WHITE POTATO LAKE

Oconto County

2013 Fish Management Report

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Your purchase of fishing equipment and motor boat fuel supports boating access and Sport Fish Restoration.

2014

SUMMARY

Lake and location:
White Potato Lake, Oconto County, T31N R19E Sec 23

Physical / chemical attributes (Wisconsin DNR, 1975):
Surface acres: 978
Maximum depth (ft): 11
Average depth (ft): 5
Shoreline length (mi): 6.3
Lake type: Seepage
Basic water chemistry: Slightly alkaline, light-stained water of moderate transparency.
Littoral substrate: 60% sand, 35% muck and 5% exposed rock and gravel.
Aquatic vegetation: Diverse community of aquatic plants.
Other features: A water-level control structure on the eastern shore controls the water surface elevation during periods of high water. This structure is capable of raising the surface water elevation 0.62 vertical feet.

Purpose of survey:
Determine the current status of fishery and evaluate walleye fishing mortality.

Surveys:
WDNR Survey ID: 443121800 – Spring fyke netting (4/29/2013 – 5/6/2013)
WDNR Survey ID: 443121806 – Gamefish/Panfish electrofishing (5/21, 29/2013 & 6/3/2013)
WDNR Survey ID: 443121805 – Mini-fyke netting (8/19/2013 – 8/21/2013)
WDNR Survey ID: 443121804 – Fall juvenile walleye/muskellunge electrofishing (9/24/2013)

Fishery:

The fishery of White Potato Lake is comprised of panfish species (bluegill, yellow perch, black crappie, pumpkinseed, and rock bass) and gamefish species (walleye, largemouth bass, muskellunge and northern pike).

EXECUTIVE SUMMARY

- White Potato Lake is located in northern Oconto County, 10 miles west of Pound and 2 miles north of Highway 64. At 978 acres, the lake offers a variety of recreational opportunities in addition to fishing. There are five boat landings around the lake.
- WDNR has been stocking small fingerling walleye intermittently since 1990 in even numbered years while the White Potato Lake Sportsman's Club have supplemented the WDNR's efforts by stocking large fingerling walleye in odd numbered years (Table 1).
- Overall, 5,584 fish representing 17 species and 1 hybrid were collected during the 2013 sampling season (Table 4). The five most abundant species collected by number were bluegill (29%), walleye (18%), rock bass (17%), bluntnose minnow (10%) and largemouth bass (10%).
- A total of 1,630 bluegill was collected, ranged in length from 2.5 to 8.8 in (inches) and averaged 6.0 in (Figure 1). Sixty percent of the bluegill collected were 6.0 in or greater. All age groups were well represented and age-4 fish averaged 6.0 in. Growth was average at all ages compared to the mean length at age of bluegill in northeast Wisconsin (Figure 2).
- During the survey, 1,005 walleye were collected during both electrofishing and fyke netting (12.2/NN). This total includes recaptured fish. Walleye ranged in length from 7.9 to 24.5 in and averaged 15.9 in across all samples (Figure 3). Walleye were reaching legal size (15 in) by age 4 (Figure 4). Compared to the average length at age for northeast Wisconsin, walleye growth was average until age 6 but below average from age 7 and older (Figure 4).
- All walleye over 14.0 inches were floy tagged (673 total). Overall, 60 tagged walleye were reported by anglers. Fishing mortality was estimated from the proportion of tagged individuals (673) to the number of tagged walleye caught and reported by anglers (60). Therefore, fishing mortality during the 2013 fishing season was estimated to be 9%.
- Five hundred fifty largemouth bass were collected during the 2013 survey (Table 4). Bass ranged in length from 4.3 to 20.3 in and averaged 12.6 in (Figure 7). Forty-three percent of largemouth bass measured were over the 14-in minimum length limit. Bass are reaching legal size (14 in) around age 6.
- Yellow perch comprised 2% of fish collected in 2013 and 8% 2008 (Table 7). Perch spawn was observed on April 28 while fyke nets were being set. Reduced catch rates (Table 7) are not indicative of a decline in abundance. A modest evaluation of perch stocking occurred in 2012/2013 whereby 2,000 perch were fin clipped (left ventral) before stocking. Overall, 5 out of the 41 perch registered were stocked fish and only 2 of 13 perch over 10 inches were fin clipped (Figure 13). While stocked yellow perch are utilized by anglers, it is evident that stocking is not necessary.
- The current stocking rate of 10 small walleye fingerlings / acre should be increased to the maximum allowable rate; 35/acre. White Potato Lake would also be a good candidate lake to research the effect of increasing the stocking rate of small fingerling walleye (i.e. from 35/acre to between 50 and 100/acre) on adult densities.
- WDNR staff identified two areas that would be ideal for creating walleye spawning habitat; along Bodega Point and the shoreline east of the water control structure. These locations receive a great deal of wind and wave action that would stimulate walleye spawning.
- Stocking of muskellunge in White Potato Lake should be pursued (250 large fingerling muskellunge / year). Natural reproduction has not been capable of creating or sustaining a fishable population. No adverse impacts to the fishery have been observed as a result of previous muskellunge stockings. All fish should be fin clipped for future evaluations.

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INTRODUCTION

White Potato Lake is located in northern Oconto County, 10 miles west of Pound and 2 miles north of Highway 64. At 978 acres, the lake offers a variety of recreational opportunities in addition to fishing. There are five boat landings around the lake.

The Wisconsin Department of Natural Resources (WDNR) has been stocking small fingerling walleye intermittently since 1990 (Table 1). Since 2004, WDNR has stocked small fingerling walleye in even numbered years while the White Potato Lake Sportsman's Club have supplemented the WDNR's efforts by stocking large fingerling walleye in odd numbered years (Table 1).

The last fisheries survey of White Potato Lake was conducted in 2008 (Rowe, 2010). The survey indicated healthy populations of panfish and gamefish. Rowe (2010) recommended discontinuing panfish stockings, evaluating the source of walleye recruitment (stocking versus natural reproduction), and pursuing habitat protection and enhancement. While panfish stockings have continued, walleye recruitment was assessed by marking small fingerling walleye before stocking with oxytetracycline (OTC) in 2008, 2010, and 2012. Young-of-the-year (YOY) walleye were collected in the same year as stocking. Otoliths were removed and examined for marks. The subsequent proportion of marked to unmarked fish revealed that there was no natural reproduction occurring.

A tag-reward study was initiated in cooperation with the White Potato Sportsman's Club during the 2013-2014 fishing season. Reporting information (signs) was posted at all boat landings and advertised on the Club's website. Tags were eligible for reporting from the opening day of fishing season until March 2, 2014. The data collected from tag returns was used to estimate walleye harvest and annual fishing mortality.

The goal of the 2013 comprehensive fisheries survey was to assess the status of the fishery by characterizing gamefish populations based on relative abundance, proportional stock density (PSD), relative stock density (RSD), catch per unit effort (CPUE) and mean length at capture (age). Comparisons to the 2008 fisheries survey were made where applicable.

METHODS

Data collection:

Standard fyke nets (3-foot hoop, $^{3}/_{4}$-bar, 1.5-inch stretch), mini-fyke nets ($^{1}/_{4}$-inch stretch with turtle exclusion) and a standard WDNR Direct Current electrofishing boat were used to collect fish on White Potato Lake. Sampling gear, effort, date, and target species for the survey are listed in Table 2. All fish collected were measured to the nearest 0.1 inch total length (TL) and separated into half-inch groups (X.0-X.4 for inch group and X.5-X.9 for half-inch group). A sub-sample of scales or dorsal spines was collected for age and growth analysis from all gamefish. Aging structures (scales or spines) were collected from 5 non young-of-the-year (YOY) fish per half inch group. If gender could be determined, structures from 5 fish per sex were collected per half inch group. Aging structures for panfish and nongame fish consisted of 5 samples per half inch group when gender could not be established. Ages were assigned to each fish using standard WDNR procedures. Passive integrated transponders (PIT tags) were implanted in all muskellunge collected.

Data analysis:

Relative abundance was calculated as the percentage each species represented from the total sample (i.e. 22 fish of a single species from a sample of 100 total fish = 22% relative abundance). Catch per unit effort (CPUE) was calculated as catch by gear divided by sampling effort for each species collected. Length frequency distributions were tabulated for dominant gamefish and consisted of combined April and May electrofishing samples as well as fyke net data. Proportional stock density (PSD) and relative stock density for **p**referred length fish (RSD^{P}) were calculated for dominant gamefish (Anderson and Neumann 1996). Preferred lengths of various gamefish have a minimum length between 45 and 55% of the world record length for that species (Anderson and Neumann 1996). Stock, quality, and preferred lengths were used as proposed by Gabelhouse (1984). Mean length at capture data was calculated for dominant gamefish and compared to the average of mean length at age for northeast Wisconsin.

Population estimates for walleye, northern pike and muskellunge were obtained during the spring fyke net survey by giving each captured fish a top caudal fin clip. Marks (fin clips) were noted is subsequent collections until the survey was complete. The Schumacher-Eschmeyer and Schnabel formulas for multiple census were used to generate population estimates (Schneider, 1998, Schnabel, 1938). Mortality estimates were calculated using methods published by Van Den Avyle and Hayward (1999) and Miranda and Bettoli (2007).

RESULTS

Comprehensive Fisheries Survey

Overall, 5,584 fish representing 17 species and 1 hybrid were collected during the 2013 sampling season (Table 4). The five most abundant species collected by number were bluegill (29%), walleye (18%), rock bass (17%), bluntnose minnow (10%) and largemouth bass (10%).

A total of 1,630 bluegill was collected which accounted for 29% of the fish collected (Table 4). Bluegill ranged in length from 2.5 to 8.8 in (inches) and averaged 6.0 in (Figure 1). Sixty percent of the bluegill collected were 6.0 in or greater and considered harvestable. Bluegill PSD was 69 and within the desirable range for a balanced population but RSD^P was 4 and only slightly below the desirable range of 5 to 20 (Table 3). Electrofishing CPUE was 121.0/h and fyke net CPUE was 14.0/NN (Tables 5 & 6). A subsample of 46 bluegill was aged from 3 to 8 years old. All age groups were well represented and age-4 fish averaged 6.0 in. Growth was average at all ages compared to the mean length at age of bluegill in northeast Wisconsin (Figure 2). Successful reproduction and recruitment of bluegill was evident.

During the survey, 1,005 walleye were collected during both electrofishing and fyke netting (12.2/NN). This total includes recaptured fish. Electrofishing for walleye was conducted in April and October with CPUE's of 13.3/h and 4.9/h, respectively. Walleye ranged in length from 7.9 to 24.5 in and averaged 15.9 in across all samples (Figure 3). Walleye PSD and RSD^P from the spring fyke net sample was 76 and 2, respectively. Walleye PSD was well above the desirable range of 30 to 60 (Table 3). A subsample of 126 walleye from fyke nets was aged from 1 to 13 years old. Walleye were reaching legal size (15 in) by age 4 (Figure 4). Compared to the average length at age for northeast Wisconsin, walleye growth was average until age 6 but below average from age 7 and older (Figure 4). The Schnabel multiple census fyke net population estimate for walleye 12 inches and larger was 2,061 or approximately 2.1 walleye/acre. Catch curve analysis (Miranda and Bettoli, 2007) estimated total annual mortality (natural and fishing) at 28% of walleye age 4 and older (Figure 5).

