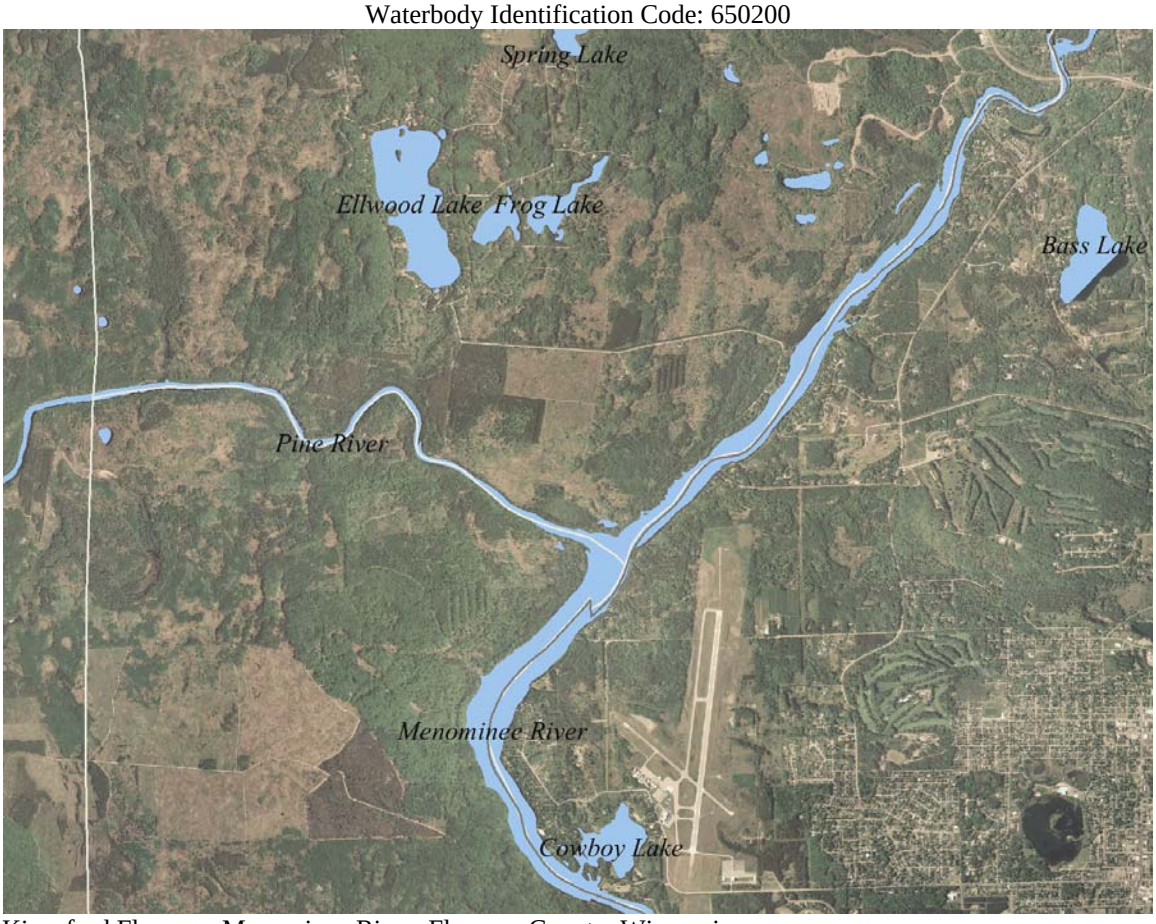
Kingsford Flowage, Florence County, Wisconsin
Fisheries Survey Report, 2008

Waterbody Identification Code: 650200



Kingsford Flowage, Menominee River, Florence County, Wisconsin

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May 2009

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Report Approval signatures

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Michael Donofrio, Fisheries Supervisor, Date

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George Boronow, Regional Fisheries Supervisor, Date

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Andrew Fayram, Bureau of Fisheries Management, Date

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SUMMARY

Lake and location
Kingsford Flowage, Florence County, T39N R19E Sec 33

Physical / chemical attributes (Carlson et al, 1971)
Surface acres: 491
Mean depth: 13
Maximum depth 32 feet
Lake type: drainage with 15% being less than 5 ft in depth and 3% being over 20 ft deep
Basic water chemistry: Slightly alkaline, stained light brown and moderate transparency
Littoral substrate: 85% sand, 8% rubble, and 7 % exposed rock and gravel
Aquatic vegetation: Sparse, 5% emergent and 5% submergent vegetation with Eurasian water milfoil
Other features: WE Energies owns and operates the Kingsford Hydroelectric Project that controls the water level and outlet flows as a seasonal run of the river.

