WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Fishery Survey Summary
Ladysmith Flowage
Rusk County, Wisconsin, 2004-2022

Introduction

The Wisconsin Department of Natural Resources' (DNR) Fisheries Management Team from Park Falls completed several netting and electrofishing surveys between 2004 and 2022 to assess the abundance, size structure and reproductive success of important sportfish populations in Ladysmith Flowage. Fyke nets captured too few fish to infer population status in April of 2009, August of 2004 and October of 2008 and 2014. So, we discontinued fyke netting effort directed at spawning walleye, northern pike and muskellunge in the spring, panfish in the summer and black crappie in the fall. Instead, we tried to characterize adult pike, walleye and musky status from electrofishing samples in the early spring of 2015. We targeted smallmouth bass and bluegill by electrofishing in late spring. Fall electrofishing surveys measured natural walleye recruitment and gave us insight about the adult walleye population in a riverine system where traditional sampling methods are ineffective. Quality, preferred and memorable sizes referenced in this summary are based on standard proportions of world record lengths developed for each species by the American Fisheries Society. "Keeper size" is the team's description for black crappie and yellow perch 9 inches or longer and bluegill at least 7 inches long, based on observed angler behavior.

HABITAT AND PUBLIC ACCESS CHARACTERISTICS

Four earthen dams built between 1909 and 1951 for the purpose of hydroelectric generation form a series of narrow, riverine impoundments. Xcel Energy, Inc. operates the Big Falls, Ladysmith and Thornapple hydroelectric projects and Dairyland Power Cooperative operates the Flambeau Hydroelectric Station under authority granted by the Federal Energy Regulatory Commission. The Port Arthur Dam, a fifth dam once located 12.9 miles upstream from the confluence of the Chippewa and Flambeau rivers, was decommissioned and removed in 1968. Third in upstream to downstream sequence, the Ladysmith Dam is located in the City of Ladysmith, Wisconsin at river mile 20.0.

Ladysmith Flowage has a surface area of 288 acres, 10.4 miles of shoreline and authorized reservoir elevation between 1113.3 and 1114.8 feet National Geodetic Vertical Datum. The Flambeau River flows with gradient for a distance of about 1,800 feet from the Dairyland Power Cooperative's dam before reaching the normal elevation of Ladysmith Flowage. The reservoir's maximum depth is 19 feet, and 21% of its surface area is less than 3 feet deep. Lakebed materials include sand, gravel, rubble and bedrock. Based on physical and biological characteristics, Ladysmith Flowage was classified with riverine lakes that have a complex fish community. Much of the shoreland has residential development or grass uplands, but about 40% of the shoreline is steep, forested land. The City of Ladysmith maintains a boat landing, swimming beach, fishing pier, playground, pavilions and other recreational amenities in the park on the shore just west of the State Highway 8 bridge.

SURVEY EFFORT

In addition to the netting and electrofishing surveys summarized in the table below, we targeted lake sturgeon by gillnetting and dip-netting for about 3 hours in the immediate tailwaters of the Flambeau Hydroelectric Station on June 6, 2007.

DATES	FYKE NETS (net-nights)	ELECTROFISHING				WATER °F	TARGETED SPECIES/GROUPS
		GAMEFISH		ALL SPECIES			
		(miles)	(hours)	(miles)	(hours)		
August 3-5, 2004	8	--	--	--	--	73	Panfish
September 28, 2004	--	4.00	1.60	1.00	0.40	65	Walleye
October 7-8, 2008	5	--	--	--	--	60	Black crappie
April 13-20, 2009	35	--	--	--	--	40	All
June 2, 2009	--	3.14	1.57	0.52	0.33	63	Basses/Sunfishes
October 2-3, 2014	5	--	--	--	--	59	Black crappie
April 28, 2015	--	3.00	1.50	--	--	49	Walleye, pike, musky
May 20, 2015	--	3.01	1.72	0.50	0.38	58	Basses/Sunfishes
May 23, 2022	--	3.00	1.65	1.50	0.85	62	Basses/Sunfishes