Rock bass made up 17% of the fish collected totaling 954 fish (Table 4). Rock bass ranged in length from 3.3 to 9.8 in and averaged 6.3 in (Figure 6). Electrofishing CPUE was 29.5/h and fyke net CPUE was 11.0/NN (Tables 5 & 6). Rock bass PSD was 34 and RSD^P was 8. Overall the

length frequency (Figure 6) suggests that the rock bass population is well balanced in terms of age and size structure.

Five hundred fifty largemouth bass were collected during the 2013 survey (Table 4). Electrofishing yielded a CPUE of 29.5/h and fyke netting a CPUE of 1.4/NN (Tables 5 & 6). Bass ranged in length from 4.3 to 20.3 in and averaged 12.6 in (Figure 7). Largemouth bass PSD was 44 and RSD^P was 18 (from electrofishing sample). Bass PSD and RSD^P are within the desirable range for a balanced population (Table 3). Forty-three percent of largemouth bass measured were over the 14-in minimum length limit. A subsample of 63 largemouth bass was aged from 2 to 12 years old. Largemouth bass growth was average at all ages compared to the average mean length at age for bass in northeast Wisconsin (Figure 8). Bass are reaching legal size (14 in) around age 6. Successful reproduction and recruitment of largemouth bass was evident.

Northern pike accounted for 8% of the fish collected in 2013 (Table 4). A total of 414 pike was collected and ranged in length from 11.2 to 36.2 in, while averaging 19.1 in (Figure 9). Northern pike electrofishing CPUE in was 0.6/h and fyke netting CPUE was 5.3/NN (Tables 5 & 6). Pike PSD was 16 and RSD^P was 2. No northern pike were aged from this survey. The Schnabel multiple census fyke net population estimate was 797 northern pike or approximately 0.8 pike/acre.

A total of 199 black crappie was collected yielding an electrofishing CPUE of 1.0/h and a fyke net CPUE of 2.5/NN (Tables 5 & 6). Crappie ranged in length from 6.0 to 13.6 in and averaged 7.9 in (Figure 10). Black crappie PSD was 19 and RSD^P was 14. A subsample of 36 crappie was aged from 2 to 6 years. Fifty-three percent of the crappie aged were age 2 and averaged 7.4 in. Crappie growth was above average compared to the mean length at age for northeast Wisconsin (Figure 11).

Yellow perch made up 2% of the fish collected totaling 102 fish (Table 4). Perch ranged in length from 2.5 to 11.5 in and averaged 6.6 in (Figure 12). Electrofishing CPUE was 38.4/h and fyke net CPUE was 0.4/NN (Tables 5 &6). No yellow perch were aged from this survey however, successful reproduction and recruitment of yellow perch was also evident. Additionally, yellow perch were fin clipped before stocking in 2012 and examined for marks during the Ice Fishing Derby in January 2013. While several fin-clipped perch were registered (Figure 13), it was evident that natural reproduction of perch is capable of sustaining the fishery. Habitat enhancement has been recommended but not pursued.

Thirty-eight muskellunge were collected in 2013. Muskellunge ranged in length from 36.8 to 49.3 in and averaged 41.5 in (Figure 14). Twenty-two of the muskellunge collected were aged using fin rays. Ages ranged from 5 to 16 years old (Figure 15). Age-14 muskie was the most represented year class and averaged 41.9 in (Figure 15). Muskellunge were reaching the 40-inch minimum length between ages 12 and 13. The Schnabel multiple census fyke net population estimate was 43 or 0.05 fish/acre. Overall, muskellunge growth was average compared to other lakes in northeast Wisconsin (Figure 15).

Additionally, pumpkinseed, hybrid sunfish, Johnny darter, golden shiner, Iowa darter, white sucker and bullhead species (yellow, black and brown were also collected during the 2013 survey and accounted for approximately 2.0% of all fish collected (Table 4).

Mini-fyke Netting

Mini-fyke nets were set for 2 days (12 NN total effort) in mid-August to assess natural reproduction of various species. Fish were separated by species and counted; no lengths were taken and it was assumed that all fish were young-of-the year. Overall, 1,466 fish comprised of 8 species and 1 hybrid were collected (Table 7). Bluntnose minnow was the most abundant species with 570 fish collected followed by bluegill (433), largemouth bass (346), rock bass (47) and yellow perch (36) (Table 7).

Walleye Tag-Reward Study

All walleye over 14.0 inches were floy tagged. The total number of walleye tagged was 673. Anglers could return/report tagged walleye anytime during the fishing season which ran from May 4, 2013 through March 2, 2014. Overall, 60 tagged walleye were reported by anglers. Fishing mortality was estimated from the proportion of tagged individuals (673) to the number of tagged walleye caught and reported by anglers (60). Therefore, fishing mortality during the 2013 fishing season was estimated to be 9%.

Tag retention was estimated by double tagging every 10^{th} walleye. A total of 62 walleye were double tagged. Seven days after tagging began, a recapture electrofishing run was conducted as part of our population estimate model. During that sampling period, 14 tagged walleye were collected of which, 2 were double tagged. The remaining 12 walleye were cross-referenced with all tagged walleye to determine if they were originally double tagged. This same procedure was

followed during our gamefish/panfish electrofishing samples (May 21, 29 and June 6). These three electrofishing runs resulted in the collection of 5 tagged walleye (2 were double tagged). Two tagged walleye were collected during our fall walleye assessment conducted in September. No tag loss was detected 7, 30 or 120 days post tagging from recaptured double tagged walleye. All angler tag returns were examined (cross referenced) for tag loss. One angler reported a single tag from a walleye (200+ days post tagging) that was originally double tagged. This angler was contacted again to confirm that only one tag was in the fish when harvested. This was the only tagged fish confirmed to have lost a tag. Therefore, tag retention was estimated at 98% (conversely tag loss was 2%) during our study period.

DISCUSSION

White Potato Lake is moderately fertile and offers anglers a wide variety of fishing opportunities. Good populations of panfish (bluegill, yellow perch, black crappie and rock bass) and gamefish (northern pike, walleye, largemouth bass and muskellunge) are present.

It is very important to note that spring arrived late in northeast Wisconsin in 2013. Spring fyke netting did not begin until April 29, 2013. Fisheries staff observed a multitude of perch spawn while setting nets. In 2008, spring netting began April 18 and was completed by April 26. Needless to say, the late spring drastically affected our sampling results. Therefore, comparisons between the fisheries survey data collected in 2008 versus 2013 may not be truly reflective of changes in the fishery.

Bluegill was the most abundant species collected in 2013 but the third most abundant in 2008. Even so, the number of bluegill collected was almost exactly the same as the 2008 survey (Table 8). Both PSD and RSD^{P} increased slightly between years. Bluegill growth, while average compared to other lakes in northeast Wisconsin, remained unchanged between surveys. Reproduction and recruitment are sufficient to maintain their numbers.

Walleye is a popular sportfish in Wisconsin. Small fingerling walleye have been stocked by WDNR since the early 1990's (Table 1). Between 2008 and 2012, small fingerling walleye were marked (using OTC) before stocking to assess their recruitment source (stocking or natural reproduction). Young-of-the year walleye were collected in the fall of each year marked walleye were stocked. All of the otoliths examined from fish stocked in 2012 (30 pairs) were marked with OTC and indicated that no natural reproduction occurring. Private stockings of large fingerling

walleye have also been permitted and all stocking efforts have produced a quality fishery. However, size at stocking cannot be used as a predictor of year class strength because strong and weak year classes have been produced by stocking both large and small walleye fingerlings (Table 1 and Figure 5). Therefore, other environmental factors are having an effect on year class strength other than size at stocking.

A population estimate for walleye indicated that density declined between 2008 and 2013 from 3.8 to 2.1 walleye/acre, respectively. The decline in density could be because of the late spring (ice out) that resulted in a poor catch rate of walleye. Typically walleye catch rates will be low when spring netting begins and increase as water temperature rises. In 2013, water temperatures rose quickly after ice out and catch rates declined rapidly after the first day netting. In 2008, our mean catch of walleye was 40.8 walleye per NN whereas in 2013, our mean catch per NN was 12.2 (Table 5). The decline in walleye density should not be alarming because our catch rates were drastically affected by the late spring and the fishery is maintained entirely by stocking.

Walleye growth was average until age 6 but significantly below average at older ages compared to 2008 and other lakes in northeast Wisconsin (Figure 4). Because the forage base is adequate and comprised of a variety of species, the decline in growth can be attributed to the lack of suitable thermal habitat during the growing season. Warmer than optimal water temperatures during the summer is the most likely culprit for the decreased growth of age-7 and older walleye. This is a plausible explanation because no other species of fish collected during the 2013 survey exhibited poor growth.

Total annual mortality was estimated using the age / frequency of walleye aged during the survey. However, this estimate is of little value because walleye recruitment has not been consistent from year to year (Figure 5). The next survey of White Potato Lake should utilize otoliths for aging. This change will not only produce reliable and accurate walleye ages but a more meaningful mortality estimate and allow better tracking of year classes as they relate to stocking (small versus large fingerlings).

The tag reward study was originally initiated because of the number of walleye collected in 2008 but catch rates were low in 2013. Monetary rewards have been shown to increase angler participation in tagging studies (MacRitchie & Armstrong, 1984). Overall, the tag reward study was a success. We received almost a 10% return on tagged fish and very good tag retention (in excess of 95%) of double-tagged fish. Fish that were tagged with a single floy tag should have

been fin-clipped as an additional estimate of tag retention. However, this would have only been evaluated through Tier I sampling, not through angler returns because anglers would not have been aware of the second mark (fin clip).

Largemouth bass abundance increased and size structure improved between the 2008 and 2013 surveys (Table 8 and Figure 7). Even though PSD declined from 84 in 2008 to 44 in 2013, the high PSD reported in 2008 was attributed to the large number of 12-inch bass collected (Figure 7). RSD^P also increased from 15 to 18 between 2008 and 2013, respectively. The number of largemouth bass collected over the 14-inch minimum length limit also increased between surveys. An abundance of young-of-the-year bass were collected in August using mini-fyke nets, representative of excellent recruitment in 2013. Bass fishing on White Potato Lake should continue to provide the same consistent opportunity that it has in previous years. Bass growth was average and showed little change since 2008.

The reduction of black crappie abundance between 2008 and 2013 is likely a result of the late spring ice out (Table 8). Crappies are generally collected in higher abundance in fyke nets than electrofishing. Additionally, crappie are cyclic spawners meaning that successful reproduction and recruitment can be highly variable and unpredictable from year to year. The 2008 survey revealed a strong year class of crappie around 9 inches (Figures 10). The recent survey indicated a strong year class of age-2 fish averaging just over 7 inches (Figure 10 and 11). Few fish over 7 inches were collected. This example illustrates the inconsistency of reproduction and recruitment however, crappie fishing should be fair for the next couple of years.

