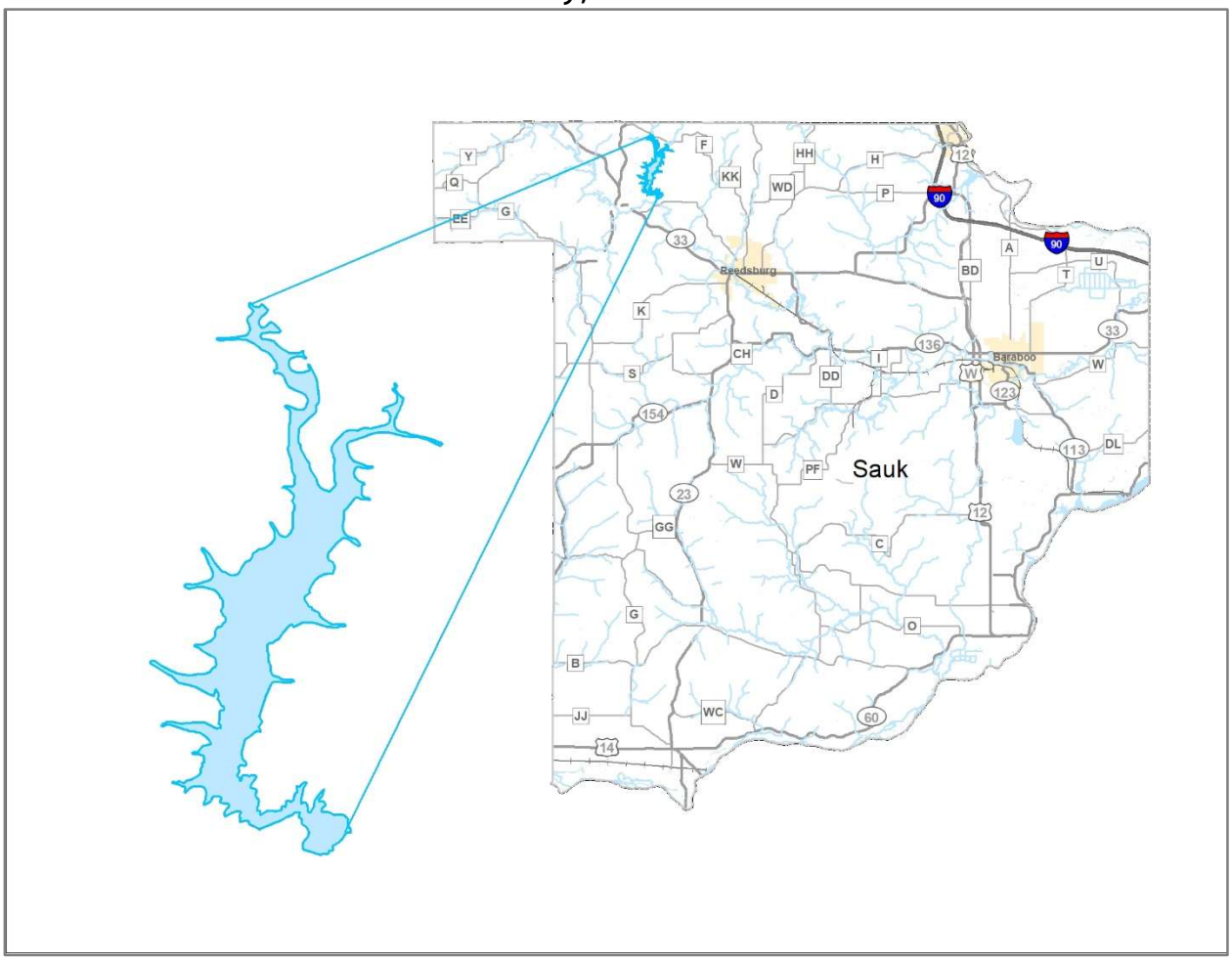
WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Comprehensive Fishery Survey of Lake Redstone

Sauk County, Wisconsin 2022



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EXECUTIVE SUMMARY

A comprehensive fishery survey was conducted on Lake Redstone during the spring and fall of 2022 and the spring of 2023. The 2022 sampling included early fyke netting to mark walleyes and muskellunge (SN1), early electrofishing to recapture marked walleyes (SE1), a second netting period that targeted muskellunge (SN2), late spring electrofishing for bass and panfish (SE2) and fall electrofishing to assess walleye recruitment (FE). The 2023 portion of the survey included early spring netting (SN1), which served as the recapture period for the muskellunge population estimate (PE). In general, gamefish species were present at abundances consistent with other lakes in the complex-warm-dark lake class, and most species exhibited good to excellent growth and body condition.

Panfish were common in Lake Redstone but abundance varied among species. The abundance of crappies (black and white) was high compared to other lakes in the complex-warm-dark lake class (198 total lakes). White crappies now appear to be more abundant than black crappies, which was not the case in 2010. Bluegill and yellow perch abundance were low relative to the rest of the lake class. Crappie growth was good relative to area and state averages and lake class medians. Crappie size structure based on proportional size distribution (PSD) values was better than most area lakes. Bluegill growth was average, and the overall scope for growth was poor, with bluegills older than age 10 showing limited potential to reach 9 inches. Yellow perch growth was average, and size structure was in the middle of the pack compared to other area lakes.

The Chapman walleye PE of 0.8 adult walleyes ≥ 15 inches/acre marked a drastic decline from the last PE of 4.4 adults ≥15 inches/acre in 2010. Reduced stocking rates and frequency, combined with reduced recruitment of stocked small fingerlings, contributed to the decline in walleye abundance. Walleye growth was excellent, well ahead of area and state averages and lake class medians. Walleyes averaged over 18 inches by age 4 and over 20 inches by age 5.

Largemouth and smallmouth bass were present in Lake Redstone, and the abundance of both species was high relative to the rest of the lake class. Largemouth bass abundance appeared to increase from 2010 to 2022, while smallmouth bass abundance appeared unchanged. Bass growth was average in local, statewide and lake class comparisons, and size structure (based on size-specific catch rates) was in the middle of the pack compared to other area lakes.

Muskellunge abundance increased from 2010 to 2022, and size structure improved over the same period. The Chapman PE was 274 adult muskellunge ≥ 30 inches, or 0.45 adults/acre. This was an increase from 200 total adults or 0.33 adults/acre in 2010, with the increase attributed to stocking occurring in eight of nine years from 2010-2018 compared to alternate year stocking strategy in place prior to the 2010

survey. Muskellunge growth was good; mean length-at-age values were well above state averages and lake class medians for most observed ages. Known age female muskellunge averaged 39.9 inches at age 7, while age-7 males averaged 37.5 inches. Muskellunge size structure improved in terms of mean and maximum length and most PSD categories from 2010 to 2022, with the PSD-45 value remaining unchanged during that time. A change to the current 50-inch minimum length limit from 40 inches in 2012 likely contributed to the upward trend in muskellunge size structure in Lake Redstone.

Future Management Recommendations

1. The adult walleye population density goal of two or more adult walleyes ≥ 15 inches/acre is realistic and should continue to be the goal moving forward. State-raised walleye stocking should continue at the rate of 10 extended growth walleyes/acre in even-numbered years.
2. Supplemental stocking of privately sourced walleyes by the Lake Redstone fishing club in years when state-raised fish are not stocked may continue. This will help increase adult walleye density to the desired level and can offset DNR production shortfalls. Privately purchased walleyes should have Mississippi River genetics (Mississippi headwaters or mainstem).
3. Muskellunge stocking should continue at the rate of one large fingerling/acre in alternating (even) years to achieve the adult density objective of 0.33 muskellunge ≥ 30 inches/acre.
4. At least one fall walleye electrofishing survey should be completed in a year when walleye aren't stocked to assess natural recruitment prior to the next comprehensive fishery survey in 2032.
5. A regulation change for walleyes to an 18-inch minimum length limit and 3-fish daily bag limit is recommended to help achieve adult abundance and size structure goals. The change to a 3-fish daily bag limit for walleyes was implemented statewide on April 1, 2024. The change to an 18-inch minimum length limit occurred through the DNR Spring Hearing rule change process.
6. All other length and bag limits should remain unchanged.

General Lake Information

Lake & location

Lake Redstone, Town of La Valle, Sauk County
T12N, R3E, Sections 2, 11-14, 23, and 24 (Town of La Valle)
Waterbody Identification Code (WBIC): 1280400

Physical/chemical attributes

- **Morphometry:** 605 acres, maximum depth of 36 feet, average depth of 14 feet, 17.9 miles of shoreline, pool elevation 916.2 feet. Lake volume (surface area x mean depth) 8,470 acre feet. Residence time (medium) 230 days.
- **Watershed:** 27.9 square miles
- **Lake type:** Drainage (artificial impoundment of East Branch and West Branch Big Creek).
- **Water Clarity:** Stained and turbid, occasional algal blooms
- **Littoral substrate:** 60% muck, 40% sand
- **Trophic status:** Eutrophic based on mean July-August TSI and Secchi depth values from 1986-2023 (Hatleli 2023)
- **Aquatic vegetation:** Sparse with low species richness; eight species found in 2022 (Hatleli 2023)
- **Winterkill:** Infrequent
- **Boat Landings:** Three public boat access points exist on the lake; two are controlled by the Town of La Valle; Section 11 Road (fee) and Fox Court (free). The third is controlled by Sauk County (North End, fee).
- **Other Features:** Lake Redstone Park is a 30-acre public park managed by Sauk County. It is located at the south end of the lake and includes a playground, beach and access to the waterfall located at the lake's outlet.

Purpose of survey

Baseline lake survey Tier 1 assessment.

Dates of fieldwork

- Fyke netting survey conducted April 5 through April 23, 2022 (SN1)
- Fyke netting survey conducted May 2 through May 6, 2022 (SN2)
- Spring electrofishing surveys conducted April 25, 2022 (SE1), and May 16-24, 2022 (SE2)
- Fall electrofishing survey conducted Oct. 11, 2022 (FE)
- Fyke netting survey conducted April 10-18, 2023 (SN1, muskellunge recapture survey)

Fishery

Black and white crappies, largemouth and smallmouth bass and muskellunge were abundant. Bullheads were common. Bluegills, yellow perch, walleyes, northern pike

and channel catfish were present. Seasons and length and bag limits for Lake Redstone are presented in Table 1.

Introduction

Lake Redstone is a 605-acre, artificially impounded drainage lake in northwest Sauk County. East and West Branch Big Creek are the two primary inflow creeks to Lake Redstone, delivering water from the 27.9 square mile watershed. Land use within the watershed is 47% forested, 46% agriculture, 6% developed, 1% wetland, 1% barren and <1% grassland (Hatleli 2023). Under normal conditions, the amount of flow entering lake Redstone from East and West Branch Big Creek is relatively low. Consequently, the lake has a long residence time ranging from 179 to 248 days based on the model used and the water in the lake is replaced 1.5 to 2.0 times per year on average (Lake Redstone Protection District 2022). Water from the lake is released primarily via the spillway on the top of the dam located at the southern end of the lake. From the lake outlet, Big Creek flows another 0.4 miles before joining the Baraboo River. The dam may also release water via a bottom draw system but generally this only occurs when larger drawdowns are needed for dam inspection, repair, etc. Lake Redstone has a maximum depth of 36 feet and a mean depth of 14 feet. The southern end of the lake has scenic red sandstone cliffs, which steeply slope into deep water with very little littoral habitat, while the many bays and inlets in the middle and upper parts of the lake have more gradual drop offs and more littoral habitat.

In 1956, before the lake was created, sections of Big Creek were surveyed and assessed for potential trout stocking at the request of the La Valle Sportsman Club. Following the survey, it was advised that the sampling area be considered for a potential brown and rainbow trout put-and-take fishery. In 1963, the idea of constructing a lake in the area began to gain traction. A landowner donated approximately 40 acres to Sauk County to create a park and lake (approximately 12-15 acres). Around the same time, the Lake Shore Development Corporation (LSDC) was looking to construct a lake in upper Sauk and lower Juneau County but could not find a suitable place to construct a dam until it ran into the aforementioned land. Because the county would save tens of thousands of dollars, the county allowed the LSDC to build a dam at this site and land was to be donated back to the county to create a park. The LSDC began buying up land and construction began in fall of 1964. In March of 1965, a washout occurred at the dam site. The LSDC could not afford the necessary dam repairs and after considerable negotiations, the Branigar Lake Properties organization from Illinois assumed control of the project. By the summer of 1966, Lake Redstone was filled. Branigar Lake Properties also constructed nearby Dutch Hollow Lake in 1970.

Lake Redstone reflects the extensive agricultural watershed it drains with heavy, late summer algal blooms. Organic decomposition depletes oxygen below 12 feet during the summer. A very active lake management district exists on the lake, and they have been studying and conducting water quality improvement projects. One of the

district's projects is the development of a sediment delivery model for the lake. This project is funded by a Lake Planning Grant from the Wisconsin Department of Natural Resources (DNR). Another Lake Planning Grant was used to fund nutrient monitoring on the lake in 2000. The monitoring data was used to examine the potential to reduce phosphorus concentrations at the bottom of the lake. One of the options proposed was the installation of a bottom draw on the lake to discharge the phosphorus laden water. A feasibility study was conducted by the DNR to evaluate this option. It found that overall, a bottom withdrawal would provide minimal water quality benefit to the lake. In addition, due to the high levels of hydrogen sulfide and ammonia concentrations in the hypolimnetic water, effluent limits and potential wastewater treatment of the discharge would be needed to prevent nuisance odors and to protect the downstream fishery in Big Creek (Marshall et al 2002).

In response to high levels of nonpoint pollution, Lake Redstone was part of the Crossman Creek & Little Baraboo Creek priority watershed project. The project was jointly sponsored by the DNR, the Department of Agriculture, Trade and Consumer Protection, and the Sauk, Richland and Juneau County Land Conservation Departments. The project was selected in 1983 and was completed in the mid-1990s. The goals of the project were to protect and improve water quality and fisheries habitat by controlling erosion from farm fields, reducing stream bank erosion, reducing or controlling barnyard runoff, and better management of manure spreading in the watershed (WDNR 2002). When the priority watershed project was completed, 60% of eligible landowners had signed up, but only 65% of the signed projects were completed. The project did achieve its goal of a 70% phosphorus reduction and 50% sediment reduction from what had been coming into the watershed (WDNR 2002). As of 2022, Lake Redstone remains a eutrophic lake based on mean July-August TSI values for Chlorophyll-a (62) and phosphorous (58) since 1988, and a mean Secchi depth of 3 feet since 1986 (Hatleli 2023). Additionally, Lake Redstone was listed as impaired under Section 303(d) of the Federal Clean Water Act for total phosphorous concentration in 2014, for eutrophication with an unknown pollutant in 2016, for total phosphorous again in 2018 and remain on the list for total phosphorous as of 2022 (Wisconsin DNR 2019, LRPD 2022).

The Lake Redstone Protection District (LRPD) is a government organization funded through a small portion of taxes from property owners within the Protection District. Together with a coalition of stakeholders including Sauk and Juneau counties, the United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS), local ag producers, the Lake Redstone Property Owners Association, and with support from the DNR, the LRPD continues to work to curb sediment and nutrient inputs into Lake Redstone through watershed protection initiatives. The LRPD has also worked to remove accumulated sediment from the lake, which was a massive undertaking. Most recently, removal efforts included the dredging of several bays on Lake Redstone during the summer and fall of 2019. The dredging removed 104,000 cubic yards of accumulated sediment from the bays and restored depth lost since the previous dredging project was completed in the late 1980s (LRPD 2022). The

LRPD completed a 9-Key Element watershed and whole-lake management plan which was approved by DNR in 2022 and an Aquatic Plant Management (APM) plan for 2023-2028 which was approved in 2023. The full versions of the plans may be found at https://www.lakeredstonepd.org. These plans contain a wealth of information and will help to guide management of the lake and surrounding watershed moving forward.

In terms of aquatic plants, a point-intercept aquatic vegetation survey in August 2022 found the maximum depth of rooted aquatic vegetation to be 6.5 feet, and aquatic plants were found at only 17% of sites shallower than 6.5 feet (Hatleli 2023). In total, eight species of aquatic plants were present, with six collected on the survey rake and two additional species identified visually near survey points. Eurasian watermilfoil, small pondweed, sago pondweed and water celery were the most common species found in 2022 accounting for 83% of the relative frequency of plants (Hatleli 2023). The aquatic plant community was characterized as sparse, with low species richness (Hatleli 2023).

Over the past 50 years, fish stocking in Lake Redstone has primarily focused on two species: walleye and muskellunge. Stocking of state-raised walleyes has occurred in most years since 1983. The age class stocked has varied (fry, small fingerling and large fingerling), but small fingerlings were the predominant year class stocked due to a combination of good recruitment and lower cost. State-raised walleye stocking exceeded state-recommended rates (number/acre) from 1999-2006 but has followed established stocking guidance since then. Leading up to the 2022 survey, state-raised small fingerling walleyes were stocked in odd-numbered years at the rate of 35 fish/acre. Large fingerling walleyes have been stocked periodically when fish were donated by a local private hatchery (2009, 2010), purchased by the Lake Redstone Fishing Club for stocking in years when DNR fish were not scheduled to be stocked (2018, 2020, 2022), or when surplus DNR fish were available (2022).

Muskellunge stocking began in 1987 and large fingerlings have been the age class stocked almost exclusively. Stocking rates have varied from 0.5 to 2.0 fish/acre, with the one fish/acre rate being most common. Stocking frequency has gone through periods of every year and alternate year stocking. In recent history, a period of every year stocking (2010-2016) was followed by a return to stocking in even-numbered years in 2018. No muskellunge were stocked in 2020 due to production limitations caused by the COVID-19 pandemic. The current stocking rate is one large fingerling/acre.

Other stocking included northern pike (1982), yellow perch (1983), channel catfish (1982 and 1993), unspecified minnows in 1983 and smallmouth bass (1998, 1999). Smallmouth bass were not present in Lake Redstone prior to being stocked and have since established a self-sustaining population. Northern pike and channel catfish populations have persisted at low abundance. Gizzard shad were not present in Lake Redstone from the time of its construction until the early 2000s. They were likely introduced to the lake illegally sometime between 2004 (the last survey where

gizzard shad were not found) and 2010 (the first survey where gizzard shad were found). Since being introduced, they have established a self-sustaining population in Lake Redstone and likely have a great impact on food web dynamics and nutrient cycling in the lake.

Periodic fish surveys occurred throughout the 1990s and early 2000s, with most surveys focused on various components of the fishery, generally for the purpose of evaluating stocking. Fall electrofishing surveys quantified recruitment of stocked fingerling walleyes or short-term survival of stocked muskellunge. Spring netting surveys helped to evaluate adult muskellunge and walleye populations. Night electrofishing surveys in the spring assessed bass and panfish populations. While these various surveys occurred mostly independently of one another, there was one previous comprehensive survey when all spring survey components (netting and electrofishing) occurred in 2010, with a muskellunge recapture survey in spring 2011. The report detailing the results of that comprehensive survey was published on the DNR website where it may be accessed by the public (Rennicke 2012, https://p.widencdn.net/qxoskg/Reports_SaukLakeRedstone2010Comprehensive).

Three public boat access points exist on the lake, which are controlled by the township and county. Each site has a paved launch and trailer parking available. A local ordinance identifies slow no-wake areas and designates a swimming area directly adjacent to the Sauk County Park beach. There are shore-fishing opportunities at the Fox Court boat landing, the north end landing and at the Sauk County Park land on the southern end of the lake. As of 2022, Lake Redstone follows the general inland fishing regulations except for the 50-inch minimum length limit for muskellunge. Motor trolling is permitted on Lake Redstone and all other Sauk County lakes, with three hooks, baits or lures allowed per person.

SURVEY EFFORT

Following ice-out in the middle and lower sections of the lake, five fyke nets were set on April 5, 2022. Nets were added gradually as the ice receded until 10 total nets were set by April 10. Nets were removed or moved to new locations as necessary until the final net was removed on April 23. Nets were a mixture of 3-foot and 4-foot rectangular frame nets with circular hoops, and they targeted northern pike and walleyes (SN1). Total SN1 effort was 165 net nights. Fyke net descriptions and locations (GPS coordinates) from SN1 can be found in Table 2.

Gamefish, as defined in Wisconsin Statutes Section 29.001 (41), includes all varieties of fish except rough fish and minnows. Panfish are therefore gamefish, and in Wisconsin Administrative Code Section 20.03 (29), panfish includes yellow perch, bluegill, black crappie, white crappie, pumpkinseed, green sunfish, warmouth and orangespotted sunfish (orangespotted sunfish are not present in Lake Redstone). For the purposes of this report, sport fish refers to a subset of gamefish including walleye, northern pike, muskellunge, largemouth bass, smallmouth bass and channel catfish.

Gamefish were measured to the nearest 0.1 inch and a subsample of each species was weighed to the nearest 0.01 pound. Otoliths were taken from a subsample of bluegills, black crappies, white crappies and yellow perch for aging. Fin rays or spines were taken from walleyes, muskellunge, northern pike, largemouth bass, smallmouth bass and channel catfish. The goal was to take structures from five fish per half-inch group for bluegills, black crappies, largemouth bass, smallmouth bass and channel catfish. Five structures per half-inch group from each sex were removed from walleye, northern pike and yellow perch. Sex was recorded when evident for walleye, muskellunge, northern pike and yellow perch. Captured walleyes that were 12.0 inches and larger were marked with a top caudal fin clip, while fish smaller than 12.0 inches received a bottom caudal fin clip. Sexually mature northern pike were marked with a top caudal fin clip, and immature fish were marked with a bottom caudal fin clip. Muskellunge ≥ 30 inches were marked with a top caudal fin clip and a PIT tag if no PIT tag was found during an initial scan of the fish with the tag reader. Muskellunge < 30 inches were marked with a bottom caudal fin clip as well as a PIT tag if they weren't already tagged. Largemouth and smallmouth bass ≥ 8 inches were marked with a top caudal fin clip, and bass ≤ 8 inches were marked with a bottom caudal fin clip. Fin clips were given for the purpose of calculating mark-recapture PEs for the species listed.

A DNR standard direct current (DC) boom shocker boat was used to sample fish on Lake Redstone, with the first electrofishing survey occurring on the night of April 25 (SE1) to recapture walleyes that were marked during SN1 and to mark largemouth and smallmouth bass for a PE. Slightly over half of the total lake shoreline was sampled (9.1 miles total) with two boats, and all sport fish were collected and measured to the nearest 0.1 inches. Calcified 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, and marking of new walleyes ≥ 12 inches continued. Largemouth and smallmouth bass were marked with fin clips, and muskellunge were marked with PIT tags and fin clips as during SN1.

Five fyke nets were set for SN2 on May 2, 2022. Nets were mix of 3-foot and 4-foot frame nets that targeted muskellunge. One net was moved to a new location on May 4, and all nets were removed when the survey ended on May 6 due to warming water temperatures and low muskellunge catches. Total SN2 effort was 20 net nights, and fish marking and data collection procedures continued as outlined previously. Fyke net descriptions and locations (GPS coordinates) from SN2 can be found in Table 3.

The late-spring electrofishing survey (SE2) occurred on the nights of May 16 and May 23, 2022, to assess relative abundance of panfish and recapture marked bass for a PE. Electrofishing stations matched those that were sampled during SE2 in 2010. All species were collected during the first 0.5 miles of each station and were processed before sampling the remaining 1.5 miles. Only sportfish were collected from the 1.5-miles portions of each station. Non-game fish were also collected and measured while sampling the all-species segments, except common carp were counted but not dipped. All fish marking and data collection procedures continued as outlined

previously. Starting and ending GPS coordinates for SE1 and SE2 stations can be found in Table 4.

The 2022 fall electrofishing survey of Lake Redstone occurred on the night of Oct. 11, 2022. Sampling included 3-mile sections of shoreline along the east and west shores of the central part of the lake. The purpose of the fall survey was to assess abundance of juvenile walleyes that were stocked earlier in 2022 and to collect data from adult walleyes and other sport fish species. All sport fish were collected and measured to the nearest 0.1 inches, muskellunge were checked for PIT tags and unmarked muskellunge were given PIT tags.