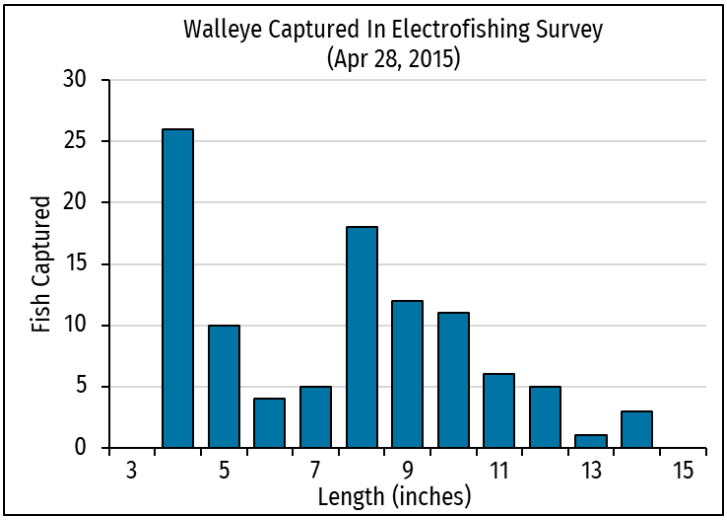
Results and Discussion

FISH COMMUNITY

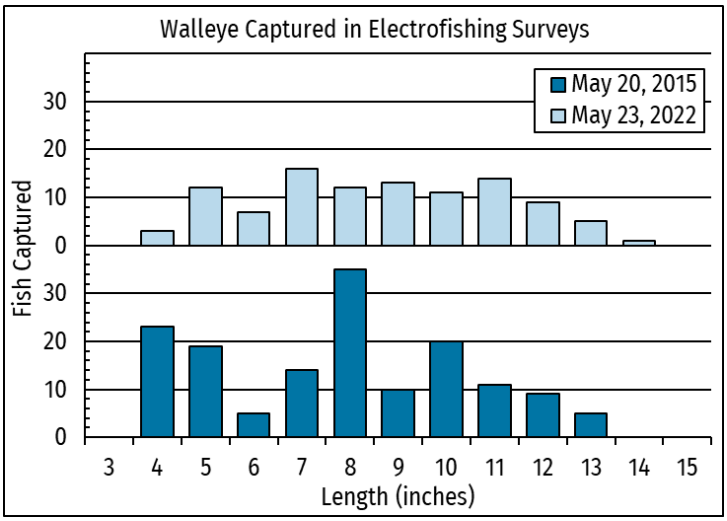
Though these surveys were not designed to characterize the entire fish community, our combined netting and electrofishing efforts captured 18 fish species and one hybrid (northern pike x muskellunge) from 2004 to 2022. The fish assemblage included the species expected to occupy and use riverine habitat, including channel catfish, lake sturgeon and redhorses. Panfish were rare and bluegills were absent in all surveys.

WALLEYE

We typically evaluate adult walleye population status from samples captured in fyke nets shortly after the ice thaws. However, we captured only two walleyes in 35 net-nights of early spring fyke netting effort in April 2009. Similarly, fyke nets fished in the fall captured no walleye in October 2008 and three in October 2014. We suspect that adults move upstream in the spring to spawn at the base of the next dam where high discharge makes fyke netting impractical. At other times, they probably occupy the channel of this narrow impoundment where they would not be vulnerable to capture in fyke nets deployed near shore. So, we abandoned our attempts to characterize walleye abundance and size by fyke netting in Ladysmith Flowage. Instead, we tried to obtain larger samples by electrofishing in the early spring of 2015. In April of 2015, early spring electrofishing captured 101 walleyes that ranged from 4.0 to 14.6 inches and averaged 7.9 inches long. That sample had three males, and the rest were immature. Though their spawning activities had subsided, walleyes were



prominent as bycatch in electrofishing surveys that targeted basses and sunfish in the late spring of 2015 and 2022. We incidentally captured 151 and 103 walleyes by electrofishing in May of 2015 and 2022. Most walleye captured in late spring were less than 10 inches long and presumed to be immature. Despite our trials with various gear types, we have been unable to collect samples that can represent the adult walleye population in Ladysmith Flowage. None of our samples had any legal-size walleye from 15 to 20 inches or over 24 inches long. Novel methods are needed to characterize walleye population status in small, shallow riverine impoundments.



With no record of walleye stocking, native fingerlings produced in the impoundment and transient fingerlings produced upstream and entrained through the Dairyland Dam are the mixed source of new recruits to the population. In the only two evaluations of walleye recruitment in Ladysmith Flowage, electrofishing catch rates were 2.1 fingerlings per mile on August 27, 1996 and 4.5 fingerlings per mile on September 28, 2004. By comparison, the average catch rate of age-0 walleye in populations sustained entirely by natural reproduction across Wisconsin's Ceded Territory was 32.7 fingerlings per mile in 3,226 recruitment surveys completed by the DNR or the Great Lakes Indian Fish & Wildlife Commission from 1985 to 2023.