Purpose of surveys
Spring and Fall Electrofishing assessments

Dates of fieldwork
Electrofishing surveys conducted May 14, September 29, and October 2, 2008.

BACKGROUND

Kingsford Flowage is a 491 acre impoundment just west of the Village of Aurora. Kingsford Flowage is one of ten impoundments on the Menominee River. The Menominee River, a boundary water with Michigan, enters the impoundment roughly 5 miles upstream of the dam which controls the water level. This flowage contains only impounded waters since the flowage extends upstream to the base of Twin Falls Dam. This impoundment would also be considered a widened river channel rather than a lake type impoundment. The Pine River enters from the southwest about one third of the way upstream of the impoundment dam on the Wisconsin side.

The deepest part of the flowage is 32 feet just above the dam, the average depth is 13 feet, and 15% of the lake is 5 feet or shallower. The littoral area is 85% sand, 8% rubble, and 7% gravel and rock. There are 5.7 miles of shoreline and little development on this flowage.

The lake has sparse macrophyte growth with a plant community comprised of vallisineria, coontail, and several potamogeton species. The presence of Eurasian water milfoil was reported for this flowage.

In 2001, the Federal Energy Regulatory Commission re-licensed the Kingsford Hydroelectric Project operated by WE Energies ended the practice of full time peaking the outflow of the impoundment which stabilized the lake's water level. The hydroelectric project is now operated at run-of-river mode from April 10 through June 15 and the pool elevation is maintained at 1066.4 feet above sea level, ± 0.5 feet.

The last comprehensive survey was conducted in 1998 including spring fyke netting and fall electrofishing. Fishing pressure on this flowage is believed to be very low in the winter and light to moderate during the rest of the year. According to stocking records for Michigan and Wisconsin, no fish have been stocked into these waters. Access to the flowage can be obtained from a boat landing maintained by the City of Kingsford on Cowboy Lake (Michigan). There is also an accessible fishing pier that is located in a park owned by the city. Access to the flowage can also be obtained from a WE Energies boat access on the lower portion of the Pine River, Wisconsin.

METHODS

Data collection

A WDNR standard direct current electrofishing boat was used to sample 2 miles of shoreline on the evening of May 14, 2.2 miles of shoreline on September 29 and 4 miles of shoreline on October 2, 2008 (see attachments). All fish captured were identified to species and counted for the first ½ mile and only game fish during the succeeding 1.5 miles each evening. Total length of gamefish and a sub-sample of panfish were measured to the nearest 0.1 inch. Scales or dorsal spines were collected from a sub-sample of fish stratified within 0.5 inch bins. Ages were assigned to fish after scales and spines were aged using standard WDNR procedures.

Data analysis

Total catch and catch per gear type was calculated for all species. Length frequency distributions were performed for walleye, smallmouth bass, and northern pike. A subsample of adult largemouth and smallmouth bass were aged for comparisons with previous surveys. Proportional Stock Density (PSD) and Relative Stock Density of preferred length fish (RSD-preferred, Anderson and Neumann 1996) were calculated for smallmouth bass, northern pike, bluegill, walleye, largemouth bass, rock bass and yellow perch. Stock length, quality length, and preferred length values were as proposed by Gabelhouse (1984).

RESULTS AND DISCUSSION

A total of 427 fish of 10 different species were collected in 2008. Catch per date are shown for each species sampled (Table 2). Smallmouth bass was the most abundant species. Bluegill, rock bass, northern pike, largemouth bass, yellow perch, walleye and smallmouth bass were common. Black Bullhead, black crappie, and white sucker were sampled in low numbers. Electrofishing comparisons indicate a decrease in the

abundance of yellow perch, northern pike, and walleye since 1998, but an increase in abundance of bluegill, largemouth bass, rock bass, and smallmouth bass in 2008.