The final component of the survey was a second SN1 effort in spring 2023. Following ice-out across the entire lake, six fyke nets were set on April 10, 2023. Nets were moved to new locations as necessary until all nets were removed on April 18 due to warming water temperatures and declining catch rates. Nets were a mixture of 3-foot and 4-foot rectangular frame nets with circular hoops, and they targeted muskellunge. Total SN1 effort was 48 net nights. Muskellunge were measured to the nearest 0.1 inches. Sex was recorded and fish were examined for fin clips and PIT tags. Previously unmarked fish were marked with a PIT tag. All other fish species were released immediately, and no other data were collected. Fyke net descriptions and locations (GPS coordinates) can be found in Table 5.

Methods

The walleye PEs were calculated using the Chapman modification of the Petersen single-census method, where fish are marked during multiple fyke netting events (SN1), followed by a single recapture event (SE1). 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 calculated, the estimate was divided by the surface area of the lake to determine total adult walleye density (the number of sexually mature walleyes / acre) and the density of harvestable walleyes (the number of fish ≥ 15 inches / acre). These densities were then compared to average densities for stocked walleye fisheries across Wisconsin.

A single census mark-recapture PE for muskellunge was calculated (the number of muskellunge ≥ 30 inches), again using the Chapman method. The 2022 spring survey served as the marking period, and a spring netting survey in 2023 served as the recapture period.

Various data analyses were completed using both Microsoft Excel and R (version 4.0.5) combined with R Studio (version 1.4.1106). For all sampling periods, total catch and catch-per-unit of effort (CPUE) was calculated by gear type for all species. Length

frequency distributions were generated for gamefish species of interest. Length range, mean and median lengths were calculated for gamefish species as well. The proportional size distribution (PSD), proportional size distribution of fish sizes often acceptable for harvest (PSD-H, either socially acceptable or legally acceptable under current fishing regulations) and proportional size distribution of preferred length fish (PSD-P) were calculated for all gamefish species of interest with more than 100 stock size individuals collected (Anderson and Neumann 1996, Guy et al. 2007). Length designations for stock, quality, harvestable, preferred, memorable and trophy sizes of the gamefish species collected from Lake Redstone can be found in Table 6; these values were used for calculation of PSD (Anderson and Neumann 1996, Guy et al. 2007). For bluegills, PSD calculations were reported separately for fyke netting and electrofishing due to possible bias, with fyke nets being selective for larger bluegills (Laarman and Ryckman 1982).

Ages were estimated from calcified structures for a subsample of each species, and age and size data of these fish were used to generate age-length keys and ages were assigned to all fish sampled to estimate the age frequency of the population based on the aged subsample (Isermann and Knight 2005). Age frequency distributions were then generated for each species and inferences were made about year class strength and annual mortality when possible. Catch curves were generated for species exhibiting consistent recruitment for calculation of total annual mortality rates. The mean length-at-age was used to make inferences about fish growth in Lake Redstone by comparing the lake to area, regional and statewide averages. Area averages are calculated from mean length-at-age values from lakes managed out of the Poynette fisheries office and surveyed from 2010-2022. Area comparisons are helpful for local anglers who are interested in knowing which of the lakes in their area they might fish in a given day that offers the greatest fishing potential for a certain species. Statewide comparisons help to give anglers a better idea how a given lake compares on a broader scale. Lake class comparisons help anglers understand how a given lake shapes up against other lakes in the state that are the most like that lake.

Lake Redstone is classified as complex-warm-dark under a recently developed classification system for Wisconsin Lakes. The complex-warm-dark class includes 198 lakes across Wisconsin (Rypel et al. 2019). Lakes in this classification account for 3% of classified lakes by number but account for 31% of the total surface area of classified lakes which is more than any other lake class. Complex-warm-dark lakes have four or more sportfish species present, a high number of degree days, low water clarity, are located low in the landscape, contain walleyes, may contain abundant black crappie populations and may develop quality northern pike or muskellunge size structure (Rypel et al. 2019).

The 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.

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 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

GENERAL FISH COMMUNITY

In total, 16,781 fish representing 22 species and hybrids from seven families were collected during spring netting and electrofishing on Lake Redstone in 2022. Catch and catch rate (CPUE) by gear type are shown for each species collected in Table 7. Length, age and relative weight data are summarized in Table 8.

BLUEGILL

In total, 10,306 bluegills were collected during the spring; the catch rates were 58.0 fish/net-night during SN1, 30.8 fish/net-night during SN2 and 61.0 fish/mile of shoreline during SE2. The bluegill catch rate was much higher in 2022 than in 2010 (10.5 fish/mile). The bluegill SE2 catch rate ranked in the bottom third when compared to other lakes in the Poynette management area (Table 9). When compared to other lakes in its class (complex-warm-dark, 198 total lakes), Lake Redstone again compared poorly in terms of SE2 catch rate, placing just above the 25th percentile for the lake class (Figure 1).

Lengths of 1,695 bluegills ranged from 2.9 to 9.2 inches with mean and median lengths of 6.3 and 6.5 inches, respectively. The length frequency distribution for bluegills is presented in Figure 2. The PSD, PSD-7 and PSD-P values from SN1 were 67, 35 and 2, respectively. The PSD, PSD-7 and PSD-P values from SE2 were 29, 5 and 0, respectively. Size structure appeared to be similar but slightly lower in 2022 compared to 2010 when the SN1 PSD, PSD-7 and PSD-P values were 70, 36 and 6, respectively. While drawing size structure comparisons from netting data is not

preferable, too few bluegills were collected during SE2 in 2010 for meaningful PSD calculations or comparisons between years based on electrofishing data.

Ages ranged from 2 to 12 years and bluegills were fully recruited to the sampling gear by age 3, which is typical. However, recruitment appeared to be somewhat inconsistent based on the age frequency distribution, with weaker year classes evident in 2017 and 2018 (ages 4 and 5 in 2022) and stronger year classes in 2014 and 2016 (ages 6 and 8 in 2022) (Figure 3). Because bluegill recruitment was so inconsistent, a catch curve could not be applied to the age frequency distribution and conclusions about mortality after age 3 are hard to draw. Bluegills did show the ability to live to old ages, with fish up to age 12 collected in 2022. The maximum bluegill age observed in Lake Redstone was higher than is typically observed in other area lakes.

Bluegill mean length-at-age in Lake Redstone appeared to keep pace with area and statewide averages and lake class medians through age 7 but fell behind for age 8 and older (Figure 4). Bluegills in Lake Redstone didn't average over 8 inches until age 9, and this is 1-3 years later than in other area lakes. Comparisons of mean length-at-age of bluegills between the 2022 and 2010 surveys are difficult because otoliths were used to age bluegills in 2022 and scales were used in 2010. Otoliths yield more accurate and precise estimates of age for bluegills than scales do, and comparisons of mean length-at-age data from two different years using two different structures really aren't valid.

Overall, bluegills larger than 3 inches were in good condition; relative weight averaged 97.7. Twenty-two bluegills (32.2%) had relative weight values >100, indicating excellent condition, while only five (8%) had relative weight values <75, indicating poor condition.

WHITE CRAPPIE

In total, 971 white crappies were collected; the catch rates were 1.7 fish/net night during SN1, 33.6 fish/net night during SN2 and 6.0 fish/mile during SE2. The SN1 and SN2 catch rates were higher than the last survey in 2010 (1.2 and 7.9 fish/net-night, respectively). White crappies aren't as widely distributed across the state as black crappies are, and lake class catch rate metrics were not available for comparison. However, it should be noted that among the six lakes in the Poynette management area where white crappies are found, Lake Redstone had the highest spring netting catch rates. Lengths of 894 white crappies measured in spring 2022 ranged from 5.5 to 13.2 inches, and the mean and median lengths were 9.1 and 9.0 inches, respectively. The PSD-8, PSD-9, PSD-P and PSD-M values were 89, 60, 26 and 2, respectively, and these values are indicative of good size structure when compared to other area lakes; Lake Redstone is at or near the top in every category (Table 10). The range of PSD values in 2022 were very similar to those observed in 2010 with any minor differences attributed to differences in population age structure in 2010 vs 2022. The white crappie length frequency distribution from the 2022 survey is presented in Figure 5.

Ages ranged from 2 to 11 years with age-3 fish being the most common in the distribution (Figure 6). While year class strength was somewhat variable, there was only one failed year class; age 5 (2017). Variable year class strength violated the assumption of constant recruitment. Thus, application of a catch curve to the crappie data was not possible, and no inference on annual mortality could be made. White crappies in Lake Redstone averaged over 10 inches by age 4 (Figure 7). However, quality mean length-at-age data weren't available from area white crappie populations, so meaningful growth comparisons among area lakes weren't possible.

Overall, white crappies in Lake Redstone were in average condition; relative weight values of 84 fish averaged 85.9. Eleven fish (13.1%) had a relative weight value ≤ 75, indicating poor body condition, and nine fish (10.7%) had relative weight values ≥ 100, indicating excellent body condition.

BLACK CRAPPIE

In total, 792 black crappies were collected; the catch rates were 2.6 fish/net night during SN1, 18.2 fish/net night during SN2 and 1.5 fish/mile during SE2. The SN1 and SN2 catch rates were lower than the last survey in 2010 (4.3 and 25.3 fish/net night, respectively). The SN1 catch rate was low compared to the rest of the lake class, falling just above the 25th percentile for complex-warm-dark lakes (Figure 8). However, the SN2 catch rate was high compared to the rest of the lake class, placing above the 75th percentile (Figure 9). Lengths of 756 black crappies measured in spring 2022 ranged from 5.0 to 17.4 inches and mean and median lengths were 7.9 and 6.8 inches, respectively. The PSD-8, PSD-9, PSD-P, PSD-M and PSD-T values were 47, 38, 22, 2 and 1, respectively, and these values are indicative of good size structure when compared to other area lakes; Lake Redstone was near the top in almost every category (Table 11). The range of PSD values in 2022 was similar to those observed in 2010 when they were 62, 39, 22, 2 and 0, respectively. The lower PSD-8 value in 2022 can be attributed to the higher proportion of age-2 fish (length 5-7 inches) in the sample compared to 2010. The black crappie length frequency distribution from the 2022 survey is presented in Figure 10.

Ages ranged from 2 to 7 years with age-2 fish being the most common in the distribution (Figure 11). Ages 4 and 6 (2018 and 2016) were weaker year classes than ages 3, 5 and 7 (2019, 2017 and 2015). Alternating weak and strong year classes violated the assumption of constant recruitment. Thus, application of a catch curve to the crappie data was not possible, and no inference on annual mortality could be made. Mean length-at-age values for black crappies in Lake Redstone were equal to or slightly greater than area and state averages and lake class medians for most ages, with fish reaching 10 inches as early as age 4, and averaging over 10 inches by age 6 (Figure 12). Lake Redstone is the only lake in Columbia and Sauk Counties where black crappies larger than 15 inches have been captured in a survey since the current sampling protocol was instituted in 2008, and the lake is truly capable of producing giants. Black crappies larger than 15 inches in Lake Redstone in 2022 ranged from 7 to 11 years old.

Overall, black crappies in Lake Redstone were in good condition; relative weight values of 85 fish averaged 94.1. Six fish (7.1%) had a relative weight value ≤ 75 indicating poor body condition, and 23 fish (27.1%) had relative weight values ≥ 100 indicating excellent body condition.

YELLOW PERCH

In total, 245 yellow perch were collected; catch rates were 1.3 fish/net night during SN1, 1.6 fish/net night during SN2 and 1.5 fish/mile during SE2. Netting and electrofishing catch rates were similar to the previous survey in 2010, and the SN1 catch rate ranked 9th out of 15 lakes surveyed in the Poynette management area since 2010. When compared to other lakes in its class across the state, the yellow perch catch rate was low, just above the 25% percentile for the class (Figure 13). Lengths of 226 measured yellow perch ranged from 5.0 to 11.6 inches, and the mean and median lengths were 7.0 and 6.9 inches, respectively. The yellow perch length frequency distribution is presented in Figure 14. The 2022 PSD, PSD-9 and PSD-P values were 19, 6 and 2, respectively, somewhat better than in 2010 when they were 9, 1 and 0, respectively. Compared to other area lakes surveyed since 2010, Lake Redstone ranks in the middle of the pack in terms of yellow perch size structure when comparing PSD values (Table 12). Female yellow perch accounted for about two-thirds of the catch that measured 8 inches or larger. Therefore, the fish that anglers would find acceptable for harvest are predominantly female, and this is relatively common across area lakes. Males (n = 97) ranged from 5.0 to 8.7 inches and averaged 6.8 inches while females (n = 102) ranged from 5.2 to 11.6 inches and averaged 7.3 inches.

Yellow perch were fully recruited to the sampling gear by age 2, and this was true for males and females alike. Yellow perch recruitment appeared to be inconsistent, with the 2017 and 2018 year classes (ages 4 and 5) being weaker than the 2016 year class (age 6), with the 2018 year class being especially weak (Figure 15). The application of a catch curve to the yellow perch data was not possible due to inconsistent recruitment and conclusions about mortality are hard to draw. Yellow perch mean length-at-age was at or slightly above area and state averages and lake class medians, with fish averaging over 8.0 inches by age 4 (Figure 16). Females grew faster and reached larger sizes than males, averaging 8.8 inches at age 5 compared to 7.8 inches at age 5 for males.

Overall, yellow perch in Lake Redstone were in excellent condition; relative weight values of 93 fish averaged 102.7 and were nearly equal when comparing females (W_r = 104.5) to males (W_r = 100.7). Five fish (5.4%) had a relative weight value ≤ 75, indicating poor body condition, and 48 fish (52.6%) had relative weight values ≥ 100, indicating excellent body condition.

WALLEYE

In total, 578 walleyes were sampled during the spring including recaptures. The catch rates were 1.6 fish/net night during SN1, 22.6 fish/mile during SE1, 0.6 fish/net night during SN2 and 12.9 fish/mile during SE2. The 2022 SN1 and SE1 catch rates were markedly lower than the last survey in 2010, and the SN1 catch rate fell just below the

median for the lake class (Figure 17). For the PE, a total of 139 adult walleyes ≥ 15 inches were marked during SN1 (M). Seventy-four were captured during SE1 (C), and 22 were recaptures (R). The Chapman PE was 456 adult walleyes ≥ 15 inches (95% CI = 330-674) or 0.8 fish/acre (95% CI = 0.5-1.1 fish/acre). This was markedly lower than the 2011 estimate of 4.4 walleyes ≥ 15 inches/acre. The coefficient of variation (CV) value is a measure of precision of the estimate, and the CV for the PE was 17.0%, which is within the range of 0-20% recommended for reporting a PE (Krebs 1999).

When the PE was expanded to include all walleyes ≥ 15 inches plus all sexually mature fish < 15 inches (all adult walleyes), a total of 193 walleyes were marked during SN1 (M). During SE1, 101 walleyes were collected (C), and 33 were recaptures (R). The Chapman PE was 581 total adult walleyes (95% CI = 447-794, CV = 13.8%) or 1.0 fish/acre (95% CI = 0.7-1.3 fish/acre).

In total, 508 unique walleyes were measured during spring sampling periods (total catch excluding recaptures), and lengths ranged from 6.7 to 28.5 inches, with mean and median lengths of 14.8 and 12.7 inches, respectively. The length frequency distribution is presented in Figure 18. The PSD, PSD-18, PSD-P and PSD-M values were 44, 38, 21 and 2, respectively. For known-sex walleyes, males (n = 259) ranged from 9.6-26.5 inches, with mean and median lengths of 16.2 and 17.0 inches, respectively. Female walleyes (n = 54) ranged from 17.8-28.5 inches, with mean and median lengths of 22.1 and 21.5 inches, respectively.

Age-2 fish were the most common in the distribution (41.2%) followed by age 4 (20.3%), age 3 (16.7%) and age 5 (8.2%). Ages 2 and 4 represent the only years in recent history when large fingerling walleyes were stocked. No age-6 fish were found, and no stocking occurred in 2016. There were no fish stocked in 2014 either; age-8 fish found in 2022 represent naturally produced fish or stocked fish from a different year class that were mis-aged as age 8. All remaining age classes, except for age 12, represent years when small fingerling stocking occurred. The age frequency distribution is presented in Figure 19. Variable recruitment arising from non-stocked years and variable stocking rates and differences in fingerling size in stocked years prevented application of a catch curve to the age data to make inferences on annual mortality.

Walleye growth was good in Lake Redstone, with mean length-at-age values generally at or above area and statewide averages and lake class median values (Figure 20). Exceptions include older age classes where the fish sampled were predominantly male; male walleyes typically don’t grow to be as large as female walleyes even at older ages. This was certainly true in Lake Redstone in 2022 when mean length-at-age of female walleyes outpaced males across the entire range of observed ages (Figure 21). Overall, walleyes reached 15 inches as early as age 3, averaging over 18 inches by age 4 and over 20 inches by age 5. Females averaged over 18 inches by age 3 compared to age 4 for males. The number of female walleyes sampled from older age classes was limited. However, it was apparent that female walleyes in Lake Redstone do have the ability to exceed 28 inches by age 11. A von Bertalanffy growth model was

fitted to the length-at-age data (all walleyes regardless of sex), and the result is presented in Figure 22, including the parameter estimates for L_∞ (24.8 inches), k (0.30377254) and t_0 (-0.05894994). The L_∞ value was likely lower than expected for a walleye population with good growth due to females being underrepresented in the older age classes.

The condition of walleyes in Lake Redstone was good overall based on relative weights, which averaged 98.8 overall for 217 weighed fish. Females averaged 110.9, males averaged 95.3 and unknown sex or immature fish averaged 95.9. Four walleyes (1.8%) had a relative weight ≤ 75 (poor condition), while 90 walleyes (41.5%) had relative weights ≥ 100 indicating excellent condition.

LARGEMOUTH BASS

In total, 318 largemouth bass were collected including recaptures; catch rates were 0.2 fish/net night during SN1, 6.0 fish/mile during SE1, 0.1 fish/net night during SN2 and 28.6 fish/mile during SE2. The SE2 catch rate in 2022 was nearly seven times higher than the SE2 catch rate in 2010 (4.7 fish/mile). The same electrofishing stations were sampled in 2010 and 2022. The 2022 SE2 catch rate was well above the median for the lake class (Figure 23); largemouth bass abundance in Lake Redstone was consistent with what one should expect to see from lakes of its type. Lake Redstone was in the middle of the pack on a local level, ranking 12th for total catch rate out of 24 lakes surveyed in the Poynette management area since 2011. The catch rate of fish ≥ 8 inches (CPUE-8; stock size) during SE2 was 19.8 fish/mile, and this ranked 14th out of 24 area lakes. Catch rates of larger bass once again put Lake Redstone in the middle of the pack, 11th out of 24 lakes for CPUE-14 (5.6 fish/mile) and 13th out of 24 lakes for CPUE-18 (0.1 fish/mile). Rankings for local lakes based on various size-specific largemouth bass electrofishing catch rates can be found in Table 13.

Lengths of 314 unique largemouth bass ranged from 4.5 to 19.5 inches, and the mean and median lengths were 10.9 and 10.8 inches, respectively. The length frequency distribution is presented in Figure 24. Of the largemouth bass ≥ 8 inches in length (stock size), fish ≥ 12 inches were present in good proportion (PSD = 61), as were fish ≥ 14 inches (PSD-14 = 31: legally harvestable). Larger bass were less common (PSD-18 = 1). Too few largemouth bass ≥ 8 inches were collected in the previous survey in 2010 for meaningful PSD calculations, which limited comparisons between 2010 and 2022.

Age 2 was the most common in the distribution (32.0%), with age frequency declining steadily thereafter through age 12 (Figure 25). One exception was age 5, which was a markedly weaker year class compared to the others. This exceptionally weak year class violated the assumption of constant recruitment and prevented fitting a catch curve to the data. Thus, inferences on annual mortality were limited. Largemouth bass mean length-at-age in Lake Redstone was at or above state and local averages and lake class median values for all observed ages (Figure 26). Some faster-growing largemouth bass exceeded the minimum length limit of 14 inches in Lake Redstone by age 5, and largemouth bass averaged over 14 inches by age 6. Mean length-at-age 6 was 14.3 inches, which was close to the value from the previous survey in 2010 (14.5

inches) and ranked 8th out of 15 lakes surveyed since 2011, where largemouth bass data growth data were available (Table 14).

The body condition of largemouth bass in Lake Redstone was good; relative weights of 128 fish averaged 99.4. Four fish (3.1%) had a relative weight below 75, indicating poor body condition, and 43.8% of weighed fish (n = 56) had relative weights greater than 100.

SMALLMOUTH BASS

In total, 57 smallmouth bass were collected including recaptures, and all were collected during electrofishing surveys. Catch rates were 2.2 fish/mile during SE1 and 4.6 fish/mile during SE2. The SE1 catch rate was markedly lower than the 2010 survey (14.0 fish/mile). However, the SE2 catch rate in 2022 was nearly the same as 2010 (4.2 fish/mile). The 2022 SE2 catch rate was well above the 75th percentile for the lake class (Figure 27); smallmouth bass abundance in Lake Redstone was high compared to what one should expect to see from a lake in this class. Lake Redstone was in the middle of the pack compared to other area lakes with smallmouth bass populations, ranking 4th for total catch rate out of nine area smallmouth bass lakes surveyed since 2013. Lake Redstone held the 4th spot across most size classes as well, including CPUE-7, CPUE-11 and CPUE-14. Size-specific smallmouth bass electrofishing catch rates for all area lakes can be found in Table 15.

Lengths of 57 unique smallmouth bass ranged from 5.2 to 17.6 inches, and the mean and median lengths were 11.1 and 11.4 inches, respectively. The length frequency distribution is presented in Figure 28. Too few smallmouth bass were collected in 2022 to allow for PSD calculations, limiting size structure comparisons between 2010 and 2022.

Age-4 was the most common in the distribution (31.6%), with age frequency declining steadily thereafter through age 8 (Figure 29). Recruitment appeared to be relatively consistent based on the age frequency distribution, with perhaps only the 2016 year class (age 6) being slightly weak relative to the other age classes. The weaker 2016 year class violated the assumption of constant recruitment, preventing fit of a catch curve to the age data and limiting inferences on annual mortality. Smallmouth bass mean length-at-age in Lake Redstone was on par with area and state averages and lake class median values except for age 8, which was markedly lower but was based on a single fish (Figure 30). Some faster-growing smallmouth bass exceeded 14 inches in Lake Redstone by age 3, but smallmouth bass didn't average over 14 inches (the minimum harvest size) until age 6, consistent with most other area lakes. Lake Redstone mean length-at-age values did not change much from 2010 values, indicating growth has been stable over time.

The condition of smallmouth bass in Lake Redstone was good; relative weights of 51 fish averaged 90.3. One fish (2%) had a relative weight below 75, indicating poor condition, and 11 fish (21.6%) had relative weights greater than 100, indicating excellent condition.

MUSKELLUNGE

In total, 195 muskellunge were collected including recaptures during the spring of 2022; catch rates were 1.0 fish/net-night during SN1, 1.4 fish/mile during SE1, 0.3 fish/net-night during SN2 and 0.4 fish/mile during SE2. The SN1 catch rate in 2022 was slightly lower than the SN1 catch rate in 2010 (1.6 fish/net-night). However, the 2022 SN1 catch rate was well above the 75th percentile for the complex-warm-dark lake class (Figure 31); muskellunge abundance in Lake Redstone was higher than most lakes in the class. In total, 159 unique muskellunge ≥ 30 inches were marked for the PE.

Lengths of 159 unique muskellunge ranged from 30.4 to 48.4 inches, and the mean and median lengths were 39.2 and 39.1 inches, respectively. Mean and maximum lengths in 2022 were higher than in 2010 (35.7 and 46.7 inches, respectively). Female muskellunge (n = 85) ranged from 32.6 to 48.4 inches, with mean and median lengths of 41.5 and 42.1 inches, respectively. Male muskellunge (n = 70) ranged from 30.4 to 41.6 inches with mean and median lengths of 36.7 and 37.1 inches, respectively. The length frequency distribution is presented in Figure 32. The PSD, PSD-P, PSD-40, PSD-M and PSD-45 values were 100, 59, 45, 28 and 6 in 2022 compared to 92, 29, 15, 11 and 6 in 2010. This indicated that muskellunge size structure improved markedly in most categories from 2010 to 2022.

