WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Fishery Survey Report for Largon Lake
Polk County, Wisconsin 2021

WATERBODY IDENTIFICATION CODE: 266810

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Introduction

Largon Lake is a 135-acre drainage lake located in northeastern Polk County. The lake has a maximum depth of 13 feet and a mean depth of 6 feet. Largon Lake is an algae-dominated shallow lake with gradual sloping shorelines, a large littoral zone and bottom substrates roughly composed of 40% sand and 60% muck. Shorelines are primarily developed with 15.5 dwellings per shoreline mile.

Largon Lake has a history of winterkills, and thus, a compressed air aeration system is operated during winters to prevent fish kills due to persistent low dissolved oxygen conditions. The aerator has been in operation since 1977 and has largely prevented significant winterkills. An aerator malfunction occurred during the winter between 2013-2014, which resulted in a significant winterkill that greatly affected most species in Largon Lake, including the quality northern pike fishery.

The Wisconsin Department of Natural Resources (DNR) surveyed Largon Lake to assess the status of the northern pike population following public concerns of low size structure and harvest potential under the current fishing regulation. An early spring fyke netting survey (SN1) was conducted using mark-recapture techniques to estimate adult densities, relative abundance, size structure and growth.

LAKE CHARACTERISTICS

Largon Lake is a fertile system classified as a simple-cool-dark lake (Rypel et al. 2019). Largon Lake experiences heavy algal blooms, and the July-August mean Trophic State Index (TSI) values for chlorophyll-a, Secchi depth and total phosphorus was 63, 65 and 66, respectively. Mean TSI has generally remained stable over the past decade. There is one public boat launch located on the southeast shoreline of the lake off 208th Ave (45.611, -92.192). More information on water quality and invasive species can be found on the DNR lake page for Largon Lake.

STOCKING HISTORY

Northern pike and largemouth bass were the only species stocked into Largon Lake in recent decades (Appendix Table 1). Northern pike stocking was discontinued after 2002, and the population was maintained through natural reproduction. Largemouth bass were last stocked by the DNR annually from 2014-2016 following the 2013-2014 winterkill.

FISHING REGULATIONS

Largon Lake has only one special fishing regulation, which is the 32-inch minimum length limit (MLL) and one fish daily bag limit for northern pike. This regulation has been in place since 1995. All other species follow statewide regulations.

Methods

Largon Lake was sampled during 2021 to estimate the adult northern pike population abundance. An early spring netting (SN1) survey occurred March 30 – April 2, 2021and up to six fyke nets were set for a total of 21 net nights. Northern pike were measured (total length), weighed, sexed and given a mark indicating capture. Recaptures were identified following the first day of netting. The adult northern pike (≥ 14 inches) population was estimated using the Schnabel method. Catch-per-unit effort (CPUE) was estimated as catch per net night.

Lake class standards CPUE were calculated by comparing Largon Lake northern pike CPUE to the CPUEs of the other simple-cool-dark lakes in Wisconsin (Rypel et al. 2019).

Aging structures were collected from a subsample of five fish per 0.5-inch group for each sex. Northern pike were aged with pelvic fin rays, which were cut with a Dremel tool and aged under a microscope by a single interpreter. The mean length at age was compared to the median length at age for simple-cool-dark lakes and to previous surveys when data were available. The von Bertalanffy growth model was fitted using mean length at age data to assess growth (von Bertalanffy 1938).

Size structure was assessed using the proportional size distribution (PSD) indices (Neumann et al. 2013) and comparing relative length frequencies between survey years using a Kolmogrov-Smirnov (KS) test. The PSD value for a species is the number of fish of a specified length and longer divided by the number of fish of stock length or longer, the result multiplied by 100. The fish condition was assessed by estimating the relative weight (W_r) of each fish, or the actual weight of a fish divided by its standard weight (Wege and Anderson 1978). The mean W_r was determined.

