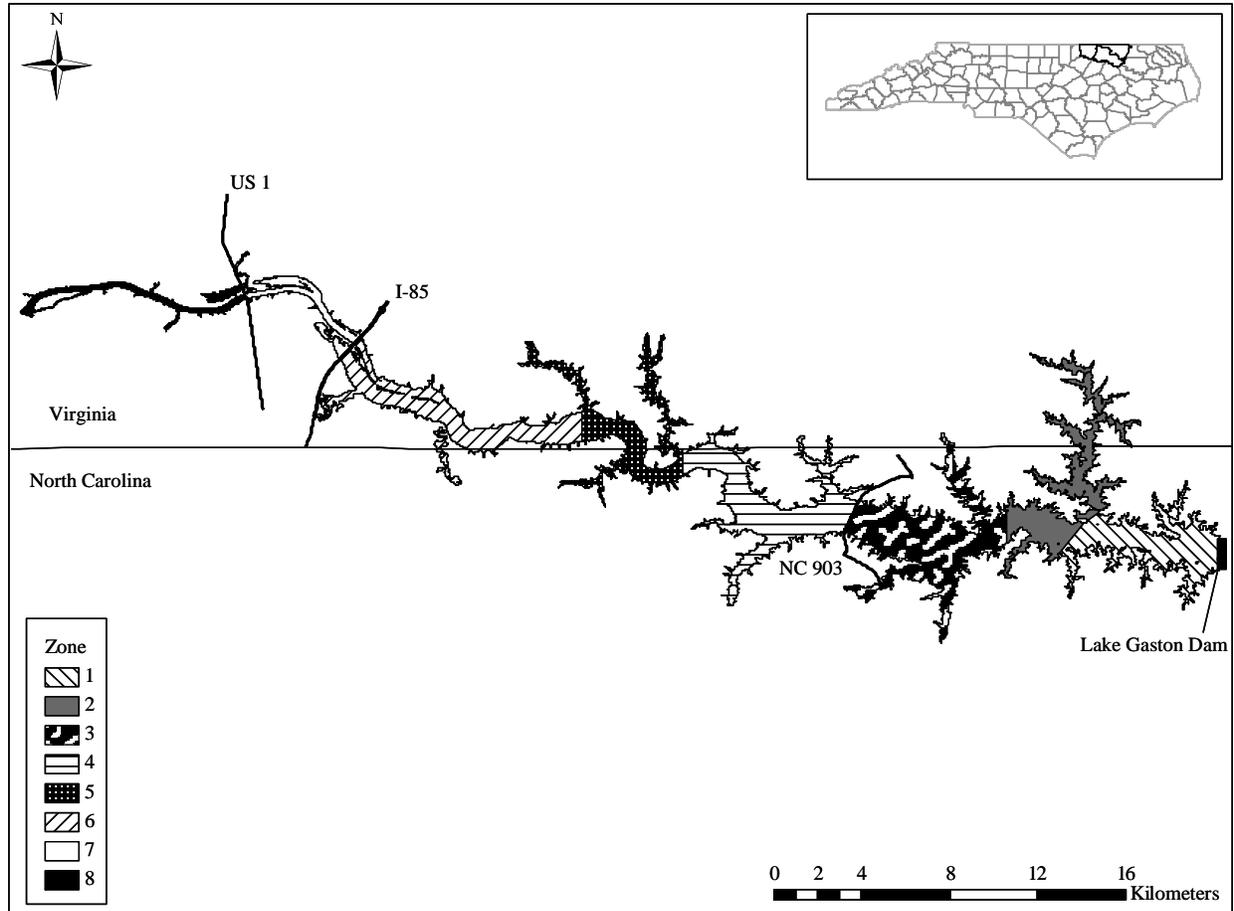


FIGURE 1.—Map of Lake Gaston identifying the eight zones to which walleye catch locations were assigned based upon descriptions from anglers submitting tag returns, 2004-2005.