As of 2022, no muskellunge had been stocked in Lake Redstone since 2018 and ages in 2022 ranged from 4 to 13 years (Figure 33). Age 7 was the most common in the distribution (23.3%), followed by age 9 (17.6%), ages 6 and 8 (13.8%) and ages 4 and 10 (10.1%). Age 5 was the weakest year class in the distribution, but those fish would have been from 2017, a year when no stocking occurred. Age-5 fish were either mis-aged or represent a small level of natural reproduction. The lack of any fish younger than age 4 in the catch supports the idea that natural reproduction is not occurring in Lake Redstone, and the age-5 fish found in 2022 were likely mis-aged fish from a different year class.

Muskellunge mean length-at-age in 2022 in Lake Redstone was well above the state average and lake class median values for most ages (Figure 34). The analysis included a mix of ages estimated from fin rays and ages of known age fish that were PIT tagged prior to stocking. Female muskellunge in Lake Redstone averaged over 40 inches by age 8, and the mean length of female muskellunge was greater than mean length of males for all ages. Male muskellunge did not average 40 inches at any age, but some age 8-11 male muskellunge did reach 40 inches. Muskellunge mean length-at-age for females and males are presented separately in Figures 35 and 36.

A von Bertalanffy growth model was fitted to the length-at-age data (all 2022 muskellunge regardless of sex), and the result is presented in Figure 37, including the parameter estimates for L_∞ (46.7 inches), k (0.1972491) and t_0 (-1.9618956).

There was a total of 107 known age muskellunge observations in 2022 and 2023, including 23 fish that were sampled in both 2022 and 2023. Mean lengths at age of known age muskellunge are presented in Table 16. The known age fish represented

two treatment groups from the paired feeding study (2013-2016); pellet-reared fish and minnow-reared fish. Mean length-at-age of minnow-reared muskellunge was higher compared to pellet-reared fish for ages 7-10. However, the difference in the mean length-at-age between the treatment groups was not significant based on analysis of variance (ANOVA) for ages 7-9. Ages 6 and 10 were left out of the analysis because only pellet-reared fish were stocked in 2016 (age 6 in 2022), and too few age 10 fish were collected in 2023 (stocked in 2013) to allow a meaningful analysis.

The body condition of muskellunge in Lake Redstone in 2022 was good; relative weights of 140 fish averaged 100.3. No fish had a relative weight below 75 (poor body condition), and 49.3% of weighed fish (n = 69) had relative weights greater than 100. Females were in slightly better condition, with relative weights averaging 102.9 compared to 97.2 for males.

The spring 2023 recapture effort for muskellunge yielded a total catch of 142 fish in 48 net nights for a CPUE of 3.0 fish/net night, higher than the SN1 catch rates in both 2010 and 2022. In total, 159 unique muskellunge ≥ 30 inches were marked for the PE in 2022 (M), 104 were collected in 2023 (C) and 60 were recaptures from 2022 (R). The final PE was 274 total adult muskellunge (95% CI 236-332, CV=8.3%), or 0.45 adults/acre (95% CI 0.39-0.55 adults/acre). The adult muskellunge density in 2022 was higher than the last estimate in 2010 (0.33 adults/acre) and was higher than the goal of 0.33 adults/acre desired for managing a trophy fishery in Lake Redstone.

OTHER SPECIES OF INTEREST

Other species of interest to anglers included yellow bullhead, pumpkinseed, northern pike and channel catfish. In total, 1,087 yellow bullheads were collected, and the catch rates were 3.9 fish/net night during SN1, 21.9 fish/net night during SN2 and 2.5 fish/mile during SE2. Lengths of 273 measured yellow bullheads ranged from 5.6 to 13.0 inches, averaging 9.7 inches. In total, 342 pumpkinseeds were collected, and the catch rates were 1.7 fish/net night during SN1, 0.9 fish/net night during SN2 and 24.5 fish/mile during SE2. Lengths of 124 measured fish ranged from 3.5 to 7.3 inches, averaging 5.8 inches. Northern pike have never been abundant in Lake Redstone, and 2022 was no exception. The total catch was 22 northern pike including recaptures, with all but one fish caught during spring netting. Lengths of 13 unique northern pike ranged from 25.6 to 38.4 inches, averaging 31.4 inches. Eleven of 13 northern pike were larger than the 26-inch minimum length limit. Ages ranged from 4 to 8 years, with age 5 being the most common age class in the sample (8/13 fish: 61.5%). Channel catfish were not numerous, but the few that were sampled were large; five collected during SN1 ranged from 21.7 to 34.3 inches, averaging 28.9 inches. The largest channel catfish weighed 19 pounds.

DETRIMENTAL SPECIES

Common carp were collected during SN1 (n = 18; 0.1 fish/net night), and SN2 (n = 4; 0.1 fish/net night) and observed and counted during SE2 (n = 44; 22 fish/mile). The fyke net catch rates of common carp in 2022 were identical to the 2010 survey, and the SE2 catch rate in 2022 was lower than 2010 (22 fish/mile vs. 29 fish/mile). Lengths of 16

common carp measured during SN1 ranged from 23.9-33.3 inches, averaging 28.6 inches. Gizzard shad were abundant and were the second most common fish in the survey by number. In total, 1,509 gizzard shad were collected, and the catch rates were 2.7 fish/net night during SN1, 2.5 fish/net night during SN2 and 507 fish/mile during SE2. Gizzard shad appeared to be more abundant in 2022 compared to in 2010 when the catch rates were 0.8 fish/net night during SN1, 4.8 fish/net night during SN2 and 64 fish/mile during SE2. It should be noted that SE2 in 2022 appeared to coincide with gizzard shad spawning activities, which may help explain the extremely high catch rate relative to past surveys.

FALL ELECTROFISHING SURVEY

Sport fish were sampled during the fall electrofishing survey on Oct. 11, 2022 which covered two 3-mile stations, one on the east shore and one on the west shore. Walleyes were the focus of the survey, and 143 were collected for a CPUE value of 23.8 fish/mile. The fall walleye catch rate in 2022 was lower than in 2021 (31.5 fish/mile), but 2022 had a higher age-0 CPUE (12.3 fish/mile vs. 3.0 fish/mile). Walleye stocking differed between the two years, with small fingerlings stocked in June 2021 versus large fingerlings which were stocked in September 2022, about a month prior to the fall survey. Walleye lengths in fall 2022 ranged from 5.5-25.3 inches with mean and median lengths of 10.0 and 8.4 inches, respectively.

In total, 114 largemouth bass were collected for a catch rate of 19.0 fish/mile which was about half of the 2021 survey CPUE of 39.3 fish/mile (same stations). Largemouth bass lengths ranged from 7.4-18.5 inches, with mean and median values of 11.0 and 10.2 inches, respectively. Twenty-eight smallmouth bass were collected, and the CPUE was 4.7 fish/mile. This was less than half of the 2021 fall CPUE (11.0 fish/mile). Smallmouth bass lengths ranged from 7.3-15.7 inches, with mean and median lengths of 11.2 and 10.6 inches, respectively. Sixteen muskellunge were collected for a CPUE value of 2.7 fish/mile. All but one muskellunge collected were age-0 fish (length range 11.6-14.0 inches) that had been stocked a few weeks prior to the survey. The single adult muskellunge measured 37.4 inches. The only other fish collected was a 29-inch northern pike. Length frequency distributions for walleye and largemouth bass collected during the fall survey are presented in Figures 38 and 39.

Discussion

In general, panfish populations in Lake Redstone provide a quality fishing opportunity for anglers. The abundance of the various panfish species varies from low to high in Lake Redstone relative to other complex-warm-dark lakes, but in all cases, the populations are self-sustaining. Crappies were abundant in Lake Redstone in 2022, with white crappies more abundant than black crappies. Crappie growth and population size structure were very good, and black crappies in Lake Redstone have the best scope for growth (maximum size) of any lake in the area. Abundant forage helps to propel some crappies, particularly black crappies, to trophy sizes. Crappie recruitment in Lake Redstone isn't consistent from year to year, but this is common

among crappie populations. The crappie population age structure appeared to be impacted more by inconsistent recruitment as opposed to overharvest (cropping off).

Bluegill abundance was relatively low compared to the rest of the lake class but appears to have increased since 2010. Bluegill growth and size structure were only average, and the overall scope for growth was poor, with age-10 and older bluegills seldom exceeding 8.5 inches. The presence of good numbers of age-6 and age-8 bluegills, along with fish as old as age 12, suggests size structure is limited by poor growth and not by excessive harvest. Bluegill abundance is not high, and challenges with respect to growth don't appear to be density related. Gizzard shad are abundant in the lake, and gizzard shad have been known to negatively impact bluegill growth through competition for zooplankton (DeVries and Stein 1992, Dettmers and Stein 1992, Aday 2003). This competition can lead to reduced growth rates and body condition of bluegills throughout life (Aday 2003). Gizzard shad are well established in Lake Redstone, and that isn't going to change, which means any competition for food resources between gizzard shad and bluegills will continue. Bluegill abundance is likely to be held in check primarily by predation pressure from bass, walleye and muskellunge, and to a lesser degree, angler harvest.

Yellow perch abundance in Lake Redstone is relatively low for the lake class but has been stable over time. Yellow perch growth is good relative to other area lakes and within the lake class, and fish have the potential to exceed 10 inches. Yellow perch are a nice accessory component of the panfish fishery for anglers but may act primarily as valuable forage for walleyes and potentially muskellunge (Glade et al. 2023). If Lake Redstone is being managed to maximize walleye and muskellunge fishing opportunities, yellow perch abundance will be held in check largely through predation by those species.

Harvest doesn't appear to be negatively impacting any panfish species in Lake Redstone. Factors impacting panfish growth, population size and age structure in Lake Redstone are driven more by biotic factors (recruitment, food availability, predation) than by abiotic factors (harvest pressure from anglers). There are no species-specific management goals for panfish in Lake Redstone, and no changes to panfish regulations are recommended.

Walleye growth and population size structure were very good in Lake Redstone in 2022, but abundance was relatively low. Walleye abundance in Lake Redstone experienced a marked decline from 4.4 adults ≥ 15 inches/acre in 2010 to 0.8 adults ≥ 15 inches/acre in 2022. The high abundance of adult walleyes in 2010 was the result of an extended period of hyper-stocking from 1999-2006 and excellent recruitment of those fish. Those stockings were primarily small fingerlings but also included fry or large fingerlings in some years. During that period, small fingerling walleyes were stocked nearly every year at rates of 50-100 fish/acre, far exceeding statewide walleye stocking guidance, which calls for walleyes to be stocked every other year at either 35 fish/acre (small fingerlings) or 10 fish/acre (fall extended growth fingerlings). Beginning in 2008, stocking levels were reduced, and small fingerling

walleye stocking continued annually through 2013, but only at half of the recommended rate (18 small fingerlings/acre). After 2013, walleye stocking returned to an alternate year schedule at the rate of 35 small fingerlings per acre. The period of hyper stocking and high recruitment inflated walleye abundance by 2010. However, walleye abundance came back down due to reduced stocking levels and reduced recruitment of stocked fish. Recruitment of stocked walleyes appeared to be greatly reduced in recent years compared to the early 2000s. Fall age-0 walleye catch rates in 2000 (small fingerlings and fry stocked), 2003 (small fingerlings) and 2004 (small fingerlings) were 24.7 fish/mile, 60.3 fish/mile and 32.5 fish/mile, respectively. By contrast, fall age-0 walleye catch rates in 2017 and 2021 (small fingerlings stocked) were 1.3 fish/mile and 3.0 fish/mile, respectively. For reference, an age-0 walleye catch rate ≥ 10 fish/mile is considered successful recruitment. Reduced walleye abundance in Lake Redstone is indicative of reduced recruitment and not purely the result of stocking fewer fish because other area lakes stocked, with small fingerlings at the same rate (35 fish/acre) in recent years showed successful walleye recruitment. One example is Swan Lake in Columbia County which had fall YOY catch rates of 16.4 fish/mile and 27.3 fish/mile in 2017 and 2019, respectively.

Additionally, spring sampling data in 2022 found the population age structure in Lake Redstone dominated by age-2 and age-4 fish (61.5% of the population). Ages 2 and 4 were from years when extended-growth fingerlings were stocked (2018 and 2020). By contrast, ages 3 and 5 were from years when small fingerlings were stocked (2017 and 2019) and contributions of those two age classes were far lower (24.9% of the population). No walleyes were stocked in 2016, and zero age-6 fish were found in 2022 indicating there was no measurable natural reproduction of walleyes in the only non-stocked year.

Small fingerling walleye stocking is no longer creating the desired walleye fishery in Lake Redstone, and natural reproduction is likely zero. Reasons for reduced recruitment of stocked small fingerlings aren't completely clear but may be due in part to the establishment of gizzard shad in the lake in the early 2000s. As gizzard shad abundance increased, competition for food (zooplankton) between age-0 gizzard shad and stocked small fingerling walleyes may have led to reduced survival of the walleyes. A similar phenomenon was observed in Swan Lake, where walleye fry stocking was highly successful until the establishment of gizzard shad in the upper Fox River in the late 1990s. Subsequently, walleye recruitment from stocked fry dropped to zero by the early 2000s. In any case, stocked large fingerling walleyes appear to survive well and currently form the bulk of the walleye fishery in Lake Redstone. To date, walleye natural reproduction has been assumed to be zero in Lake Redstone. Further assessment through a fall electrofishing survey during a non-stocked year is recommended at least once prior to the next comprehensive fishery survey.

Moving forward, the goal is to provide a walleye fishery with good opportunities for angler harvest as well as opportunities to catch quality (20 inches) and memorable-sized (25 inches) fish. The objectives are an adult walleye density of two or more

adult walleyes ≥ 15 inches/acre with a PSD-P ≥ 25 and a PSD-M ≥ 5. Currently, abundance and size structure objectives are not being met.

It is recommended that the stocking of state-raised walleyes change to extended-growth fingerlings stocked every other year at the rate of 10 fish/acre. Supplemental stocking of walleyes from private sources may continue if the proper Mississippi River basin genetic strains are used. It is also recommended that the minimum length limit for walleyes be increased from 15 to 18 inches to help improve the quality of the fishery. The statewide change to the daily walleye bag limit from five fish to three fish that was proposed in 2023 was recently approved, and this change was implemented on April 1, 2024. Walleyes grow very fast in Lake Redstone, and it would only take walleyes one additional year on average to reach legal harvest size at 18 inches. Protecting fish to 18 inches will lead to an increase in the number of adult walleyes in the lake which should increase catch rates for anglers. Increasing the size of harvested walleyes will also increase the yield of edible fillet meat anglers get from each fish. Once walleyes reach 18 inches at age 4, it only takes another year on average to reach 20 inches, and faster growing females reach 25 inches by age 7. Protecting walleyes from harvest until they are 18 inches creates a larger pool of fish that will have the potential to reach 20 and 25 inches, which will help accomplish the size-structure objective. Walleye growth won't suffer even if abundance increases dramatically; walleye mean length-at-age 4 was nearly 18 inches in 2010 when there were over five times the number of adult walleyes in the lake as there were in 2022.

The abundance of both largemouth and smallmouth bass in Lake Redstone was high compared to the rest of the lake class. Largemouth bass abundance increased markedly from 2010, while smallmouth bass abundance was unchanged. Largemouth bass recruitment doesn't appear to be hampered by the abundant gizzard shad population or by a lack of high-quality littoral zone habitat (aquatic vegetation). Foodweb interactions in reservoir systems that contain gizzard shad can be complex, and it is tough to make concrete conclusions about how shad may be impacting bass in Lake Redstone from the survey data (Dettmers and Stein 1992, Aday et al. 2005). Growth of both bass species was comparable to area and state averages and lake class medians, and population size structure was in the middle of the pack for area lakes. It might be expected that bass would grow faster in a lake with such abundant forage. Other piscivorous species in Lake Redstone, like crappies, walleye and muskellunge, all grow faster than average, but bass do not. All are sight feeders, so if the turbid, stained waters of Lake Redstone were limiting visibility and reducing foraging efficiency, one would expect growth to be limited across the board, and that isn't happening. One possible explanation is that bluegills, often a favorite prey item for bass, are less abundant in Lake Redstone than in other area lakes. Largemouth bass and bluegills generally occupy the same habitat (vegetated littoral areas), and if prey is somewhat limited in those areas, then this may account for only average growth of bass. In any case, bass growth is by no means poor, and it really isn't a cause for concern. Both bass populations appear to be performing well compared to other lakes in the area and the lake class. There are no specific population goals for

either bass species, and no regulation changes or supplemental stocking are recommended.

Muskellunge abundance in Lake Redstone increased between 2010 and 2022 because of annual stocking for several years instead of the normal alternate year stocking. Annual stocking occurred mostly as part of a 2013-2016 study of stocked muskellunge reared under different feeding practices at DNR hatcheries. Muskellunge population size structure improved as indicated by increased mean and maximum lengths of fish and several PSD values being higher in 2022 than in 2010. This is likely due to the increase in the minimum length limit from 40 to 50 inches in 2012. Muskellunge grow fast in Lake Redstone thanks to abundant forage. Lake Redstone offers one of the best muskellunge fisheries in the area. Muskellunge stocked during the paired feeding study (2013-2016) formed a large part of the adult population in 2022 and 2023 and fish from both treatment groups (pellet and minnow) were common. Mean length-at-age of muskellunge did not differ in Lake Redstone between treatment groups. Data from Lake Redstone will be combined with data collected from other study lakes and will be analyzed in-depth by scientists at UW Stevens Point and DNR to determine conclusions about the survival and growth of stocked muskellunge reared using different feeding methods. Results will inform future muskellunge propagation practices at DNR hatcheries in Wisconsin.

Looking ahead, the muskellunge management goal for Lake Redstone is to manage the lake as a trophy fishery because of the excellent growth potential the fish have shown. The population density objective is 0.33 adult muskellunge ≥ 30 inches per acre or around 200 total adults. Currently, adult muskellunge density exceeds the target level, but a return to alternate year stocking should slowly bring the density number back down to the target level, where the lake was in 2010. Size structure objectives include a PSD-40 ≥ 30 and a PSD-45 ≥ 5. Currently, all abundance and size structure objectives have been met or exceeded. Stocking of fall fingerling muskellunge should continue at the rate of one fish/acre in alternating (even) years. Lake Redstone is a universal receptor lake for muskellunge, so any genetic strain raised in state hatcheries may be stocked.

Other gamefish such as northern pike and channel catfish are not abundant in Lake Redstone but provide occasional catches of quality-sized fish for anglers. Northern pike were stocked once in 1982 and persist due to a small amount of natural reproduction. The lake is managed for trophy muskellunge and active management of the pike population is not a priority. Channel catfish can reach large sizes in Lake Redstone, and the catfish population supports a popular summer fishing tournament for local anglers. Bullheads are abundant and provide another angling opportunity. Common carp are present, but not at detrimental levels. With a wide array of abundant panfish and predatory gamefish to prey on the carp in various life stages and the limited potential for winter kill events that help carp become dominant in some systems, common carp are not likely to become overly abundant in Lake Redstone. By contrast, gizzard shad are abundant and persist in high abundance despite heavy predation pressure. Gizzard shad may contribute to reduced water

quality in Lake Redstone through internal nutrient loading. Gizzard shad may experience periodic die-offs during cold winters or extreme temperature swings, but their abundance is not likely to be reduced by any factor for any extended period because they are prolific breeders and populations recover quickly. Gizzard shad prefer to spawn along rocky shorelines. Riparian landowners can avoid enhancing shoreline habitat for gizzard shad by keeping shoreline areas wild and limiting the use of riprap for bank protection. Protecting emergent vegetation like rushes, reeds and grasses along shorelines helps support healthy native fish populations and helps to absorb wave energy which protects shorelines from erosion.

Vegetated littoral areas in Lake Redstone are somewhat limited, and this may impact recruitment and ultimately abundance of some centrarchids like largemouth bass and bluegills. Bluegill abundance is low relative to other lakes in the class, but largemouth bass abundance is high, especially for a turbid system with limited aquatic vegetation. Ultimately, the level to which the sparse aquatic plant community is impacting fish populations in Lake Redstone is unclear. Reductions in sediment and nutrient delivery to Lake Redstone from the surrounding watershed achieved through better land use practices may improve water clarity and lead to an increase in aquatic vegetation over time.

Coarse woody habitat (fallen trees) in the littoral zone is limited at Lake Redstone, and the lake could benefit from addition of more littoral coarse woody habitat (fish sticks, trees placed in the lake along the shore). Coarse woody structure in the littoral zone of lakes has wide ranging benefits for multiple species and all life stages of fish and helps to reduce damage to shorelines caused by wave action and ice. Installation of fish sticks structures in the littoral zone is recommended at Lake Redstone. Other “fish habitat” structures such as fish cribs have been added to the lake in recent years, but the actual benefits to fish populations from crib structures may be limited and are poorly understood. Crib structures serve as congregation areas for fish that are then more easily caught and harvested by anglers, serving the needs of the user but not necessarily the needs of the fish population. Installation of fish cribs at Lake Redstone is not recommended, but as long as exemption criteria are met, new structures may be added without a DNR permit, but require reporting to a DNR fisheries biologist.

Recommendations

1. The adult walleye population density goal of two or more adult walleyes ≥ 15 inches/acre is realistic and should continue to be the goal moving forward. State-raised walleye stocking should continue at the rate of 10 extended growth walleyes/acre in even-numbered years.
2. Supplemental stocking of privately sourced walleyes by the Lake Redstone Fishing Club in years when state-raised fish are not stocked may continue. This will help increase adult walleye density to the desired level and can offset DNR production shortfalls. Privately purchased walleyes should have Mississippi River genetics (Mississippi headwaters or mainstem).

3. Muskellunge stocking should continue at the rate of one larger fingerling/acre in alternating (even) years to achieve the adult density objective of 0.33 muskellunge ≥ 30 inches/acre.
4. At least one fall walleye electrofishing survey should be completed in a year when walleye aren't stocked to assess natural recruitment prior to the next comprehensive fishery survey in 2032.
5. A regulation change for walleyes to an 18-inch minimum length limit and 3-fish daily bag limit is recommended to help achieve adult abundance and size structure goals. The change to a 3-fish daily bag limit for walleyes was implemented statewide on April 1, 2024. The change to an 18-inch minimum length limit occurred through the DNR Spring Hearing rule change process.
6. All other length and bag limits should remain unchanged.

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Tables

Table 1. Current fishing regulations for Lake Redstone, Sauk County, Wisconsin.

SPECIES	SEASON DATES	LENGTH AND BAG LIMITS[1]
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.
Muskellunge	First Saturday in May through December 31	The minimum length limit is 50” and the daily bag limit is 1.
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.

1. At the time of the 2022 survey, the daily bag limit for walleyes at Lake Redstone was 5 fish. On April 1, 2024, the daily bag limit for walleye, sauger and hybrids will be reduced from 5 fish to 3 fish statewide.

Table 2. Dimensions, dates and locations (GPS coordinates) of fyke nets used during the 2022 SN1 survey of Lake Redstone, Sauk County, Wisconsin.

