Comprehensive Fishery Survey of White Mound Lake
Sauk County, Wisconsin 2013

Waterbody Identification Code: 1258100

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EXECUTIVE SUMMARY

A comprehensive fishery survey was conducted on White Mound Lake during the spring of 2013, including early fyke netting for northern pike and walleyes (SNI), early electrofishing to recapture marked walleyes (SEI), and late spring electrofishing for bass and panfish (SEII). Largemouth bass was the most abundant of all sport fish species collected (panfish or gamefish) from White Mound Lake. The SEII catch rate of largemouth bass ≥ 8 inches was 191.2 fish/mile, and the population density of fish ≥ 10 inches was 36.9 fish/acre based on a Chapman-modified Petersen mark-recapture estimate. Largemouth bass PSD and RSD-P values were 72 and 15 based on the SEII catch. White Mound Lake has the highest density of largemouth bass among lakes in Columbia and Sauk counties. The average age of a 14.0-14.9 inch fish (MAL14) is 6.5 years, comparable to other lakes in Columbia and Sauk counties that do not contain gizzard shad. Largemouth bass were in good condition; relative weights averaged 95.2.

Bluegills are common and grow fast in White Mound Lake, averaging 8.2 inches at age-6. Bluegill length at age meets or exceeds region averages for ages 4 through 8. Bluegill CPE during SEII was 155 fish/mile, which ranks in the 71st percentile statewide. Bluegill PSD and RSD-P values were 35 and 14, respectively. Bluegills provide an ample forage base for the dense largemouth bass population, which ensures good bluegill growth by reducing competition among bluegills for food resources.

Other panfish species of note that were collected include pumpkinseed, yellow perch, and white crappies. These species are minor components of the fishery. Pumpkinseeds larger than 7 inches can be found in White Mound Lake. White crappies are present at low abundance, and the catch in this survey was dominated by age-2 fish. Yellow perch size structure appears to be poor; the catch was dominated by small males. However, rare individuals over 8 inches can be found in White Mound Lake. Brown bullheads up to 16.1 inches provide a minor fishery as well.

The spring walleye population estimate (PE) of 1.4 adult walleyes ≥ 15 inches per acre indicated that the extended growth fish stocked in 2009 survived well to age-4 despite high densities of largemouth bass. Walleye growth was good. Male walleyes averaged 17.6 inches and female walleyes averaged 19.6 inches (all age-4). The average length for all walleyes regardless of sex was 18.2 inches. In a small, simple system like White Mound Lake, impacts to other species such as yellow perch and crappies should be monitored as walleyes have the potential to drive these low-abundance species into extirpation via predation.

Northern pike are present in White Mound Lake at low abundance. Growth and condition of northern pike are average to poor. Condition is worse for males than females. Age 5 northern pike were the most common in the distribution and averaged 25.0 inches. The largest northern pike sampled was a 37.0 inch female that was aged at 6 years old. The oldest northern pike sampled were aged at 9 years.

Common carp were not found in the 2013 survey and have historically been absent from White Mound Lake.

Lake & location
White Mound Lake, Sauk County
T10N, R3E Sections 11, 12

Physical/chemical attributes
Morphometry: 104 acres, maximum depth of 26 feet, average depth of 11 feet (McComas and Stuckert 1996).
Watershed: 6.99 square miles (4,474 acres, McComas and Stuckert 1996).
Lake type: Drainage, seepage; artificial impoundment of Shannahan Valley Creek. Dam was built in 1969, lake was filled in 1970 (McComas and Stuckert 1996). Artesian springs also add water to the lake (McComas and Stuckert 1996).
Water Clarity: Turbid in summer and fall, clear in winter and spring.
Littoral substrate: Gray-brown silt loams characteristic of the watershed (McComas and Stuckert 1996).
Trophic status: Eutrophic (Marshall et al. 2006)
Aquatic vegetation: Ten species in 1995 including Eurasian watermilfoil and curly-leaf pondweed (McComas and Stuckert 1996). Emergent plants and sago pondweed dominant in shallow depths, Eurasian watermilfoil and coontail at nuisance levels at three and six foot sampling depths (Molter 2002). The 2006 aquatic vegetation survey noted 15 species with small pondweed, coontail, filamentous algae, Eurasian watermilfoil, and common waterweed being the five most abundant species in terms of relative frequency (WDNR unreported data).
Winterkill: Infrequent
Boat Landings: One public boat access point exists at the north end of the lake; it is controlled by Sauk County.
Other Features: The dam is located at the southern end of the lake and can release water from a top-draw spillway as well as a bottom-draw structure that discharges cold hypolimnetic water into Shannahan Valley Creek to offer thermal stability for brown trout downstream of the lake. Hook and line fishing season dates, minimum harvest lengths, and bag limits can be found in Table 1.

Purpose of survey
Baseline lake survey Tier 1 assessment.

Dates of fieldwork
Fyke netting survey conducted April 21 through April 25, 2013 (SNI).
Electrofishing surveys conducted April 25, 2013 (SEI), and May 8, 2013 (SEII).

Fishery
Largemouth bass are abundant, bluegills are common, and yellow perch, northern pike, walleye, and white crappies are present. Black crappies were present in previous surveys but were not found in 2013.

BACKGROUND

White Mound Lake is a 104 acre artificial impoundment of Shannahan Valley Creek located in west-central Sauk County, approximately 5 miles northwest of the Village of Plain. White Mound Lake is contained within the 1,100 acre White Mound County Park, managed by Sauk County. The Sauk County Soil & Water Conservation District began sponsoring a program in 1965 to install flood control structures in the Plain-Honey Creek watershed in response to frequent and occasionally severe flooding (McComas and Stuckert 1996). As part of this program, a dam was constructed on Shannahan Valley Creek in 1969, the dam was closed in 1970, and the first fish stockings occurred in 1971. White Mound County Park was created when Sauk County purchased 5 farms surrounding the lake (McComas and Stuckert 1996). White Mound Lake County Park offers camping, hiking, horseback riding trails, hunting, and other recreational opportunities in addition to the water-based recreation activities that the lake provides.

The White Mound Lake watershed is approximately 7.0 square miles (4,474 acres), and since formation of the park, land use in the watershed consisted of approximately 65% open land/pasture/forest/wetlands and park land, with the remaining 35% devoted to agriculture (McComas and Stuckert 1996). White Mound Lake is eutrophic with mean annual surface phosphorous concentrations ranging from 47 to 60 µg/L during 2000-2005, and Secchi measurements ranged from 0.61 to 1.17 m during the same period (Marshall et al. 2006). This was a decline from 1995, when the average Secchi disc transparency for the summer was 2.2 meters (McComas and Stuckert 1996).

The dam at White Mound Lake was originally designed to accommodate 100% of base flow from the bottom, but increases in regional base flows over time caused the water released from the dam to be a mixture of bottom and surface waters (Marshall et al. 2006). In 1995, the outlet at White Mound Lake was modified to accommodate 100% of base flow from the bottom of the lake to facilitate the release of cold water to Shannahan Valley Creek for the purpose of trout management (Marshall et al. 2006). Shannahan Valley Creek below White Mound Lake supports low abundances of brown trout but is not officially classified as a trout stream. It flows into Honey Creek approximately 1.3 miles downstream of White Mound Lake. Honey Creek is a recreationally important class II brown trout stream which supports between 750 and 2,000 brown trout per mile along a 1.5 mile stretch from State Highway 23 downstream to Leland Road

(WDNR unreported data). Water temperature and dissolved oxygen profiles measured during the 1993 survey indicated that White Mound Lake stratified both thermally and in terms of dissolved oxygen, with the thermocline at a depth of approximately 7.5 feet over the deepest part of the lake (Larson 1993). The temperature at the surface was 80°F, 71°F at 7.5 feet, and 53°F at the lake bottom. Dissolved oxygen was > 10 parts per million (ppm) at the surface, 3.5 ppm at 7.5 feet, and 0.4 ppm at the lake bottom. By 2005, however, White Mound Lake was no longer thermally stratifying, although the dissolved oxygen profile continued as in a strongly stratified lake with oxygen depletion at depths greater than 2 meters (6.5 feet, Marshall et al. 2006). The loss of thermal stratification was attributed to cold water depletion of the hypolimnion with subsequent replacement by warm water due to the bottom-draw water release structure in the dam (Marshall et al. 2006).

White Mound Lake was drawn down 14 feet in the fall and winter of 2003-2004, reducing the lake's size from 104 to 40 acres. The drawdown was done to allow dredging of the lake bottom to return the lake's holding capacity to the volume that existed at the time the lake was created. The dredging took place primarily in the bay at the north end of the lake, as well as the bay on the southwest side of the lake where the swimming beach is located. Sauk County performed the work under a mandate from NRCS to ensure that White Mound Lake would be able to handle major rain events without compromising the integrity of the dam. During the period of the drawdown, the fishery was closed to angling to protect fish that were concentrated in the reduced volume of the lake. The lake re-opened for fishing on May 1, 2004.

The fishery in White Mound Lake was begun from stockings of northern pike fry and adults, largemouth bass fry, fingerlings and adults, and white sucker fry and adults in 1971 and 1972. Stockings of fingerling and adult bluegills also occurred in 1971, and additional adults were stocked in 1972 (Larson 1993, this report Table 2). Poor size structure of bluegills plagued the lake in the 1970s and 1980s as bluegills were overly abundant, and largemouth bass were not sufficiently abundant to regulate them (Larson 1993). The lack of a size limit on largemouth bass and correspondingly high harvest was cited as one reason for poor bluegill size structure (Larson 1993). A 14 inch minimum length limit on largemouth bass was instituted as the general regulation in Wisconsin in 1989, and abundance and size structure responded positively in White Mound Lake by 1993 (CPE8 = 135 fish/hr, PSD = 46), although it was noted that there was a significant drop in numbers once bass reached 14 inches (Larson 1993). Harvest of bass larger than the 14 inch limit was proposed as a reason for the lack of numbers of large fish (Larson

1993). It was also recommended that a bag limit reduction be explored for panfish because the daily bag limit at that time of 50 fish was thought to be too high to sustain harvest of quality-sized panfish on a small lake such as White Mound Lake (Larson 1993). The State of Wisconsin instituted a statewide 25 fish daily bag limit for panfish in 1998.