Results and Discussion

There were 721 northern pike collected during the SN1 survey. The adult northern pike population estimate was 10.9 fish/acre (CV = 0.13). Adult density remained similar to previous density estimates from 1998 (14.2 fish/acre) and 2003 (7.8 fish/acre) despite the 2013-2014 winterkill (Figure 1). The CPUE was 34.3 fish/net night, which was above the 99th percentile (25.7 fish/net night) for similar simple-cool-dark lakes in Wisconsin and indicative of a high-density population. Population density has remained high since the regulation change in 1995, but the population estimate of large individuals (≥ 32 inches) has decreased substantially (87%) since 2003 (Figure 1). The population estimate of fish ≥ 26 inches has also decreased by 35% since 2003. It is likely higher mortality occurred among the largest northern pike during the 2013-2014 winterkill.

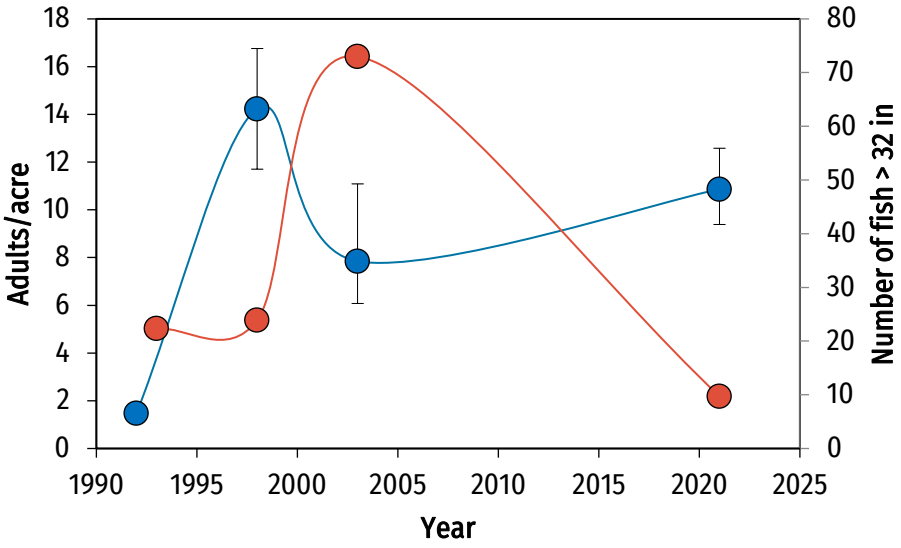

Figure 1. Population estimates of adult (≥ 14 inches) northern pike (blue circles; with 95% confidence intervals) and fish ≥ 32 inches (red circles) in Largon Lake, Polk County, WI, 1992-2021.

The mean length was 19.5 inches and near the 90th percentile (19.3 in) for similar simple-cool-dark Wisconsin lakes. Males ranged in length from 15.0 to 28.5 inches, while females ranged from 18.0 to 38.5 inches (Figure 2). The male-to-female ratio was 3:1.