NET NUMBER	LEAD LENGTH (FEET)	FRAME HEIGHT (FEET)	SET DATE	FINAL LIFT DATE	LATITUDE	LONGITUDE
1	75	3	04/05/2022	04/11/2022	43.58769	-90.08884
1A	50	3	04/11/2022	04/22/2022	43.58716	-90.08901
2	75	4	04/05/2022	04/20/2022	43.60033	-90.09890
3	75	3	04/05/2022	04/12/2022	43.59729	-90.09393
4	50	3	04/05/2022	04/23/2022	43.59740	-90.09516
5	50	3	04/05/2022	04/11/2022	43.60408	-90.09330
5A	50	3	04/11/2022	04/23/2022	43.60356	-90.09311
6	75	4	04/06/2022	04/18/2022	43.61113	-90.08640
6A	75	4	04/18/2022	04/23/2022	43.61136	-90.08640
7	50	3	04/06/2022	04/22/2022	43.61291	-90.09135
8	75	4	04/06/2022	04/21/2022	43.60955	-90.09720
9	75	4	04/09/2022	04/12/2022	43.62049	-90.09074
10	75	3	04/09/2022	04/11/2022	43.62132	-90.08482
11	50	3	04/11/2022	04/22/2022	43.62991	-90.09508
12	50	4	04/12/2022	04/21/2022	43.61712	-90.08744
13	50	3	04/12/2022	04/22/2022	43.61823	-90.08381
14	50	4	04/18/2022	04/22/2022	43.62190	-90.07876
15	50	3	04/20/2022	04/22/2022	43.61460	-90.08477
16	50	3	04/21/2022	04/23/2022	43.59925	-90.09367
17	75	3	04/22/2022	04/23/2022	43.61103	-90.09520

Table 3. Dimensions, dates and locations (GPS coordinates) of fyke nets used during the 2022 SN2 survey of Lake Redstone, Sauk County, Wisconsin.

NET NUMBER	LEAD LENGTH (FEET)	FRAME HEIGHT (FEET)	SET DATE	FINAL LIFT DATE	LATITUDE	LONGITUDE
2A	50	3	05/02/2022	05/04/2022	43.60004	-90.09905
13	50	4	05/02/2022	05/06/2022	43.61823	-90.08381
14	50	4	05/02/2022	05/06/2022	43.62190	-90.07876
16	50	3	05/04/2022	05/06/2022	43.59925	-90.09367
18	75	4	05/02/2022	05/06/2022	43.63018	-90.09388
19	50	3	05/02/2022	05/06/2022	43.62575	-90.09122

Table 4. Locations of electrofishing stations (GPS coordinates) sampled during SE1 (April) and SE2 (May) on Lake Redstone, Sauk County, Wisconsin in 2022.

STATION NAME[1]	DATE	START TIME	END TIME	DISTANCE SAMPLED (MILES)	WATER TEMPERATURE (°F)	START LATITUDE	START LONGITUDE	END LATITUDE	END LONGITUDE
East Shore-all	4/25/2022	2022	2302	4.6	48.0				
East Shore-dam	4/25/2022			0.5		43.58794	-90.08900	43.58791	-90.08417
East Shore-main	4/25/2022			3.5		43.59424	-90.09573	43.62074	-90.08424
East Shore-point	4/25/2022			0.6		43.62075	-90.08570	43.62032	-90.08957
West Shore	4/25/2022	2028	2248	4.5	49.0	43.62001	-90.09080	43.59565	-90.10062
Panfish 1	5/16/2022	2100	2117	0.5	69.0	43.60954	-90.09699	43.60935	-90.09933
Gamefish 1	5/16/2022	2150	2240	1.5	68.5	43.60935	-90.09933	43.60203	-90.10489
Panfish 2	5/16/2022	2323	2338	0.5	69.0	43.58981	-90.09398	43.59343	-90.09659
Gamefish 2	5/17/2022	0001	0041	1.5	68.0	43.59343	-90.09659	43.60569	-90.09062
Panfish 3	5/23/2022	2106	2122	0.5	65.0	43.62033	-90.08446	43.62119	-90.07636
Gamefish 3	5/23/2022	2156	2238	1.5	64.0	43.62119	-90.07636	43.61884	-90.08545
Panfish 4	5/23/2022	2328	2342	0.5	64.5	43.63183	-90.09380	43.62917	-90.09856
Gamefish 4	5/24/2022	0019	0101	1.5	63.5	43.62917	-90.09856	43.61798	-90.09012

1. The east shore station included three sub-segments; one near the dam, one along the mid lake shoreline and one at Whippoorwill Point near the north end of the lake.

Table 5. Dimensions, dates and locations (GPS coordinates) of fyke nets used during the 2023 SN1 (muskellunge recapture) survey of Lake Redstone, Sauk County, Wisconsin.

NET NUMBER[1]	LEAD LENGTH (FEET)	FRAME HEIGHT (FEET)	SET DATE	FINAL LIFT DATE	LATITUDE	LONGITUDE
3	75	3	04/15/2023	04/18/2023	43.59729	-90.09393
4	50	3	04/10/2023	04/18/2023	43.59740	-90.09516
5A	50	3	04/10/2023	04/18/2023	43.60356	-90.09311
6	75	4	04/10/2023	04/18/2023	43.61113	-90.08640
7	50	3	04/10/2023	04/15/2023	43.61291	-90.09135
8	75	4	04/10/2023	04/18/2023	43.60955	-90.09720
12	50	4	04/10/2023	04/18/2023	43.61712	-90.08744

1. Net numbers in 2023 corresponded to those used in 2022; dimensions and GPS coordinates were identical for net numbers used in 2023 as for the same net numbers in 2022.

Table 6. The PSD length categories (inches) for selected fish species that were collected from Lake Redstone in 2022 (Anderson and Neumann 1996, Guy et al. 2007).

SPECIES	STOCK	QUALITY (PSD)	HARVEST (PSD-H)[1]	PREFERRED (PSD-P)	MEMORABLE (PSD-M)	TROPHY (PSD-T)[2]
Bluegill	3	6	7	8	10	12
Black crappie	5	8	9	10	12	15
Yellow perch	5	8	9	10	12	15
Largemouth bass	8	12	18	15	20	25
Smallmouth bass	7	11	14	14	17	20
Walleye	10	15	18	20	25	30
Northern pike	14	21	32	28	34	44
Muskellunge	20	30		38	42	50

1. Lengths of fish found socially (bluegill, black crappie, yellow perch) or legally (largemouth bass, northern pike, smallmouth bass, walleye) acceptable for harvest by anglers.
2. The trophy category length for muskellunge (50 inches) is also the minimum length limit for harvest in Lake Redstone.

Table 7. Summary of catch and catch-per-unit effort (CPUE) by sampling period during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

	CATCH					CPUE (FISH/NET-NIGHT)			
Species	**SN1**	**SN2**	**SE1**	**SE2**	**Total**	**SN1**	**SN2**	**SE1[1]**	**SE2**
Bluegill	9,569	615		122	10,306	58.0	30.8		61.0
Gizzard shad	445	50		1,014	1,509	2.7	2.5		507.0
Yellow bullhead	644	438		5	1,087	3.9	21.9		2.5
White crappie	287	672		12	971	1.7	33.6		6.0
Black crappie	426	363		3	792	2.6	18.2		1.5
Walleye	258	11	206	103	578	1.6	0.6	22.6	12.9
Largemouth bass	32	2	55	229	318	0.2	0.1	6.0	28.6
Pumpkinseed	275	18		49	342	1.7	0.9		24.5
Yellow perch	211	31		3	245	1.3	1.6		1.5
Muskellunge	173	6	13	3	195	1.0	0.3	1.4	0.4
Golden shiner	141	24		14	179	0.9	1.2		7.0
Common carp	18	4		44	66	0.1	0.2		22.0
White sucker	20	13		24	57	0.1	0.7		12.0
Smallmouth bass	0	0	20	37	57	0.0	0.0	2.2	4.6
Northern pike	17	4	1	0	22	0.1	0.2	0.1	0.0
GSF x PKS hybrid	16	3		0	19	0.1	0.2		0.0
Green sunfish	3	0		11	14	0.0	0.0		5.5
PKS x BLG hybrid	7	2		0	9	0.0	0.1		0.0
GSF x BLG hybrid	5	0	0	0	5	0.0	0.0		0.0
Channel catfish	5	0		0	5	0.0	0.0		0.0
Brown bullhead	2	1		0	3	0.0	0.1		0.0
Black bullhead	0	1		0	1	0.0	0.1		0.0
Creek chub	1	0		0	1	0.0	0.0		0.0
	12,555	2,258	295	1,673	16,781				

1. Only sportfish were collected during SE1 and CPUE values for other species were left blank.

Table 8. Summary of lengths (inches), PSD and ages of gamefish sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin. Lengths are given in inches.

SPECIES	PERIOD	NUMBER COLLECTED	NUMBER MEASURED[1]	LENGTH RANGE	MEAN LENGTH	MEDIAN LENGTH	PSD	PSD-H	PSD-P	PSD-M	AGE RANGE	MEAN RELATIVE WEIGHT
Bluegill	SN1	9,569	1,577	3.3-9.2	6.4	6.6	67	35	2	0		
Bluegill	SE2	122	122	2.9-7.6	5.3	5.3	29	5	0	0		
Bluegill	ALL	10,306	1,695	2.9-9.2	6.3	6.5	64	33	2	0	2-12	97.7
White crappie	ALL	971	894	5.5-13.2	9.1	9.0	89	54	23	2	2-11	85.9
Black crappie	ALL	792	756	5.0-17.4	7.9	6.8	47	38	22	2	2-11	94.1
Yellow perch	ALL	245	226	5.0-11.6	7.0	6.9	19	6	2	0	2-7	102.7
Walleye	ALL	578	508	6.7-28.5	14.8	12.7	44	44	21	2	1-12	98.8
Largemouth bass	ALL	318	314	4.5-19.5	10.9	10.8	61	31	21	3	1-12	99.4
Smallmouth bass	ALL	57	57	5.2-17.6	11.1	11.4					1-8	90.3
Muskellunge	ALL	195	159	30.4-48.4	39.2	39.1	100	0	59	28	4-13	100.3
Northern pike	ALL	22	13	25.6-38.4	31.4	31.4					4-8	101.9

1. Number measured is the number of unique fish measurements included in calculation of length range, mean and median length for each species.

Table 9. Bluegill size-specific electrofishing catch rates (CPUE; fish/mile) from SE2 surveys of lakes in the Poynette management area, 2011-2022.

			CPUE				AREA CPUE RANK			
Lake[1,2]	**County**	**Year**	**Total**	**6"+**	**7"+**	**8"+**	**Total**	**6"+**	**7"+**	**8"+**
Silver	Columbia	2016	345.0	5.0	0.0	0.0	1	20	22	22
Tarrant	Columbia	2018	267.0	37.0	22.0	7.0	2	13	6	2
Blass	Sauk	2017	190.0	50.0	27.3	1.3	3	6	3	7
Fish-Mud	Dane	2021	189.0	16.0	1.0	0.0	4	17	20	20
Mirror	Sauk	2014	143.3	62.0	14.7	0.0	5	3	9	12
Dutch Hollow	Sauk	2016	141.3	69.3	30.7	6.0	6	2	1	3
Fish	Dane	2015	135.0	46.0	8.0	0.0	7	9	12	15
Seeley	Sauk	2016	123.4	85.5	14.5	0.0	8	1	10	13
Lazy	Columbia	2011	122.0	24.0	13.0	0.0	9	15	11	14
Mud (Marx Pond)	Dane	2015	120.7	38.0	0.0	0.0	10	12	21	21
White Mound	Sauk	2019	102.0	48.0	22.0	7.0	11	8	5	1
George	Columbia	2013	101.0	53.5	19.2	0.0	12	5	7	11
West	Columbia	2019	86.7	2.7	1.3	0.0	13	22	19	19
Crystal	Dane/Col.	2015	79.3	62.0	28.7	0.0	14	4	2	10
Swan	Columbia	2018	74.0	38.7	6.7	0.7	15	11	13	9
Delton	Sauk	2021	68.0	50.0	3.0	0.0	16	7	14	16
Redstone	**Sauk**	**2022**	**61.0**	**17.5**	**3.0**	**0.0**	**17**	**16**	**15**	**17**
Wisconsin	Col/Sauk	2017	59.8	29.0	15.0	1.2	18	14	8	8
Virginia	Sauk	2016	53.9	38.8	26.7	4.2	19	10	4	4
Park	Columbia	2021	43.0	15.0	2.0	0.0	20	18	18	18
Spring	Columbia	2018	32.0	2.0	0.0	0.0	21	23	23	23
La Valle Millpond	Sauk	2021	29.0	1.0	0.0	0.0	22	25	25	25
Wyona	Columbia	2022	22.0	2.0	0.0	0.0	23	24	24	24
Crystal	Columbia	2014	20.0	2.9	2.9	2.9	24	21	17	6
Mean			104.8	32.1	10.6	1.3				
Median			86.7	37.0	6.7	0.0				

1. Mud Lake and Fish Lake are listed separately for 2015 and as one combined lake for 2021. In 2019 rising lake levels inundated Fish Lake Road, causing the two lakes to become one.
2. Crystal Lake in Columbia County (2014) is 28 acres and is located within the Peter Helland Wildlife Area near Pardeeville.

Table 10. White crappie size structure metrics for lakes in the Poynette management area, 2011-2022. Lengths are given in inches.

LAKE	COUNTY	YEAR	GEAR TYPE[1]	NUMBER COLLECTED	NUMBER MEASURED	PSD	PSD9	PSDP	PSDM	MEAN LENGTH	MEDIAN LENGTH	LARGEST FISH
Redstone	**Sauk**	**2022**	**Fyke, EF**	**971**	**885**	**89**	**60**	**26**	**2**	**9.1**	**9.1**	**13.2**
Wisconsin	Columbia	2017	Fyke	280	280	86	65	25	5	8.8	9.2	13.5
Delton	Sauk	2014	Fyke, EF	104	104	63	1	0	0	8.7	8.8	10
Crystal	Dane	2015	Fyke, EF	68	68					8.5	8.3	11.6
White Mound	Sauk	2019	Fyke	28	28					5.6	4.4	15.7
Mirror	Sauk	2014	Fyke	8	8					8.9	8.8	9.7

1. EF = electrofishing

Table 11. Black crappie size structure metrics for lakes in the Poynette management area, 2011-2022. Lengths are given in inches.

LAKE[1]	COUNTY	YEAR	SURFACE AREA (ACRES)	NUMBER COLLECTED	NUMBER MEASURED	MEAN LENGTH	MEDIAN LENGTH	LARGEST FISH	PSD	PSD9	PSDP	PSDM
Mud	Dane	2015	85	1,344	473	8.2	8.7	9.8	97	37	0	0
Park	Columbia	2021	312	512	351	10.4	10.4	13.5	92	88	77	27
Lazy	Columbia	2011	161	342	173	8.4	8.8	12.0	86	52	17	1
Crystal	Dane	2015	600	764	764	8.3	8.4	10.8	78	17	1	0
Swan	Columbia	2018	406	525	525	9.2	9.7	13.0	78	68	43	1
Wisconsin	Columbia	2017	7,200	501	501	8.8	8.4	14.2	70	34	26	16
Delton	Sauk	2014	267	1,661	635	8.1	8.3	9.4	68	4	0	0
Redstone	**Sauk**	**2022**	**605**	**792**	**756**	**7.9**	**6.8**	**17.4**	**47**	**38**	**22**	**2**
Spring	Columbia	2018	24	951	845	7.4	7.4	12.3	34	12	4	0
Fish	Dane	2021	404	3,173	495	7.2	7.6	12.5	29	3	1	0
Mirror	Sauk	2014	139	510	508	7.5	7.2	12.8	28	17	3	1
Fish	Dane	2015	258	1,627	877	5.3	4.3	9.8	24	4	0	0
Dutch Hollow	Sauk	2016	166	76	76	9.3	9.8	12.2				
White Mound	Sauk	2019	104	35	35	5.9	4.0	13.2				
Devils	Sauk	2013	375	17	17	4.9	4.1	11.5				

1. Mud Lake and Fish Lake are listed separately for 2015 and as one combined lake (Fish Lake) for 2021. In 2019 rising lake levels inundated Fish Lake Road, causing the two lakes to become one.

Table 12. Yellow perch size structure metrics for lakes in the Poynette management area, 2013-2022. Lengths are given in inches.

LAKE[1]	COUNTY	YEAR	NUMBER COLLECTED	NUMBER MEASURED	PSD	PSD-9	PSD-P	PSD-M	MEAN LENGTH	MEDIAN LENGTH	LARGEST FISH
White Mound	Sauk	2019	131	130	71	42	16	0	8.6	8.7	11.9
Devils	Sauk	2013	106	106	63	51	37	10	9.0	9.1	13.5
Swan	Columbia	2018	887	887	26	8	2	0	7.3	7.2	12.0
Crystal	Dane	2015	590	590	23	3	0	0	7.4	7.5	9.8
Redstone	**Sauk**	**2022**	**245**	**226**	**19**	**6**	**2**	**0**	**7.0**	**6.9**	**11.6**
Wisconsin	Col/Sauk	2017	281	281	13	3	1	0	7.0	6.9	11.3
Mirror	Sauk	2014	267	267	6	2	0	0	6.2	6.0	9.9
Park	Columbia	2021	4,718	1,197	3	1	0	0	6.1	6.0	11.3
Fish-Mud	Dane	2021	369	72					6.3	6.3	8.8

1. Fish Lake and Mud Lake in Dane County combined into one lake when rising lake levels inundated Fish Lake Road in 2019 and did not recede.

Table 13. Largemouth bass size-specific electrofishing catch rates (CPUE; fish/mile) from SE2 surveys of lakes in the Poynette management area, 2011-2022.

			CPUE						AREA CPUE RANK					
LAKE[1,2,3]	COUNTY	YEAR	Total	8"+	12"+	14"+	18"+	20"+	Total	8"+	12"+	14"+	18"+	20"+
White Mound	Sauk	2019	273.2	243.2	102.4	5.2	1.6	0.8	1	1	2	12	4	1
Virginia	Sauk	2016	207.9	201.2	172.7	2.4	0.0	0.0	2	2	1	19	NA	NA
Crystal	Columbia	2014	190.5	184.8	23.8	0.0	0.0	0.0	3	3	7	23	NA	NA
Tarrant	Columbia	2018	81.0	76.0	44.0	31.0	0.0	0.0	4	5	3	1	NA	NA
Dutch Hollow	Sauk	2016	79.2	76.2	43.3	11.3	0.7	0.0	5	4	4	3	7	NA
Silver	Columbia	2016	72.4	59.6	23.2	10.4	0.0	0.0	6	6	8	4	NA	NA
Devils	Sauk	2013	55.8	51.9	32.2	0.6	0.3	0.0	7	7	5	22	11	NA
George	Columbia	2013	49.5	45.5	13.1	1.0	0.0	0.0	8	8	10	20	NA	NA
Fish	Dane	2015	35.3	26.5	23.9	15.6	2.1	0.3	9	10	6	2	1	5
Blass	Sauk	2017	32.7	28.7	12.0	6.7	0.0	0.0	10	9	11	10	NA	NA
Lazy	Columbia	2011	32.5	26.0	11.5	3.8	0.3	0.3	11	11	13	16	12	6
Redstone	**Sauk**	**2022**	**28.6**	**19.8**	**11.6**	**5.6**	**0.1**	**0.0**	**12**	**14**	**12**	**11**	**13**	**NA**
Seeley	Sauk	2016	25.8	21.0	13.7	8.1	0.0	0.0	13	13	9	6	NA	NA
Crystal	Dane/Col.	2015	23.7	22.1	11.3	7.6	2.1	0.5	14	12	14	7	2	2
Fish	Dane	2021	20.8	18.5	9.6	4.6	1.7	0.4	15	15	16	13	3	4
Mud	Dane	2015	18.7	4.7	1.3	0.7	0.0	0.0	16	23	23	21	NA	NA
Mirror	Sauk	2014	18.2	17.0	11.2	9.0	0.3	0.0	17	16	15	5	9	NA
Delton	Sauk	2021	10.6	10.3	9.4	7.1	0.5	0.0	18	17	17	8	8	NA
Wyona	Columbia	2022	9.9	9.3	8.1	6.9	0.3	0.0	19	18	18	9	10	NA
Wisconsin	Col/Sauk	2017	7.8	6.5	5.2	3.7	0.0	0.0	20	20	19	17	NA	NA
Swan	Columbia	2018	7.4	7.0	5.0	3.9	0.9	0.4	21	19	20	15	6	3
Spring	Columbia	2018	7.0	6.0	4.0	4.0	0.0	0.0	22	21	21	14	NA	NA
Park	Columbia	2021	6.3	5.4	3.7	2.9	1.0	0.0	23	22	22	18	5	NA
West	Columbia	2019	2.7	0.0	0.0	0.0	0.0	0.0	24	24	24	24	NA	NA
Mean			54.1	48.6	24.8	6.3	0.5	0.1						
Median			27.2	21.6	11.6	4.9	0.2	0.0						

1. Crystal Lake in Columbia County is 28 acres and is located within the Peter Helland Wildlife Area near Pardeeville.
2. Mud Lake and Fish Lake are listed separately for 2015 and as one combined lake for 2021. In 2019 rising lake levels caused the two lakes to become one.
3. West Lake suffered a winter kill in the winter of 2018-2019 due to low oxygen levels. The lake lost most of its largemouth bass as a result.

Table 14. Mean length at age-6 (MLA-6) of largemouth bass in lakes in the Poynette management area, 2011-2022.

LAKE	COUNTY	YEAR	MLA-6
Park	Columbia	2021	16.6
Fish	Dane	2021	15.8
Spring	Columbia	2018	15.6
Wisconsin	Col/Sauk	2017	15.5
Delton	Sauk	2014	15.4
Swan	Columbia	2018	15.3
Lazy	Columbia	2011	14.4
Redstone	**Sauk**	**2022**	**14.3**
Mirror	Sauk	2014	14.2
Fish	Dane	2015	13.1
Crystal	Dane/Col.	2015	13.1
White Mound	Sauk	2019	12.8
Virginia	Sauk	2016	12.5
Dutch Hollow	Sauk	2016	12.2
Devils	Sauk	2013	10.8
Mean			14.1
Median			14.3

Table 15. Smallmouth bass size-specific electrofishing catch rates (CPUE; fish/mile) from SE2 surveys of lakes in the Poynette management area, 2013-2022.