Yellow perch comprised 2% of fish collected in 2013 and 8% 2008 (Table 8). As mentioned previously, perch spawn was observed on April 28 while fyke nets were being set. Reduced catch rates (Table 8) are not indicative of a decline in abundance. A modest evaluation of perch stocking occurred in 2012/2013 whereby 2,000 perch were fin clipped (left ventral) before stocking. Perch registered during the annual ice fishing derby were examined for marks. Additional prize categories were created as an incentive for people to target and register perch during the derby. Overall, 5 out of the 41 perch registered were stocked fish and only 2 of 13 perch over 10 inches were fin clipped (Figure 13). While stocked yellow perch are utilized by anglers, it is evident that stocking is not necessary. Good reproduction and recruitment of yellow perch was also observed.

Only 38 muskellunge were collected during the 2013 survey which was consistent with what was collected during the 2008 survey (39). Our population estimate indicated the population to be 43 fish compared to 86 in 2008. Muskellunge have only been stocked in White Potato Lake on three occasions (Table 1). The large, age-14 year class corresponds to the last stocking which occurred in 1999. The 2008 survey also documented natural reproduction however, the observed low level of reproduction is inadequate to sustain the fishery.

CONCLUSIONS & RECOMMENDATIONS

The late arrival of spring in 2013 diminished the efficiency of spring fyke netting and the overall comparability of data between survey years. Even so, the 2013 fisheries survey of White Potato Lake indicated good numbers of gamefish including panfish species such as bluegill, rock bass and black crappie and predator species such as largemouth bass, northern pike, and walleye. All species showed good size structure compared to other lakes in northeast Wisconsin. Growth for most species, except walleye, was average compared to other lakes in northeast Wisconsin.

Small fingerling walleye have been stocked by WDNR in alternate years since the early 1990's (Table 1). Stocking small fingerling walleye has produced varied results but recruitment of small fingerling walleye to the fishery has occurred. Small fingerling walleye marked with OTC have also been used to evaluate natural reproduction. No natural reproduction by walleye has been observed. The current stocking rate of 10 small fingerlings / acre should be increased to the maximum allowable rate; 35/acre. The increased stocking rate may create more consistent year class strength as long as the White Potato Lake Sportsman's Club continues stocking in years when WDNR does not. Stocking large fingerling walleye at the rate of 5/acre/year would produce more consistent year class strength and improve the walleye population and fishing opportunities. White Potato Lake would also be a good candidate lake to research the effect of increasing the stocking rate of small fingerling walleye (i.e. from 35/acre to between 50 and 100/acre) on adult densities.

WDNR staff identified two areas that would be ideal for creating walleye spawning habitat. In 1994, glacial stone was placed along Bodega Point to improve walleye spawning habitat. This area could be greatly enhanced with the addition of more stone, further out from shore. The shoreline east of the water control structure is also another spot where glacial stone could be added to promote walleye spawning. Walleye were actively using this shoreline during our spring fyke

net survey. This shoreline receives a great deal of wind and wave action that would stimulate walleye spawning.

Stocking of muskellunge in White Potato Lake should be pursued. Rowe (2008) recommended a density goal of 0.25 muskie / acre. The current population estimate (0.05 musky per acre) is well below that recommendation. It does not appear that natural reproduction is capable of creating or sustaining a fishable population of muskellunge. No adverse impacts to the fishery have been observed as a result of previous muskellunge stockings. Because the forage base and habitat are conducive to support a muskellunge fishery, we recommend stocking 250 large fingerling muskellunge / year. It is also recommended that these fish are fin clipped prior to stocking, if possible. Fin clips should alternate between years (i.e. RV in even years; LV in odd years) to distinguish stocked fish from those that may be the result of natural reproduction. Fin clipping will also help identify individual year classes, potentially making it easier to assess age and growth in future surveys.

The current fishing regulations (Table 9) are adequate to provide quality fishing opportunities. The next comprehensive fisheries survey (fyke netting, spring and fall electrofishing) of White Potato Lake is scheduled for 2019 and will focus on the age, growth, abundance, and recruitment of the dominant gamefish. Boat access to White Potato is adequate since anglers have 5 boat landings to choose from but shorefishing opportunities are very limited for the public. Boaters are reminded to remove all vegetation from their boat and trailer before leaving to limit the spread of this and other invasive species. A map of White Potato Lake can be found at the following internet address; http://dnr.wi.gov/lakes/maps/DNR/0515100a.pdf

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APPENDIX I – TABLES

Table 1. Stocking history of White Potato Lake; Oconto County, WI.

Year	Species	Strain	Age Class	Number Stocked	Average Length	Source
1998	BLACK CRAPPIE	UNSPECIFIED	LARGE FINGERLING	2,000	4	Private
1999	BLACK CRAPPIE	UNSPECIFIED	YEARLING	100	5	Private
1995	BLUEGILL	UNSPECIFIED	FINGERLING	1,000	4	Private
1999	BLUEGILL	UNSPECIFIED	LARGE FINGERLING	6,000	4	Private
2003	BLUEGILL	UNSPECIFIED	ADULT (BROODSTOCK)	850	4	Private
2004	BLUEGILL	UNSPECIFIED	UNKNOWN	3,000	6	Private
2005	BLUEGILL	UNSPECIFIED	ADULT	950	5	Private
2003	HYBRID BLUEGILL	UNSPECIFIED	ADULT (BROODSTOCK)	1,745	4	Private
1992	MUSKELLUNGE	UNSPECIFIED	FINGERLING	500	11	WDNR
1997	MUSKELLUNGE	UNSPECIFIED	YEARLING	150	12	Private
1999	MUSKELLUNGE	UNSPECIFIED	YEARLING	150	16	Private
1982	WALLEYE	UNSPECIFIED	FRY	2,000,000		WDNR
1985	WALLEYE	UNSPECIFIED	FRY	2,000,000	1	WDNR
1990	WALLEYE	UNSPECIFIED	FINGERLING	2,635	4	WDNR
1991	WALLEYE	UNSPECIFIED	FINGERLING	3,000	7	Private
1992	WALLEYE	UNSPECIFIED	FINGERLING	6,045	4	WDNR
1993	WALLEYE	UNSPECIFIED	FINGERLING	8,187	3	WDNR
1994	WALLEYE	UNSPECIFIED	FINGERLING	6,268	3	WDNR
1995	WALLEYE	UNSPECIFIED	FINGERLING	3,000	7	Private
1996	WALLEYE	UNSPECIFIED	FINGERLING	9,346	2	WDNR
1997	WALLEYE	UNSPECIFIED	LARGE FINGERLING	2,000	8	Private
1998	WALLEYE	UNSPECIFIED	SMALL FINGERLING	10,000	1	WDNR
1999	WALLEYE	UNSPECIFIED	LARGE FINGERLING	10,000	8	Private
2000	WALLEYE	UNSPECIFIED	SMALL FINGERLING	10,000	2	WDNR
2003	WALLEYE	MISSISSIPPI HEADWATERS	SMALL FINGERLING	10,000	2	WDNR
2003	WALLEYE	UNSPECIFIED	LARGE FINGERLING	999	8	Private
2004	WALLEYE	LAKE MICHIGAN	SMALL FINGERLING	9,985	1	WDNR
2005	WALLEYE	UNSPECIFIED	FALL YEARLING	4,000	8	Private
2006	WALLEYE	LAKE MICHIGAN	SMALL FINGERLING	9,985	1	WDNR
2006	WALLEYE	UNSPECIFIED	LARGE FINGERLING	4,000	8	Private
2007	WALLEYE	UNSPECIFIED	LARGE FINGERLING	4,000	8	Private
2008	WALLEYE	MISSISSIPPI HEADWATERS	SMALL FINGERLING	4,994	1	WDNR
2008	WALLEYE	UNSPECIFIED	ADULT	4,082	9	Private
2009	WALLEYE	MISSISSIPPI HEADWATERS	ADULT	4,075	8	Private
2010	WALLEYE	LAKE MICHIGAN	SMALL FINGERLING	10,000	1	WDNR
2011	WALLEYE	LAKE MICHIGAN	ADULT	4,175	8	Private
2012	WALLEYE	LAKE MICHIGAN	SMALL FINGERLING	9,992	2	WDNR
2013	WALLEYE	UNSPECIFIED	ADULT	4,998	8	Private
1997	YELLOW PERCH	UNSPECIFIED	LARGE FINGERLING	3,000	4	Private
1998	YELLOW PERCH	UNSPECIFIED	LARGE FINGERLING	3,000	6	Private
1999	YELLOW PERCH	UNSPECIFIED	LARGE FINGERLING	3,000	10	Private
2003	YELLOW PERCH	UNSPECIFIED	ADULT (BROODSTOCK)	3,000	9	Private
2004	YELLOW PERCH	UNSPECIFIED	UNKNOWN	516	9	Private
2005	YELLOW PERCH	UNSPECIFIED	ADULT	1,700	7	Private
2006	YELLOW PERCH	UNSPECIFIED	ADULT	1,800	8	Private
2007	YELLOW PERCH	UNSPECIFIED	ADULT	4,560	5	Private
2008	YELLOW PERCH	UNSPECIFIED	ADULT	1,550	7	Private
2009	YELLOW PERCH	UNSPECIFIED	ADULT	2,000	10	Private
2011	YELLOW PERCH	UNSPECIFIED	ADULT	1,564	9	Private
2012	YELLOW PERCH	UNSPECIFIED	ADULT	2,000	11	Private
2013	YELLOW PERCH	UNSPECIFIED	ADULT	1,550	9	Private

Table 2. Sampling gear, date, target species, sampling effort, and location (distance) for 2013 fisheries survey on White Potato Lake; Oconto County, WI.

Gear	Date	Target Species	Sampling Effort hours (h) or net night (NN)	Shoreline Distance (mi)
Fyke net	April 29 - May 6	All fish	77 NN	
Electrofishing	06-May	Walleye,	2.5 h	5.0
		Muskellunge		
Electrofishing	May 21, 29 and June 3	All fish	3.3 h	2.0
		Gamefish	1.0 h	6.5
Mini-Fyke net	August 19 & 20	Juvenile assessment	12 NN	
Electrofishing	24-Sep	YOY Walleye	1.8 h	4.0
		YOY Muskellunge		

Table 3. Proposed length categories for various fish species. Measurements are total lengths for each category in inches. Updated from Anderson and Neumann (1996), Bister et al. (2000), Hyatt and Hubert (2001).

Species	PSD	RSD-P	Stock	Quality	Preferred	Memorable	Trophy
Black crappie			5	8	10	12	15
Bluegill	20 - 40	5 - 20*	3	6	8	10	12
Brown bullhead			5	8	11	14	17
Largemouth bass	40 - 70	10 - 40*	8	12	15	20	25
Muskellunge	30 - 60		20	30	38	42	50
Northern pike	30 - 60		14	21	28	34	44
Pumpkinseed	20 - 40		3	6	8	10	12
Rock bass	20 - 60		4	7	9	11	13
Smallmouth bass	30 - 60		7	11	14	17	20
Walleye	30 - 60		10	15	20	25	30
Yellow perch	30 - 50		5	8	10	12	15
Yellow bullhead			4	7	9	11	14

*Range based on management strategy for balanced populations.