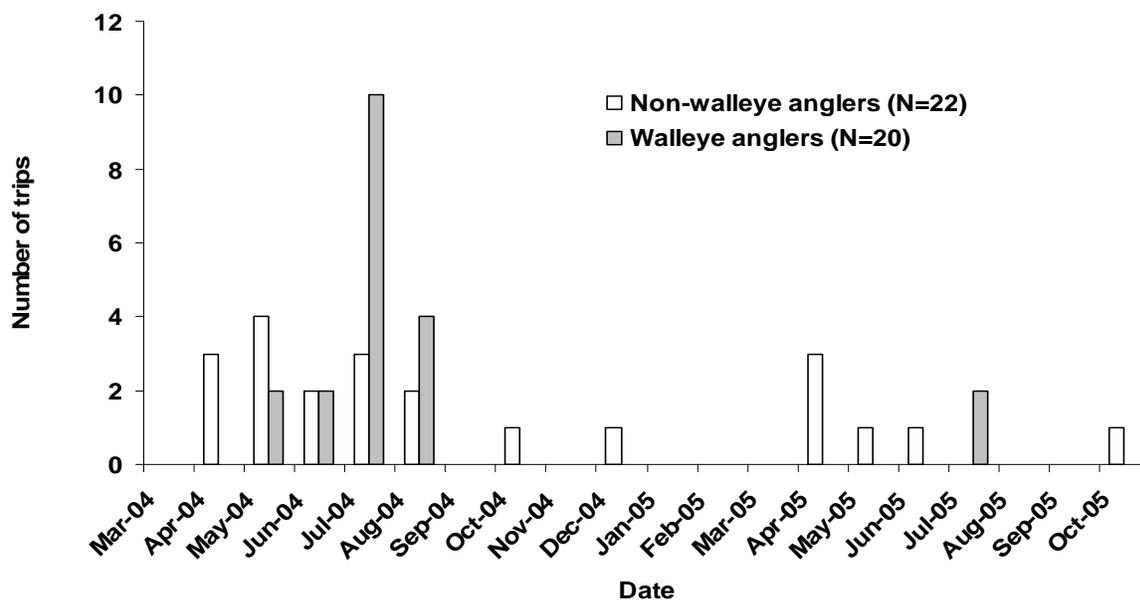


FIGURE 2.—Number of trips by month for non-walleye anglers and for anglers specifically targeting walleye that submitted tag returns for walleye at Lake Gaston, 2004-2005.

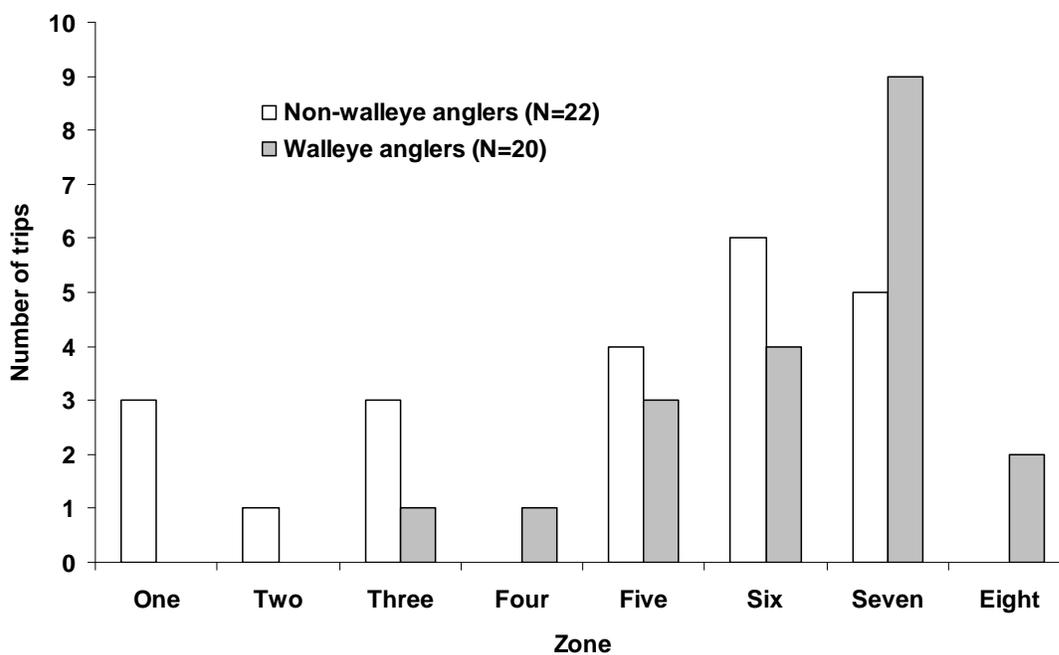


FIGURE 3.—Number of trips by zone for non-walleye anglers and for anglers specifically targeting walleye that submitted tag returns for walleye at Lake Gaston, 2004-2005
Appendix: Questionnaire

Gaston Reservoir Walleye Angler Questionnaire

Name: _____

Tag Number: _____

Please answer the following questions for the fishing trip during the tagged walleye was caught.

1. When did you catch the tagged fish? Month _____ Day _____ Year _____
2. Where did you catch the tagged fish? (Please provide as detailed a description as possible)

3. Was the tagged fish released? _____
4. How much time did you spend fishing that day? Hours _____ Minutes _____
5. Were you fishing during the day, at night, or both? _____
6. How many people were in your fishing party? _____
7. How many additional walleye were caught by you or your fishing party that day? _____
How many were released? _____
8. Were you specifically fishing for walleye? _____
If not, what species were you fishing for? _____

May we contact you by phone if additional information is needed? _____

Telephone number: _____