An electrofishing survey was conducted in the fall of 2003, just prior to the drawdown. It was noted that bass abundance and size structure had regressed from the previous survey in 1999; PSD and RSD-P had declined from 91 and 12 to 24 and 10, respectively. Abundance of small bluegills had increased, and the number of larger fish had decreased; bluegill PSD and RSD-P had declined from 48 and 3, to 3 and 0 respectively (WDNR previously unreported data). One explanation was that aquatic vegetation had become so dense that largemouth bass could no longer forage efficiently for bluegills. Surveys in 2006 and 2007 saw largemouth bass PSD and RSD-P values return to previous levels, and bluegill size structure showed minor improvements. The 2013 comprehensive fishery survey was the first fishery survey of any kind on White Mound Lake since the spring of 2007.

Walleyes were stocked in 1989 (7,900 fingerlings averaging 3 inches, Table 2) in an unsuccessful attempt to establish a population. Predation by largemouth bass likely eliminated most of the fingerlings before they grew large enough to be invulnerable to bass. In 2009, extended growth walleyes were stocked at the rate of 10 per acre, as per the Wisconsin Walleye Stocking Guidance. These fish were donated by a private fish hatchery; all Sauk County walleye lakes got 10 extended growth fingerlings per acre that year from the private hatchery. This survey provided the opportunity to evaluate the survival of those fish to adulthood.

Pumpkinseed, yellow perch, black crappie, white crappie, and northern pike have produced only minor fisheries in White Mound Lake since the lake was formed. Channel catfish stocked in 1982 and 2000 did not succeed in providing a fishery.

METHODS

Data collection-spring netting and electrofishing

Following ice-out, 6 standard 3-foot hoop fyke nets with 0.7 inch bar, 1.4 inch stretch mesh were set on April 21, 2013; these fyke nets targeted northern pike and walleye (SNI). Fyke net

locations (GPS coordinates) can be found in Table 3. All six nets were run each day from April 22 through April 25 before being pulled out.

Gamefish and panfish were measured to the nearest 0.1 inch and a subsample of each species was weighed to the nearest 0.01 pound. Aging structures were taken from a subsample of bluegills, white crappies, largemouth bass, northern pike, walleyes, and yellow perch. The goal was to take structures from 5 fish per half-inch group for bluegills, white crappies, and largemouth bass, and 5 structures per half-inch group for each sex for northern pike, walleye, and yellow perch. Sex was recorded when evident for northern pike, walleye, and yellow perch. Only one year class of walleyes was present in the lake from the single stocking of extended growth fingerlings in 2009. All captured walleyes were marked with a top caudal fin clip for the population estimate (PE). Northern pike were marked with a top caudal fin clip for the purpose of calculating a multiple census Schnabel mark-recapture population estimate. Northern pike captured after the first lift day were examined for marks.

A WDNR standard direct current (DC) boom shocker boat was used to sample fish on White Mound Lake during the spring of 2013. The first electrofishing survey occurred on the night of April 25 (SEI) to recapture walleyes that were marked during SNI, and also to mark largemouth bass for a population estimate. The entire shoreline was sampled and all gamefish were collected and measured to the nearest 0.1 inch. Hard structures were removed and fish were weighed as needed to fill out length bins for age and growth analysis. Walleyes were examined for marks for calculation of the PE. Largemouth bass were marked with a top caudal fin clip.

The second electrofishing survey occurred on May 8, 2013 (SEII). A total of two electrofishing stations were chosen, which encompassed the entire shoreline of the lake. The first station began with a randomly chosen start point and was 2 miles of shoreline in length. Within the station, panfish and gamefish were collected during the first 0.5 mile, while gamefish only were collected for the remaining 1.5 miles. The second station consisted of a 0.5 mile panfish and gamefish run only, because by this point the entire shoreline had been sampled. Rough fish and other non-game fish were observed and counted while sampling the 0.5 mile panfish stations, but were not dip netted. All gamefish and panfish were measured to the nearest 0.1 inch. Aging structures were taken and weights were recorded from gamefish and panfish where necessary to fill out length bins. Starting and ending GPS coordinates for electrofishing stations can be found in Table 4.

Data Analysis

The walleye PE (number of adult fish ≥ 15 inches) was calculated using the Chapman modification of the Petersen single-census method where fish are marked during multiple fyke netting events (SNI), followed by a single recapture event (SEI). The formula is noted here:

$$N = \frac{(M+1)(C+1)}{R+1} - 1$$

Where N is the estimated population size, M is the number of fish that were marked, C is the number of fish captured on the recapture run and examined for marks, and R represents the number of fish captured on the recapture run that had marks. Once the estimate was calculated, it was divided by the surface area of the lake to determine adult walleye density (number of fish ≥ 15 inches / acre). This density was then compared to average densities for stocked and naturally reproducing walleye fisheries in Wisconsin.

The largemouth bass PE was calculated using the same formula. However, largemouth bass were marked during SEI instead of SNI, and recaptured during SEII instead of SEI. Population estimates were then calculated for several length classes of largemouth bass.

For SNI, SEI, and SEII total catch and catch per unit of effort (CPE) was calculated by gear type for all species. Data for both gear types was then combined, and length frequency distributions were generated for panfish and gamefish species of interest, including bluegill, largemouth bass, and walleye. Length frequencies were not generated for white crappie, northern pike, and yellow perch because too few individuals were collected to make it a worthwhile exercise. Length range, mean length, median length, and mode length were calculated for all species. Proportional stock density (PSD) and relative stock density of preferred length fish (RSD-P) were calculated for all panfish and gamefish species with more than 100 individuals collected (Anderson and Neumann 1996). Length designations for stock, quality, preferred, memorable, and trophy sizes of the panfish and gamefish species collected from White Mound Lake can be found in Table 5; these values were used for calculation of stock density indices (Anderson and Neumann 1996). For bluegills, stock density index calculations excluded fish collected during fyke netting due to possible bias, with fyke nets being selective for larger bluegills (Laarman and Ryckman 1982). Aging structures (scales, dorsal spines, and anal fin rays/spines) were used to estimate ages of a subsample of each species, and age and size data of these fish were used to generate age-length keys to estimate the age frequency of the population as a whole based on the aged subsample. Age frequency distributions were then generated for each species except for walleyes and white

crappies; the distributions for these species were simple enough to describe without graphic representation. The mean age at 14.0-14.9 inches (MAL14) is a metric sometimes used to compare growth in largemouth bass populations in Wisconsin, and this metric was calculated for largemouth bass from White Mound Lake and compared to the MAL14 values for several other lakes in Columbia and Sauk counties.

Once age frequency distributions were completed for each species, inferences were made about year class strength and mortality when possible. Mean length at age was used to make inferences about growth of fish in White Mound Lake by comparing the lake to regional and statewide averages. Mean length at age was calculated using methods outlined in Bettoli and Miranda (2001), with the formula listed here:

$$\overline{Li} = (\sum N_{ij}\bar{l}_{ij})/N_i$$

Where $\overline{L}_i$ represents the mean length of the *i*th age group, $N_{ij} = N_j(\frac{n_{ij}}{n_j})$, N_j is the number of fish in the *j*th length group, n_{ij} = number of fish of the *i*th age group subsampled in the *j*th length group, n_j is the number of fish subsampled in the *j*th length group, and $N_i = \sum N_{ij}$ over all *j* length groups. The inputs to this equation are derived from the length frequency distribution of the sample and the age-length key. The midpoints of each length group were used for the values of $\bar{l}_{ij}$. This is the "correct" method which extrapolates length at age data from the subsample of aged fish to the entire sample of fish collected (Bettoli and Miranda 2001). Simply reporting the mean length at age as the values calculated from the subsample of aged fish is "incorrect" because these values do not represent the entire sample since the subsampling is not in proportion to the frequency distribution of the sample as a whole (Bettoli and Miranda 2001).

A von Bertalanffy growth curve was not fitted to walleye length at age data for White Mound Lake because only one age class of walleyes was present in the lake. Mean length at age values were reported separately for males and females, and also for all walleyes combined, regardless of sex.

Relative weights were calculated to evaluate body condition of fish. Relative weight (W_r) is a tool that compares the length of the fish to an expected weight for that length. Standard weights were calculated for individuals of each species that had weights recorded and standard weights were only calculated for individuals larger than the minimum recommended length for each species. (Murphy et al. 1991, Anderson and Neumann 1996). Relative weights for each fish

were calculated by dividing a fish's actual weight by the standard weight for a fish of that length. Average relative weight was then calculated for each species, and was done for each sex separately when sex data were available. Relative weight values between 75 and 100 indicate normal weight for a given length. A relative weight value greater than 100 indicates that a fish is in excellent condition. A relative weight value less than 75 indicates that a fish is in poor condition.

RESULTS AND DISCUSSION

General Fish Community

A total of 1,520 fish representing 12 different species from 5 families was sampled during spring netting and electrofishing on White Mound Lake in 2013. Catch by gear type is shown for each species collected in Table 6.

Largemouth Bass

In total, 980 largemouth bass were collected during the spring; overall catch rates were 1.0 per net night during fyke netting, 179.1 per mile of shoreline during SEI, and 224.8 per mile during SEII (Table 6). The catch rate of fish ≥ 8 inches (stock size) during SEII was 191.2 per mile, and this ranked in the 100th percentile in a comparison of four southern Wisconsin drainage basins. This indicates that based on SEII CPE8, largemouth bass densities in White Mound Lake are among the highest in southern Wisconsin, and probably in the state. Largemouth bass CPE8 in White Mound Lake is much higher than the typically desired 20-30 fish per mile. Largemouth bass was the most abundant sport fish species sampled during the survey.

Largemouth bass lengths ranged from 4.8 to 19.9 inches, and the average, median, and mode lengths were 12.4 inches, 13.1, and 13.4 inches, respectively (Table 7). The length frequency distribution is represented in Figure 1. Of the largemouth bass ≥ 8 inches in length (stock size), fish ≥ 12 inches were present in good numbers (PSD = 72), as were fish 15 inches and larger (RSD-P = 15).