LAKE	COUNTY	YEAR	TOTAL	<7"	7"+	11"+	14"+	17"+	20"+
Delton	Sauk	2021	33.2	4.9	28.3	8.9	5.1	0.6	0.0
Devils	Sauk	2013	12.2	0.3	11.9	9.4	0.0	0.0	0.0
Wisconsin	Columbia	2017	8.6	1.1	7.5	4.4	1.1	0.0	0.0
Redstone	**Sauk**	**2022**	**4.6**	**0.8**	**3.9**	**2.4**	**0.5**	**0.1**	**0.0**
Mirror	Sauk	2014	2.0	0.0	2.0	1.2	0.3	0.0	0.0
Wyona	Columbia	2022	1.5	0.0	1.5	0.9	0.6	0.0	0.0
Swan	Columbia	2018	1.0	0.0	1.0	0.6	0.4	0.1	0.0
Park	Columbia	2021	1.0	0.0	1.0	0.2	0.0	0.0	0.0
Dutch Hollow	Sauk	2016	0.5	0.0	0.5	0.5	0.0	0.0	0.0
Mean			7.2	0.8	6.4	3.2	0.9	0.1	0.0
Median			2.0	0.0	2.0	1.2	0.4	0.0	0.0

Table 16. Mean length-at-age (inches) of known-age muskellunge sampled in spring 2022 and 2023 during the comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

AGE-ALL	NUMBER COLLECTED	MEAN LENGTH	MINIMUM LENGTH	MAXIMUM LENGTH
6	23	36.5	33.3	39.9
7	43	39.0	32.6	42.4
8	24	40.0	34.6	44.1
9	13	40.4	36.2	47.7
10	4	42.3	37.0	45.4
AGE-FEMALE				
6	8	38.3	36.1	39.9
7	29	39.9	32.6	42.4
8	17	41.2	34.7	44.1
9	7	42.7	39.5	47.7
10	3	44.0	43.3	45.4
AGE-MALE				
6	15	35.6	33.3	38.3
7	13	37.5	35.4	39.6
8	7	37.0	34.6	38.1
9	6	37.6	36.2	39.4
10	1	37.0		

Figures

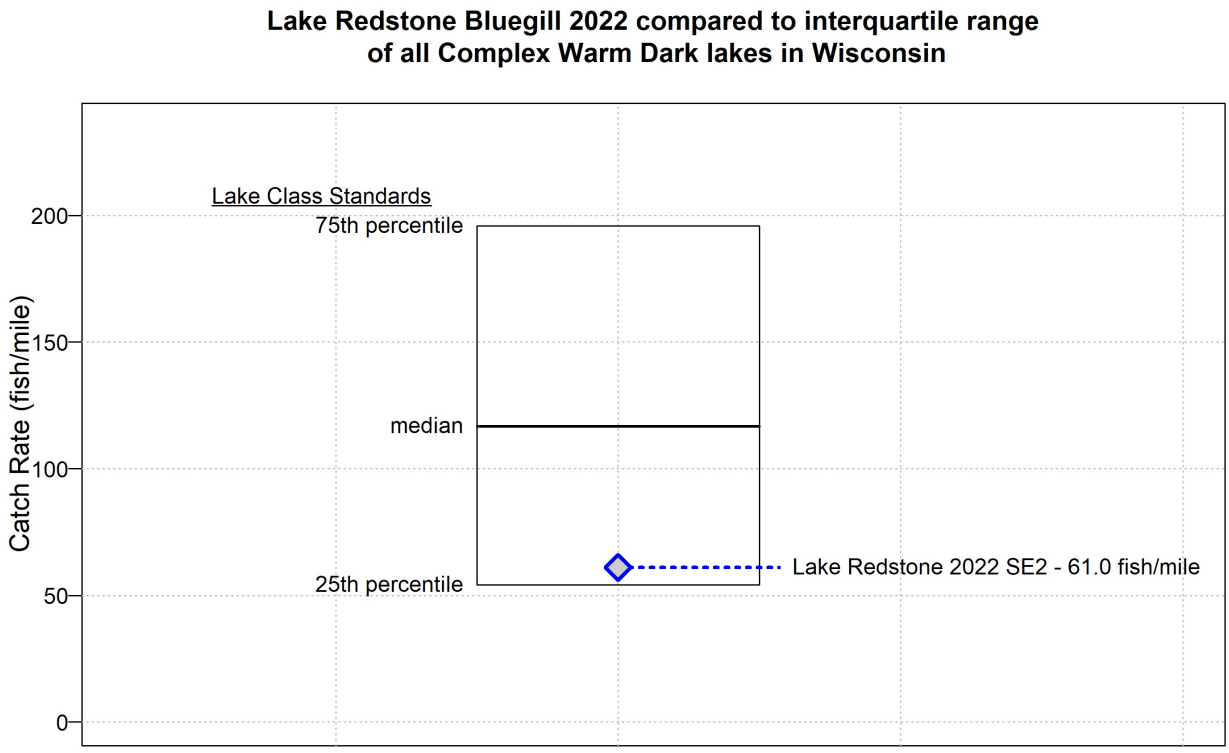

Figure 1. Bluegill fyke net catch rate lake class comparison for Lake Redstone, Sauk County, Wisconsin.

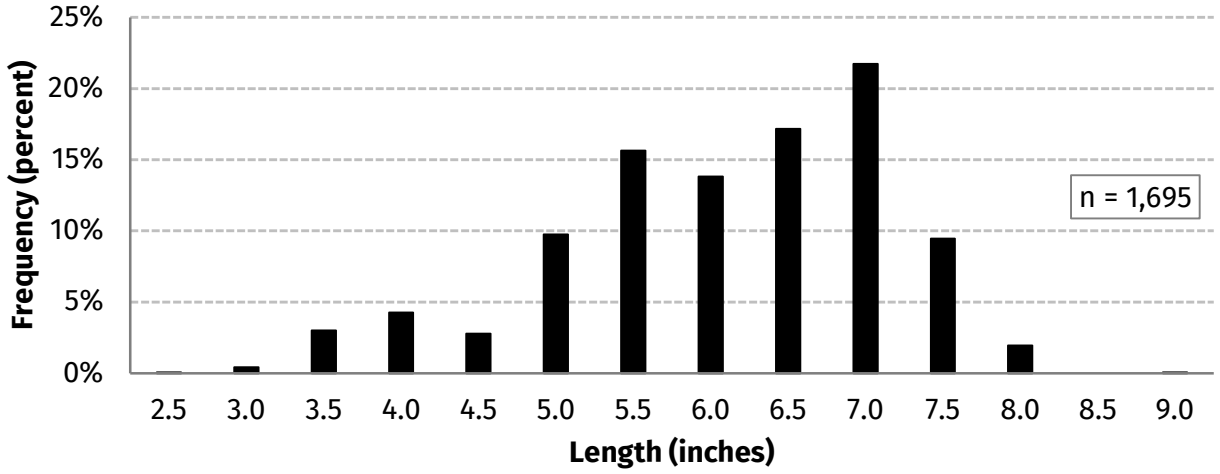

Figure 2. Length frequency distribution of bluegills sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

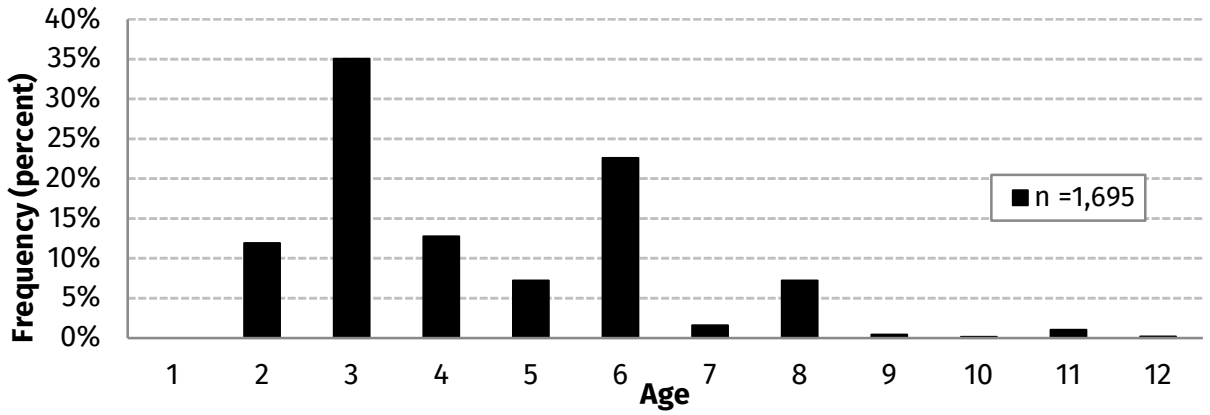

Figure 3. Age frequency distribution of bluegills sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

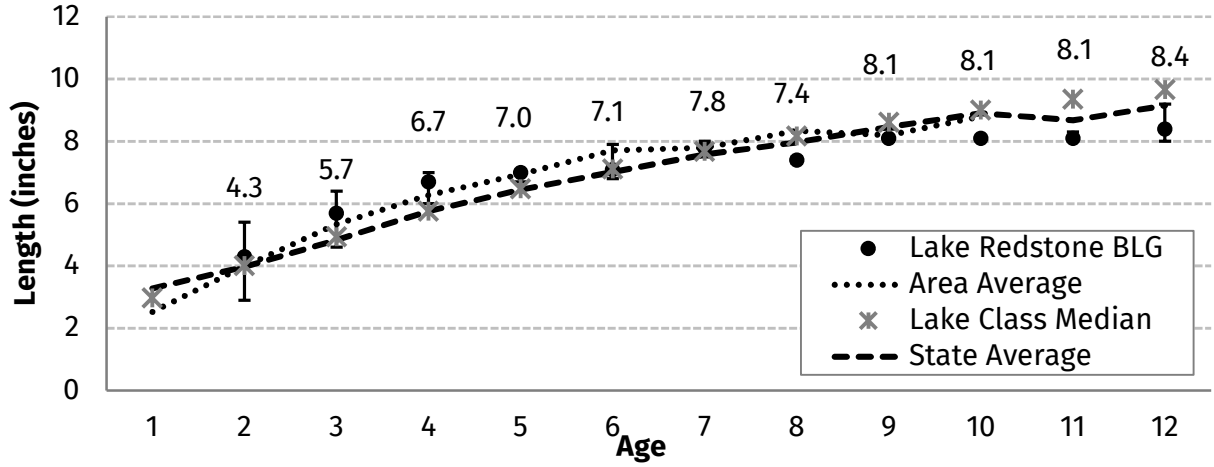

Figure 4. Mean length-at-age of bluegills (BLG) sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

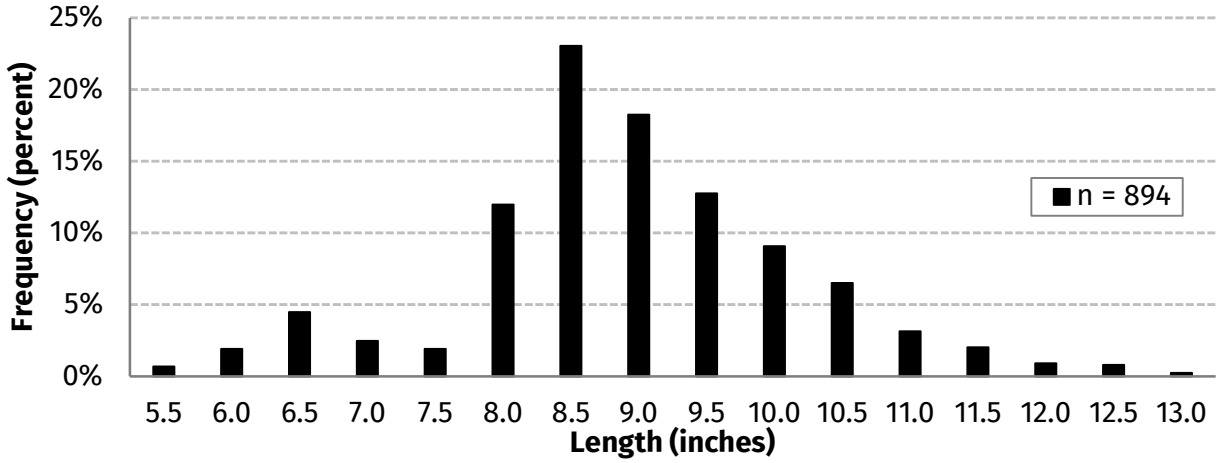

Figure 5. Length frequency distribution of white crappies sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

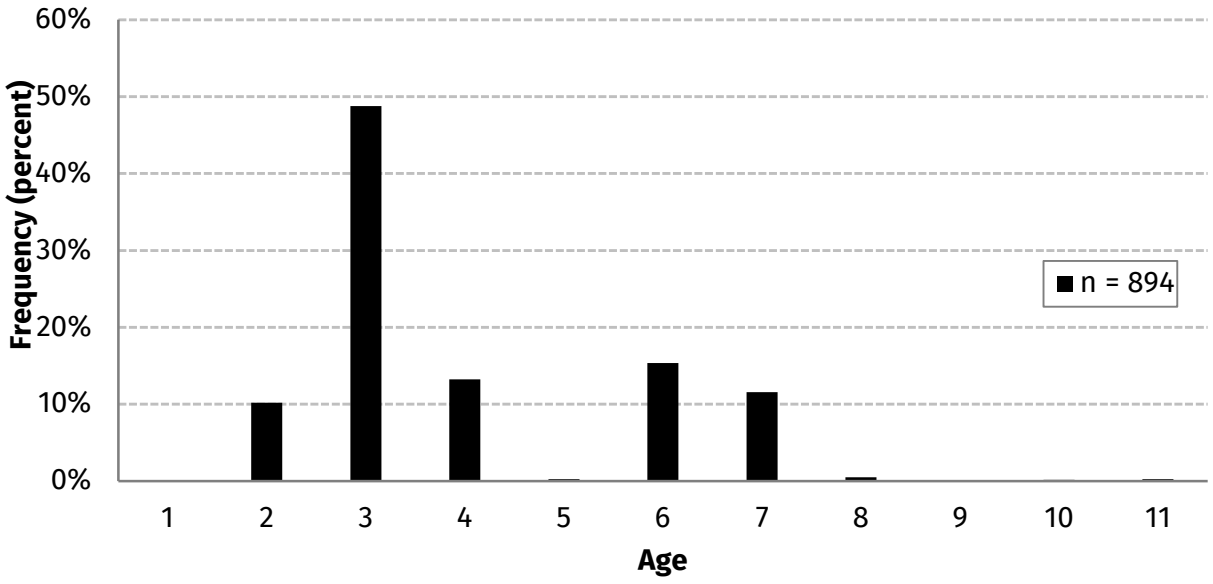

Figure 6. Age frequency distribution of white crappies sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

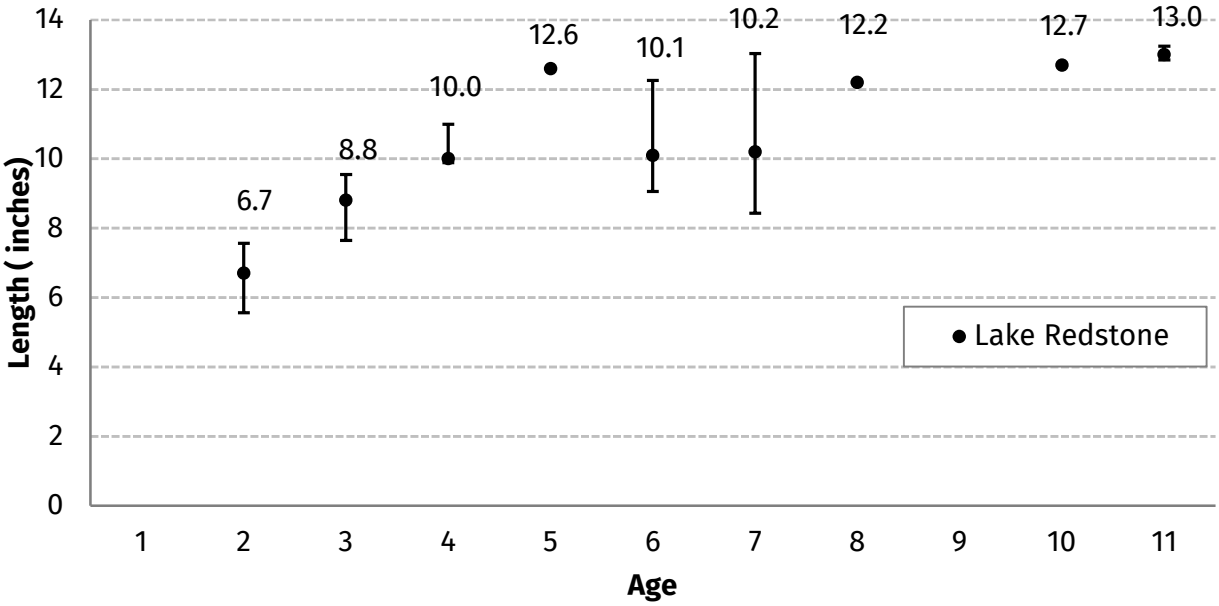

Figure 7. Mean length-at-age of white crappies sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

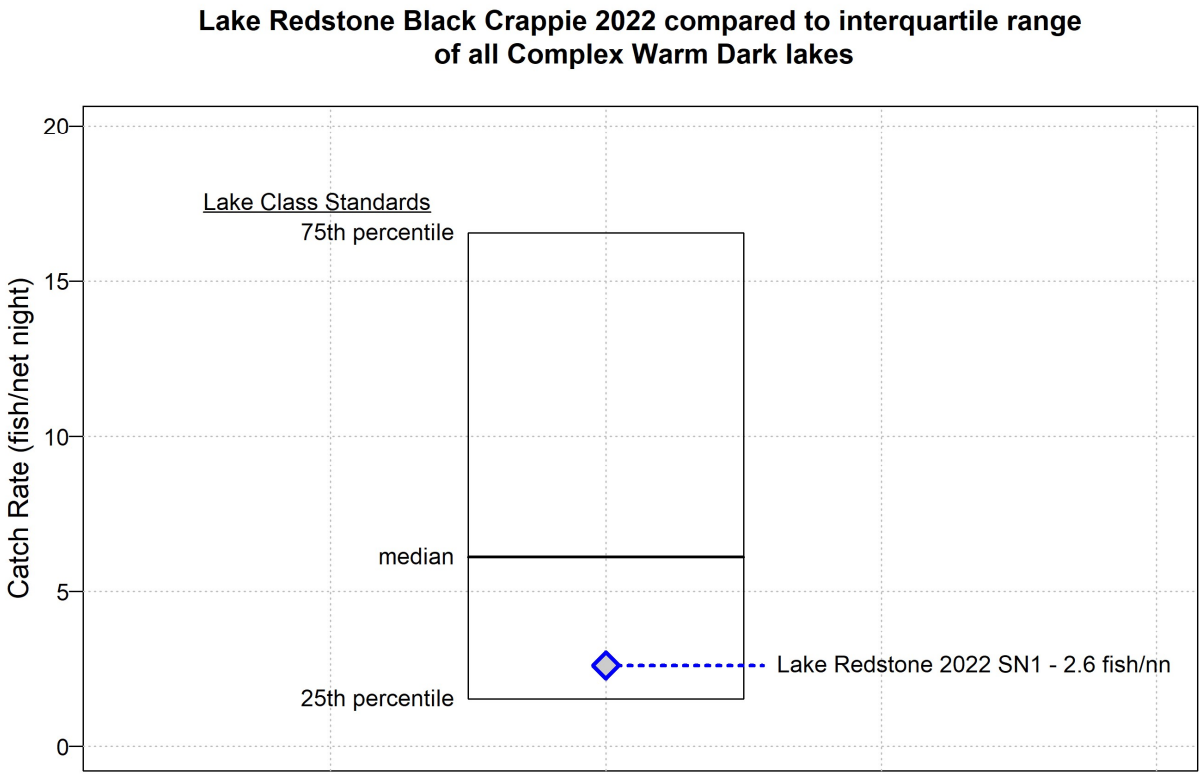

Figure 8. Black crappie SN1 catch rate lake class comparison for Lake Redstone, Sauk County, Wisconsin.

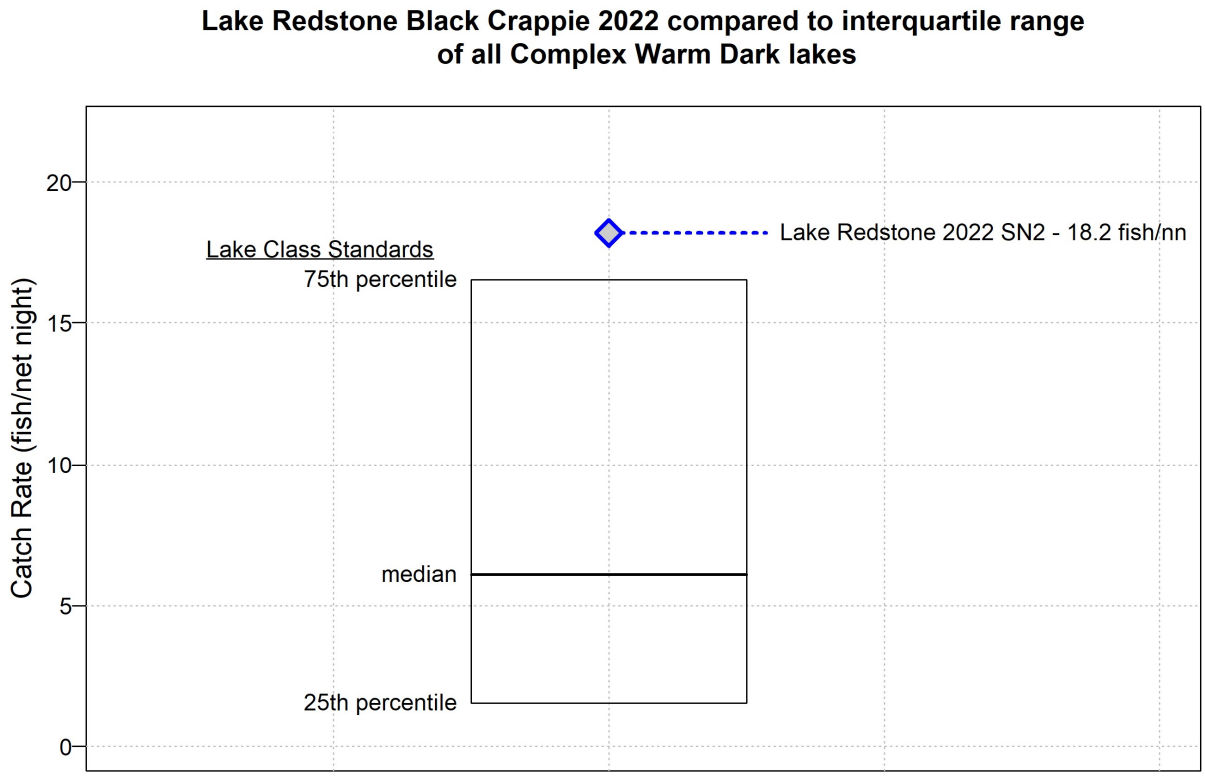

Figure 9. Black crappie SN2 catch rate lake class comparison for Lake Redstone, Sauk County, Wisconsin. Lake class is complex-warm-dark.