Smallmouth Bass

Only 2 smallmouth bass (16.3 and 17.7 inches) were captured during spring netting in 1998. The electrofishing catch rate was 18 per hour in 1998 compared to a catch rate of 24.0 per hour in 2008 (Table 2). A total of 103 smallmouth bass were sampled in 2008. Average length was 12.5 inches with a range from 4.5 to 19.4 inches in 1998 compared to an average of 11.3 with a range from 4.1 to 19.2 inches in 2008. The 2008 size structure was good to excellent with 71% of the fish greater than 12 inches (PSD) and 44% of fish greater than 15 inches (RSD-preferred) which are much better than a PSD of 28% and RSD15 of 22% in 1998. Size structure was similar for both survey years with good representation from juvenile and adult bass (Figure 1). Growth rates were less than other Northern Region lakes (Table 3). Smallmouth bass reproduction was not as negatively impacted by the impoundment fluctuations compared to more lentic species. This occurrence may have resulted in greater inter-specific competition for food with other species.

Northern Pike

Fyke netting in 1998 resulted in 411 northern pike with a size range of 7.7 to 41.5 inches. The catch rate was 4.8 per net night in 1998 (Table 2). Fall electrofishing in 1998 yielded 48 pike with an average size of 14.0 inches and range of 5.0 to 28.4 inches. In the spring of 2008, we surveyed 29 pike with an average length of 17.5 and ranging from 9.0 to 28.4 inches. During fall of 2008 electrofishing, 48 pike were sampled with an average length was 17.2 inches with a range from 7.7 to 31.2 inches. The size structure was poor in 1998 with a 4% PSD and 4% RSD28 and fair to poor in 2008 with 20% of the fish greater than 21 inches (PSD) and 5% of fish greater than 28 inches-preferred (RSD) in 2008. Size structure was similar for both survey years with good representation from juvenile and adult northern pike, but higher numbers of juveniles (under 10 inches) were observed in 1998 (Figure 2). No northern pike were aged from 2008 samples.

Bluegill

The catch rate was 5.46 per net night in 1998 (Table 2). The length range was 3.9 to 9.6 inches and a mean length of 5.8 inches. Fifteen bluegill were sampled in the spring of 2008 with electrofishing equipment. In that spring sample, size structure was fair to good with 86% of the fish greater than 6 inches (PSD) and 6.7% of the fish greater than 8 inches (RSD-preferred). In the fall of 1998, only 1 fish per hour was sampled at 4.25 average inches compared to 70 fish per hour in 2008 and a size range of 2.4 to 6.2 inches. A total of 90 bluegills were sampled in 2008. In the fall of 2008, the size structure was poor with only 5% of the fish greater than 6 inches (PSD) and zero fish greater than 8 inches (RSD-preferred). None of the blue gill were aged during any surveys. Bluegill recruitment appeared good since 38% of the fall caught bluegills were under 4 inches.

Walleye

Only 3 walleye were netted in the spring of 1998 with a size range from 15.7 to 27 inches and 0.04 fish per net night (Table 2). In the spring of 2008, we surveyed 23 walleye with a size range of 5.3 to 20.1 inches and an average length of 12.1 inches. In the fall of 2008, we caught and released 19 walleye with an average length of 12.5 inches and a range of 7.0 to 20.7 inches. In 2008, the walleye PSD was 31% and 6.3% of the walleye were grater than 20 inches (RSD 20), but usually walleye are difficult to sample in a flowage because of poor access to the shallow waters in the tailwater area. Size structure was similar for both survey years with fair representation from juvenile and adult walleye, but higher numbers of juveniles (under 10 inches) were observed in 1998 (Figure 2). No walleye were aged from this survey.

Largemouth Bass

A total of 21 largemouth bass were sampled during spring netting in 1998. The catch rate was only 0.25 bass per net night (Table 2). Those bass ranged from 10.2 to 20.2 inches. During 2008 spring electrofishing, we sampled 7 largemouth bass ranging from 12.5 to 18.4 inches. During the fall electrofishing in 1998, 7 juvenile largemouth bass were processed with an average length of 4.3 inches. In the fall of 2008, we shocked 16 largemouth bass ranging in size from 5.4 to 17.3 inches with a mean length of 12.0

inches. The size structure was good with 56% of the fish greater than 12 inches (PSD) and 19% of fish greater than 15 inches (RSD-preferred). The size structure is similar when comparing 1998 fall electrofishing and 2008 fall surveys. Only 6 largemouth bass were aged from 2008 samples at Age 3- 12.6 , Age 4- 12.6 and 13.2 , Age 10- 17.5 and 18.2, and Age 11 at 16.8 inches. When comparing largemouth bass year class strength to the NOR values, the Age 3 and 4 largemouth bass were longer than the NOR average but the Age 10 and 11 bass were slower growing.