Table 4. Number, relative abundance (%), and length range (in) of fishes collected in 2013 from White Potato Lake; Oconto County, WI.

SPECIES AND RELATIVE ABUNDANCE OF FISHES COLLECTED BY NUMBER			
*COMMON NAME OF FISH	NUMBER	PERCENT	LENGTH RANGE (inches)
Bluegill	1,630	29.4%	2.5 - 8.8
Walleye**	1,005	18.1%	7.9 - 24.5
Rock bass	954	17.2%	3.3 - 9.8
Bluntnose minnow	571	10.3%	
Largemouth bass**	550	9.9%	4.3 - 20.3
Northern pike**	414	7.5%	11.2 - 36.2
Black crappie	199	3.6%	6.0 - 13.6
Yellow perch	102	1.8%	2.5 - 11.5
Muskellunge**	60	1.1%	36.8 - 49.3
Pumpkinseed	34	0.6%	
Yellow bullhead	19	0.3%	
Hybrid sunfish	18	0.3%	
Johnny darter	10	0.2%	
White sucker	6	0.1%	
Golden shiner	4	0.1%	
Black bullhead	3	0.1%	
Brown bullhead	3	0.1%	
Iowa darter	2	< 0.1%	
Total	5,584		
* Common names of fishes recognized by the American Fisheries Society.			
** Includes recaptured fish.			

Table 5. Comparison of spring fyke netting data between 2008 and 2013 collected from White Potato Lake; Oconto County, WI.

2013 Fyke Netting (77*)			2008 Fyke Netting (77*)		
Species	**Total Catch**	**Mean Catch per net night**	Species	Total Catch	Mean Catch per net night
Bluegill	1074	14.0	Walleye**	3138	40.8
Walleye**	940	12.2	Rock bass	2321	30.1
Rock bass	850	11.0	Bluegill	1626	21.1
Northern pike**	410	5.3	Yellow perch	789	10.2
Black crappie	195	2.5	Black crappie	767	10.0
Largemouth bass**	108	1.4	Northern pike**	644	8.4
Muskellunge**	55	0.7	Largemouth bass**	189	2.5
Yellow perch	27	0.4	Pumpkinseed	115	1.5
Pumpkinseed	21	0.3	Muskellunge**	48	0.6
* Sampling effort in net nights for each corresponding year.					
**Includes recaptured fish.					

Table 6. Seasonal electrofishing summary between 2008 and 2013 surveys on White Potato Lake; Oconto County, WI.

	Spring electrofishing						Gamefish/Panfish electrofishing						Fall electrofishing					
	2013 April			2008 April			2013 May			2008 May			2013 October			2008 October		
Species	Total Catch	CPUE / hour	CPUE / mile	Total Catch	CPUE / hour	CPUE / mile	Total Catch	CPUE / hour	CPUE / mile	Total Catch	CPUE / hour	CPUE / mile	Total Catch	CPUE / hour	CPUE / mile	Total Catch	CPUE / hour	CPUE / mile
Bluegill							**123**	**121.0**	**61.5**	45	22.5	36.5						
Yellow perch							**39**	**38.4**	**19.5**	30	15	24.3						
Northern pike	**2**	**0.8**	**0.4**				**2**	**0.6**	**0.3**	2	0.3	0.5						
Black crappie							**1**	**1.0**	**0.5**	5	2.5	4.1						
Walleye	**33**	**13.3**	**6.6**	184	33.5	64.6	**23**	**7.1**	**3.5**	115	17.7	29.2	**9**	**4.9**	**2.3**	103	14.6	22.3
Largemouth bass							**96**	**29.5**	**14.8**	57	8.8	14.5						
Pumpkinseed							**13**	**12.8**	**6.5**	8	4.0	6.5						
Rock Bass							**30**	**29.5**	**15.0**	94	47.0	76.2						
Muskellunge	**4**	**1.6**	**0.8**				**1**	**0.3**	**0.2**	3	0.5	0.8				3	0.4	0.7

Table 7. Mini-fyke net catch in 2013 on White Potato Lake; Oconto County, WI.

Species	Number collected
Bluntnose minnow	570
Bluegill	433
Largemouth bass	346
Rock bass	47
Yellow perch	36
Hybrid sunfish	18
Johnny darter	10
Black crappie	3
Iowa darter	2
Golden shiner	1

Table 8. Comparison of species relative abundance between 2008 and 2013 surveys on White Potato Lake; Oconto County, WI.

2013			2008		
Species	No.	%	Species	No.	%
Bluegill	1,630	29.4%	Walleye*	3,540	34.1%
Walleye*	1,005	18.1%	Rock bass	2,415	23.2%
Rock bass	954	17.2%	Bluegill	1,671	16.1%
Bluntnose minnow	571	10.3%	Yellow perch	819	7.9%
Largemouth bass*	550	9.9%	Black crappie	772	7.4%
Northern pike*	414	7.5%	Northern pike*	657	6.3%
Black crappie	199	3.6%	Largemouth bass*	289	2.8%
Yellow perch	102	1.8%	Pumpkinseed	123	1.2%
Muskellunge*	60	1.1%	Muskellunge*	54	0.5%
Pumpkinseed	34	0.6%	Yellow bullhead	34	0.3%
Yellow bullhead	19	0.3%	White sucker	9	0.1%
Hybrid sunfish	18	0.3%	Golden Shiner	5	< 0.1%
Johnny darter	10	0.2%	Black bullhead	2	< 0.1%
White sucker	6	0.1%			
Golden shiner	4	0.1%			
Black bullhead	3	0.1%			
Brown bullhead	3	0.1%			
Iowa darter	2	< 0.1%			
Total	5,584		Total	10,390	
* Includes recaptured fish.					

Table 9. Current fishing regulations for White Potato Lake; Oconto County, WI.

Species	Fishing Season	Daily Limit	Minimum Length
Largemouth bass Smallmouth bass	1st Saturday in May - 1st Sunday	0	Catch and release
Largemouth bass Smallmouth bass	June 19 - 1st Sunday in March	5 in total	14 inches
Northern pike	1st Staurday in May - 1st Sunday in March	5	None
Muskellunge	Last Saturday in May - November 30th	1	40 inches
Walleye	1st Saturday in May - 1st Sunday in March	5	15 inches
Panfish (bluegill, pumpkinseed, crappie, and yellow perch)	Open all year	25 in total	None
Bullheads	Open all year	None	None
Rock bass	Open all year	None	None

APPENDIX II – FIGURES

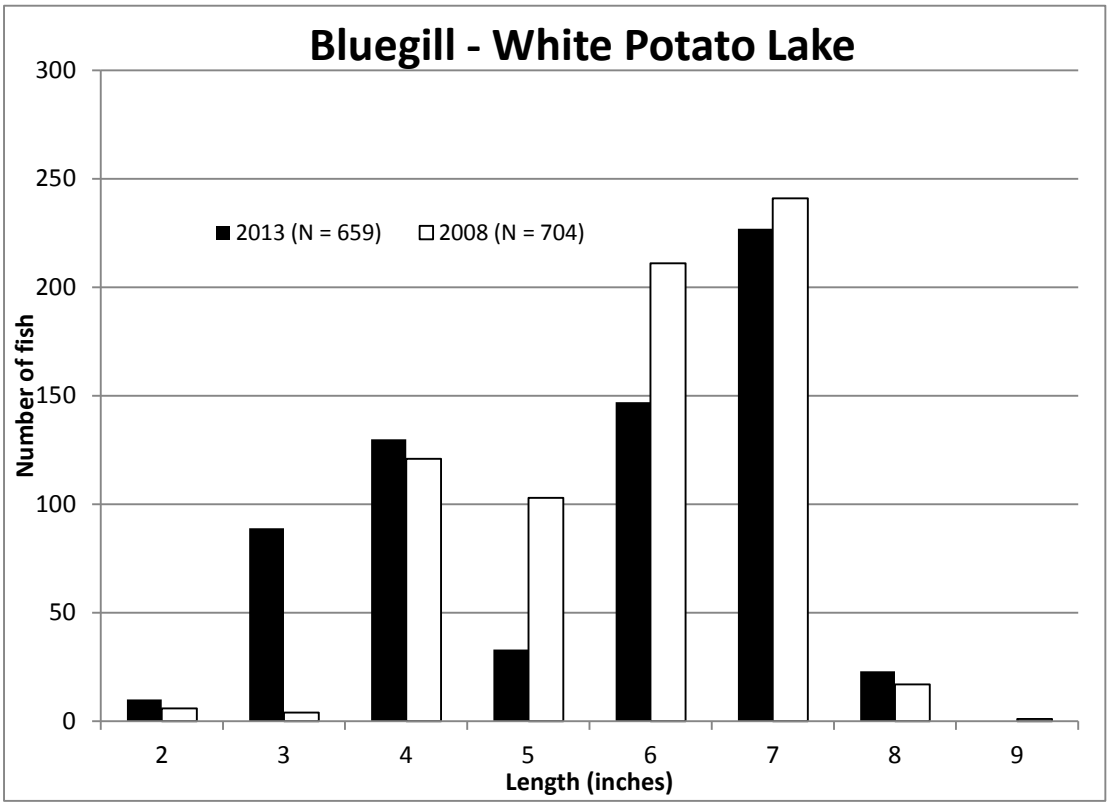

Figure 1. Bluegill length frequency from 2008 and 2013 fisheries surveys at White Potato Lake; Oconto County, WI.

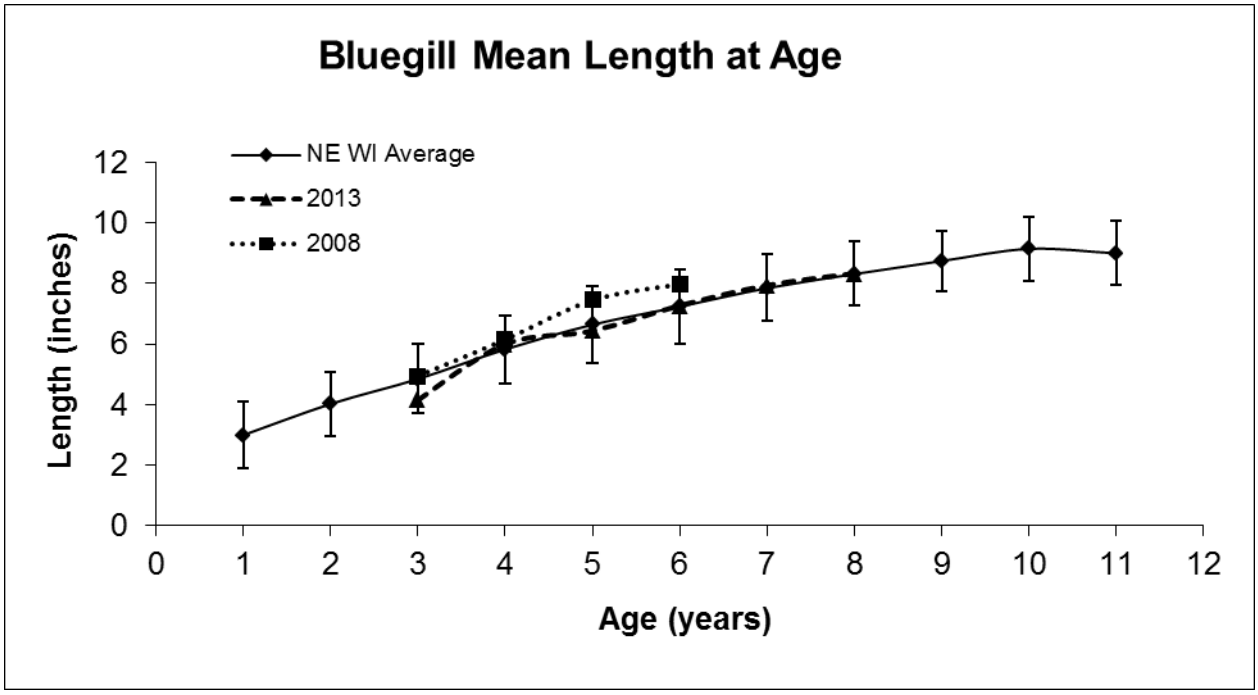

Figure 2. Bluegill mean length at age comparison from White Potato Lake; Oconto County, WI.