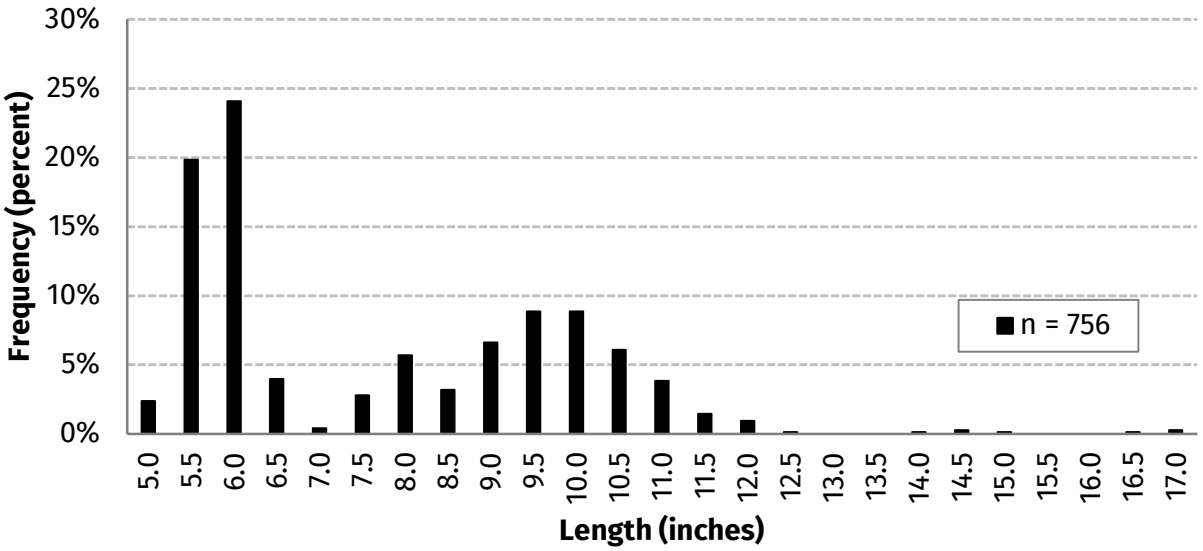

Figure 10. Length frequency distribution of black crappies sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

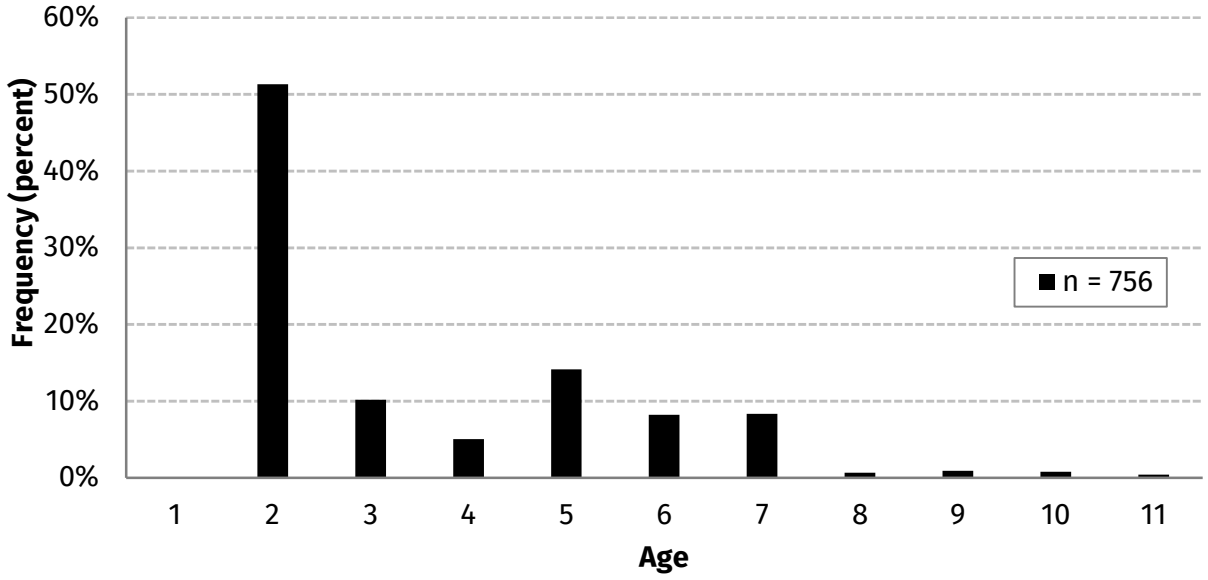

Figure 11. Age frequency distribution of black crappies sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

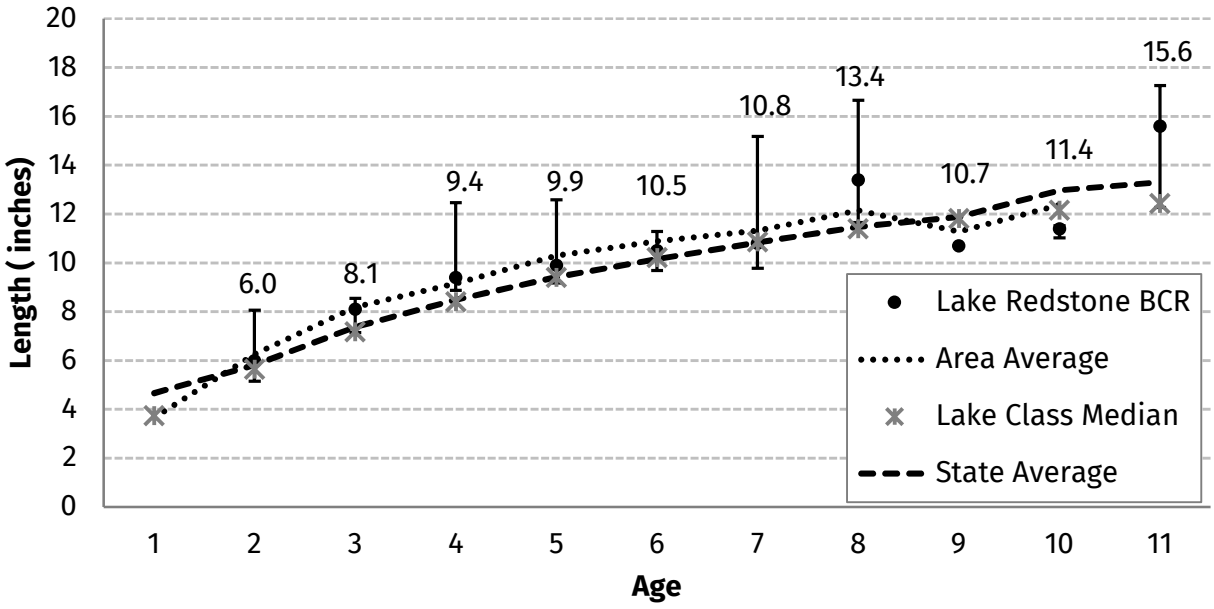

Figure 12. Mean length-at-age of black crappies (BCR) sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

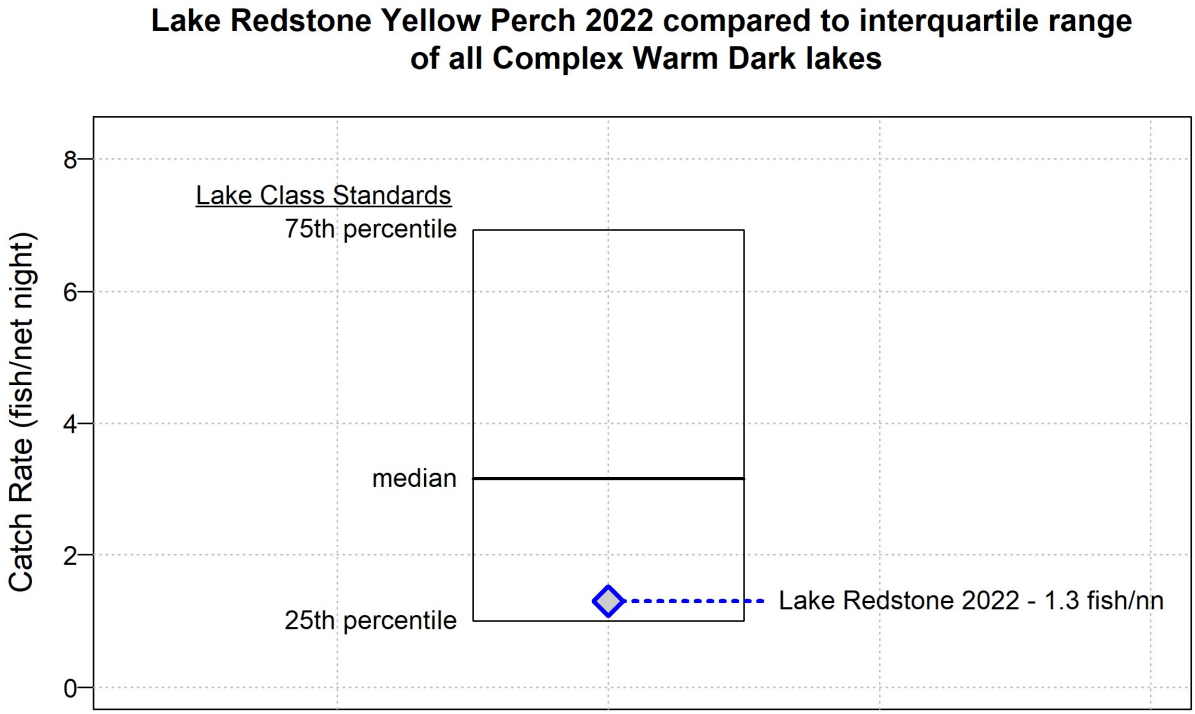

Figure 13. Yellow perch SN1 catch rate lake class comparison for Lake Redstone, Sauk County, Wisconsin.

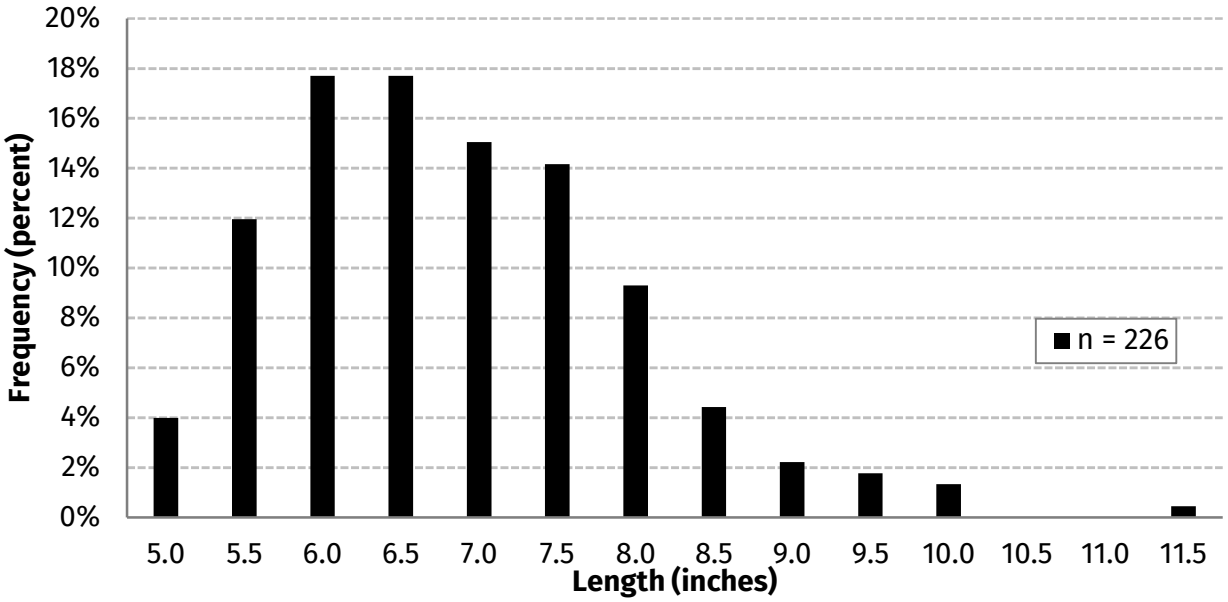

Figure 14. Length frequency distribution of yellow perch sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

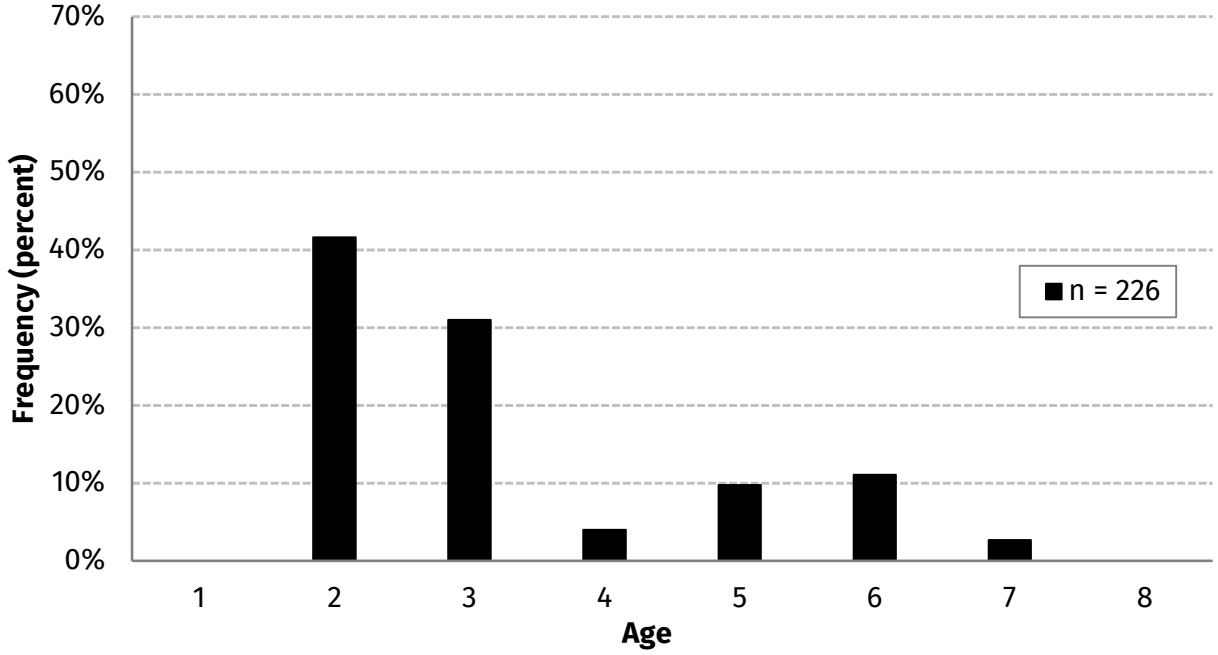

Figure 15. Age frequency distribution of yellow perch sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

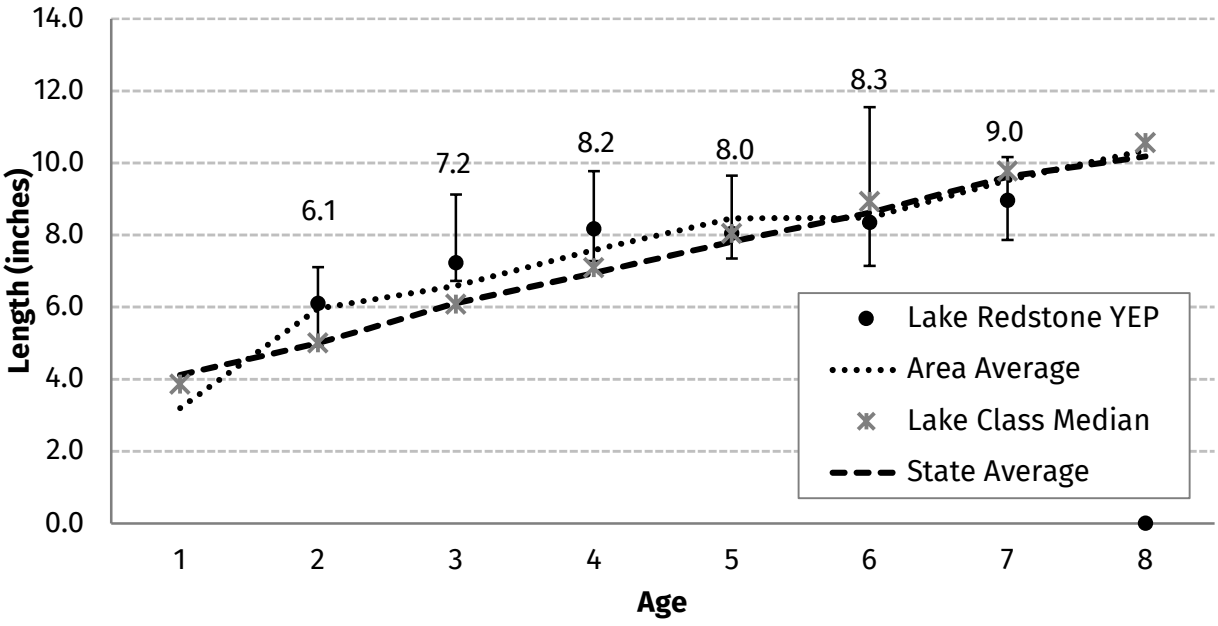

Figure 16. Mean length-at-age of yellow perch (YEP) sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

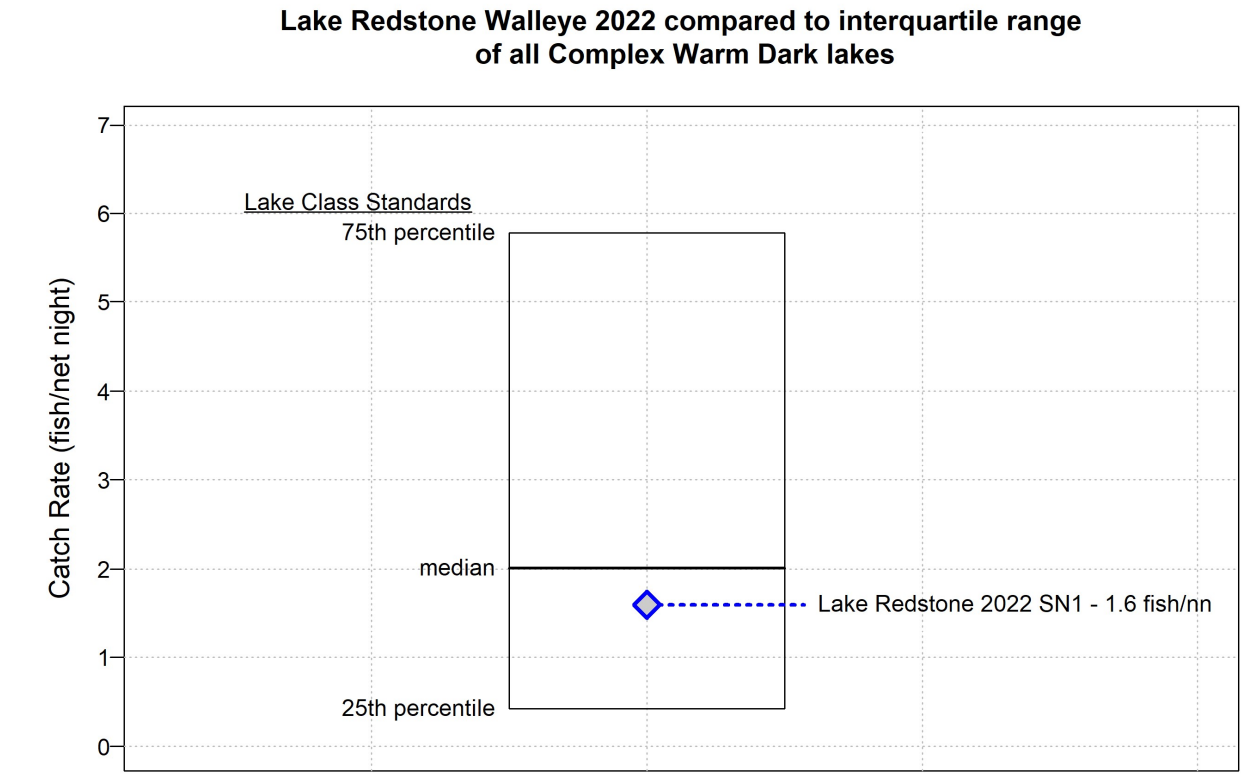

Figure 17. Walleye SN1 catch rate lake class comparison for Lake Redstone, Sauk County, Wisconsin.

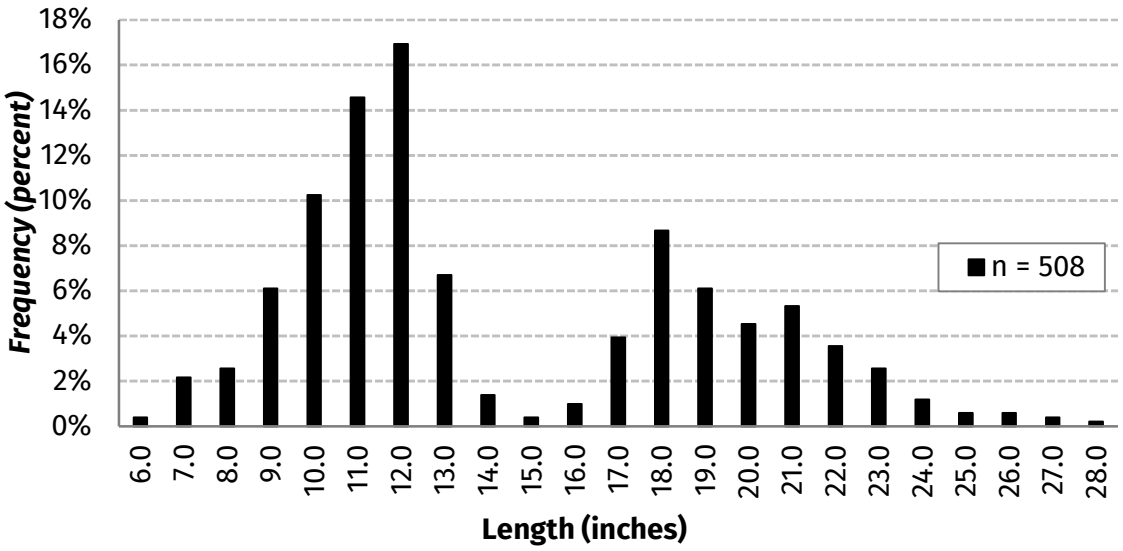

Figure 18. Length frequency distribution of walleyes sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

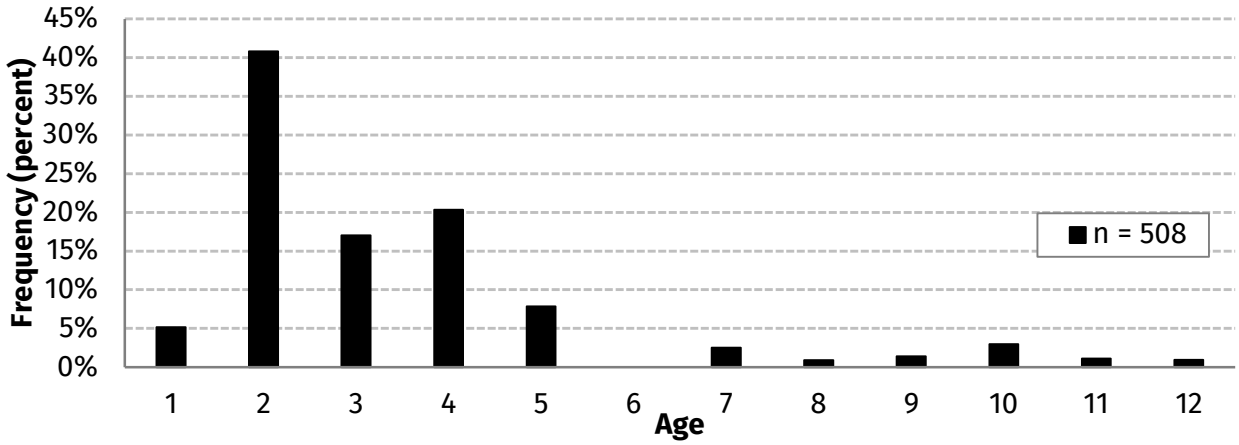

Figure 19. Age frequency distribution of walleyes sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

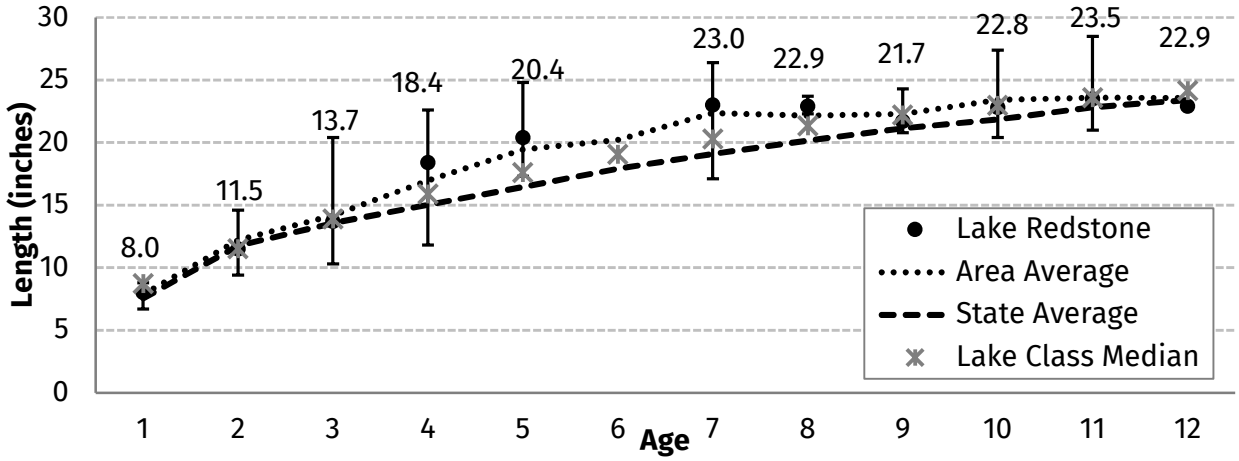

Figure 20. Mean length-at-age of walleyes sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