In total, 396 largemouth bass were marked during the PE, 562 were captured on the second run, and 42 of those were found to have marks. The overall PE was 5,197 fish (95% CI 3,919 – 7,080), or 50.0 per acre. For fish ≥ 8 inches, 384 were marked, 478 were captured on the second run, and 42 of those were found to have marks. The PE for fish ≥ 8 inches was 4,370 fish (95%

CI 3,240 – 5,831), or 41.2 per acre. Full results of the PE broken down by size class can be found in Table 8). The density of largemouth bass ≥ 10 inches in White Mound Lake is high compared to several other lakes in southern Wisconsin (Table 9). Since the previous largemouth bass PE on White Mound Lake in 2007, the density of largemouth bass in White Mound Lake has shown a marked increase. The numbers per acre of 8, 12, and 15 inch fish have increased from 11.8, 7.8, and 3.0 fish per acre to 41.2, 24.7, and 4.6 fish per acre, respectively (Table 10). For stock density indices, PSD and RSD-P for largemouth bass were relatively stable when comparing values from electrofishing surveys in fall 2006, spring 2007, and spring 2013, and the values reported for these surveys were significantly higher than values reported for the electrofishing survey in the fall of 2003 (Table 10).

Altogether, 139 largemouth bass were included in the age analysis. Age 3 was the most common age in the sample, with numbers declining steadily thereafter through age 8, before the distribution flattens out for ages 9 through 13 where relatively few individuals are present (Figure 2). Largemouth bass growth in White Mound Lake is moderate; bass generally grow faster than the state average but slower than the regional average, except for ages 7 and 8, where White Mound Lake lags behind the state average (Figure 3). Largemouth bass begin to reach legal harvest size (14 inches) as early as age 5, and by age 6 they average 14.8 inches. All fish age 6 and older that were subsampled for age analysis measured over 14 inches. The average age of fish that measured 14.0-14.9 inches (MAL14) was 6.5 years; this is average growth compared to eight other lakes (9 total surveys) in Columbia and Sauk counties since 2006, and is slightly below the median value (MAL = 6.1, Table 11). Moderate growth of largemouth bass is likely a function of the high density of fish. The waters with the fastest growing populations of largemouth bass in Columbia and Sauk counties have low density bass populations with abundant gizzard shad as the main forage fish. White Mound Lake has a high density bass population with no gizzard shad present; bluegills are the primary prey of largemouth bass in White Mound Lake. Largemouth bass in White Mound Lake grow similarly to other lakes in Columbia and Sauk counties with high bass densities and a bluegill dominated prey base.

Condition of largemouth bass in White Mound Lake was good despite the high density of fish; relative weights averaged 95.2. No fish had a relative weight below 75, and 27% of weighed fish had relative weights greater than 100. Relative weights for largemouth bass in White Mound Lake are represented in Figure 4.

Bluegill

In total, 214 bluegills were collected during the spring; the catch rates were 2.5 per net night during SNI and 155.0 per mile of shoreline during SEII (Table 6). The SEII catch rate ranked in the 71st percentile statewide; bluegills are common in White Mound Lake. The SEII catch rate was much lower than CPE values reported for electrofishing surveys in fall 2003 and fall 2006, which were 241.9 and 1,082.0 fish per mile, respectively. In terms of the total number of fish caught during spring netting and electrofishing, bluegill was the second most abundant species collected (Table 6). All bluegills collected during SNI and SEII were measured. Aging structures were taken from a subsample of 78 fish with lengths between 3.0 and 9.5 inches. Weights were recorded from a total of 83 fish. Lengths ranged from 1.6 to 9.4 inches, and the average, median, and mode lengths were 5.6, 5.4, and 3.6 inches, respectively (Table 7, Figure 5). Bluegill PSD and RSD-P values calculated from the SEII catch were 35 and 14, respectively (Table 7). The RSD-P falls toward the upper end of the desired range of 5 to 20 for a balanced bluegill population; size structure is good. Bluegill size structure (particularly RSD-P) has shown marked improvement over electrofishing surveys in spring 1999, fall 2003, and fall 2006, and a late spring fyke netting survey in 2007. The values for PSD from these past surveys were 48, 3, 6, and 9, and the values for RSD-P were 3, 0, 1, and 0, respectively (Table 12). Major increases in largemouth bass density and improved ability of bass to forage for bluegills following the dredging project likely explain the reduction in bluegill abundance and corresponding improvement in size structure.

Ages ranged from 2 to 10 years, with age 3 fish being the most common in the distribution (Figure 6). Bluegill growth in White Mound Lake appears to be moderate to fast. Bluegill mean length at age is very near or above the region average for ages 4 through 8 (Figure 7). Predation from largemouth bass appears sufficient to regulate bluegill densities, leading to better growth rates for these fish. Bluegills reach an average length of 5.2 inches by age 3, 6.9 inches by age 4, and 7.6 inches by age 5. Overall, bluegills larger than 3 inches were in very good condition (mean relative weight = 100.3) (Figure 8). Relative weight appears to be highly variable for bluegills measuring three to five inches, but this is likely an artifact of the imprecision offered by the pan balance used when weighing small fish.

Walleye

In total, 116 walleyes were collected from White Mound Lake during the spring (including recaptures); catch rates were 2.7 per net night during SNI, 15.9 per mile of shoreline sampled during SEI, and 6.8 per mile during SEII (Table 6). The SEII catch rate of fish ≥ 15 inches (CPE15) was 6.8 per mile, ranking in the 74th percentile statewide. Walleye was the third most abundant sport fish species by number collected during the survey (Table 6). For the population estimate, a total of 58 adult walleyes ≥ 15 inches were marked during fyke netting. Thirty-five adult walleyes were captured during SEI, and marks were found on 14 of those fish. The Chapman population estimate was calculated at 141 adult walleyes ≥ 15 inches (95% CI 99 – 226), for a density of 1.4 adults ≥ 15 inches per surface acre (95% CI = 1.0 – 2.2 per acre). This population of adult walleyes was established from a single stocking of 1,040 extended growth fingerlings in 2009, and indicates a survival rate of approximately 14% to age 4. The success of this single stocking of extended growth walleyes in a high density bass fishery supports the idea that extended growth fingerlings are the preferred product to be stocked into fisheries with high centrarchid densities.

In total, 84 walleyes were measured during spring sampling (total catch excluding recaptures) and lengths ranged from 16.6 to 20.6 inches (Table 7, Figure 9). The average length for males was 17.6 inches, the average length for females was 19.6 inches, and the average length for all walleyes was 18.2 inches. All fish were aged at 4 years. The mean length at age 4 of 18.2 inches was higher than both the state and region averages for age-4 walleye. Condition of walleyes in White Mound Lake was good based on relative weights (Figure 10). Males averaged 89.8 and females averaged 95.1. Only one fish, a 17.7 inch male, had a relative weight value below 75. The walleyes that were stocked into White Mound Lake in 2009 likely filled a niche in the food web that was previously unoccupied or perhaps more appropriately under occupied, leading to good growth. Prey in the form of yellow perch, small bluegills, and small crappies provided an abundant food source, and they faced no competition from other walleyes, and little from northern pike which exist at low abundance in White Mound Lake.

Northern Pike

In total, 52 northern pike were sampled during the spring; the catch rates were 1.6 fish per net night (SNI), 5.9 fish per mile during SEI, and 1.2 fish per mile during SEII (Table 6). Thirty-six northern pike were marked during fyke netting, but only two were recaptured during the fyke net

period. Due to the low number of recaptured fish, a meaningful Schnabel PE could not be calculated.

Lengths ranged from 17.2 to 37.0 inches, averaging 24.5 inches (Table 7, Figure 11). The median length was 24.2 inches, and the mode was 24.0 inches (Table 7). Ages ranged from 2 to 9 years, with age-5 fish being the most common, as represented in Figure 12. Northern pike in White Mound Lake show moderate growth for ages 2 through 6, with mean length at age values between the state and region averages (Figure 13). After age 6, northern pike appear to grow slower than state and region averages, but the mean length at age values for these fish are based on the one or two individuals sampled per age class, with a few small males having a large influence. Condition of northern pike was average to poor. Relative weights for northern pike were generally lower for males which averaged 78.8, while females averaged 87.0 (Figure 14). Thirty percent of male northern pike (N = 11) and 13% of female northern pike (N = 1) had relative weight values below 75, indicating poor body condition.

Northern pike have sustained themselves at low abundances through natural reproduction in White Mound Lake since being introduced in the early 1970s. There a small amount of suitable spawning habitat in the form of emergent vegetation; most of this is located in the vicinity of the two inlet creeks at the north end of the lake, and a third inlet creek at the head of the bay on the southwest side of the lake. There appears to be little in the way of traditional northern pike forage such as white suckers (mostly large individuals present) and golden shiners (none found) in White Mound Lake. The brown bullheads that were observed in the survey were mostly large individuals that were likely invulnerable to predation. Northern pike are left to forage for small bluegills, crappies, largemouth bass, and yellow perch, and these may be difficult to capture efficiently during the height of summer when aquatic plant growth is at its peak.

Yellow Perch

In total, 37 yellow perch were collected; catch rates were 1.3 per net night during SNI and 7.0 per mile of shoreline during SEII (Table 6). Yellow perch were the sixth most abundant sport fish by number collected during spring netting and electrofishing (Table 6). Lengths ranged from 3.4 to 9.1 inches, and the average, median, and mode lengths were 6.2, 6.0, and 5.2 inches, respectively (Table 7, Figure 15). Sex was known for 27 fish and the sex ratio of these fish was 26:1, males to

females; the distribution was heavily skewed toward males. Male yellow perch averaged 6.1 inches, while the single female yellow perch measured 8.0 inches.

Age-1 fish were not present in the sample, and this is most likely due to them not being vulnerable to the sampling gear. Nearly all of the yellow perch collected were caught in fyke nets, and age 1 perch are too small to be contained by the fyke net mesh used in the survey. Age 3 was the most common age class present in the catch, followed by age 5, with no distinct descending limb on the age frequency distribution (Figure 16). Recruitment is either highly variable, or we did not sample enough of the population to approximate the true age structure. In any case, abundance appears to be low, and yellow perch in White Mound Lake are not providing a significant fishery for anglers. Growth was slow, with fish reaching an average length of 5.3 inches by age 2, and 5.6 inches by age 3, and 7.0 inches by age 4, which is at or below the state average (Figure 17). However, males mature at younger ages and attain smaller size over their lifetime than females (Becker 1983). This sample was heavily skewed toward males, and this is reflected in the below average values for mean length at age. The single known female measured 8.0 inches and was aged at 4 years which falls midway between state and region averages. Relative weights of yellow perch in White Mound Lake averaged 82.9, and 32% of the individuals included in the analysis were in poor condition with relative weight values below 75 (Figure 18).