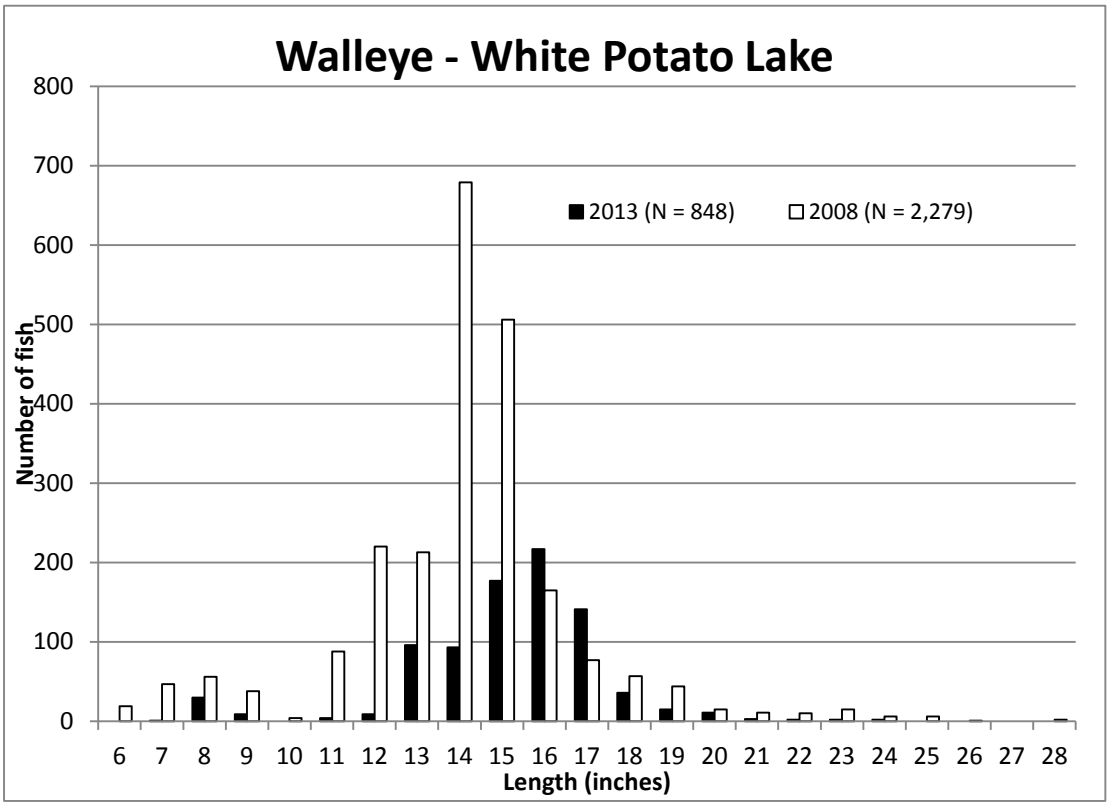

Figure 3. Walleye length frequency from 2008 and 2013 fisheries surveys at White Potato Lake; Oconto County, WI.

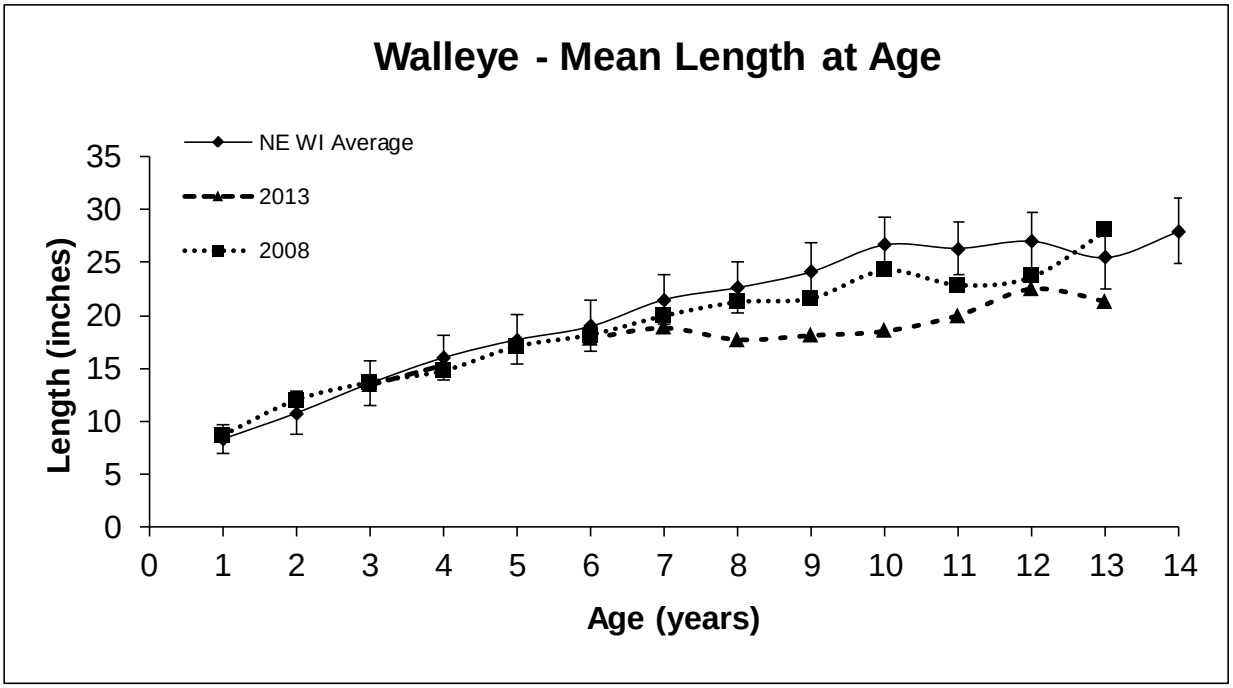

Figure 4. Walleye mean length at age comparison from White Potato Lake; Oconto County, WI.

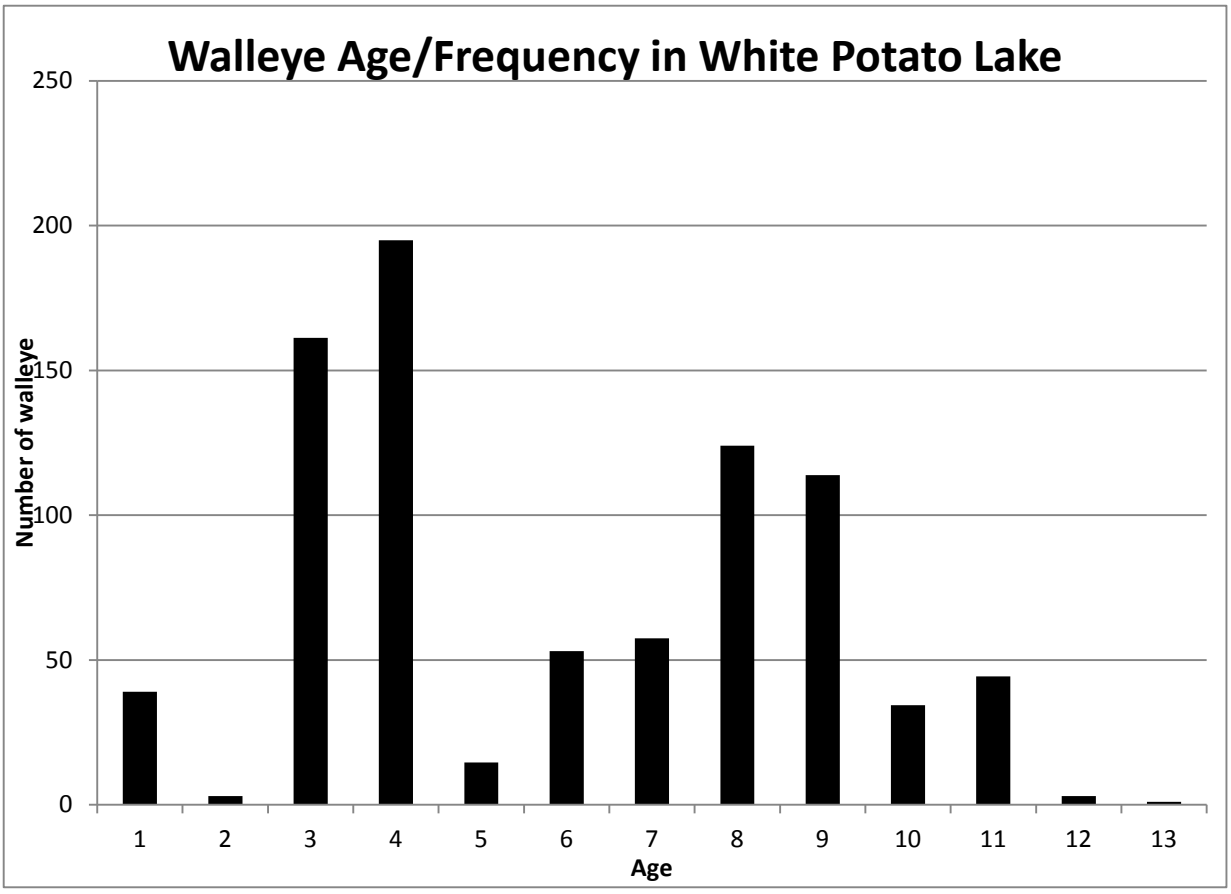

Figure 5. Walleye age/frequency in White Potato Lake; Oconto County, WI.