Black Crappie

The catch rate was .22 per net night in 1998 (Table 2). In 1998, black crappie lengths ranged from 6.2 to 10.6 inches. In the fall of 1998, only 2 fish per hour were sampled with size range of 2.5 to 3.4 inches compared to 1.5 fish per hour in 2008 and a size range of 4.6 to 4.9. None of the black crappie were aged during any surveys.

Other Panfish

The catch rate for rock bass in the spring of 1998 was 0.21 fish per net night (Table 2). During that survey, 18 rock bass were captured and the size range was 2.8 to 6.1 inches. A spring of 2008 electrofishing event yielded 56 rock bass with an average size of 5.0 inches and ranging from 2.8 to 7.6 inches. The RSD value was 6.3 and the PSD9 was zero. During an electrofishing event in October of 1998, 24 rock bass were sampled with an average size of 5.0 inches and ranging from 3.2 to 7.2 inches. We sampled only 3 rock bass in the fall of 2008 ranging from 3.3 to 7.0 inches. No rock bass were aged from 2008 samples.

The catch rate for yellow perch in the spring of 1998 was 0.72 fish per net night (Table 2). A total of 34 perch were sampled with a size range of 4.9 to 11.3 inches. In the spring of 2008 electrofishing event, we only sampled 6 perch with an average size of 6.0 inches and ranging in size from 3.3 to 8.5 inches. In the fall of 1998, we sampled 71 perch with an average size of 5.4 inches and ranging from 3.0 to 10.4 inches. In the fall of 2008, we sampled 23 yellow perch with an average size of 5.8 inches and ranging from 4.4 to 8.7 inches. The RSD value was poor at 15.8 and the PSD10 was zero. No yellow perch were aged from 2008 samples.

CONCLUSIONS AND RECOMMENDATIONS

Overall, the fishery of Kingsford Flowage appears to be in good condition. In 2008, three electrofishing events on this flowage indicated a similar smallmouth bass fishery as the other flowages on the Menominee river. Smallmouth bass were abundant and demonstrated a good size structure. In comparison to the 1998 survey, there are greater numbers of bass and most panfish. Length frequency graphs revealed adequate recruitment of smallmouth bass, northern pike and walleye. The size range of bluegill, largemouth bass, black crappie, rock bass, and yellow perch indicated evidence of natural recruitment. In 1998, two muskellunge were sampled but none were captured in 2008.

Proportional stock densities (PSD) are defined as some length within 20-26% of an angling world record length. The following ranges of proportional stock density values are indicative of balance when the population supports a substantial fishery are 30-60 for smallmouth bass, northern pike, walleye; 30-50 for yellow perch, 40-70 for largemouth bass, and 20-40 for bluegill. Therefore, PSD values for smallmouth bass, walleye and largemouth bass at Kingsford Flowage indicated balanced populations; while PSD values for northern pike, bluegill, yellow perch demonstrated unbalanced populations. However, PSD values are only one value used to manage a fishery and a more comprehensive survey would better reveal the status of this fishery.

The regulation of the hydro-electric facilities and the subsequent stabilization of the water level appear to have had a positive effect on improving the fishery. Additional fisheries habitat improvements such as shoreline restoration and the addition of coarse woody structure may increase fish recruitment and growth rates.

The current regulations seem to be appropriate. I would recommend a comprehensive survey of these waters in the next 5 years. Public access to Kingsford Flowage is adequate. There is also shore access fishing. I would recommend no improvements to the current landing facilities.

ACKNOWLEDGEMENTS

I would like to thank Greg Kornely, Cory Weinandt, Ron Rhode and Cliff Sebero for their assistance in collecting, processing, tabulating and aging the fish from Kingsford Flowage. I also appreciate editorial comments from George Boronow.

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Carlson, H, L.M. Andrews, and C.W. Threinen. 1971. Surface Waters of Florence County. Department of Natural Resources, Madison, WI.

Gabelhouse, D. W., Jr. 1984. A length-categorization system to assess fish stocks. North American Journal of Fisheries Management 4:273-285.

TABLES AND FIGURES

TABLE 1. Current fishing regulations for Kingsford Flowage.