White Crappie

In total, 30 white crappies were collected during the spring; the catch rates were 1.2 per net night during SNI and 1.0 per mile of shoreline during SEII (Table 6). Lengths ranged from 5.5 to 14.7 inches, and all but a single fish were between 5.5 and 7.5 inches.

Ages were estimated from scales for a subsample of 18 white crappies collected and 29 were weighed. The most common age class in the sample was age 2, with single individuals aged at 3 and 8 years. This indicates that the single year class of note was produced in 2011. Age-2 white crappies averaged 6.5 inches which was 1.2 inches shorter than the age-2 state average, with no region average available for comparison. White crappies were generally in good condition, with relative weights averaging 91.8 and only one individual had a relative weight below 75. No black crappies were captured during this survey; both black and white crappies were noted at low abundances in previous surveys.

Other Desirable Fish Species

Pumpkinseed and brown bullhead are two species that provide additional minor fishing opportunities in White Mound Lake. In total, 51 pumpkinseeds were collected during the survey. Lengths ranged from 3.3 to 7.9 inches, averaging 5.8 inches (Table 7). In total, 29 brown bullheads were collected, ranging from 8.8 to 16.1 inches, and averaging 14.6 inches (Table 7).

Detrimental Rough Fish

Detrimental rough fish, specifically common carp, were not found in the 2013 survey. Common carp historically have been absent from White Mound Lake as well; surveys in 1999, 2003, 2006, and 2007 did not find any common carp. The fact that White Mound Lake is an impoundment of a small coldwater stream likely means that carp were not present in the stream prior to its impoundment, and thus were never present in the lake.

CONCLUSIONS

White Mound Lake is relatively clear and has abundant aquatic vegetation. The fishery is dominated by largemouth bass which are present at a high density, with bluegills as their primary prey. Additional panfish species of interest to anglers include pumpkinseed, yellow perch, and white crappie, but these species are present at low abundance and provide minor fisheries at best. Black crappies historically have been present at low abundances, but were not found in this survey. Common carp were not found in this survey and have been historically absent from White Mound Lake.

Largemouth bass abundance has increased over the past 15 years, but size structure has remained relatively stable. Condition of largemouth bass is good based on relative weights, indicating that these fish have ample prey available to them and are not nutritionally stressed. Largemouth bass growth in White Mound Lake is slower than in several other lakes in Columbia and Sauk counties. However, the lakes with the fastest growing bass populations have low bass densities and the prey community is dominated by gizzard shad. Gizzard shad negatively impact bass recruitment by competing with young of year bass for food, but the bass that survive to adulthood often experience faster growth due to abundant forage provided by the gizzard shad (Dettmers and Stein 1992, Aday et al. 2005). Largemouth bass growth in White Mound Lake is very similar

to other lakes in Columbia and Sauk counties which have moderate to high bass densities, contain no gizzard shad, and have bluegill as the dominant prey species. At current densities, largemouth bass show no signs of nutritional stress (poor condition), and it appears that the bluegill prey base is ample to support them.

From 1999 through 2007, bluegills were highly abundant and size structure was poor on White Mound Lake. Increases in bass abundance since 2007 have reduced bluegill abundance and have improved size structure, specifically the percentage of bluegills ≥ 8 inches. Bluegill RSD-P values averaged 1 for four surveys of White Mound Lake from 1999 through 2007, but RSD-P has increased to 14 as of the 2013 survey. Predation by largemouth bass is currently sufficient to keep bluegill densities and growth rates at the preferred levels.

The population of walleyes in White Mound Lake provides a bonus gamefish opportunity for anglers, and the extended growth walleyes stocked in the fall of 2009 survived well. The population was estimated at 1.4 adults ≥ 15 inches per acre. The walleyes in White Mound Lake grew well, and reached lengths of 16.6 to 19.0 inches for males, and 18.7 to 20.6 inches for females by age 4. These fish faced no competition from other walleyes, little from northern pike, and at the time they were stocked, they were large enough to escape predation by largemouth bass. It is highly unlikely that these fish will ever reproduce naturally, so it will be necessary to maintain this population through stocking. With a total largemouth bass density of 50 fish per acre and abundant bluegills, stocking small fingerling walleyes would likely be unsuccessful in maintaining the walleye population due to the amount of predation they would face from centrarchids. Stocking of extended growth walleyes will be the only effective means of maintaining a walleye fishery in White Mound Lake, and should be stocked instead of small fingerlings in the future. Future surveys should re-evaluate the success of walleye stockings and adjust the stocking rate up or down as necessary. The Mississippi Headwaters strain is the correct genetic strain, although the Rock-Fox strain could be used in place of Mississippi Headwaters fish if necessary.

Other species of interest that could be impacted by walleyes in White Mound Lake include yellow perch and black and white crappies. Walleyes commonly prey on age-0 yellow perch and will also utilize age-0 crappies when available, and thus stand to impact yellow perch and crappie recruitment in White Mound Lake (Galinat et al. 2002, Chipps and Graeb 2011). In a small system with a relatively simple fish community like White Mound Lake, other sources of forage

for walleyes are limited. With yellow perch and crappie stocks already at low abundances, the impact of walleyes on these species should be closely monitored to determine whether they are in danger of being driven to extirpation. If it is felt that impacts to these species are too great, walleye stockings may need to be discontinued.

Northern pike are present in White Mound Lake, and sustain themselves at low levels through natural reproduction. Low abundance of northern pike is probably due in part to a lack of good spawning and nursery habitat, but also possibly a lack of preferred forage. Northern pike growth is average in White Mound Lake, and condition ranges from average to poor, with males having lower relative weights than females. Soft-rayed forage fishes are either present at low abundance (white sucker), or not at all (golden shiner), leaving northern pike to forage for small panfish and largemouth bass. Northern pike will show preference for yellow perch, a more cylindrically shaped species, when available even when other species such as bluegill dominate the prey base (Johnson 1969). However, yellow perch are at low abundance in White Mound Lake and are currently receiving predation pressure from walleyes in addition to northern pike. Small bluegills most likely compose the main part of the northern pike diet in White Mound Lake. Northern pike have never been abundant in White Mound Lake, and currently provide a very small component of the fishery.

Common carp were not found in the 2013 survey and have been absent historically from White Mound Lake. The likelihood of a natural carp introduction is very low because carp are not found in Honey Creek or Shannahan Valley Creek in the vicinity of White Mound Lake. Gizzard shad were noted in the 2007 stream survey of Shannahan Valley Creek upstream of County Highway GG, just below the outlet of White Mound Lake, but have not been noted since. There exists a small likelihood that gizzard shad could be introduced to White Mound Lake via natural means (birds) or accidentally by humans. Such an introduction would be detrimental to White Mound Lake because of the disruption to the current fish community, and also due to the role of shad in re-suspension of phosphorous in lake environments.

REFERENCES

Aday, D. D., D. E. Shoup, J. A. Neviackas, J. L. Kline, and D. H. Wahl. 2005. Prey community responses to bluegill and gizzard shad foraging: implications for growth of juvenile largemouth bass. Transactions of the American Fisheries Society 134(5): 1091-1102.

Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D.W. Willis editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.

Becker, G. C. 1983. Fishes of Wisconsin. The University of Wisconsin Press. Madison, Wisconsin.

Bettoli, P.W., and L.E. Miranda. 2001. Cautionary note about estimating mean length at age with subsampled data. North American Journal of Fisheries Management 21: 425-428.

Chipps, R.S., and B.D.S. Graeb. 2011. Feeding ecology and energetics. Chapter 8, pages 303-319 in B.A. Barton, editor. Biology, management, and culture of walleye and sauger. American Fisheries Society, Bethesda, Maryland.

Dettmers, J. M., and R. A. Stein. 1992. Food consumption by larval gizzard shad: zooplankton effects and implications for reservoir communities. Transactions of the American Fisheries Society 121(4): 494-507.

Galinat, G.F., D.W. Willis, B.G. Blackwell, and M.J. Hubers. 2002. Influence of a saugeye (sauger x walleye) introduction program on the black crappie population in Richmond Lake, South Dakota. North American Journal of Fisheries Management 22: 1416-1424.

Johnson, L.D. 1969. Food of angler-caught northern pike in Murphy Flowage. Wisconsin Department of Natural Resources Technical Bulletin 42, 26pp. Wisconsin DNR, Madison, WI.

Laarman, P.W., and J. R. Ryckman. 1982. Relative size selectivity of trap nets for eight species of fish. North American Journal of Fisheries Management 2: 33-37.

Larson, T. 1993. Fishery Survey, White Mound Lake, Sauk County. 11pp. Wisconsin Department of Natural Resources, Poynette, WI.

Marshall, D.W., M. Otto, J.C. Panuska, S.R. Jaeger, D. Sefton, and T.R. Baumberger. 2006. Effects of hypolimnetic releases on two impoundments and their receiving streams in southwest Wisconsin. Lake and Reservoir Management 22(3): 223-232.

McComas, S., and J. Stuckert. 1996. Water quality report and lake management plan for White Mound Lake, Sauk County, Wisconsin. 46pp.

Murphy, B. R., D. W. Willis, and T. A. Springer. 1991. The relative weight index in fisheries management: status and needs. Fisheries 16(2): 30-38.

TABLES AND FIGURES

Table 1. Current fishing regulations (2013) for White Mound Lake, Sauk County, Wisconsin.

Species	Season Dates	*Length and Bag Limits Through 2013
Catfish	Open All Year	No minimum length limit and the daily bag limit is 10.
Panfish (bluegill, pumpkinseed, sunfish, crappie, and yellow perch)	Open All Year	No minimum length limit and the daily bag limit is 25.
Largemouth bass and smallmouth bass	First Saturday in May through the first Sunday in March	The minimum length limit is 14" and the daily bag limit is 5.
Northern pike	First Saturday in May through the first Sunday in March	The minimum length limit is 26" and the daily bag limit is 2.
Walleye, sauger, and hybrids	First Saturday in May through the first Sunday in March	The minimum length limit is 15" and the daily bag limit is 5.
Bullheads	Open All Year	No minimum length limit and the daily bag limit is unlimited.
Rough fish	Open All Year	No minimum length limit and the daily bag limit is unlimited.

Table 2. Stocking history for White Mound Lake, Sauk County, Wisconsin.

