WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Fishery Survey Summary
Potato Lake
Rusk County, Wisconsin, 2019 and 2021

Introduction

The Wisconsin Department of Natural Resources' (DNR) Fisheries Management Team from Park Falls completed netting and electrofishing surveys in 2019 and 2021 to assess the abundance, size structure and reproductive success of important sportfish populations in Potato Lake. The estimate of adult walleye density derived from the early spring surveys helped us evaluate our stocking strategy under the Wisconsin Walleye Initiative. We continued netting muskellunge in mid-spring to estimate their adult abundance and to gauge the effectiveness of stocking fingerlings for over 40 years. An electrofishing survey in late spring characterized the status of largemouth bass and bluegill, and fall electrofishing measured natural walleye recruitment. We compared population status with the objectives in the draft fishery management plan to evaluate our current management strategies. Quality, preferred and memorable sizes referenced in this summary are based on standard proportions of world record lengths developed for each species by the American Fisheries Society. "Keeper size" is the team's description for black crappie and yellow perch 9 inches or longer and bluegill at least 7 inches long, based on observed angler behavior.

HABITAT AND PUBLIC ACCESS CHARACTERISTICS

Almost identical in size to nearby Island Lake, 534-acre Potato Lake ranks second largest behind Dairyland Reservoir among lakes and impoundments that lie entirely within Rusk County. Potato Lake has three connected basins each with distinct habitat and water quality characteristics (*Figure 1*). The southern-most and deepest basin, sometimes called Little Potato Lake, comprises one-sixth of the total surface area. The shallow, middle basin encompasses one-eighth of the lake's acreage where depth is generally less than 10 feet. Several lobes of the 380-acre north basin have depths greater than 15 feet. Lake-wide, average depth is 10 feet, and maximum depth is 40 feet. Muck makes up the majority (85%) of the lakebed material in the littoral zone along with small proportions of rock (10%) and gravel (5%).

Fertility in lake systems often has opposing consequences. The nutrient concentrations responsible for high rate of biological production, including better-than-average growth rates in fish populations, can also result in undesirable conditions that affect both the aquatic community and the people who use and enjoy it. The middle and north basins of Potato Lake are highly fertile and classified as hypereutrophic. Very high nutrient levels give rise to severe algae blooms in summer with Secchi depth averaging 3.2 feet. The south basin is moderately fertile and considered eutrophic. Secchi depth ranged from 3.3 to 9.0 feet. Strong thermal stratification in late summer commonly results in dissolved oxygen concentrations approaching zero near the lake bottom. Potato Lake has an inescapable risk of fish mortality associated with depleted oxygen in summer and winter. Potato Lake occasionally experiences partial winterkill—mortality of fish and other aquatic life that occurs when decomposing plant material depletes dissolved oxygen in an ice-covered lake

faster than oxygen can be replenished by atmospheric diffusion, photosynthesis and influx from tributaries. Fishkills can result from oxygen depletion in summer too, especially following prolonged periods of high water temperature and cloudy days, when oxygen saturation is lowest and plants and algae consume more oxygen than they produce.

Figure 1. North, middle, and south basins of 534-acre Potato Lake bisected by County Highway D in southwest Rusk County, WI.

In a 1999 survey of aquatic plants, 16 species of native aquatic macrophytes were present in the north and middle basins. Low water clarity restricted their growth to water depths less than 4 feet. Curly-leaf pondweed, an invasive aquatic plant, was common around nearly the entire perimeter, growing to a maximum depth of 6 feet. Of the 22 native aquatic plant species found south of County Highway D, the three most abundant were coontail, northern milfoil and flat-stem pondweed. With better water clarity maximum depth of plant growth was 9 feet in the south basin. Curly-leaf pondweed was present in very low densities at scattered locations around the perimeter at depths up to 8 feet.

Potato Lake belongs in the group of lakes that have a complex fish community, dark water clarity and a warm thermal regime. We refer to this category as the “complex-warm-dark” lake class.

Rusk County owns the 3-foot-high dam that raises Potato Lake’s elevation about two feet

above its natural condition. The spillway is uncontrolled with no capability to intentionally manipulate lake level or discharge. Potato Creek flows about seven miles to the Chippewa River with no permanent barriers to two-way fish movement. Most fish species native to the Upper Chippewa drainage could swim through the dam when seasonal discharge is favorable.

Rusk County maintains public access to the northwest shore at the end of Boat Landing Road, including a concrete boat ramp, a boarding dock and a shorefishing pier. Small, carry-in watercraft can be launched into Little Potato Lake at the unimproved, roadside access on County Highway D. The DNR provides a gravel boat ramp just above the dam at Potato Lake's outlet. Most boats can pass between Potato Lake and Little Potato Lake under the bridge, except those that need high overhead clearance.