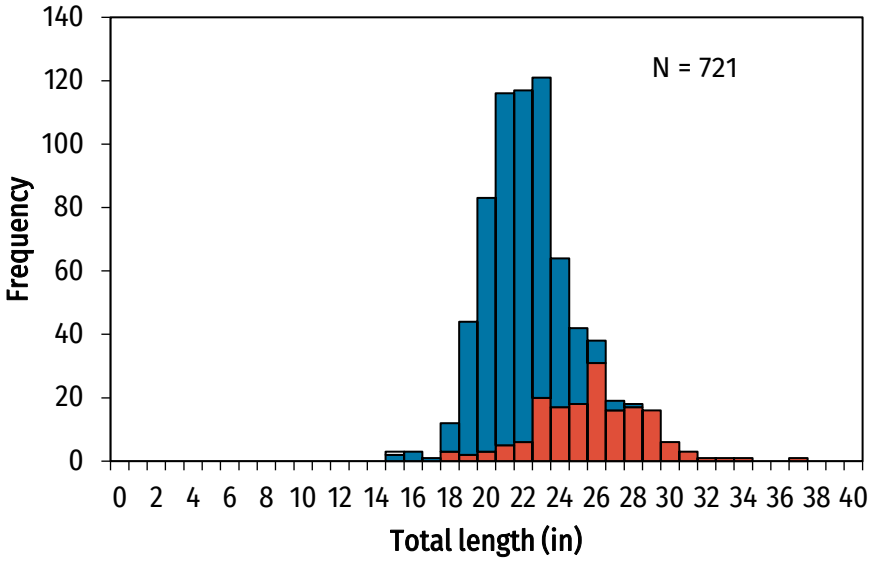

Figure 2. Length frequency of all the northern pike captured during 2021. Males are represented with blue bars, females with red bars and unknown sex with white bars.

Population relative length frequencies were not considered statistically different between 2003 and 2021 (KS test: D = 0.24, P = 0.17; Figure 3), but the relative abundance of the largest individuals decreased. Similarly, reductions in PSD indices were apparent. During 2021, PSD-32 was 1 and PSD-26 was 16. Both size structure

indices declined by > 50% since 2003 (PSD-32 was 7 and PSD-26 was 34; Figure 4). This decrease in size structure was likely attributed to the 2013-2014 winterkill, but overall size structure remained good.

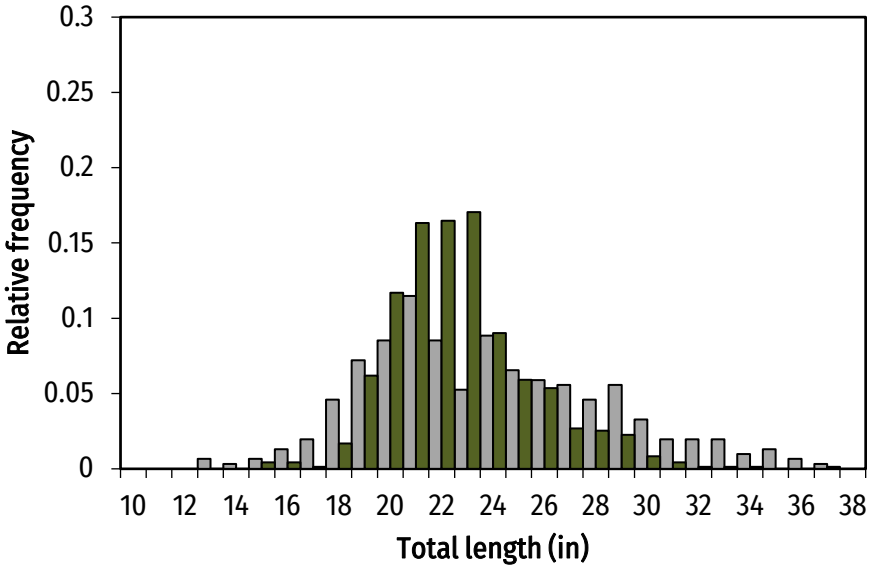

Figure 3. Relative length frequencies of northern pike sampled during 2003 (grey bars) and 2021 (green bars).