Year	Waterbody Name	Species	Strain (Stock)	Age Class	Number Stocked	Avg. Fish Length (inches)
1972	WHITE MOUND LAKE	LARGEMOUTH BASS	UNSPECIFIED	ADULT	154	14
1972	WHITE MOUND LAKE	LARGEMOUTH BASS	UNSPECIFIED	YEARLING	100,706	4
1972	WHITE MOUND LAKE	NORTHERN PIKE	UNSPECIFIED	FRY	1,473,000	1
1973	WHITE MOUND LAKE	BLUEGILL	UNSPECIFIED	ADULT	9,000	6
1973	WHITE MOUND LAKE	BLUEGILL	UNSPECIFIED	FINGERLING	10,000	3
1973	WHITE MOUND LAKE	NORTHERN PIKE	UNSPECIFIED	FRY	1,000,000	
1982	WHITE MOUND LAKE	CHANNEL CATFISH	UNSPECIFIED	NA	2,500	NA
1989	WHITE MOUND LAKE	WALLEYE	UNSPECIFIED	FINGERLING	7,900	3
2000	WHITE MOUND LAKE	CHANNEL CATFISH	UNSPECIFIED	ADULT	4,046	3
2009	WHITE MOUND LAKE	WALLEYE	UNSPECIFIED	LARGE FINGERLING	1,040	7

*This list was developed from stocking events that have been entered into the WDNR Fish Management Database. Stockings that occurred in 1971 are not reflected here.

Table 3. Locations of fyke nets (GPS coordinates) used during SNI on White Mound Lake, Sauk County, Wisconsin in 2013.

Net Number	Date First Set	Date Last Lifted	Latitude	Longitude
1	04/21/2013	04/25/2013	43.36490	-90.09138
2	04/21/2013	04/25/2013	43.36358	-90.09255
3	04/21/2013	04/25/2013	43.35600	-90.09113
4	04/21/2013	04/25/2013	43.35448	-90.09256
5	04/21/2013	04/25/2013	43.35454	-90.08697
6	04/21/2013	04/25/2013	43.36108	-90.08787

Table 4. Locations of electrofishing stations (GPS coordinates) sampled during SEII on White Mound Lake, Sauk County, Wisconsin in 2013.

Date	Station	Distance (miles)	Start Latitude	Start Longitude	End Latitude	End Longitude
05/08/2013	Panfish 1	0.5	43.36126	-90.08784	43.36327	-90.09267
05/08/2013	Gamefish 1	1.5	43.36262	-90.09234	43.35638	-90.09012
05/08/2013	Panfish 2	0.5	43.35633	-90.40899	43.36121	-90.08800

Table 5. Length categories (inches) that have been proposed for the sport fish species that were collected from White Mound Lake in 2013 (Anderson and Neumann 1996).

Species	Stock	Quality	Preferred	Memorable	Trophy
Bluegill	3	6	8	10	12
Brown bullhead	5	8	11	14	17
Largemouth bass	8	12	15	20	25
Northern pike	14	21	28	34	44
Walleye	10	15	20	25	30
White crappie	5	8	10	12	15
Yellow perch	5	8	10	12	15

Table 6. Summary of catch and catch per unit effort (CPE) by gear type for SNI, SEI, and SEII sampling on White Mound Lake, Sauk County, Wisconsin in 2013.

	CATCH				CPE				
					Fish/net night	Fish/hour		Fish/mile	
Species	SNI	SEI	SEII	Total	SNI	SEI	SEII	SEI	SEII
Largemouth Bass	24	394	562	980	1.0	231.8	432.3	179.1	224.8
Bluegill	59	0	155	214	2.5	0.0	258.3	0.0	155.0
Walleye	64	35	17	116	2.7	20.6	13.1	15.9	6.8
Northern Pike	38	13	3	54	1.6	7.6	2.3	5.9	1.2
Pumpkinseed	21	0	30	51	0.9	0.0	50.0	0.0	30.0
Yellow Perch	30	0	7	37	1.3	0.0	11.7	0.0	7.0
White Crappie	29	0	1	30	1.2	0.0	1.7	0.0	1.0
Brown Bullhead	21	0	8	29	0.9	0.0	13.3	0.0	8.0
White Sucker	8	0	0	8	0.3	0.0	0.0	0.0	0.0
Green Sunfish	2	0	0	2	0.1	0.0	0.0	0.0	0.0
Black Bullhead	1	0	0	1	0.0	0.0	0.0	0.0	0.0
Warmouth	1	0	0	1	0.0	0.0	0.0	0.0	0.0
	298	442	783	1,523					

Table 7. Summary of lengths (inches), stock density indices, and age of gamefish and panfish sampled in 2013 on White Mound Lake, Sauk County, Wisconsin.

Species	N Collected	N Measured	Minimum Length	Maximum Length	Mean Length	Median Length	Mode Length	PSD	RSD-P	Minimum Age	Maximum Age
Largemouth Bass	980	938	4.8	19.9	12.4	13.1	13.4	72	15	2	13
Bluegill	214	214	1.6	9.4	5.6	5.4	3.6	34	15	2	10
Walleye	116	84	16.6	20.6	18.2	18	17.1			4	4
Northern Pike	54	48	17.2	37	24.5	24.2	24			2	9
Pumpkinseed	51	51	3.3	7.9	5.8	5.8	5.8				
Yellow Perch	37	37	3.4	9.1	6.2	6	5.2			2	6
White Crappie	30	30	5.5	14.7	6.8	6.5	6.6			2	8

Table 8. Results of Chapman-modified Petersen population estimate for largemouth bass in White Mound Lake in 2013.

Length (inches)	M	C	R	N	LL 95% CI	UL 95% CI	Density (number/acre)	LL 95% CI (number/acre)	UL 95% CI (number/acre)
ALL	396	562	42	5,197	3,919	7,080	50.0	37.7	70.8
≥8	384	478	42	4,287	3,240	5,831	41.2	31.2	56.1
≥10	374	439	42	3,836	2,904	5,212	36.9	27.9	52.1
≥12	311	320	38	2,567	1,926	3,534	24.7	18.5	35.3
≥14	140	156	19	1,106	746	1,743	10.6	7.2	17.4
≥15	69	61	8	481	274	951	4.6	2.6	9.5

Table 9. Population estimates for largemouth bass ≥ 10 inches TL for several lakes in Columbia, Dane, and Sauk counties, 1978-2013.

Waterbody	County	Size (acres)	Year	N	LL 95% CI	UL 95% CI	N/acre	LL/acre 95% CI	UL/acre 95% CI
Park Lake	Columbia	330	1978	165	106	287	0.5	0.3	0.9
Crystal Lake	Dane	525	1999	18,752	14,907	23,989	35.7	28.4	45.7
Fish Lake	Dane	216	2004	2,179	1,842	2,618	10.1	8.5	12.1
Crystal Lake	Dane	525	2005	10,376	8,692	12,359	19.8	16.6	23.5
Dutch Hollow Lake	Sauk	136	2006	2,807	2,269	3,551	20.6	16.7	26.1
White Mound Lake	Sauk	104	2007	914	768	1,112	8.8	7.4	10.7
Swan Lake	Columbia	406	2009	2,405	1,657	3,679	5.9	4.1	9.1
White Mound Lake	Sauk	104	2013	3,836	2,904	5,212	36.9	27.9	50.1

Table 10. Catch, CPE, stock density indices, and population estimates (fish/acre) for stock, quality, and preferred-size largemouth bass collected from White Mound Lake, 1999-2013. Catch, CPE, and stock density indices reported for the 2007 survey were calculated from the marking run of the PE survey. Catch, CPE and stock density indices reported for the 2013 survey were calculated from SEII sampling. Percentile rankings are reported in parenthesis. Percentile rankings for CPE8 and CPE15 are compared across four drainage basins in southern Wisconsin. Percentile rankings for CPE12 and PSD are statewide comparisons. Percentile rankings for RSD14 are compared across Wisconsin lakes with surface areas of less than 794 acres.

Year	Month	Gear[1]	N	CPE-ALL	CPE8	CPE12	CPE15	Unit	PSD	RSD14	RSD-P	PE8	PE12	PE15
1999	May	BS	349	129.3	121.9(97)	111.5(100)	14.1(87)	fish/mile	91(93)	46(85)	12			
2003	September	MBS	252	96.9	53.8(72)	12.7(70)	5.4(43)	fish/mile	24(4)	13(22)	10			
2006	September	BS	199	68.6	38.6(58)	27.6(94)	7.2(56)	fish/mile	71(69)	49(88)	19			
2007	May	BS	401	138.3	125.9(98)	80.0(100)	26.6(100)	fish/mile	64(56)	40(76)	21	11.8	0.3	3.0
2013	May	BS	562	224.8	191.2(100)	128.0(100)	24.4(99)	fish/mile	67(62)	33(62)	13	41.2	24.7	4.6

[1]Boomshocker is abbreviated BS, mini boomshocker is abbreviated MBS.

Table 11. Mean age at 14.0-14.9 inches (MAL14) for largemouth bass populations in 8 Columbia and Sauk County lakes (9 surveys), 2006-2013.

Waterbody	County	Year	MAL14	LMB Abundance	Prey Base[1]
Lake Wisconsin	Columbia	2012	4.8	Low	GZS
Park Lake	Columbia	2011	5.3	Low	GZS
Swan Lake	Columbia	2009	5.8	Moderate	GZS and BLG
Redstone Lake	Sauk	2010	6.0	Low	GZS
Seeley Lake	Sauk	2008	6.1	Moderate	BLG
White Mound Lake	Sauk	2013	6.5	High	BLG
Dutch Hollow Lake	Sauk	2006	6.9	High	BLG
White Mound Lake	Sauk	2006	7.2	High	BLG
Devils Lake	Sauk	2013	9.3	High	BLG
Average-All Lakes			6.4		

[1]Gizzard shad is abbreviated GZS, bluegill is abbreviated BLG.

Table 12. Catch, CPE, and stock density indices for bluegills collected from White Mound Lake, Sauk County, Wisconsin, 1999-2013.