Species	Open Season	Daily limit	Minimum length
Largemouth and Smallmouth Bass	1st Saturday May- June 20 June 21- Dec 31	0 5 in total	Catch and release 14 inches
Northern Pike	first Saturday in May – first Sunday in March	5	none
Muskellunge	May 15- November 30	1	40 inches
Walleye	1st Sunday March- 1st Sat May 1st Sunday May- 1st Saturday March	1 5 in total	15 inches 15 inches
Panfish (bluegill, pumpkinseed, yellow perch, white and black crappie)	Open all year	25 in total	None
Catfish	Open all year	10 in total	none

TABLE 2. Catch summary for electrofishing samples from Kingsford Flowage, 2008. The electrofishing sample was collected on May 14th, September 29 and October 2nd, for a total of 4.3 hours of effort. On all 2008 dates, only 2 hours was allotted for panfish effort. The 1998 fyke net effort was 85 net nights. In 1998, only 2 hours fall electrofishing was performed.

Species	Fyke netting 1998		Electrofishing 2008		Electrofishing 1998	
	Total Catch	Mean Catch per net night	Total Catch	Catch per hour	Total Catch	Catch per hour
Black Crappie	19	.22	3	1.5	4	2.0
Bluegill	464	5.46	90	45	2	1.0
Muskellunge	1	.01	-	-	1	0.5
Yellow Perch	34	.72	29	14.5	71	35.5
Bullhead Spp.	57	.33	-	-	1	0.5
Largemouth Bass	21	.25	22	5.1	7	3.5
Northern Pike	411	4.8	77	17.9	48	24.0
Pumpkinseed	16	.19	-	-	-	-
Rock Bass	18	.21	59	29.5	24	12.0
Smallmouth Bass	2	.02	103	24.0	36	18.0
Walleye	3	.04	42	9.8	61	30.5

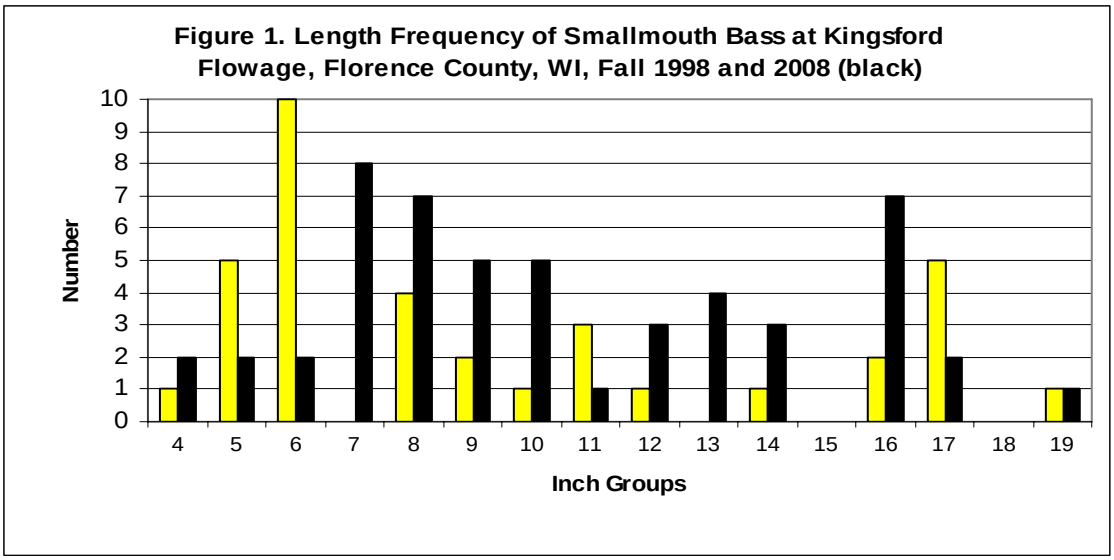


Table 3. 2008 Age- length distribution of smallmouth bass from Kingsford Flowage, Florence County, Wisconsin compared to Northern (NOR) Wisconsin average length at age data. N equals sample size.

