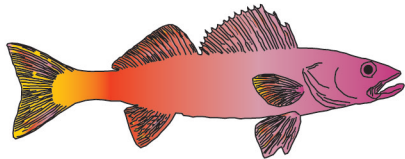


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Mortality of Live Released Walleye During a Shallow Water Ice Fishing Derby on Lac Des Mille Lacs, Ontario

by
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Abstract

During a two-day ice trolling derby in mid-March 1999, walleye (*Stizostedion vitreum*) were captured through the ice using a variety of angling methods. Walleye were captured at depths of 3.0 to 3.5 m, weighed, and held in retaining pens for a period of 48 hours. Air temperature was relatively warm, ranging from -8 to -14 C during the derby. The average handling time of the walleye was 82 seconds from the time of capture to the time they were placed into holding pens for monitoring. Well-tended lines and short handling times likely contributed to low walleye mortality during this study. Relatively warm air temperatures and cold water temperatures were also potential contributors to the healthy release of the majority of the fish.

Introduction

Live release ice fishing derbies are becoming more popular in northwestern Ontario each year. Currently, four major live release derbies occur in the Thunder Bay area, including the one that takes place on Lac des Mille Lacs during mid-March. This study examined mortality rates of walleye captured during the winter season from shallow water and was a partnership between the organizer of the Ice Trolling Fishing Derby, Ontario Ministry Natural Resources (MNR), and angler participants.

Several walleye angling mortality studies have been conducted in Ontario and the United States. In previous

studies during the open water season, hooking mortality rates have been very low, ranging from 0 to 2.9% (Fletcher 1987, Ryan and Tost 1987, Schaefer 1989, Parks *et al.* 1991). In tournaments however, this rate can increase dramatically, reaching 80% or greater in some cases (reviewed by Armstrong 1995). To our knowledge, only one other winter angling mortality study has been conducted in Ontario: a deep water catch and release study showing a 24 hour survival rate of 77% (Rowe and Esseltine 2001).

The primary purpose of this study was to determine winter mortality rates of released walleye caught in shallow water. The handling methods used in this derby also have general implications for winter catch and release angling.

Site

Lac des Mille Lacs is a large lake (24,101 ha) located northwest of Thunder Bay. The Ice Trolling Derby was held on the east side of the lake, between the Coffin Islands and Poplar Bay, in an exposed area of the lake where there are no islands. The depth on the sand flat is uniform throughout at approximately 3 to 3.5 m (12-13 feet).

Methods

The ice trolling derby was a two-day event held on March 11-12, 2000 involving a maximum of 250 anglers each day. The derby lasted four hours each day and all of the anglers were briefed on the procedures of the mortality study. Anglers were asked to leave tackle

in place on any deeply hooked walleye, and to notify a derby official that this had occurred. Gear types and terminal tackle were the choice of the participants. Ice huts were prohibited.

Derby protocol required all participants to fish a particular hole, rotating every 10 minutes to an adjacent hole. Anglers rotated until 25 holes had been fished. Weigh-in and holding pens were located in the centre of the derby area.

Participants signaled derby officials when a fish was caught and if a fish was deeply hooked. Fish were placed into an official's bucket of water and transported to the weigh master who took an official weight. MNR staff then measured and assessed the condition of each fish; a left ventral fin clip was applied to all deeply hooked walleye. Four cylindrical retaining pens, 1.3 m (4 feet) in diameter by 4 m (12 feet) in depth, were used to monitor the fish for a 48 hour observation period. Chainsaws were used to cut holes in the ice approximately the diameter of the retainers. Plastic tarps were positioned over the top of each pen to keep the holes from freezing. Fish were placed into an assigned retainer (two for each day to prevent crowding stress) and held for 48 hours. Handling times were recorded for the following:

- From when a participant signaled an official that a walleye was caught to when it was transferred to an official's bucket,
- The time a derby official took to get a fish to the weigh area,
- Time taken to weigh, measure and place the walleye into the retaining pen.

Recording this information allowed determination of the amount of time that the walleye were exposed to the air prior to being placed into monitoring areas. Air temperature was recorded every hour from the start to the end of the derby for both days. Water temperature and oxygen profiles were conducted on Saturday morning before the derby.

After the 48 hour monitoring period, walleye were removed from the holding pens and survival rates were determined. All fish in poor condition were measured, weighed and checked to see if they were a shallow or deeply hooked fish.

Results

One hundred and thirty-five walleye were caught during the derby, ranging from 200 to 406 mm in length (336 mm mean fork length) (Figure 1) and weighing 124 to 1120 g (mean size approximately 454

g). Water temperature ranged from 0 to 4 C and oxygen concentration from 12.8 to 8.2 p.p.m. during the derby. Air temperature was recorded hourly from start to finish each day and ranged from -4 to -8 C Saturday and -7 to -14 C Sunday.