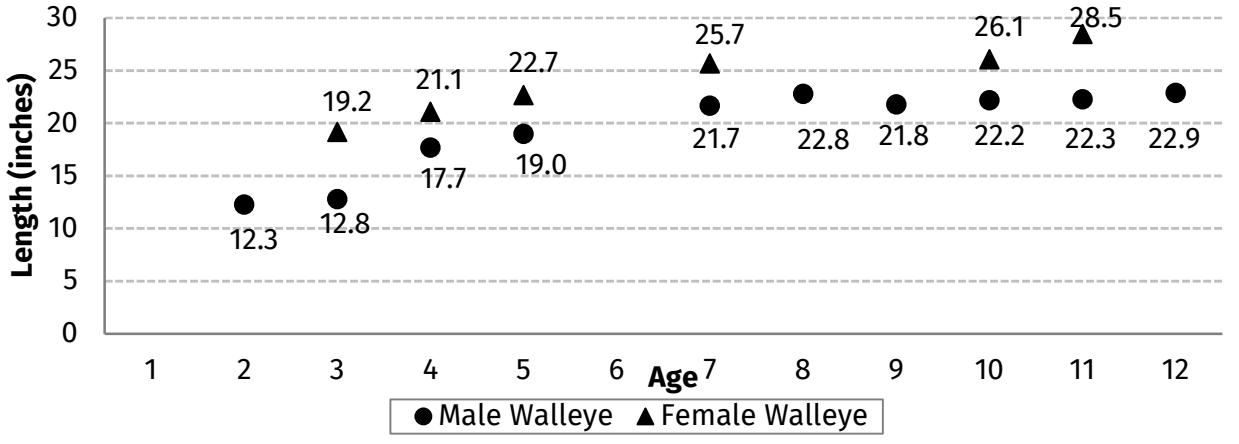

Figure 21. Mean length-at-age of male and female walleyes sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

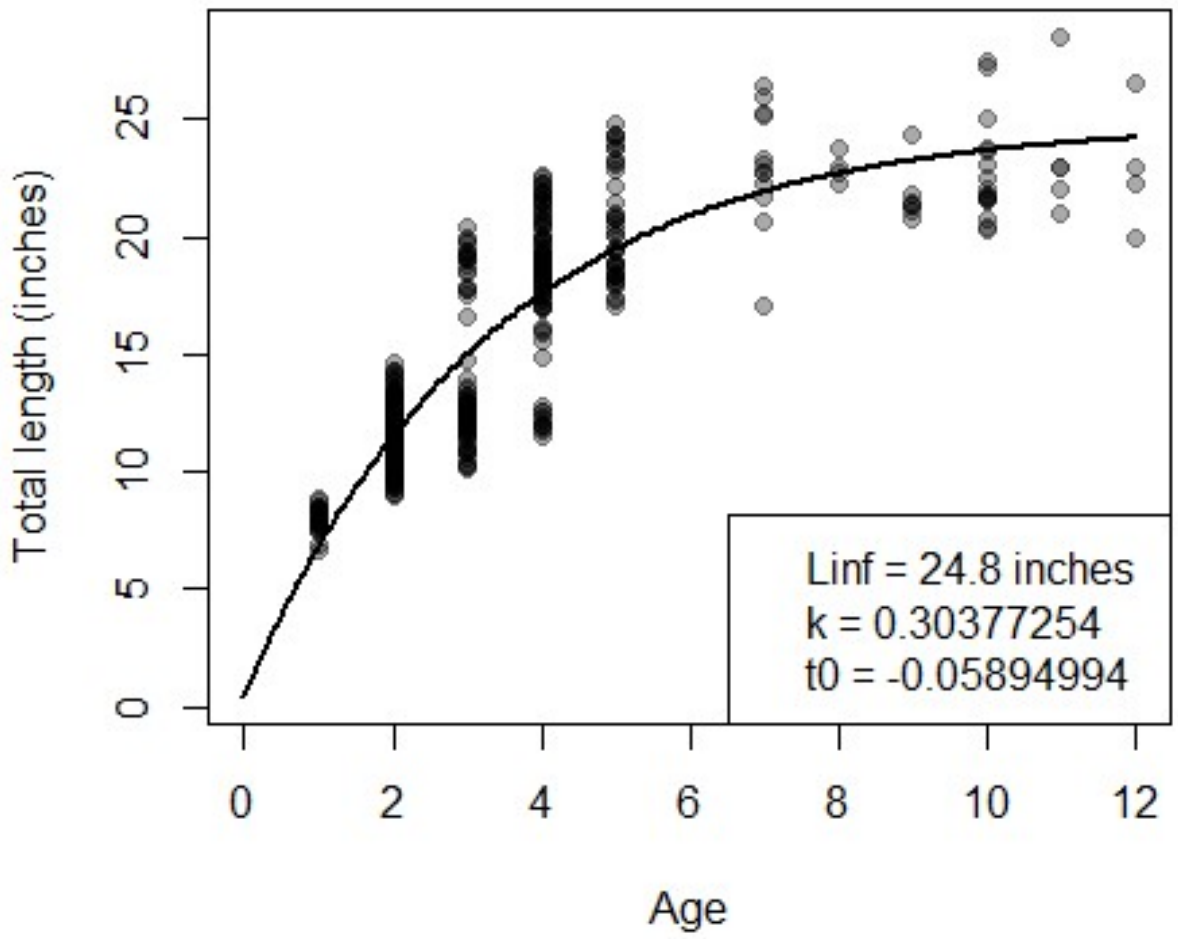

Figure 22. Length-at-age of walleyes sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin, with a von Bertalanffy growth curve fitted to the data.

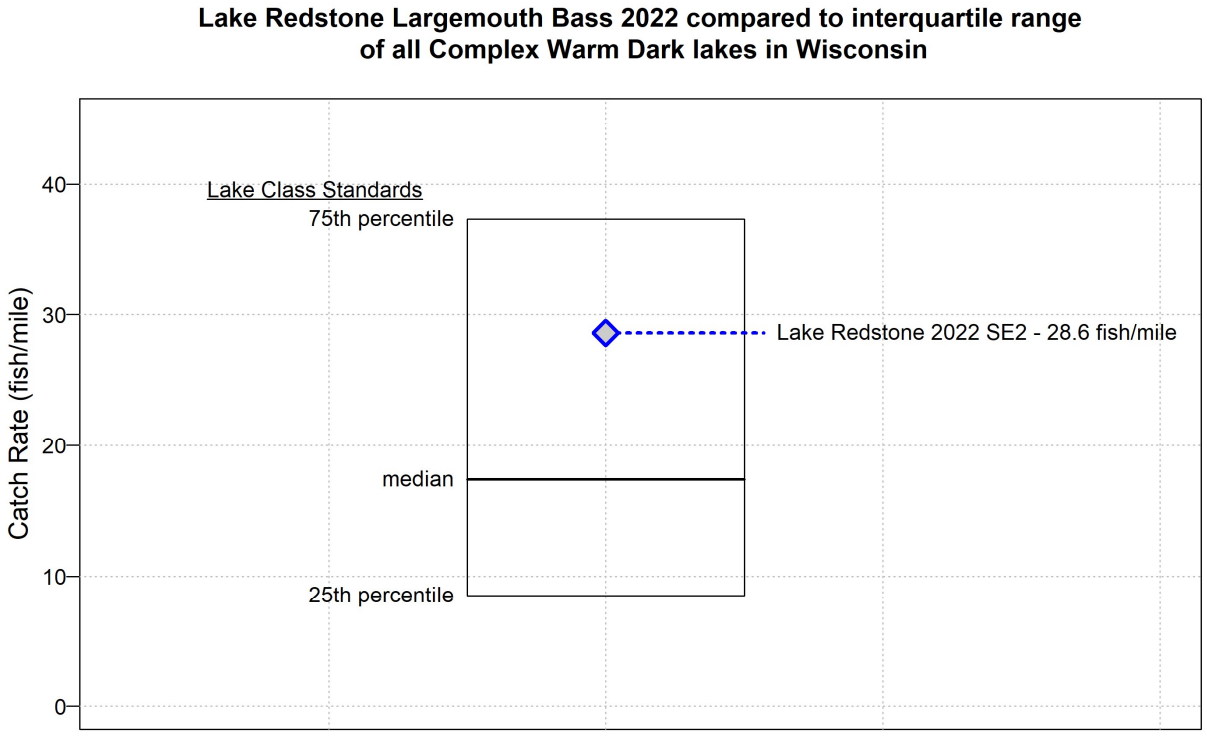

Figure 23. Largemouth bass SE2 catch rate lake class comparison for Lake Redstone, Sauk County, Wisconsin.

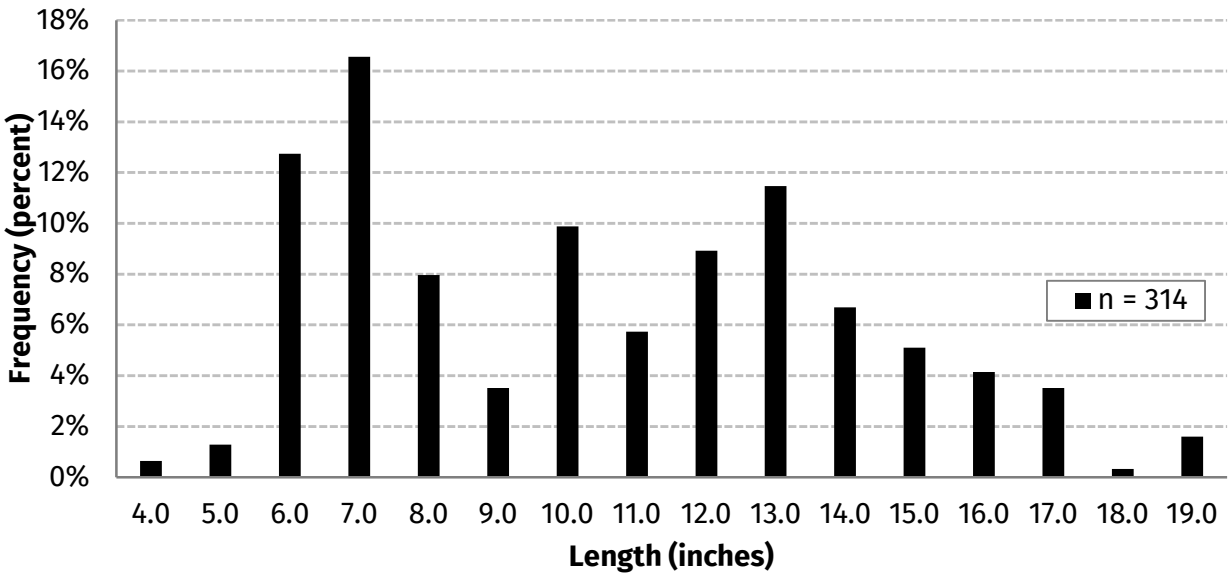

Figure 24. Length frequency distribution of largemouth bass sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

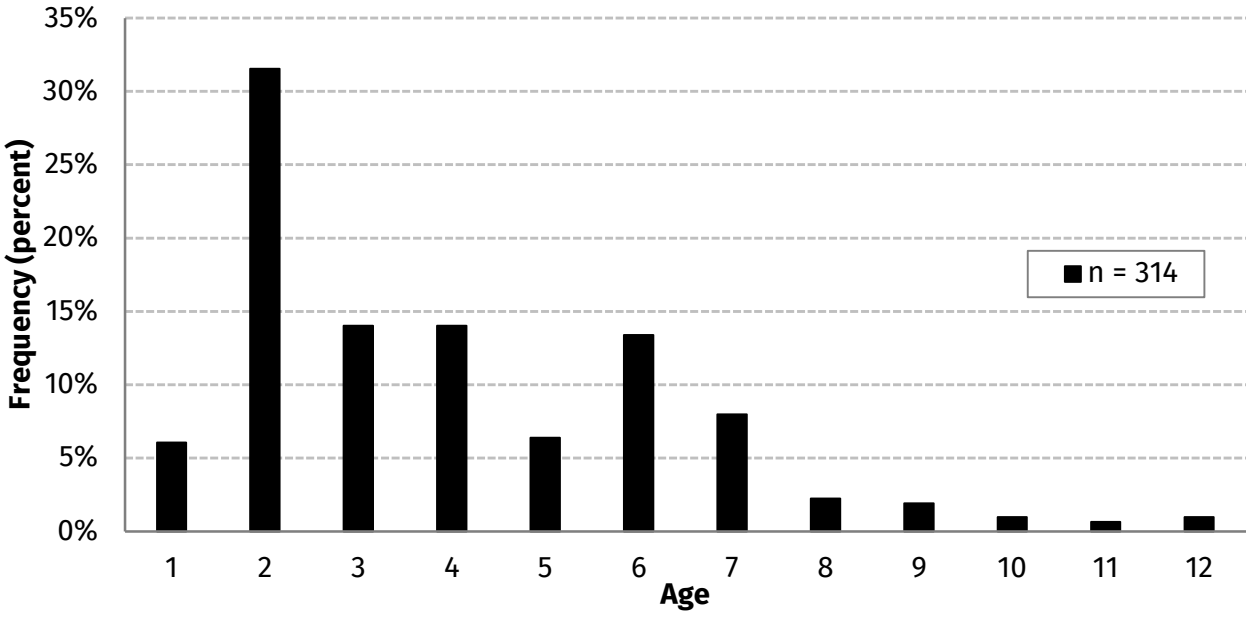

Figure 25. Age frequency distribution of largemouth bass sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

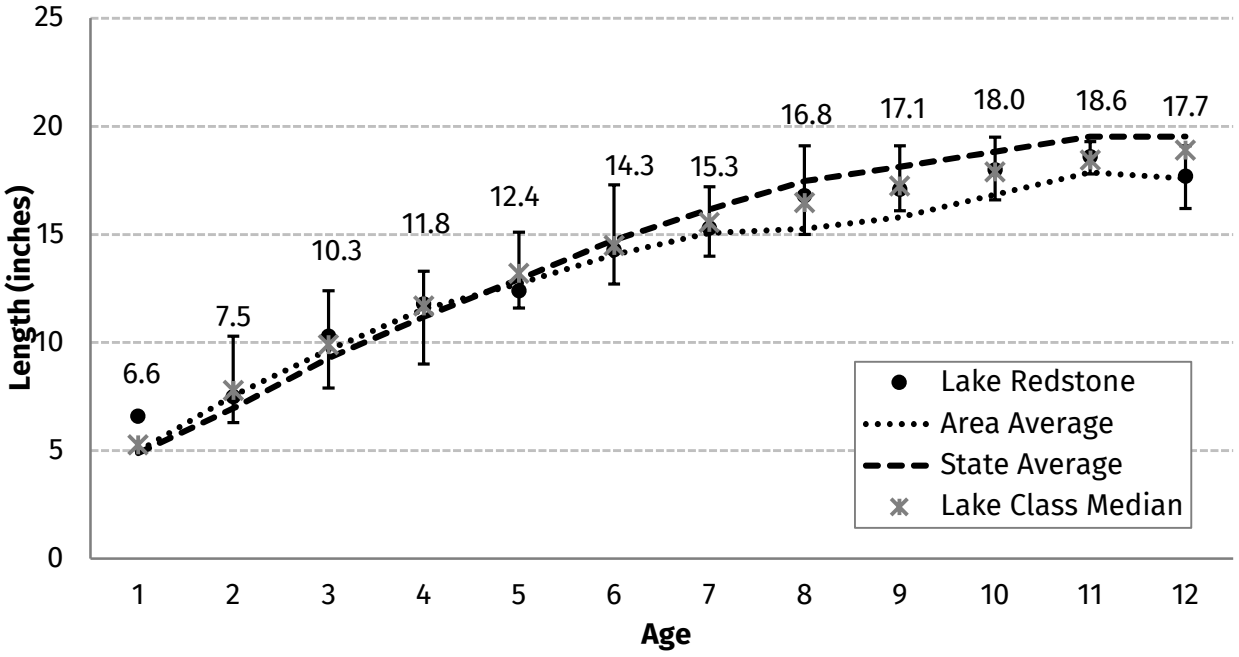

Figure 26. Mean length-at-age of largemouth bass sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

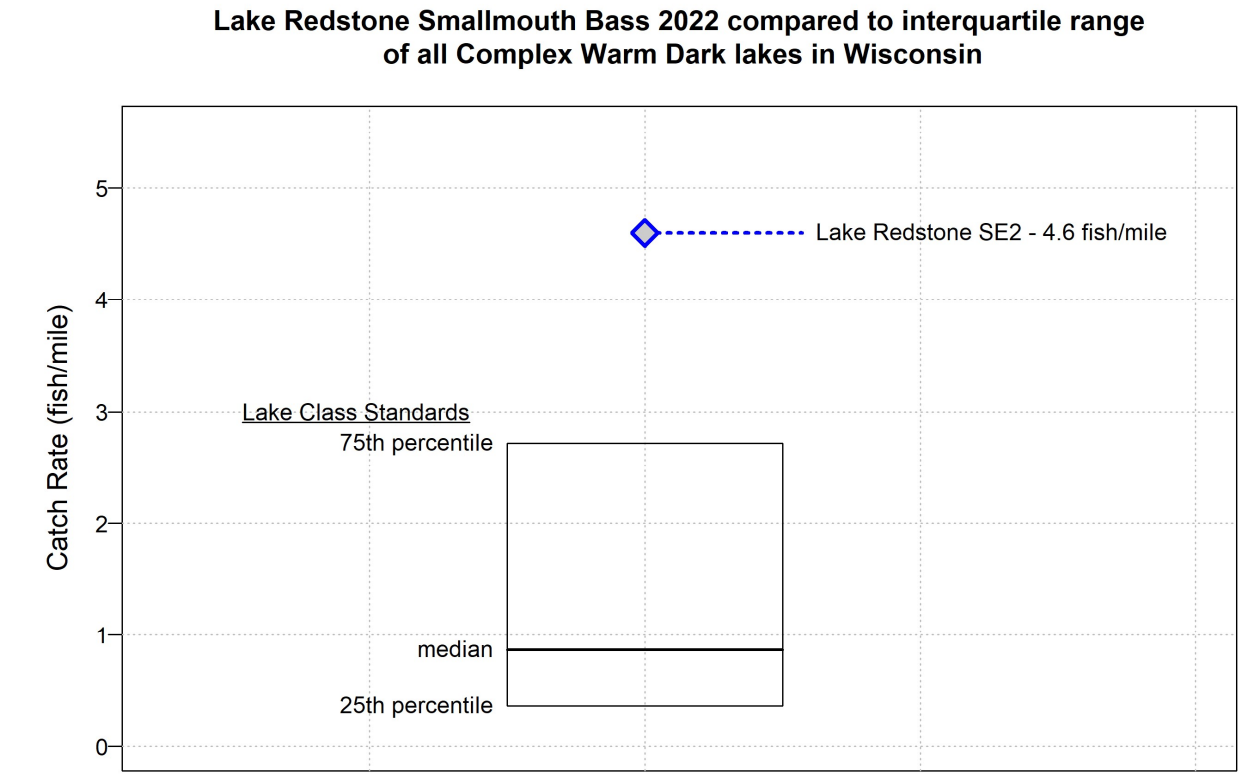

Figure 27. Smallmouth bass SE2 catch rate lake class comparison for Lake Redstone, Sauk County, Wisconsin.

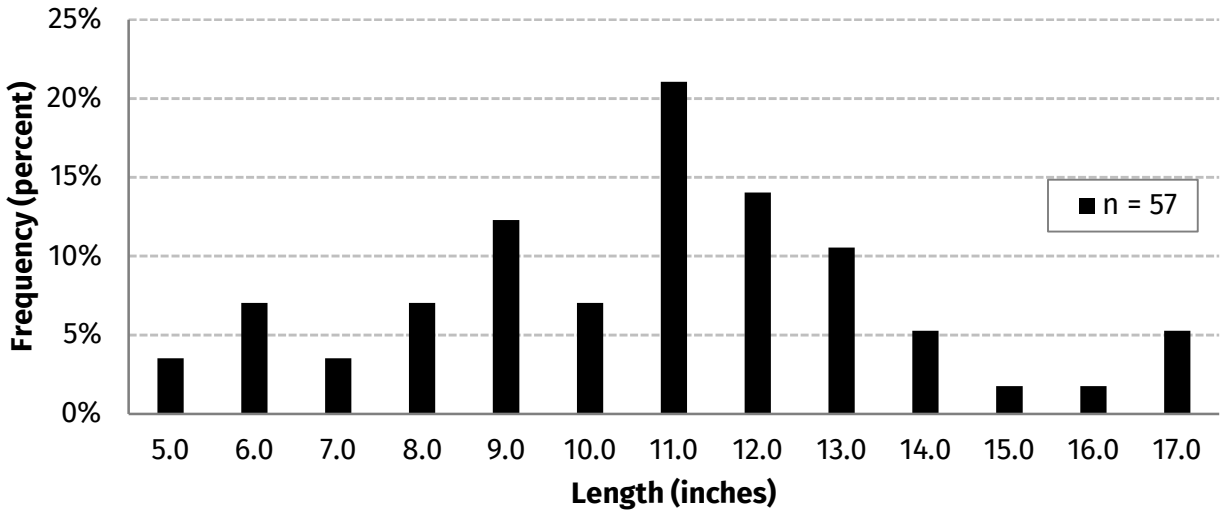

Figure 28. Length frequency distribution of smallmouth bass sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

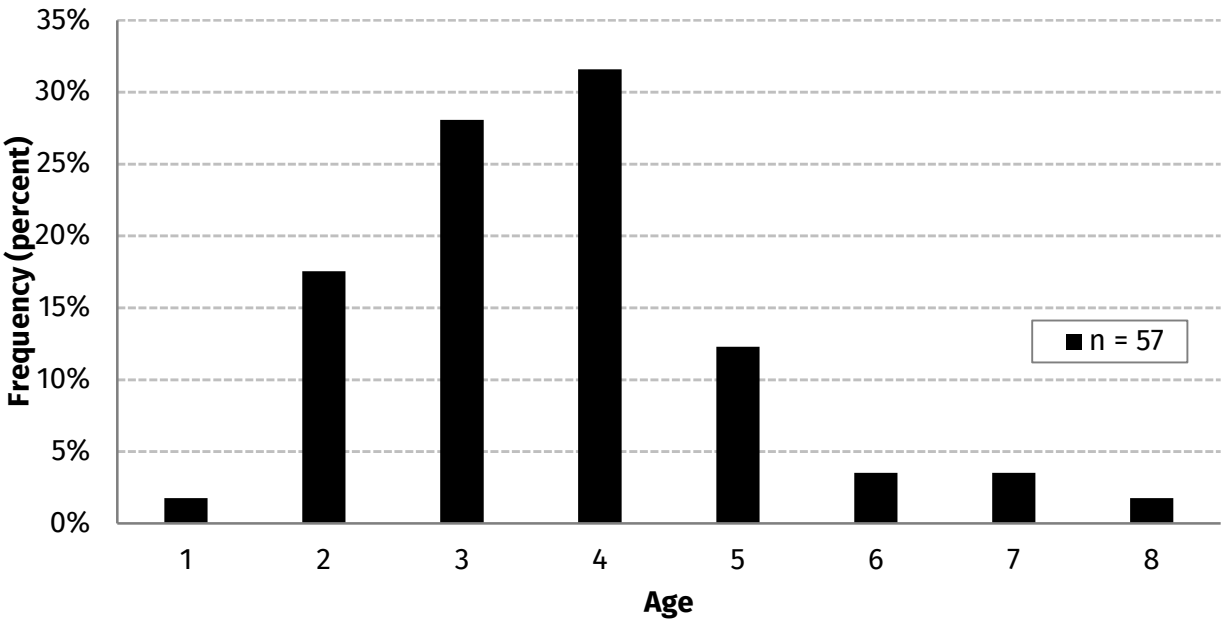

Figure 29. Age frequency distribution of smallmouth bass sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