SURVEY EFFORT

Shortly after the ice thawed, when water temperature ranged from 43 to 50° F, we captured and fin-clipped walleye and tagged muskellunge with Passive Integrated Transponders (PIT) in 40 net-nights of fyke netting effort directed at spawning walleye from April 21-26, 2019. On April 26, 2019, two crews targeted walleye again by nighttime electrofishing along the entire perimeter, sampling 9.53 shoreline miles in 4.67 hours of electrofishing effort when water temperature was 48° F. From the ratio of marked and unmarked walleye in the electrofishing sample, we estimated the number of adult walleyes in Potato Lake.

Forty-eight additional net-nights of fyke net effort targeted spawning muskellunge from April 28 to May 9, 2019, when water temperature ranged from 47 to 57° F. Typically, we estimate musky population numbers from spring fyke net samples in consecutive years, but the coronavirus pandemic suspended netting planned in 2020. In the spring of 2021, we resumed netting to estimate the adult density of muskellunge by standard mark-recapture methods. We directed 104 net-nights of fyke netting effort toward spawning muskellunge from April 12-25, 2021, when water ranged from 40 to 55° F. We measured all gamefish, and we counted or measured panfish in a subsample from 40 net-nights.

With water temperatures between 60° F and 63° F, our May 28, 2019, electrofishing survey coincided with the early spawning activities of largemouth bass and bluegill. We dip-netted gamefish along 4.00 shoreline miles in 1.87 hours, and we subsampled all fish species for 1.00 miles in 0.48 hours.

We typically measure walleye recruitment as the number of age-0 fingerlings and age-1 yearlings captured per shoreline mile in fall electrofishing surveys. On October 8, 2019, two electrofishing crews targeted young walleye, but they dip-netted walleyes of all sizes, along 6.94 shoreline miles in 2.08 hours when water temperature was 55-56° F. They did not collect other fish in that survey.

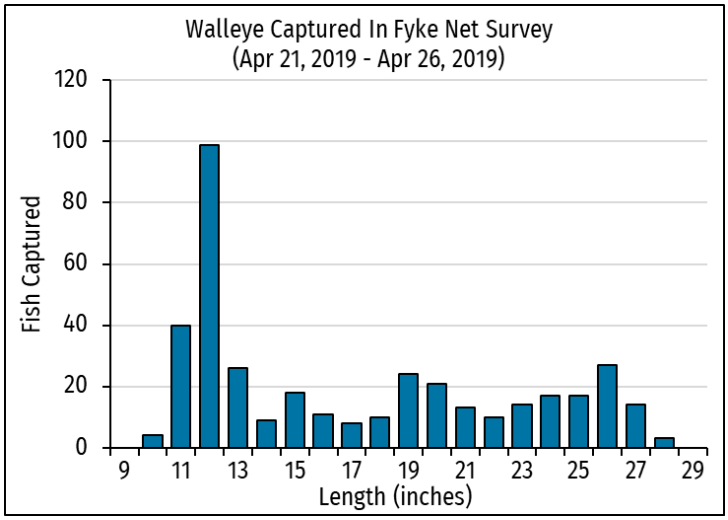
Results and Discussion

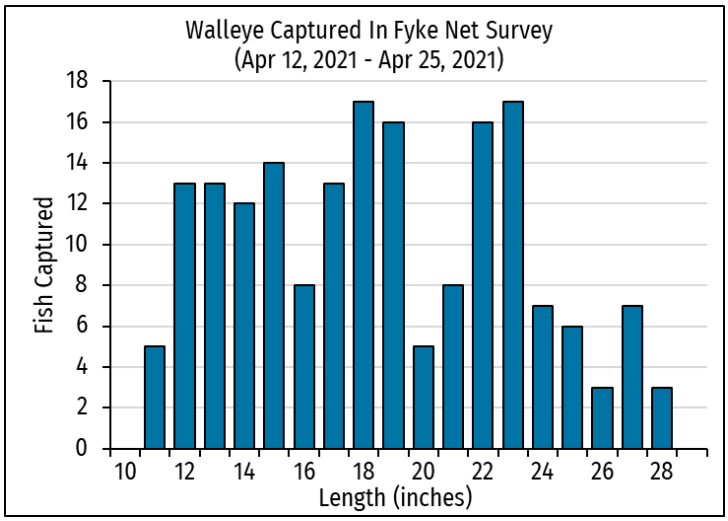
FISH COMMUNITY

Twenty-seven fish species have been captured in Potato Lake, based on survey records since 1956. We found 19 species and one hybrid in 2019 and 2021, compared to 18 species in

2013 and 2014. Smallmouth bass and rock bass, both common in neighboring waters, were not recorded from Potato Lake. The fish community included greater redhorse, a fish species reclassified from "threatened" to "special concern" under Wisconsin's Endangered Species Act. We captured eight greater redhorse by electrofishing in June of 2013, but none in 2019 or 2021. Common carp was the only non-native fish species and the only other exotic species known to occur in Potato Lake besides rusty crayfish and curly-leaf pondweed.