The results of this study were confounded by the disappearance of 14 fish from one of the holding pens. The pen was examined to determine how an escape could have occurred, but no holes were found. Tarps placed over the holes had frozen in place and were freed using an axe, suggesting that no tampering had occurred. Therefore, whether these fish escaped or were removed is unknown. All of the remaining 121 walleye, including all 71 fish angled on Day 2 were alive following the 48 hour holding period. Two small walleye were found gilled in the pens, and a single walleye that had been deeply hooked was in poor condition, but all three of these walleye were able to swim away when released.

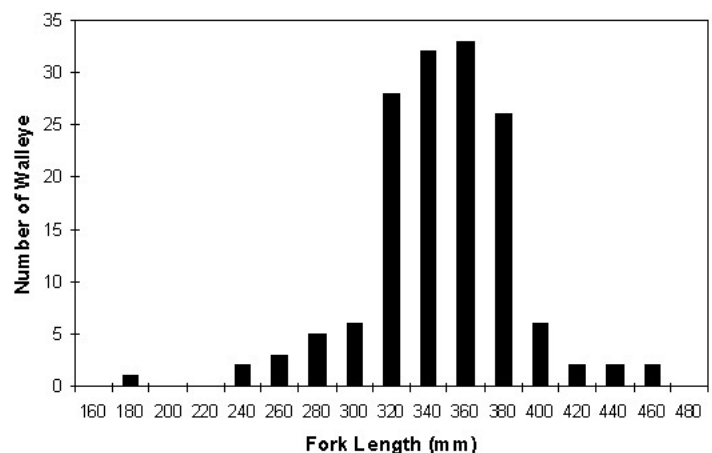


Figure 1. Walleye Length Distribution

The entire handling procedure, from the time a walleye was captured by an angler, to the time it was placed into a retainer averaged 82 seconds. This interval started when an official was notified of a capture, and ended when the fish was placed in the bucket of water following weighing and measuring. Each walleye spent an average of 35 seconds in a pail of water and 47 seconds exposed to the air.

Discussion

The results of this study are slightly uncertain because 14 walleye disappeared during the first night. If these fish were dead when removed, a mortality rate of 10% can be calculated. But since no fish were found dead in the second pen (from Day 1) after 48 hours,

the possibility remains that the survival of the walleye was actually quite high and that these 14 fish somehow escaped or were removed. In either case, mortality was quite low (maximum of 10%).

Capture and Handling

The careful tending of lines, governed by the tournament rules, ensured that fish were generally lightly hooked. When hooks penetrate deeper or pierce more sensitive hooking locations mortality increases (reviewed by Wydoski 1977). Careful tending of fishing lines has been described by others and shown to reduce hooking mortality in salmonid fish (Mason and Hunt 1967, Hulbert and Engstrom-Heg 1980). It is possible that the same results may be true for walleye, but it may not be the case during regular angling activities.

Handling of fish landed during this derby was conducted with the survival of angled fish being of key importance. This more conservative approach may have resulted in an increased survival rate when compared to everyday handling techniques used by anglers. Fish were transported in buckets filled with water minimizing their exposure to the weather and the time spent out of the water was short (averaging 47 seconds). Weighing and measuring were done quickly and the fish were immediately released into the holding pen. We suspect that gentle handling for such a short period, in combination with protection from the elements, resulted in the observed high survival rate. Duration and roughness of handling (hook removal, livewell holding, weighing etc.) have been attributed to mortality of walleye (reviewed by Armstrong 1995).

Depth of Capture

Shallow water was likely the major contributing factor for the low mortality rate of walleye during the Lac des Mille Lacs derby. Depth of capture has been shown to impact survival of walleye. The walleye were caught from a maximum depth of 3.5 m, suggesting that depressurization was not a factor in mortality. During a similar study on Lake Nipissing, walleye angled from a depth of nine metres (27 feet) demonstrated a much lower survival rate (77.2%) after 24 hours. Mortalities included fish suffering from gas bladder over-expansion and were not expected to survive after 24 hours. With the exception of one deeply hooked walleye, all fish in this group exhibited over-inflated swim bladders (Rowe and Esseltine 2001).

Air Temperature

Although air temperature did not have an adverse affect on walleye survival during this study, local anglers were concerned about walleye survival when they were captured in -20 C or colder. Dextrase and Ball (1991) suggest that weather-induced mortality may occur among lake trout released at colder ambient temperatures of -20 to -30 C.

Conclusions

Our results support a number of similar studies that show that walleye mortality in catch and release tournaments is reduced in situations where water is less than five metres (15 feet) in depth, handling time is minimal, and fish are not deeply hooked (reviewed by Armstrong, 1995).

The results of this study have implications for any catch and release angling or where size or slot limits are in place. In this study, 37% of walleye were smaller than a lake specific minimum size limit of 33 cm and would have had to be released. An education program for anglers should be undertaken to minimize walleye mortality promoting the following:

- short handling times
- proper catch and release techniques during winter (and summer)
- that survival of fish caught from shallow water is much greater than fish caught from deep water
- where regulations allow, anglers should keep or cut the line on deeply hooked walleye leaving hooks intact, and
- if fish are handled properly, mortality of fish released during the winter season can be quite low.

Acknowledgements

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