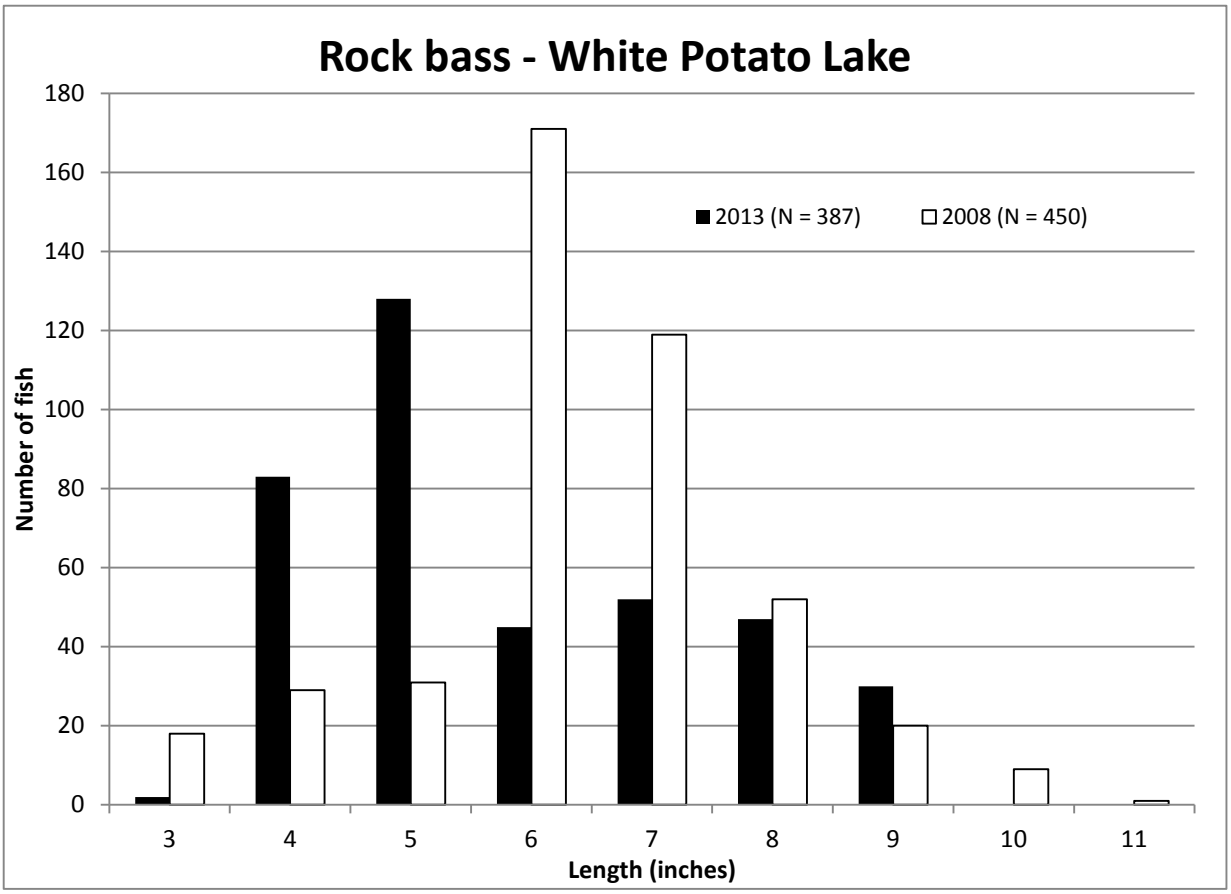

Figure 6. Rock bass length frequency from 2008 and 2013 fisheries surveys at White Potato Lake Oconto County, WI.

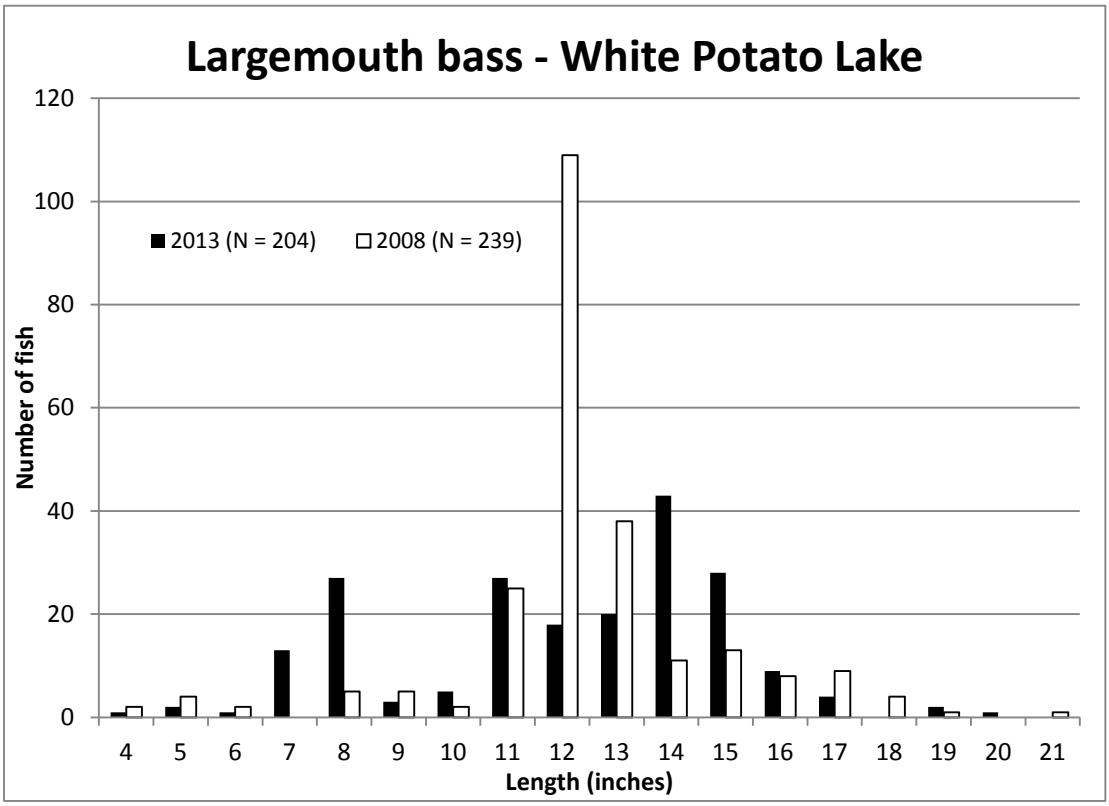

Figure 7. Largemouth bass length frequency from 2008 and 2013 fisheries surveys at White Potato Lake; Oconto County, WI.

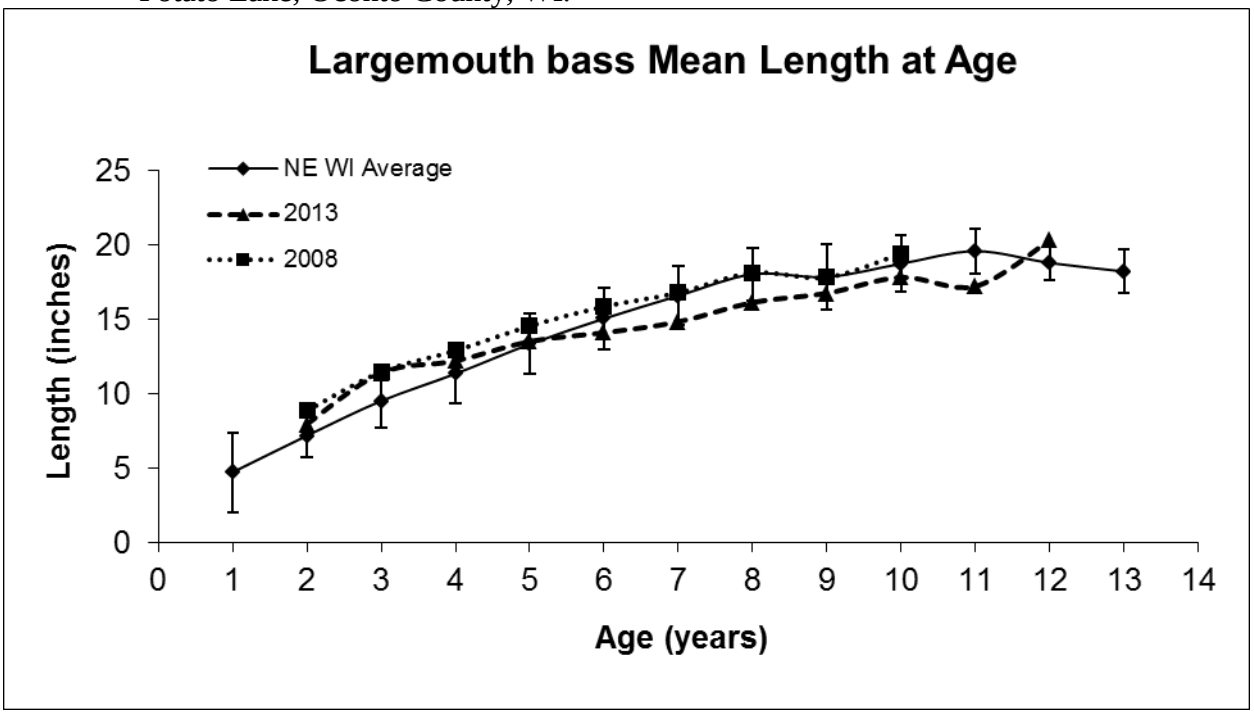

Figure 8. Largemouth bass mean length at age comparison from White Potato Lake; Oconto County, WI.

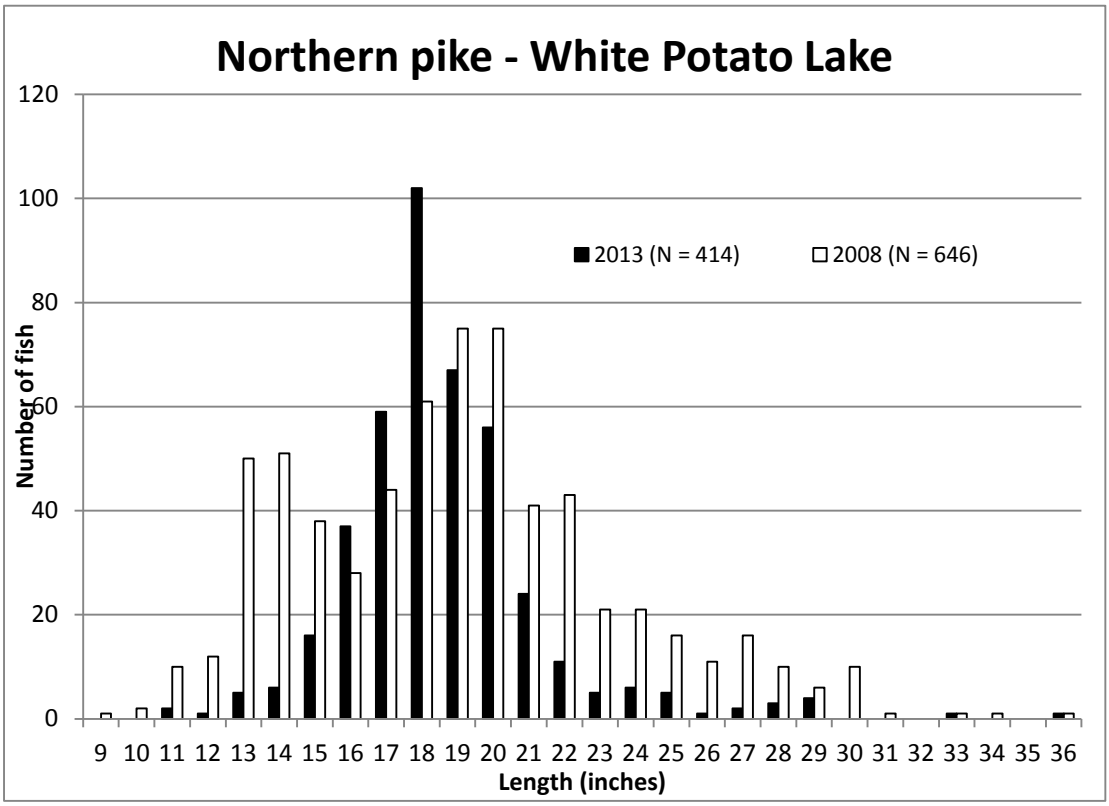

Figure 9. Northern pike length frequency from 2008 and 2013 fisheries surveys at White Potato Lake; Oconto County, WI.