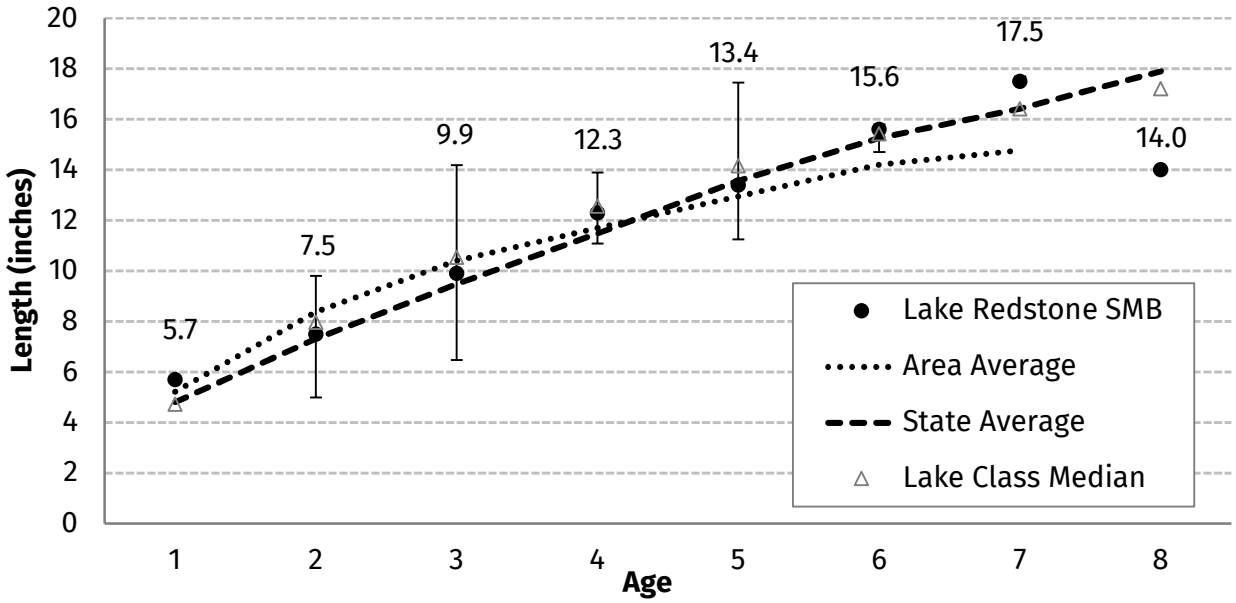

Figure 30. Mean length-at-age of smallmouth bass sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

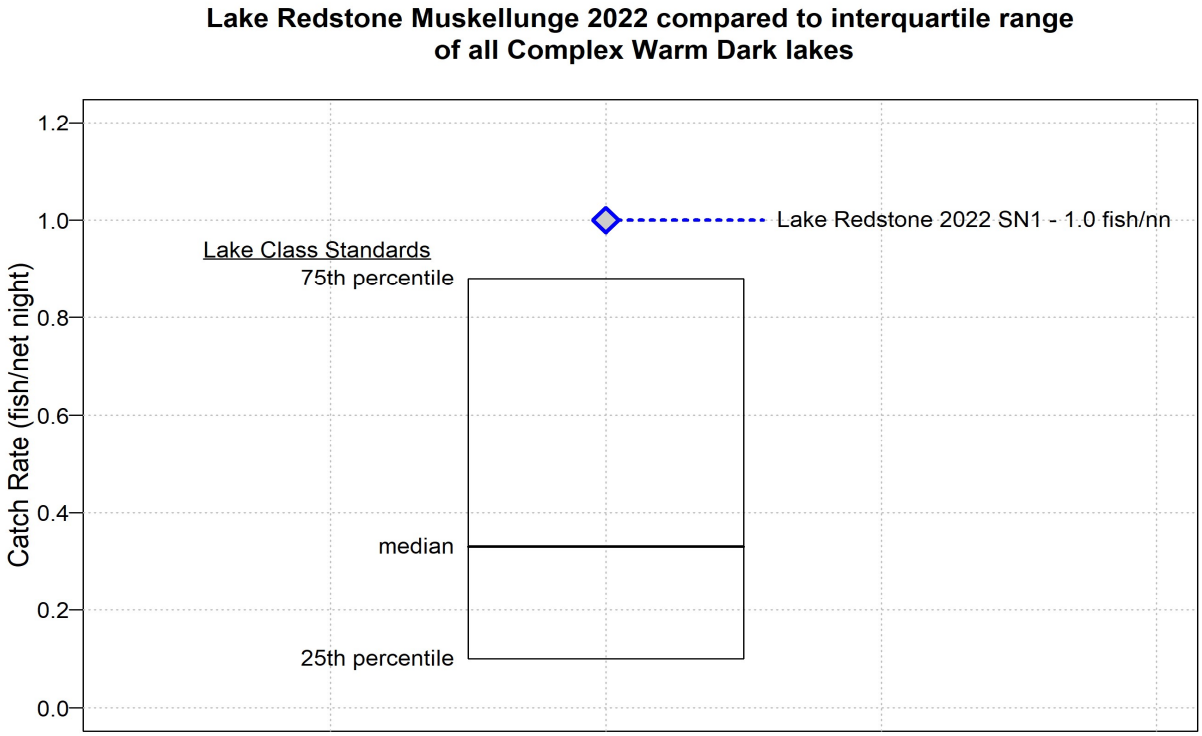

Figure 31. Muskellunge SN1 catch rate lake class comparison for Lake Redstone, Sauk County, Wisconsin.

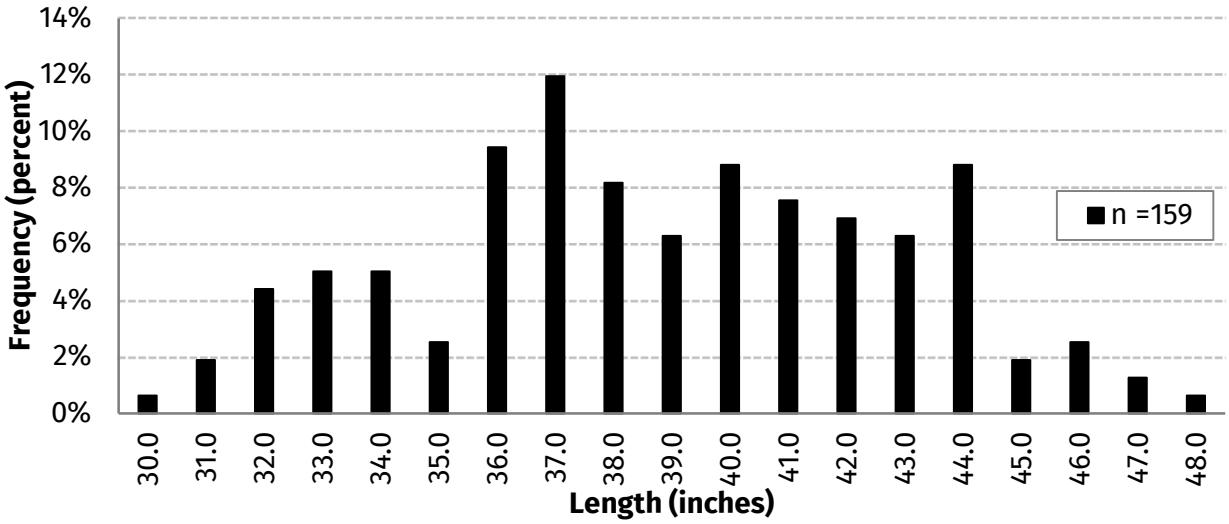

Figure 32. Length frequency distribution of muskellunge sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

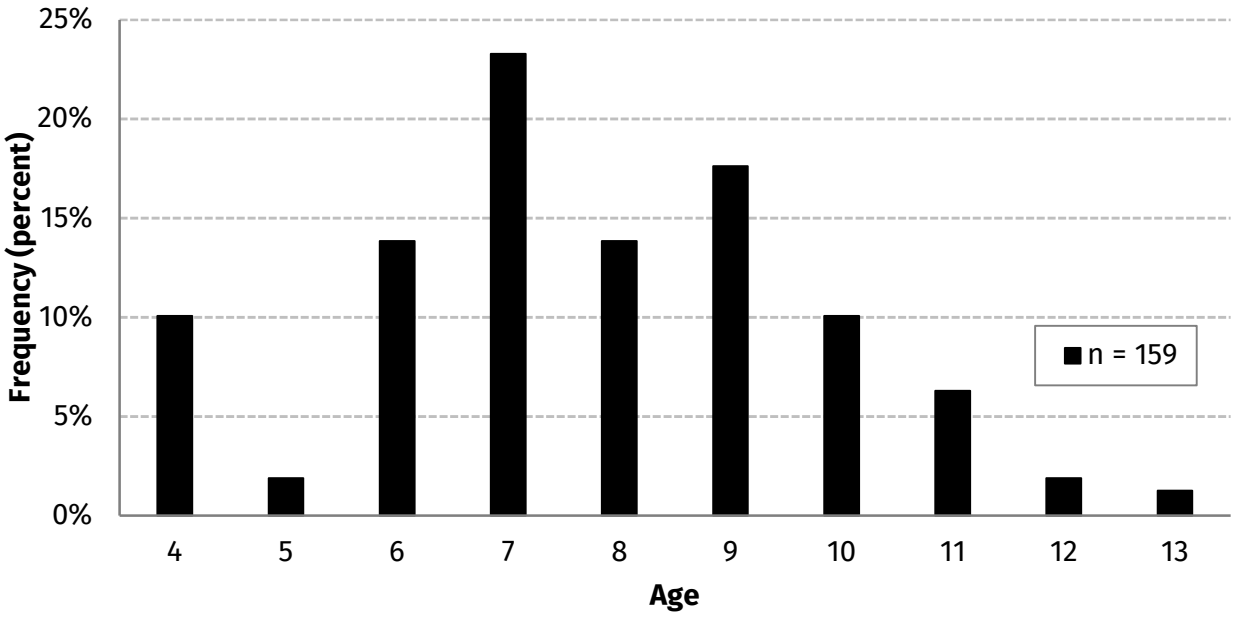

Figure 33. Age frequency distribution of muskellunge sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

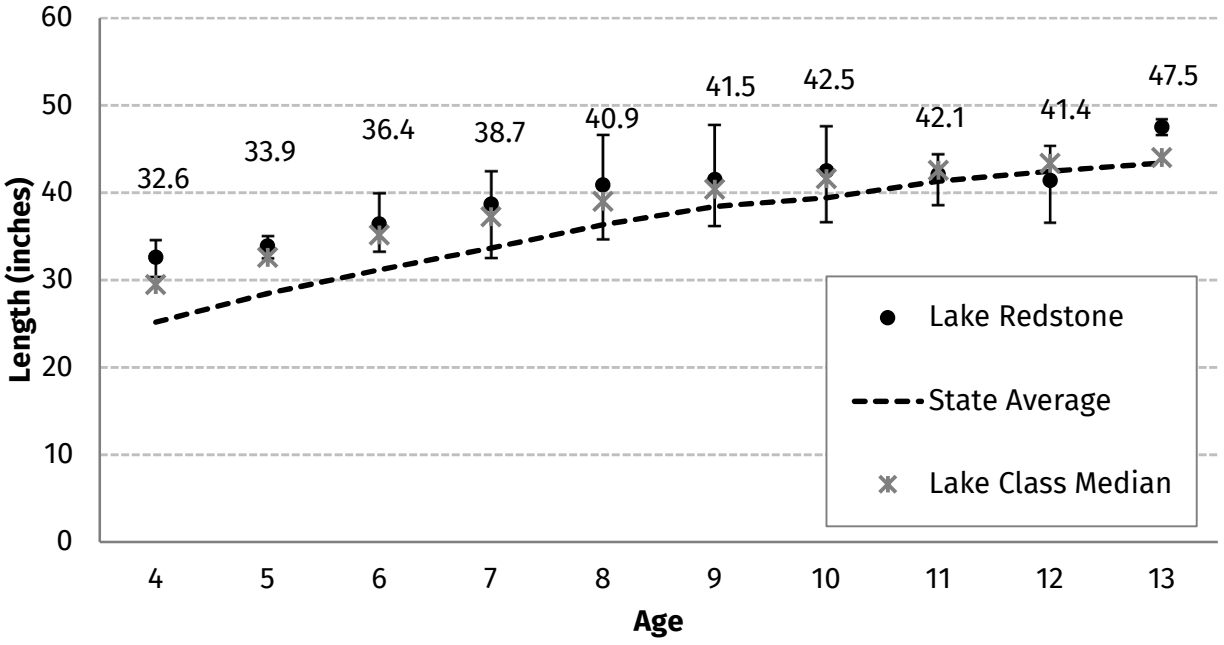

Figure 34. Mean length-at-age of muskellunge sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

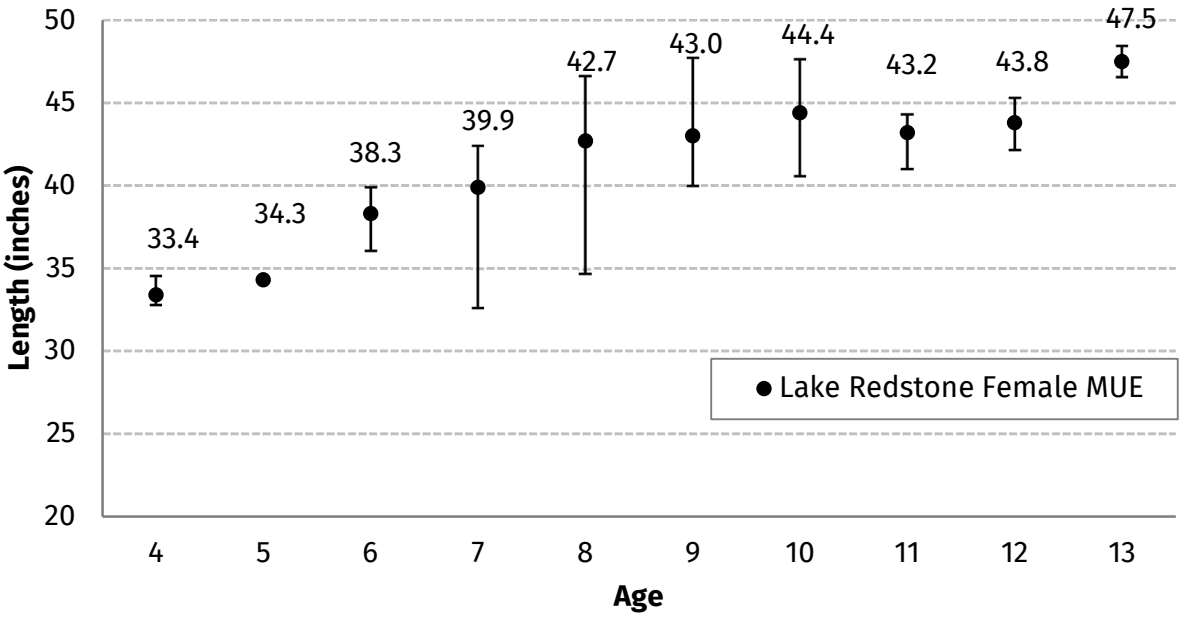

Figure 35. Mean length-at-age of female muskellunge sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

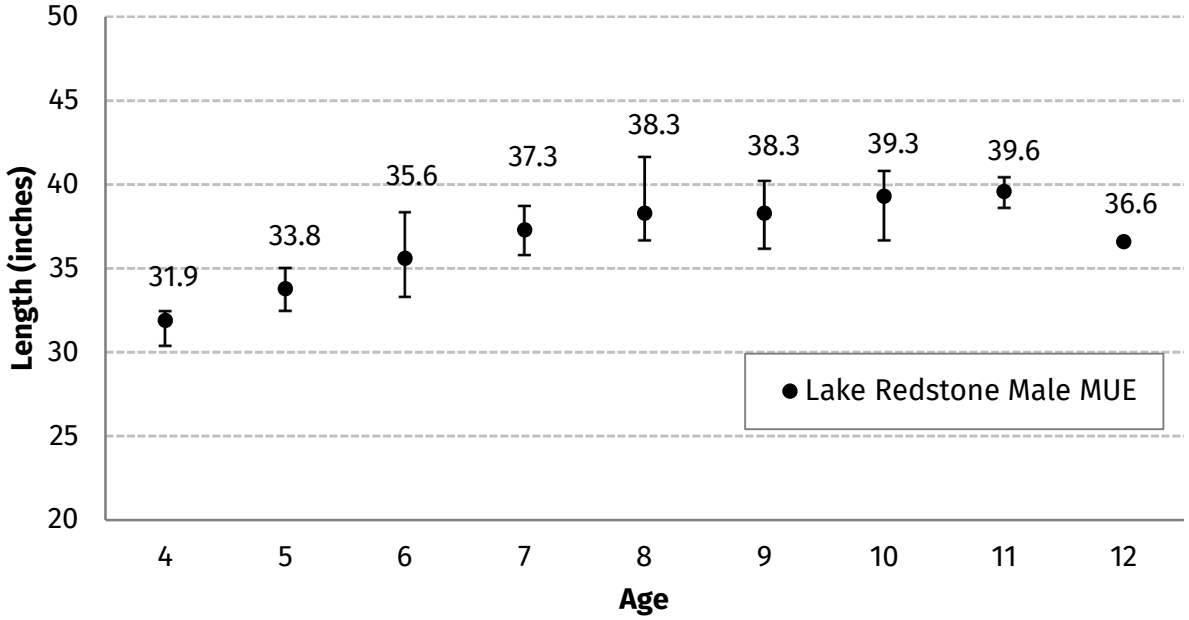

Figure 36. Mean length-at-age of male muskellunge sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin.

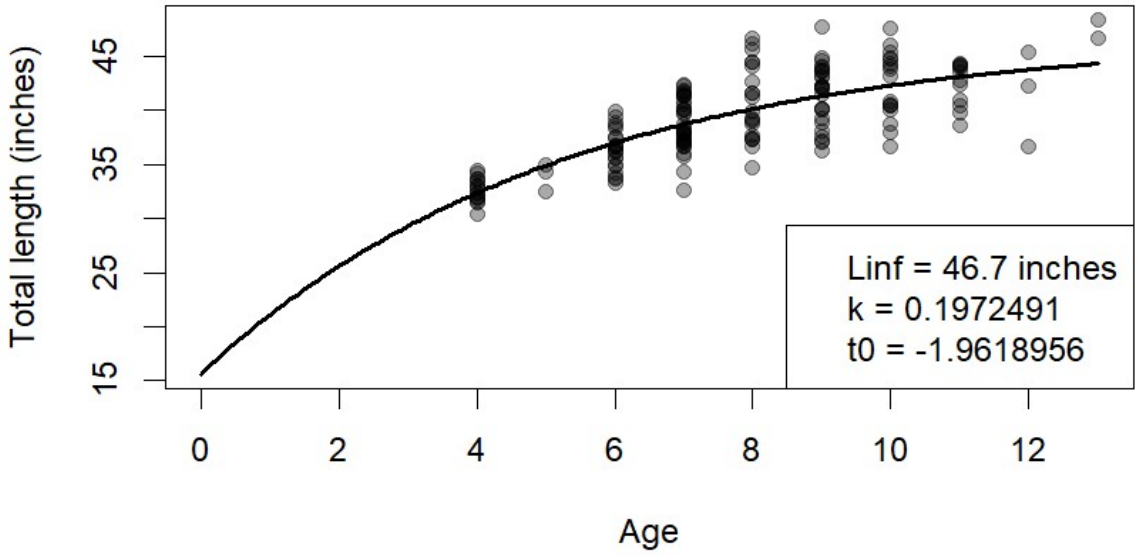

Figure 37. Length-at-age of muskellunge sampled during the 2022 comprehensive fishery survey of Lake Redstone, Sauk County, Wisconsin, with a von Bertalanffy growth curve fitted to the data.

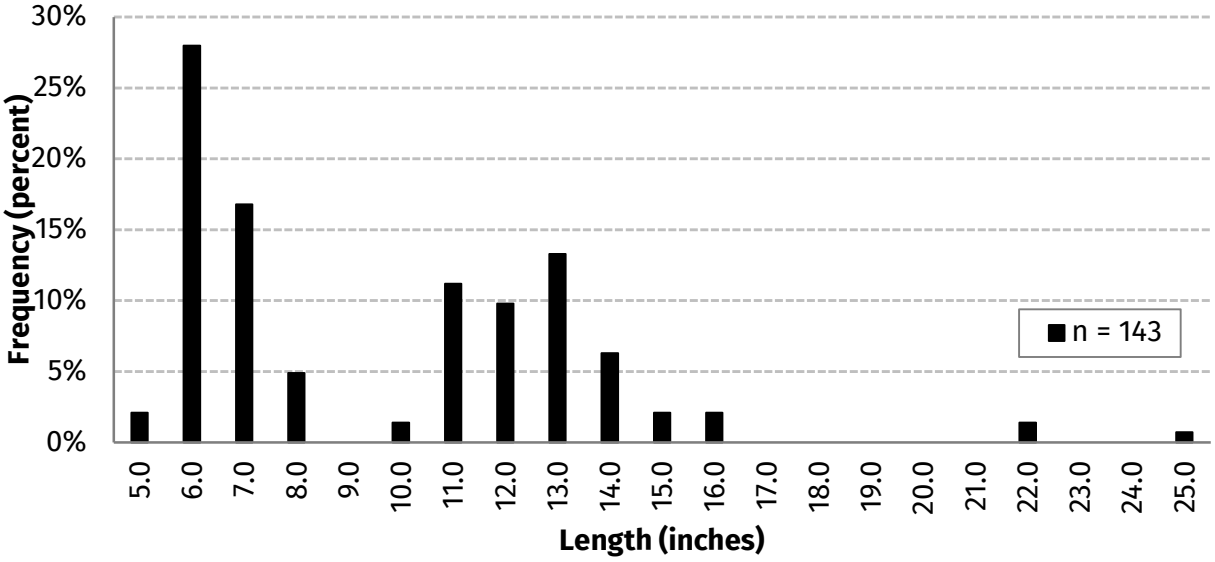

Figure 38. Length frequency distribution of walleyes sampled during the fall 2022 electrofishing survey of Lake Redstone, Sauk County, Wisconsin.

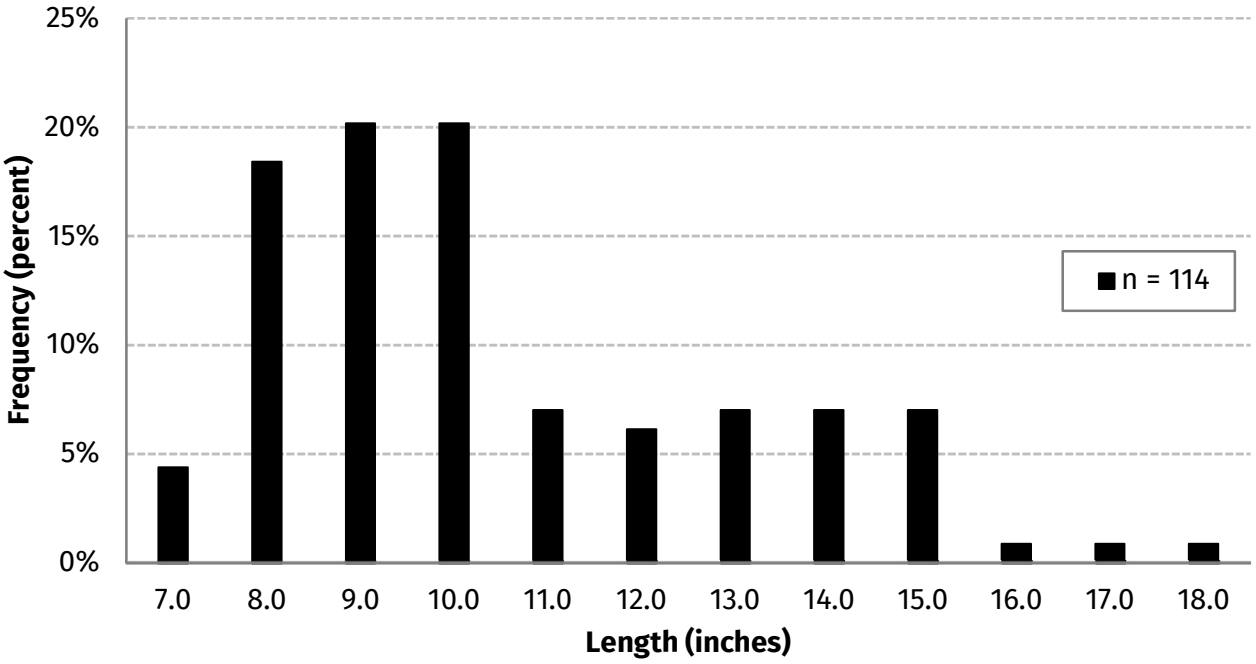

Figure 39. Length frequency distribution of largemouth bass sampled during the fall 2022 electrofishing survey of Lake Redstone, Sauk County, Wisconsin.