Age	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
NER Average	11.1	13.3	15.0	15.9	18.0	18.9	19.9	--	18.7	19.6	--
2008 Survey	10.7	13.4	14.2	14.9	14.9	16.8	16.4	16.8	--	--	19.0
2008 (N)	5	9	12	6	4	2	1	1	--	--	1

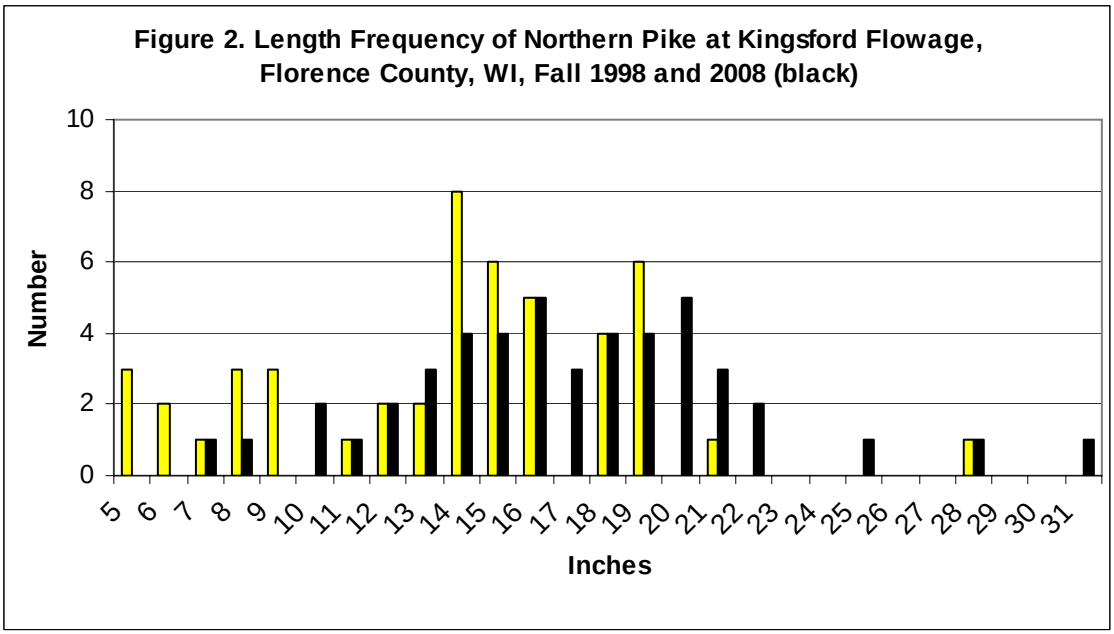


Figure 2. Length Frequency of Northern Pike at Kingsford Flowage, Florence County, WI, Fall 1998 and 2008 (black)
Number
0
2
4
6
8
10
5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Inches