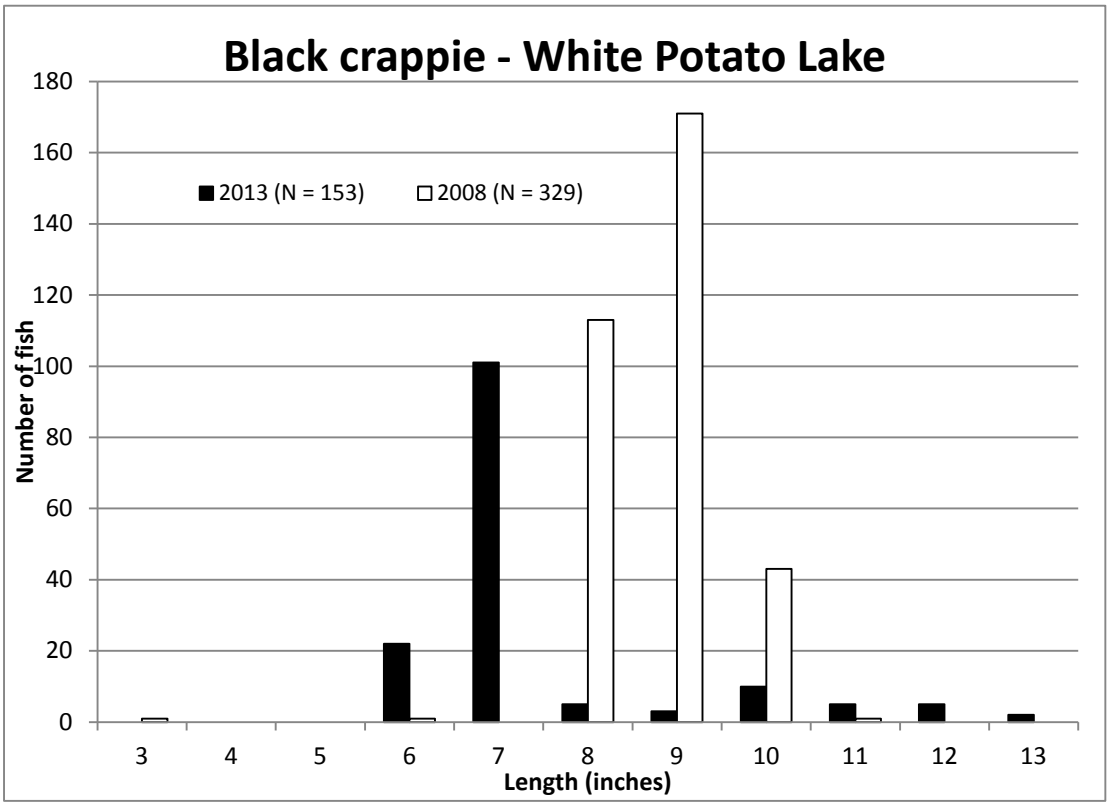

Figure 10. Black crappie length frequency from 2008 and 2013 fisheries surveys at White Potato Lake; Oconto County, WI.

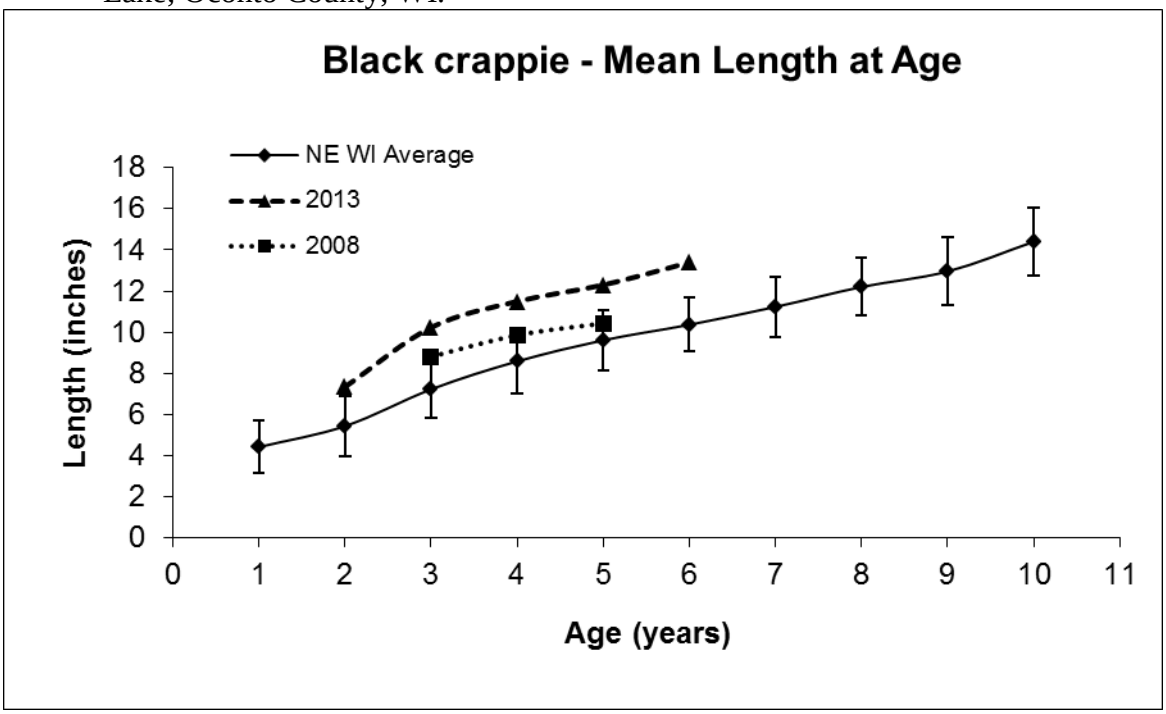

Figure 11. Black crappie mean length at age comparison from White Potato Lake; Oconto County, WI.

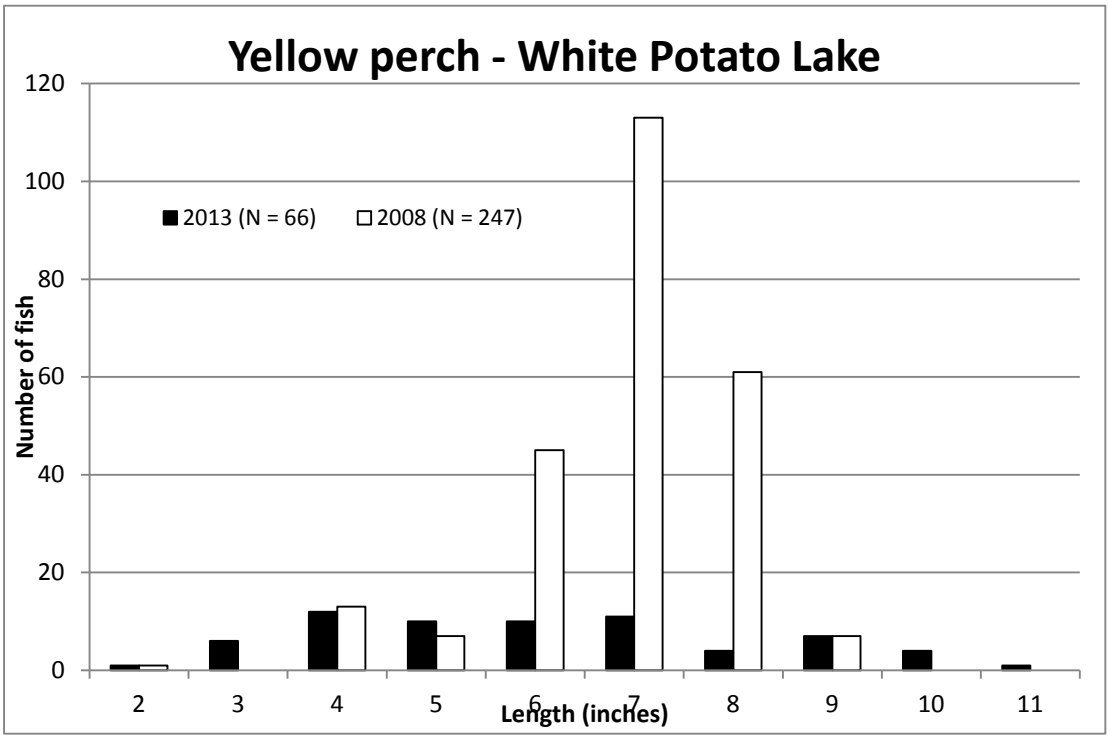

Figure 12. Yellow perch length frequency from 2008 and 2013 fisheries surveys at White Potato Lake; Oconto County, WI.