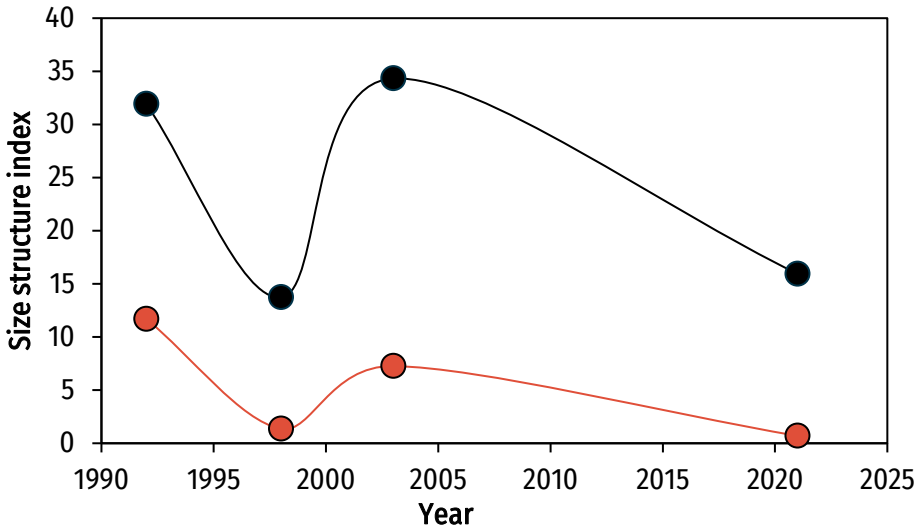

Figure 4. Size structure indices, PSD-26 represented by black circles and PSD-32 by red circles, for northern pike in Largon Lake, Polk County, WI, 1992-2021.

Northern pike ages ranged from 2 to 9, with females ranging from 3 to 9 and males 2 to 7. The mean length at age of northern pike was greater than the median from similar simple-cool-dark Wisconsin lakes (average difference in mean length at age: 4.3 inches; ages 2 - 9) and similar to the Barron/Polk counties average (average

difference in mean lengths at age: 0.8 inches; ages 2 – 9; Figure 5). Mean lengths at age of northern pike during the 2021 survey were greater than those observed during the 2003 survey (average difference in mean length at age: 1.8 inches; ages 2 - 6). Northern pike growth rates remained good in Largon Lake compared to lake class standards, Barron/Polk counties average and the 2003 survey. Northern pike remained in above-average condition, which suggested intraspecific competition had not impacted the population. Mean W_r for all northern pike was 96 and remained similar to, but slightly lower than, those observed during the 2003 and 1998 surveys (Mean W_r > 100 in both surveys). Von Bertalanffy growth models could not be fit.

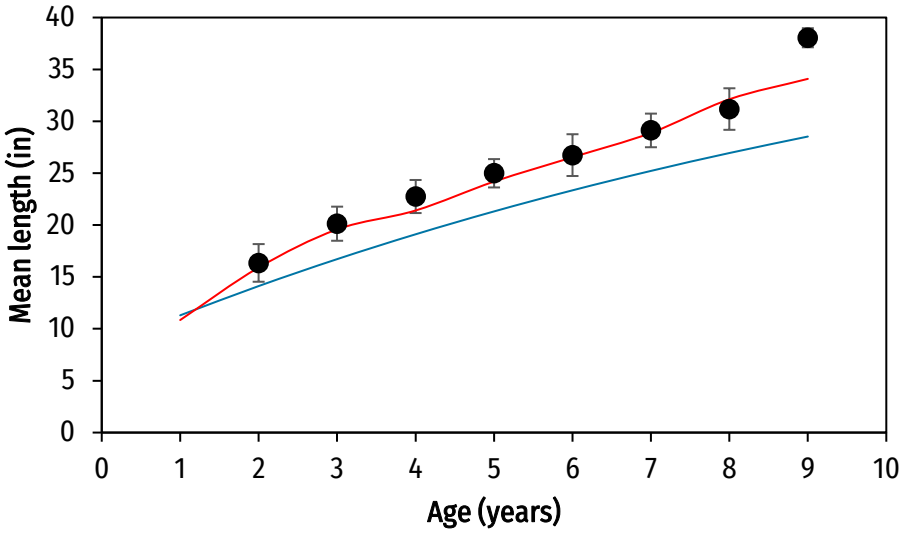

Figure 5. Mean length at age ± standard deviation of northern pike (black circles) in Largon Lake. The median length at age for similar simple-cool-dark Wisconsin lakes is represented by the blue line. Mean length at age estimates for Barron/Polk counties is represented by the red line.

During 2021, only 0.7% of the northern pike population was susceptible to harvest with the current 32-inch MLL special fishing regulation. The proportion of the population susceptible to harvest declined from 7.2% during 2003, likely driven by the 2013-2014 winterkill, which reduced abundances of the largest size classes. Additionally, 100% of harvested fish would be female given the current population structure, which could be detrimental to the reproductive success of the naturally reproducing population. Resource constituents of Largon Lake sought a change to the current northern pike harvest regulations to allow greater harvest potential while maintaining quality population size structure.