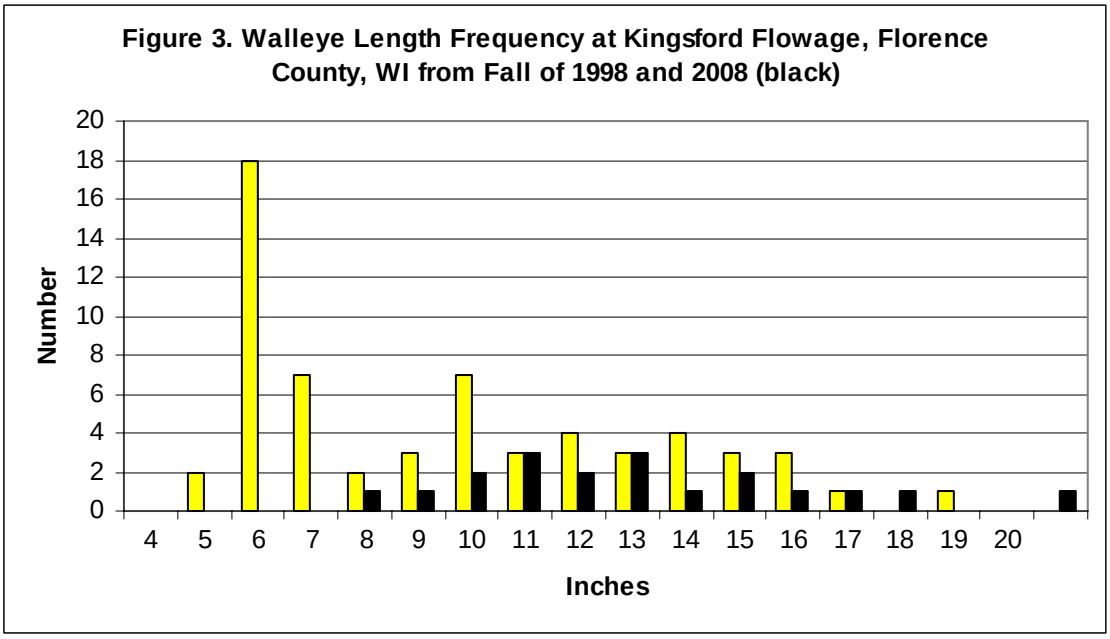
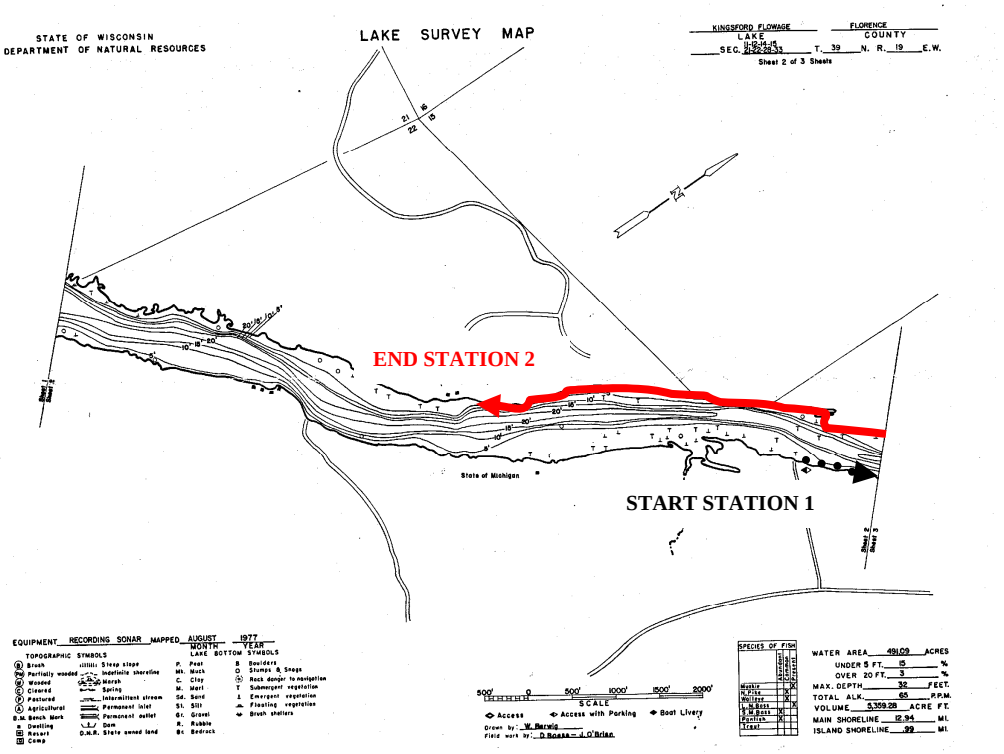
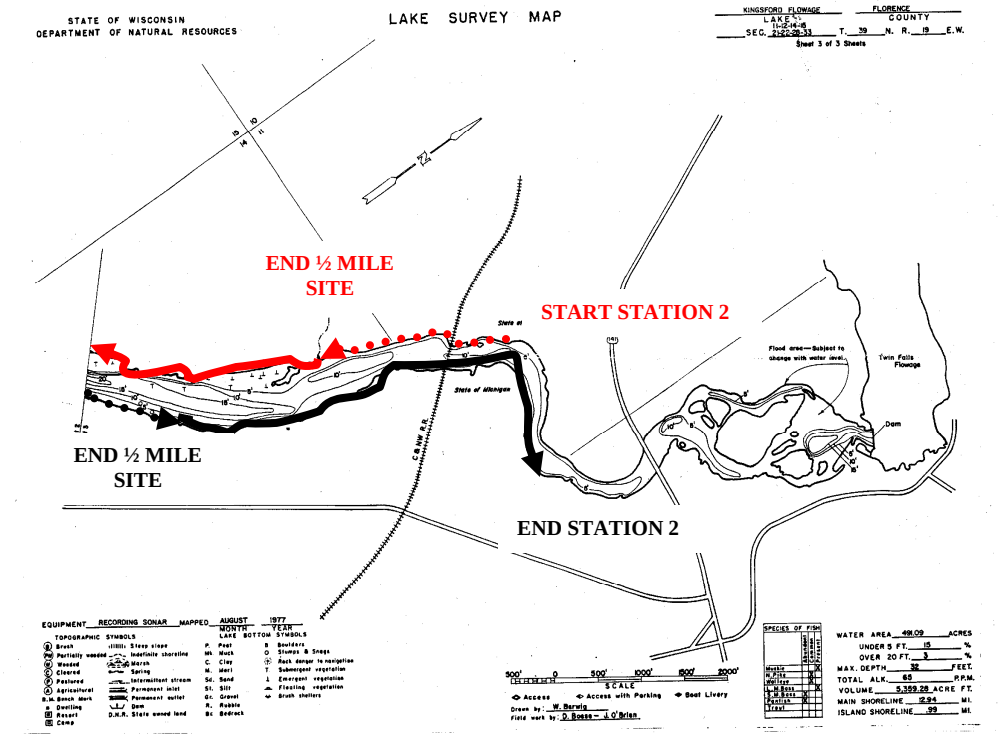