Year	Month	Gear	N	CPE	Unit	PSD	RSD-P
1999	May	Boomshocker	105	39.3	fish/mile	48	3
2003	September	Mini Boomshocker	649	241.9	fish/mile	3	0
2006	September	Boomshocker	541	1082.0	fish/mile	6	1
2007	June	Fyke Net	522	130.5	fish/net night	9	0
2013	May	Boomshocker	155	155.0	fish/mile	35	14

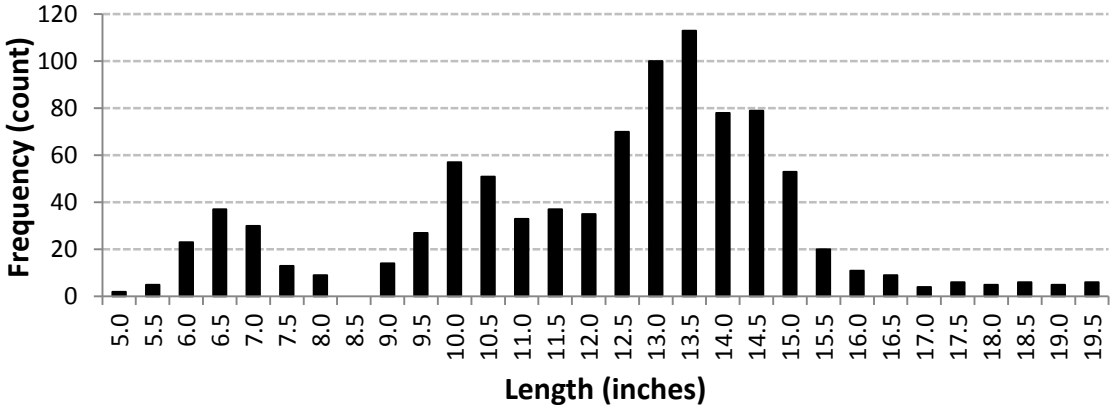

Figure 1. Length frequency distribution of largemouth bass collected during the spring 2013 survey of White Mound Lake, Sauk County, Wisconsin.

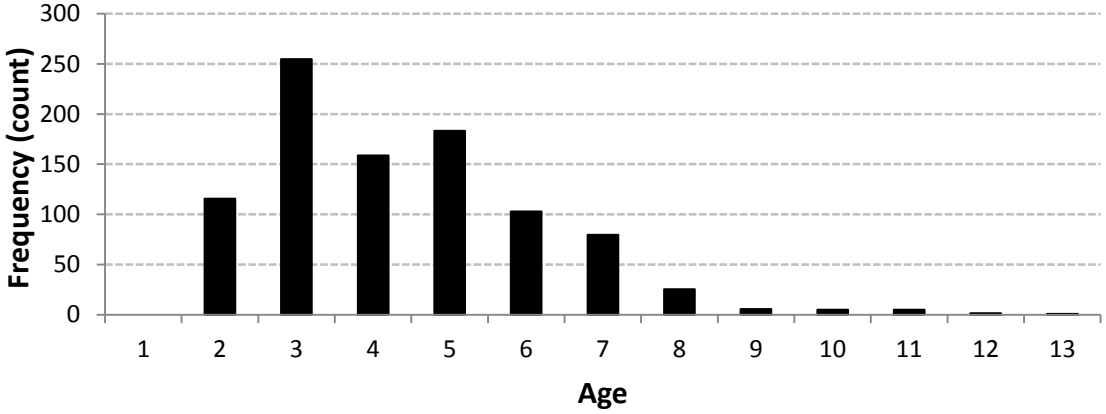

Figure 2. Age frequency distribution of largemouth bass collected during the spring 2013 survey of White Mound Lake, Sauk County, Wisconsin.

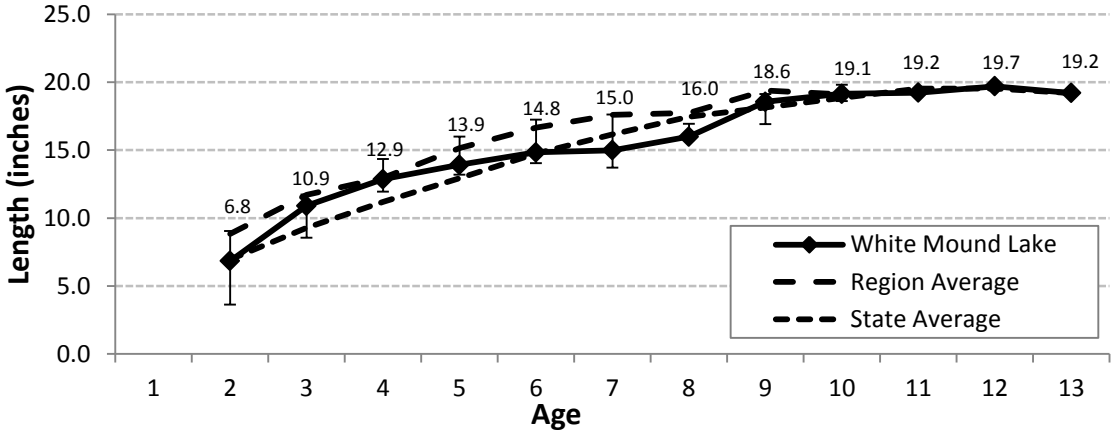

Figure 3. Mean length at age of largemouth bass collected during the spring 2013 survey of White Mound Lake, Sauk County, Wisconsin. Error bars represent minimum and maximum length values for a given age.

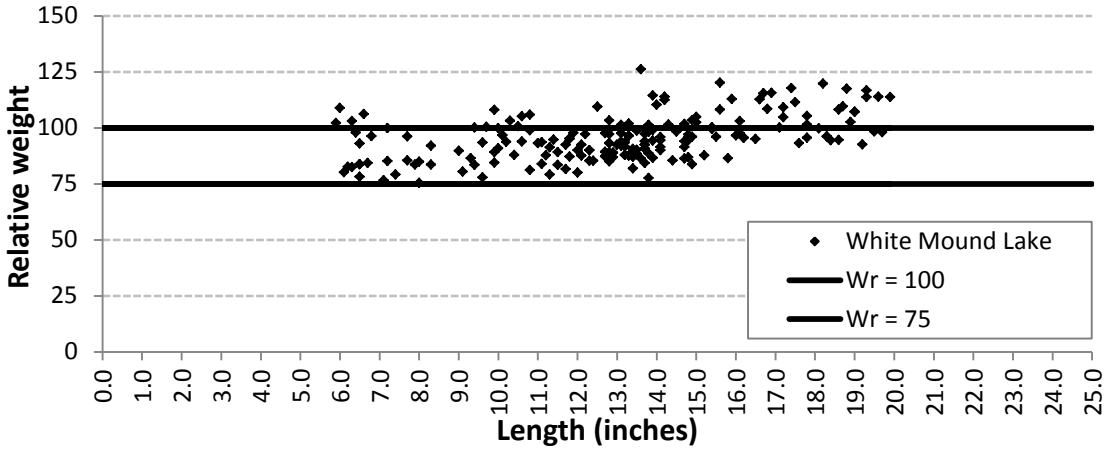

Figure 4. Relative weights of largemouth bass collected during the spring 2013 survey of White Mound Lake, Sauk County, Wisconsin.

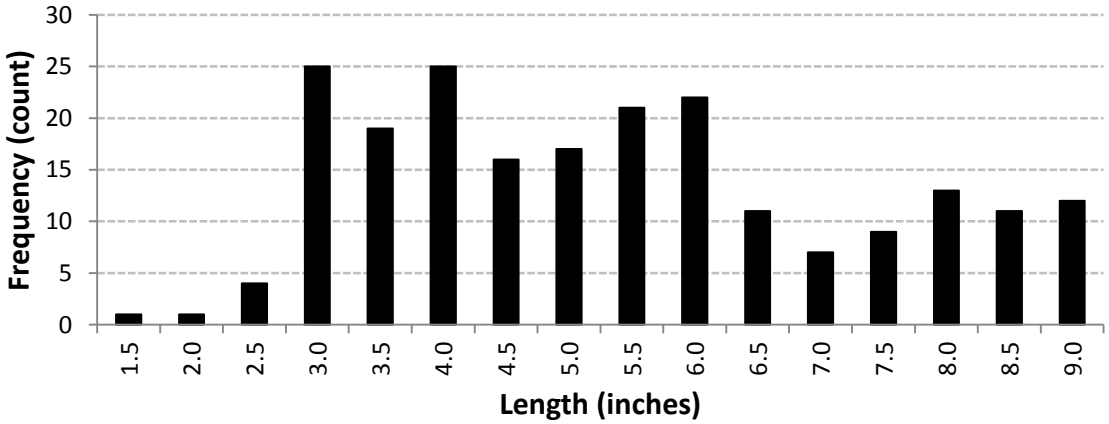

Figure 5. Length frequency distribution of bluegills collected during SEII from White Mound Lake, Sauk County, Wisconsin in 2013.

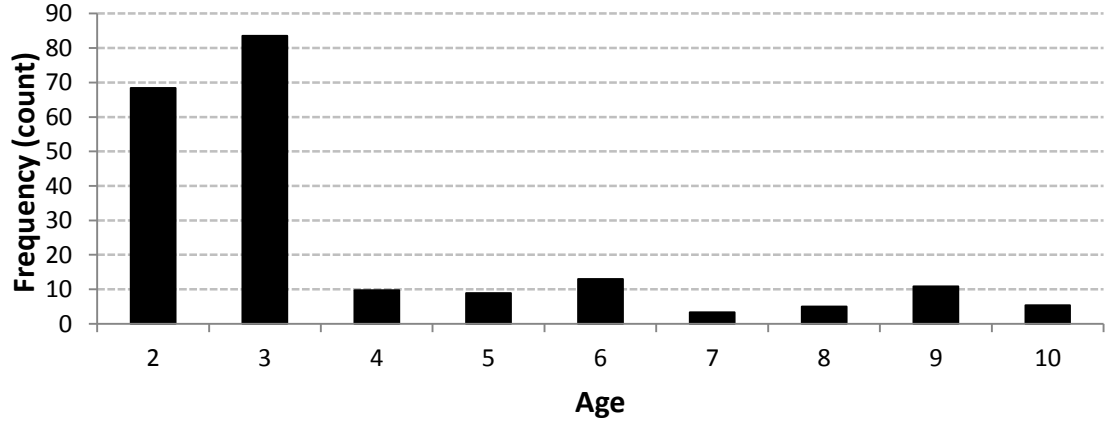

Figure 6. Age frequency distribution of bluegills collected during the spring 2013 survey of White Mound Lake, Sauk County, Wisconsin.