Management objectives are to reduce adult density by approximately 25% to eight adults/acre and increase population size structure to a target of PSD-26 > 30 and PSD-32 > 5. These management objectives would resemble the quality northern pike fishery observed during 2003. New harvest regulation options presented to the public included a no MLL (five fish daily bag limit), a 26-inch MLL (two fish daily bag limit) and a protected slot limit regulation (no fish between 25-35 inches could be

harvested) with a five fish daily bag limit. The no MLL regulation was viewed as too liberal and least supported by the public despite possibly being the most appropriate to achieve management objectives and yield a quality harvest fishery with a good size structure. The 25-35 inches protected slot limit and five fish daily bag limit would greatly increase the proportion of the population susceptible to harvest (79%), greatly increase the total allowable harvest and shift the sex-biased selection of harvest toward males (90% males; 10% females). The protected slot regulation would likely achieve management objectives and promote a quality population size structure but was not supported by the local constituents, mainly due to the low size of pike (< 25 inches) available to harvest. Resource constituents favored a regulation change to a 26-inch MLL and two fish daily bag limit, which would also increase the proportion of the population susceptible to harvest, double the total allowable harvest and provide a quality harvest opportunity. Approximately 16% of the population, of which 90% would be females and 10% males, would be vulnerable to harvest under a new 26-inch MLL. In addition, this regulation could potentially decrease adult density and improve size structure through time.

The continued effective operation of the compressed air aeration system is imperative to the success of any fisheries management goals. If winterkills are prevented on Largon Lake in the coming years, the northern pike population should continue to improve as age and size structures increase. The northern pike population in Largon Lake should be reevaluated 10 years following the implementation of the new special fishing regulation, 26-inch MLL and two fish daily bag limit, to assess if management goals have been met or if additional actions are necessary. If management objectives have not been met at that time, then alternate harvest regulations may be considered.

Management Recommendations

1. Change the northern pike size and bag limit to a 26-inch MLL and two fish daily bag limit. The 32-inch size limit is overly protective and limits harvest potential given the current northern pike population status in Largon Lake. There has been considerable public support for a regulation that maintains or improves a desirable size structure yet offers a quality harvest opportunity.
2. The next DNR survey for Largon Lake is currently scheduled for 2032 but is subject to change depending on local and statewide sampling plans. Population density and size structure of northern pike should be evaluated and compared to management goals of eight adults/acre and a PSD-26 > 30 and PSD-32 > 5.
3. To prevent future winterkills, the compressed air aeration system should continue operations.
4. Efforts to increase habitat complexity in Largon Lake should also be encouraged where applicable. Inputs of coarse woody habitat,

protection/promotion of aquatic vegetation and maintenance/restoration of vegetative buffers would be beneficial. Inputs of coarse woody habitat, protection/promotion of aquatic vegetation and maintenance/restoration of vegetative buffers would be beneficial. The Healthy Lakes and Rivers website (healthylakeswi.com) is a great resource to learn about this recommendation.

5. Invasive species monitoring and control programs should continue.

Acknowledgments

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References

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Appendix Table 1. Fish stocking records for Largon Lake, 1991-2016.

YEAR	SPECIES	AGE CLASS	NUMBER STOCKED
1991	Northern Pike	Small Fingerling	372
1992	Northern Pike	Small Fingerling	650
1994	Northern Pike	Small Fingerling	645
1996	Northern Pike	Small Fingerling	273
1998	Northern Pike	Small Fingerling	645
2000	Northern Pike	Small Fingerling	645
2002	Northern Pike	Small Fingerling	665
2014	Largemouth Bass	Large Fingerling	3,375
2015	Largemouth Bass	Large Fingerling	5,045
2016	Largemouth Bass	Large Fingerling	6,742