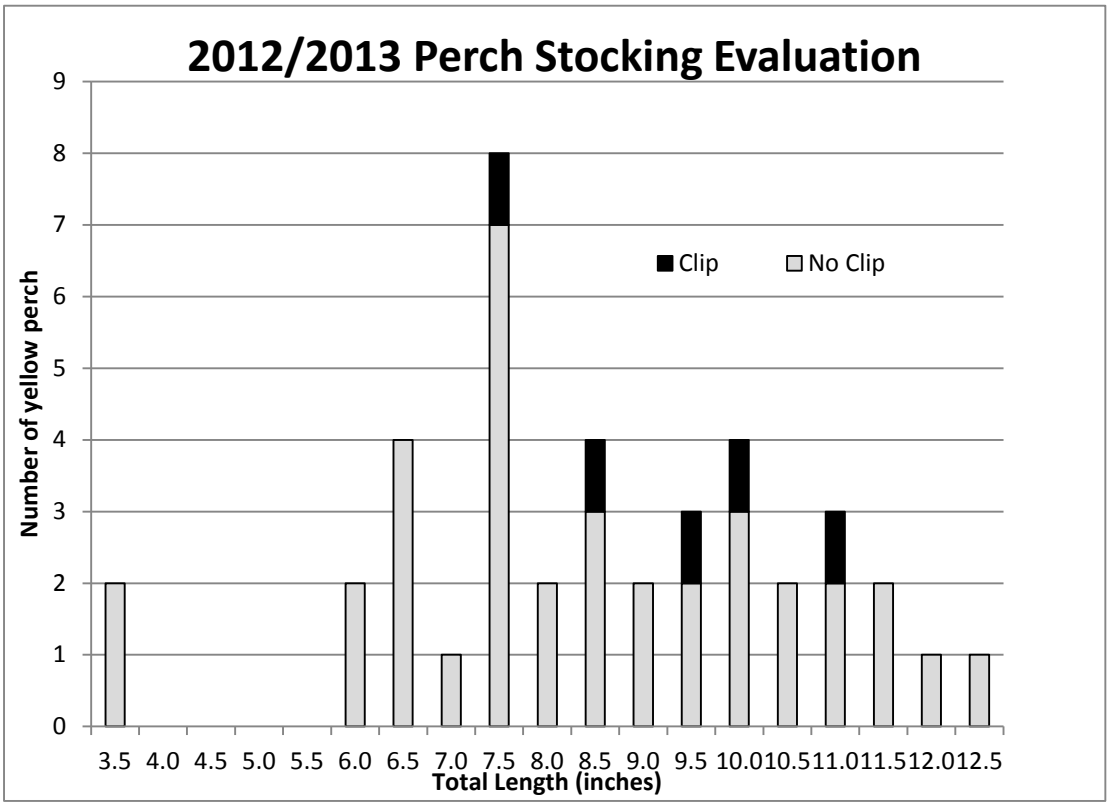

Figure 13. Proportion of fin-clipped perch to perch not clipped registered during the 2013 ice-fishing derby at White Potato Lake; Oconto County, Wisconsin.

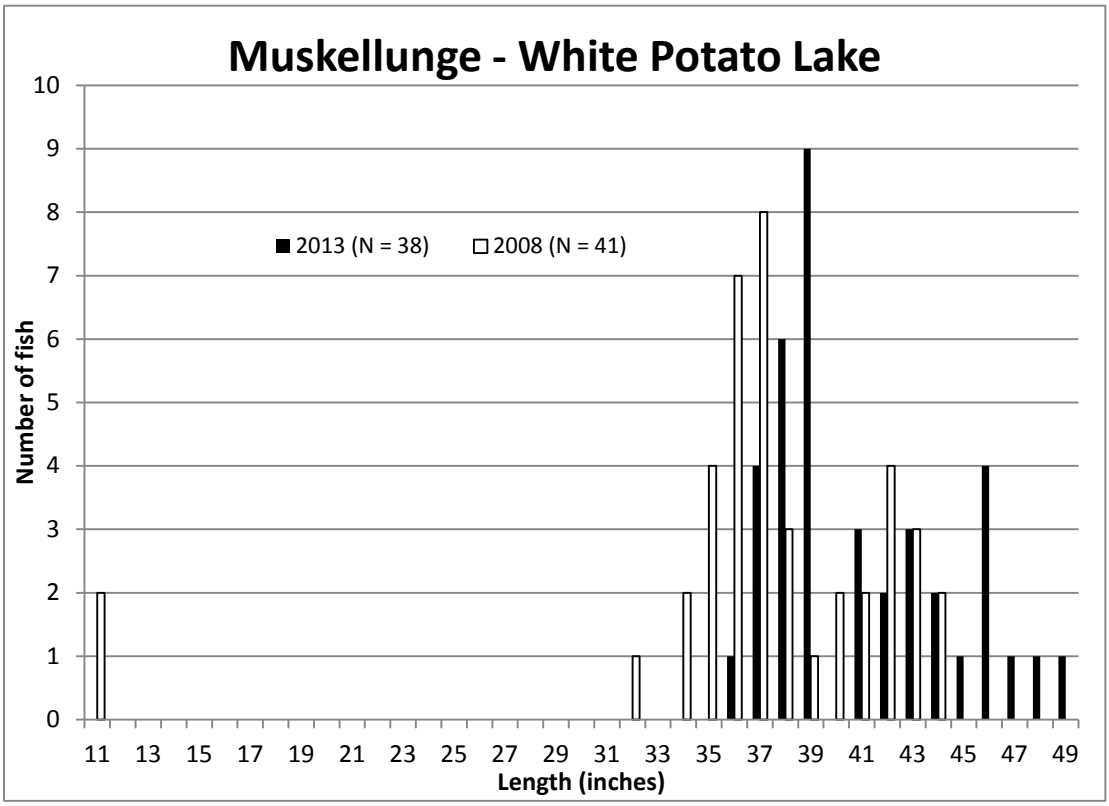

Figure 14. Muskellunge length frequency from 2008 and 2013 fisheries surveys at White Potato Lake; Oconto County, WI.

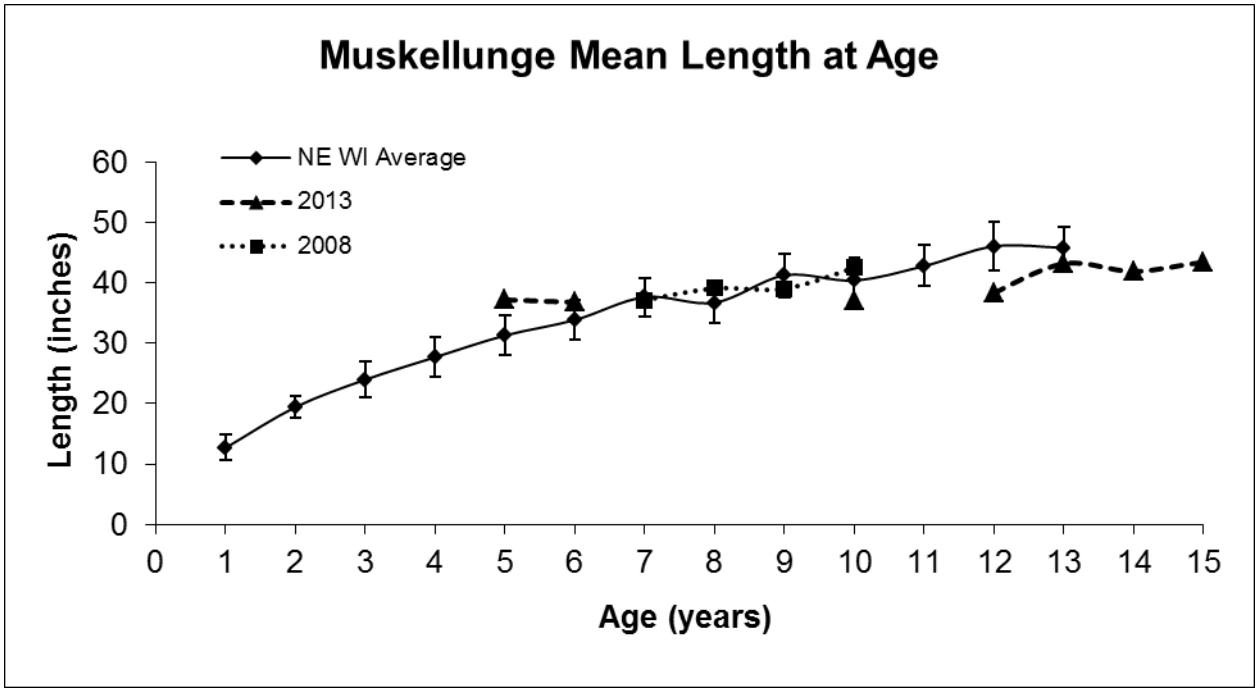

Figure 15. Muskellunge mean length at age comparison from White Potato Lake; Oconto County, WI.

APPENDIX III – SAMPLING LOCATIONS

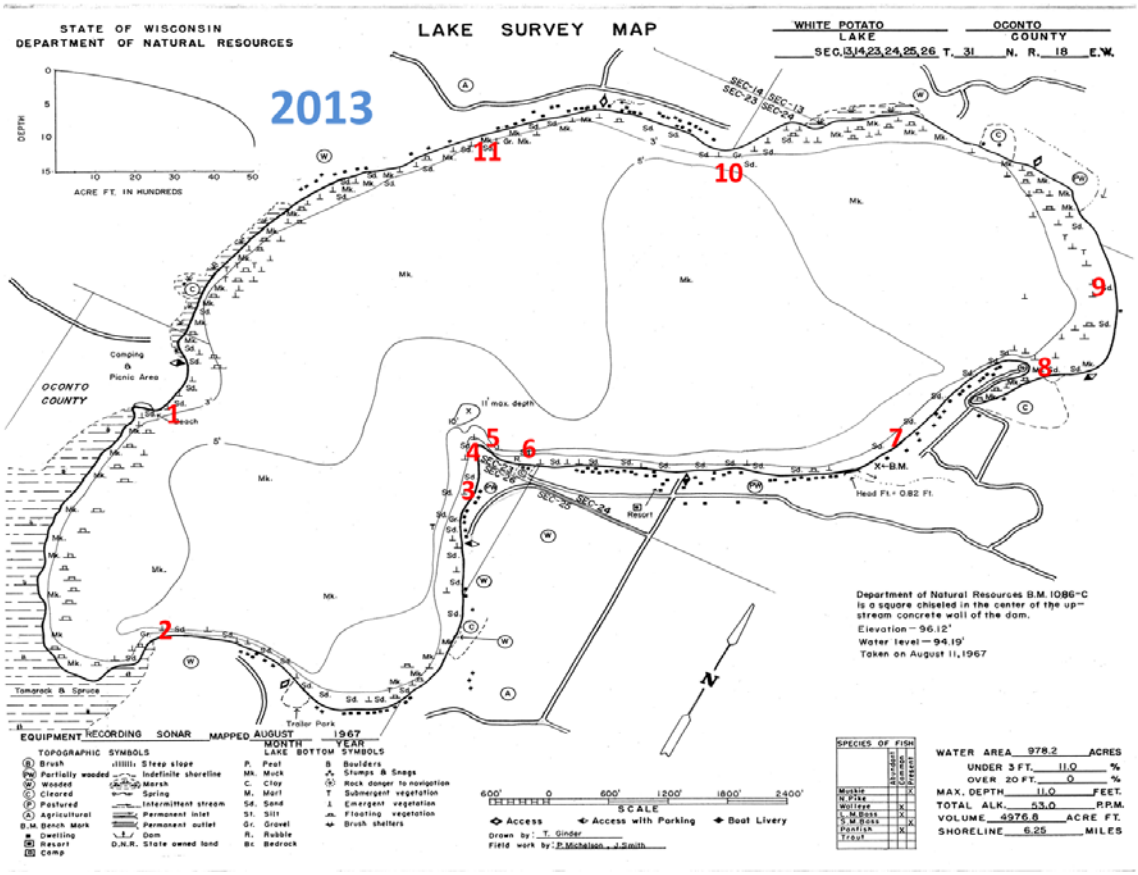

Figure 14. Fyke net locations during 2013 comprehensive survey of White Potato Lake; Oconto County,WI.