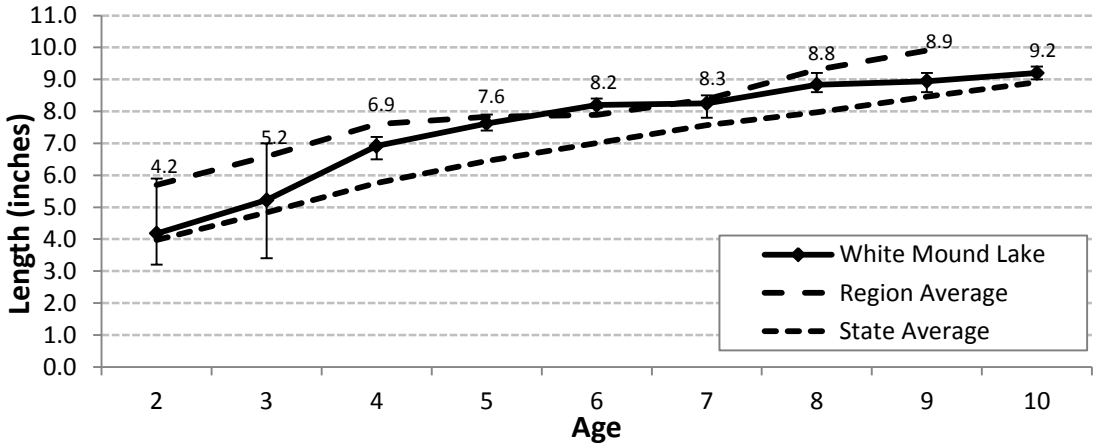

Figure 7. Mean length at age of bluegills collected during the spring 2013 survey of White Mound Lake, Sauk County, Wisconsin. Error bars represent minimum and maximum length values for a given age.

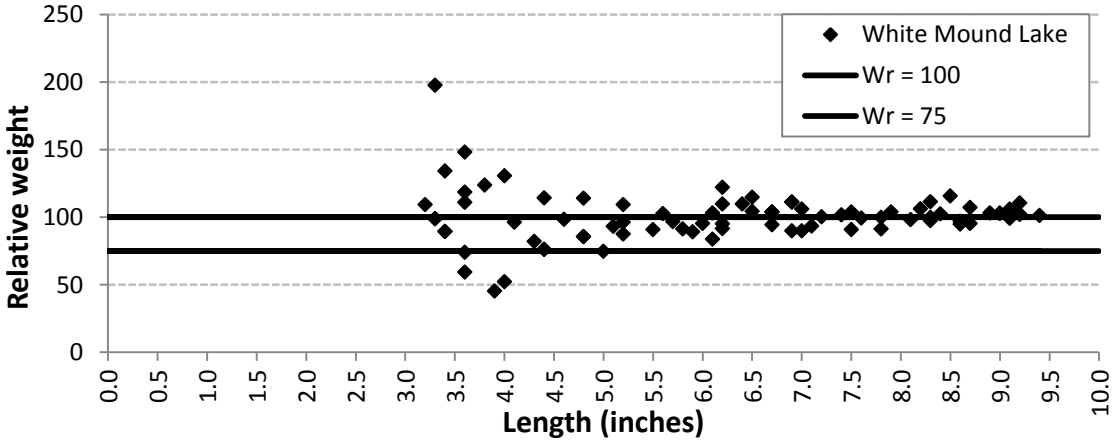

Figure 8. Relative weights of bluegills collected during the spring 2013 survey of White Mound Lake, Sauk County, Wisconsin.

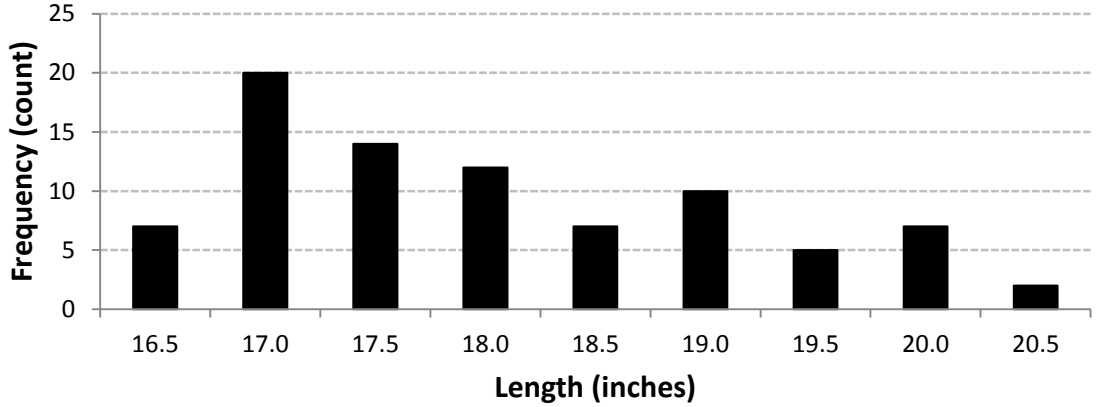

Figure 9. Length frequency distribution of walleyes collected during the spring 2013 survey of White Mound Lake, Sauk County, Wisconsin.

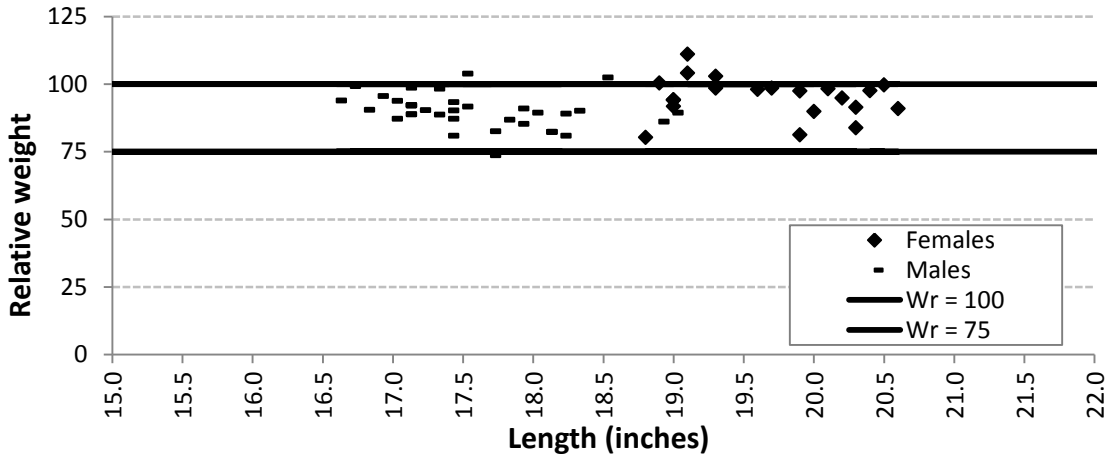

Figure 10. Relative weights of walleyes collected during the spring 2013 survey of White Mound Lake, Sauk County, Wisconsin.

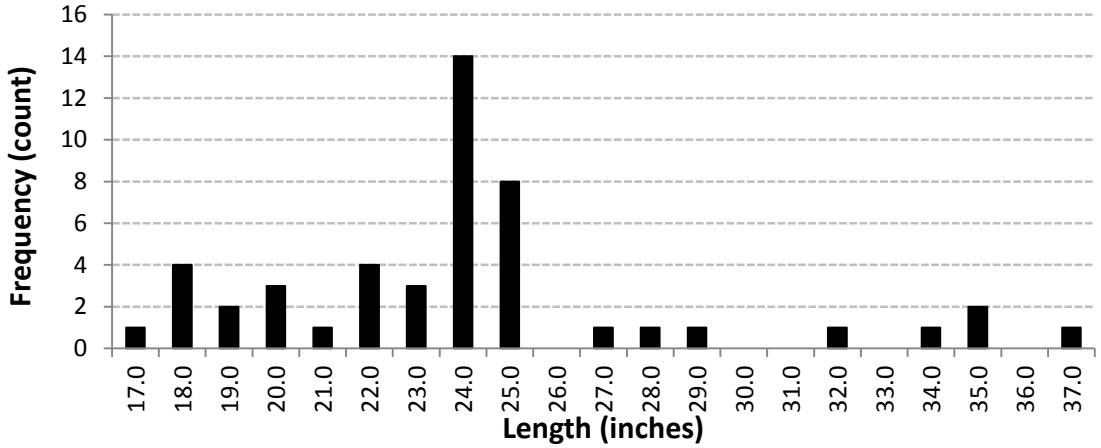

Figure 11. Length frequency distribution of northern pike collected during the spring 2013 survey of White Mound Lake, Sauk County, Wisconsin.

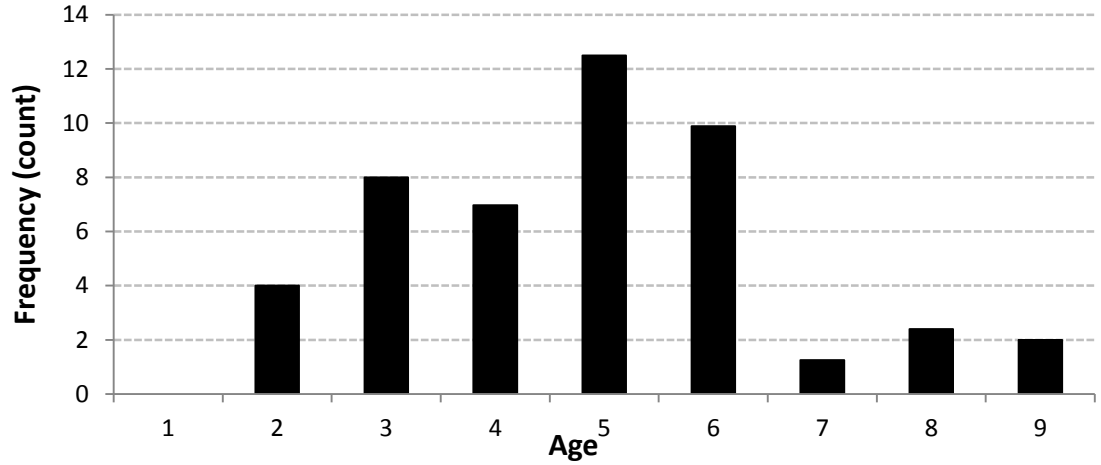

Figure 12. Age frequency distribution of northern pike collected during the spring 2013 survey of White Mound Lake, Sauk County, Wisconsin.