LAKE STURGEON

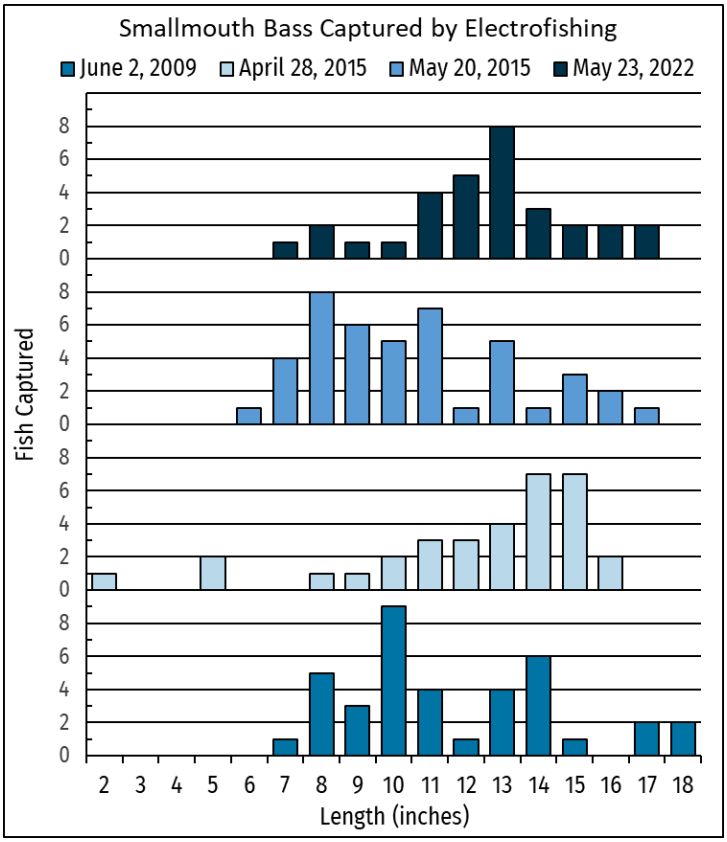
Moderate discharge from the Dairyland Dam on June 6, 2007 allowed us to target lake sturgeon with dip-nets and gillnets near the outlets of the Flambeau Hydroelectric Station. Dip-netters in two boats captured six lake sturgeon within or immediately below the turbine discharge bays. A floating gillnet and a bottom gillnet set in the plunge pool each captured three sturgeon. In the combined catch, their total length ranged from 34 to 57.5 inches. We injected a Passive Integrated Transponder (PIT) tag with a unique identification number into the dorsal neck area and released each fish. To date, none of these 12 PIT-tagged sturgeon have been recaptured. However, most subsequent surveys that targeted sturgeon in this portion of the Upper Chippewa Basin took place in the lowermost Flambeau River segment downstream of the Thornapple Dam.

MUSKELLUNGE

Similar to walleye, the status of Ladysmith Flowage's musky population has been difficult to describe. In 53 net-nights of effort directed at muskies (66%) or other species (34%), we captured two true muskellunge and one hybrid in four fyke netting surveys completed since 2004. Electrofishing captured a total of 10 muskies in one early spring survey, three late spring surveys and one fall survey. In the cumulative sample from all gear types and years, 13 muskies ranged from 9.0 to 40.5 inches and averaged 26.0 inches long. Electronic records show that Ladysmith Flowage received a total of 797 large fingerlings between 2003 and 2017

and 1,864 from 1972 to 1985. Because we could not evaluate the effectiveness of musky stocking, we suspended that management strategy in 2017.

SMALLMOUTH BASS



The black basses are exclusively represented by smallmouth bass in Ladysmith Flowage. We captured no largemouth bass in our surveys, and the statewide Fisheries Management Database had no largemouth bass records from Ladysmith Flowage. Electrofishing catch rates ranged from 10.0 to 14.3 smallmouth bass ≥ 7 inches per mile in four springtime surveys, suggesting that their relative abundance changed little between 2009 and 2022. Smallmouth bass catch rates in Ladysmith Flowage ranked between the 75th and 90th percentile values among lakes in the complex-riverine category. Unlike their consistent representation of bass abundance, each spring electrofishing sample portrayed the population's size structure differently. The early spring sample from April of 2015 had the highest proportion of preferred- and legal-size smallmouth bass 14 inches and longer (53%). Their average length fell between the 75th and 90th percentile ranks of complex-riverine lake class, except in 2022 when the mean length of Ladysmith Flowage bass (13.0 inches) was in the 90th to 95th percentile range.