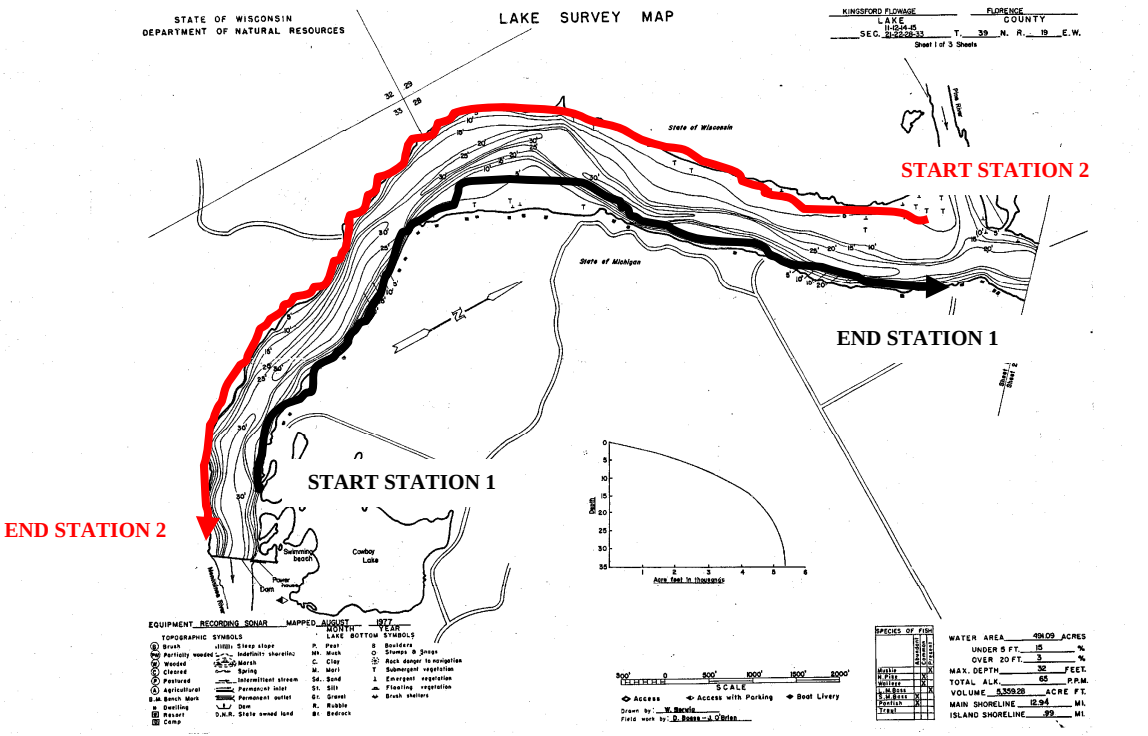
Figure 3. Walleye Length Frequency at Kingsford Flowage, Florence County, WI from Fall of 1998 and 2008 (black)
Number
0
2
4
6
8
10
12
14
16
18
20
4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Inches

KINGSFORD FLOWAGE BOOMSHOCKING EFFORT FOR EVENING OF MAY 14th 2008





KINGSFORD FLOWAGE BOOMSHOCKING EFFORT FOR EVENING OF SEPTEMBER 29th 2008



KINGSFORD FLOWAGE BOOMSHOCKING EFFORT FOR EVENING OF OCTOBER 2nd 2008