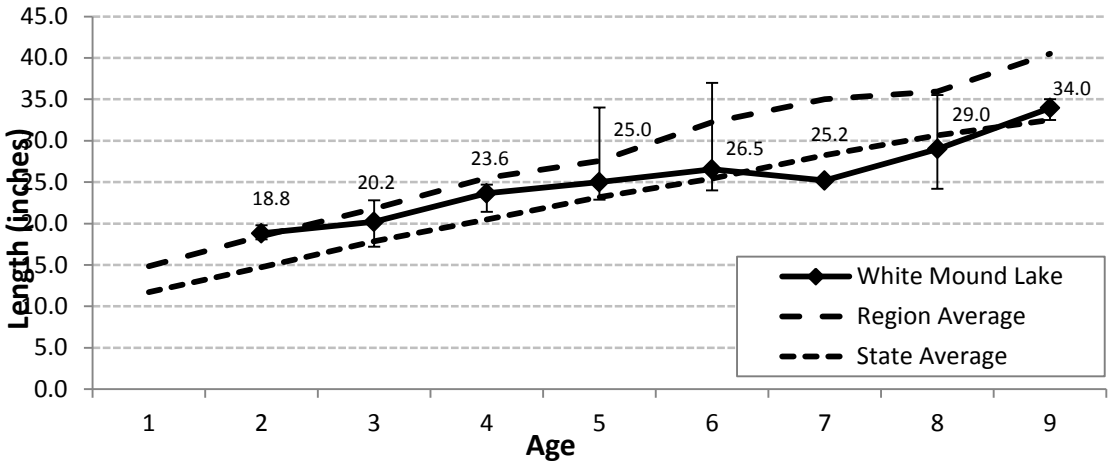

Figure 13. Mean length at age of northern pike collected during the spring 2013 survey of White Mound Lake, Sauk County, Wisconsin.

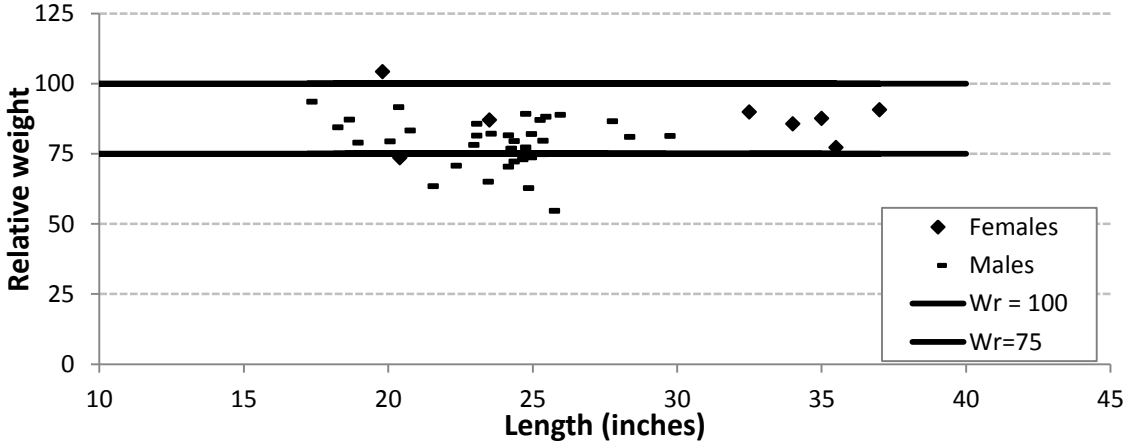

Figure 14. Relative weights of northern pike collected during the spring 2013 survey of White Mound Lake, Sauk County, Wisconsin.

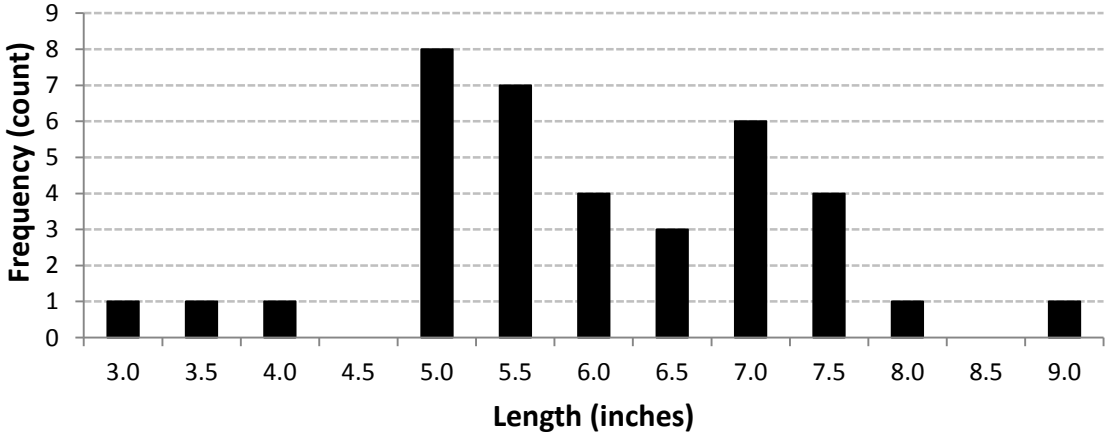

Figure 15. Length frequency distribution of yellow perch collected during the spring 2013 survey of White Mound Lake, Sauk County, Wisconsin.

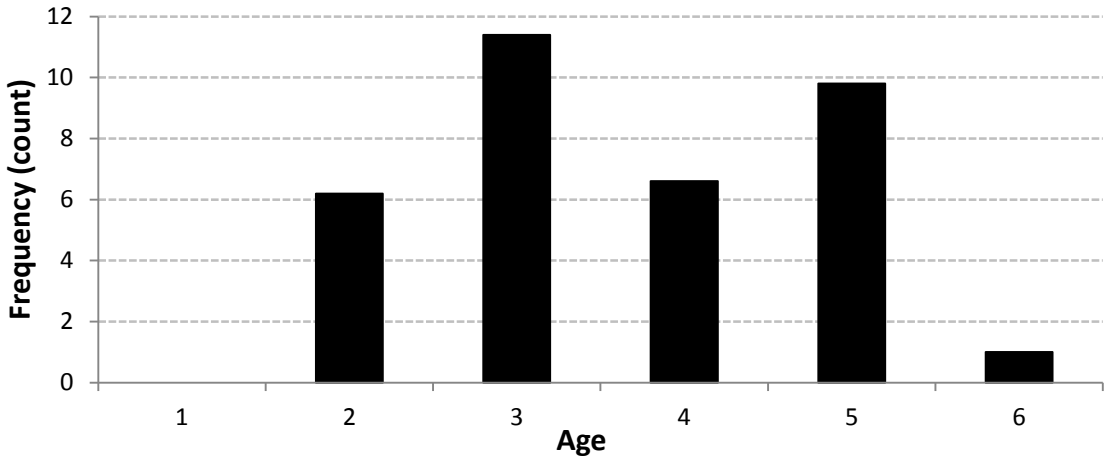

Figure 16. Age frequency distribution of yellow perch collected during the spring 2013 survey of White Mound Lake, Sauk County, Wisconsin.

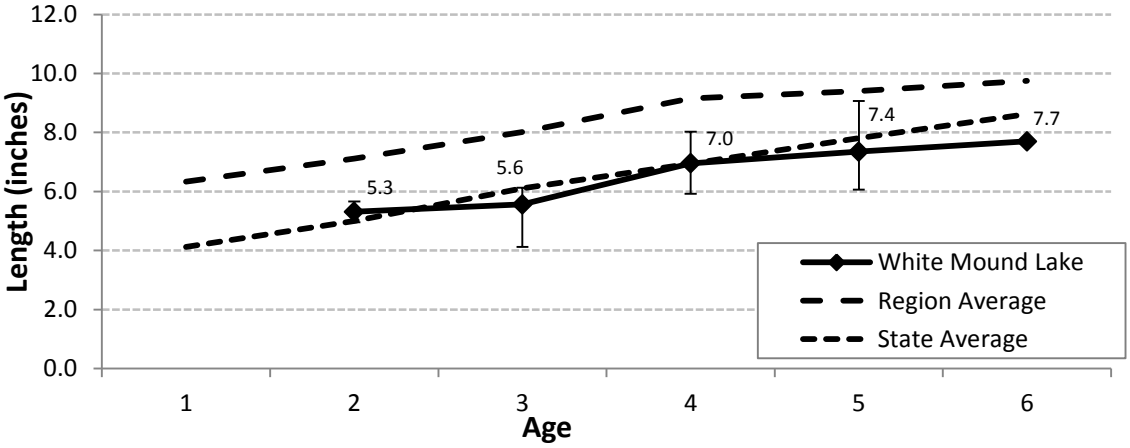

Figure 17. Mean length at age of yellow perch collected during the spring 2013 survey of White Mound Lake, Sauk County, Wisconsin.

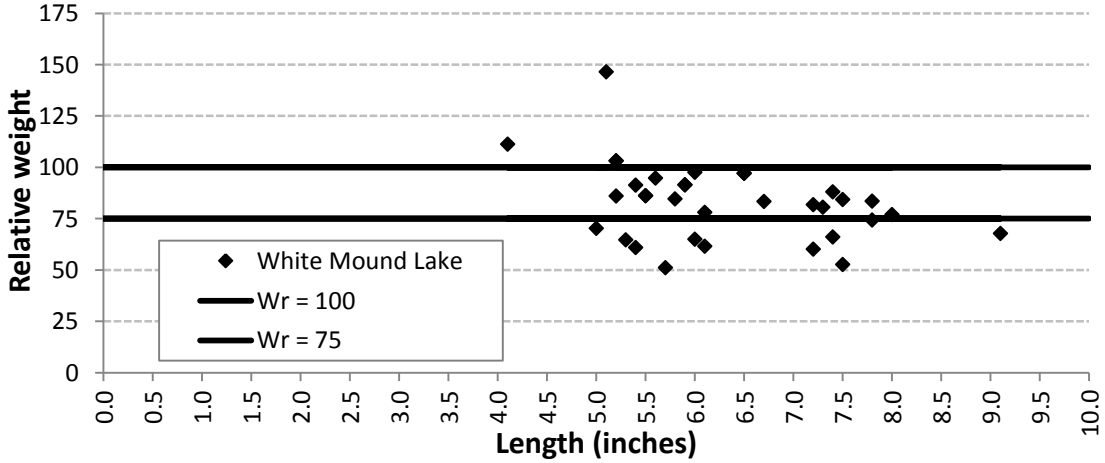

Figure 18. Relative weights of yellow perch collected during the spring 2013 survey of White Mound Lake, Sauk County, Wisconsin.