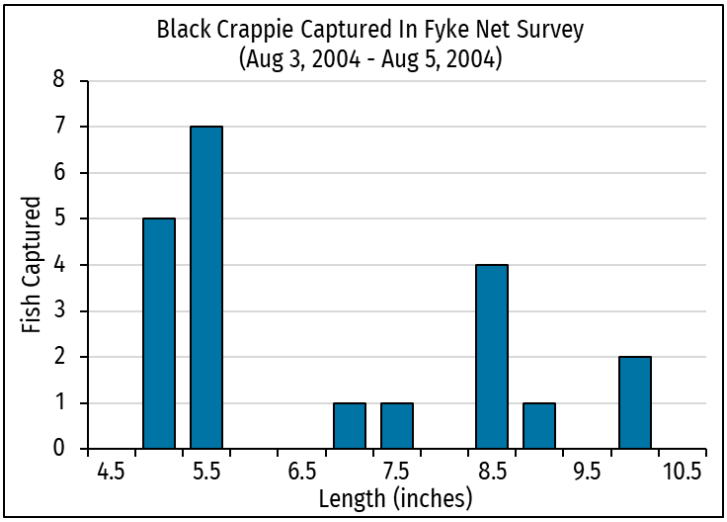
Anglers should enjoy good fishing for smallmouth bass in Ladysmith Flowage. Though we did not quantify their length-weight relationship, the smallmouth bass we captured appeared plump for their length. Anglers may catch and release smallmouth bass at any time. In the Northern Bass Management Zone, a daily bag limit of five smallmouth bass or largemouth bass in aggregate may be kept from the third Saturday in June through the first Sunday in March, but they must be at least 14 inches long.

NORTHERN PIKE

Fyke netting in the early spring of 2009 captured a small sample of 24 northern pike that ranged from 12.0 to 32.3 inches and averaged 21.5 inches long. None of the 35 pike captured in other netting and electrofishing surveys since 2004 were longer. The catch rate of 0.69 pike per net-night in April 2009 was just above the 25th percentile of the complex-riverine lake class, and their average length ranked between the 95th and 99th percentiles. At low abundance, 57% of Ladysmith Flowage's pike were quality-size fish 21 inches or longer and 10% grew to preferred size at least 28 inches long. The longest pike we captured ranked between the 75th and 90th percentiles among complex-riverine lakes. Anglers in the Northern

Management Zone may keep a daily bag limit of five northern pike of any size from the first Saturday in May through the first Sunday in March.

BLACK CRAPPIE



We collected our largest sample of black crappie in August of 2004 when fyke netting captured 21 ranging from 5.2 to 10.1 inches and averaging 6.9 inches long. The catch rate of 2.6 crappies per net-night was positioned near the 25th percentile value of the complex-riverine lake class, pointing to moderately low population abundance. Among the crappies ≥ 5 inches in this small fyke net sample, 14% were keeper-size fish at least 9 inches long and 10% attained preferred size 10 inches or longer. None of the seven crappies captured in other netting or electrofishing surveys since 2004 was longer than 10.2 inches. From 2016 to 2026, anglers who fish in Ladysmith Flowage may keep a daily bag limit of 15 panfish but only five of any one species. This panfish bag limit reduction was the most restrictive and the only effective treatment of three experimental harvest regulations applied on 94 Wisconsin lakes in a 10-year trial to increase the average length of bluegill and black crappies. Our post-treatment electrofishing sample in the spring of 2022 had no crappies from Ladysmith Flowage. On April 1, 2026, the 15/5 bag limit on panfish will expire, and anglers may again keep a daily bag limit of 25 panfish in any combination of size and species.

YELLOW PERCH

We caught zero to five perch in all surveys since 2004, except in the fall of 2004 when electrofishing captured 23 that ranged from 3.2 to 10.1 inches and averaged 6.3 inches long. In that small sample, 16% were quality-size fish ≥ 8 inches and 11% were preferred-size fish 10 inches or longer.

Management Recommendations

FUTURE EVALUATIONS

- At a 6-year frequency, the next fishery surveys in Ladysmith Flowage and the other three lower Flambeau River flowages are scheduled in 2028. However, several attempts to assess fish population status were unproductive in this riverine impoundment. Therefore, we plan to cancel the next fishery assessments in the four lower Flambeau River flowages, unless alternative survey protocols are found for trial and evaluation.

SURVEY PROTOCOLS

- In the Office of Applied Science's biennial invitation to identify fishery research needed to support fishery management, suggest an evaluation of traditional, alternative and

new survey gear, methods and timing to effectively sample walleye, muskellunge and northern pike populations in riverine systems.

- The organizers of the next Statewide Fisheries Meeting should reconvene the Large Rivers Work Group in a break-out session to share and discuss the affected Fishery Management Teams' experiences and to brainstorm new ideas for sampling these fish populations in riverine systems.

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