WALLEYE





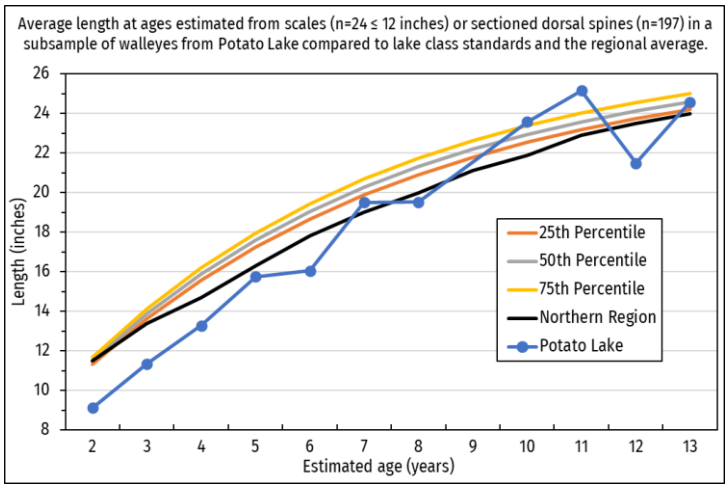
Early spring fyke netting in 2019 captured 439 walleyes at a rate of 11 fish ≥ 10 inches per net-night. That catch rate ranked between the 75th and 90th percentile values among lakes in the complex-warm-dark category, compared to spring of 2013 when the fyke net catch rate ranked between the 50th and 75th percentiles. The 385 unmarked walleyes captured in nets ranged from 10.0 to 28.5 inches and averaged 17.4 inches long. Early spring electrofishing captured 81 walleyes, including 31 that we marked in our netting survey. Electrofishing catch rates were 8.5 walleyes ≥ 10 inches per mile or 17.4 per hour. The 50 walleyes not handled before ranged from 11.0 to 27.0 inches and averaged 16.4 inches. Using Chapman's version of Petersen's equation[1], we estimated that Potato Lake's walleye population had 948 adults (95% confidence interval = 687-1,209; coefficient of variation = 0.14) or 1.8 adults per acre. Walleye density in Potato Lake matched the average value in populations maintained primarily by stocking in Wisconsin's Ceded Territory. The population achieved our objective for low to moderate density between one and two adults per acre. In the spring of 2021, fyke nets targeting spawning muskies incidentally captured 183 walleyes that ranged from 11.0 to 28.4 inches and averaged 19.0 inches long.

Electronic records show that from 1991 to 2024 Potato Lake received 134,400 small walleye fingerlings, averaging 1.5 inches and 59,780 larger fingerlings that averaged 7.1 inches long. Under the Wisconsin Walleye Initiative, the DNR has stocked walleyes into Potato Lake at a rate of 5 large fingerlings per acre in even-numbered years since 2014. We believe that

[1] Ricker, W.E., 1975, *Computation and Interpretation of Biological Statistics of Fish Populations*, Fisheries Research Board of Canada, Bulletin 191.

stocking is the primary source of new recruits to these walleye populations. Though recent measures of natural recruitment are scarce, we found no evidence of in-lake year class production in 10 walleye recruitment surveys completed in Potato Lake between 1997 and 2019. The electrofishing catch rate of 4.6 yearlings per mile in the fall of 2019 is a promising sign that the walleyes stocked as large fingerlings in 2018 are surviving and growing to help control panfish abundance and provide angling opportunity that otherwise would not be available in Potato Lake. We expect that the put-grow-and-take walleye fishery would eventually fade away without recurrent stocking at 2- or 3-year intervals to replace the adults that die to angling and natural causes. Continual stocking will be necessary to maintain this popular walleye fishery.

Ring counts on sectioned dorsal spines revealed that most males matured at age 3 and most females matured at age 6, though our subsample had no females less than 19 inches long (*Appendix 1*). Based on our unverified age estimates, walleyes start out growing slowly in Potato Lake, despite high nutrient levels that should promote high productivity. Pooling all sex categories with sample size greater than one, the average length of Potato Lake walleyes trailed the regional average and the 25th percentile values of the complex-warm-dark lake class by 0.6 to 2.6 inches at ages 2 through 8 (average=1.7; n=220). In contrast, the Potato Lake average exceeded the 75th percentile values by 0.2 and 1.1 inches at ages 10 and 11 (n=71) and surpassed the regional average by 0.6 to 2.3 inches at ages 10 through 13 (n=88). We cannot explain the variability in walleye growth as they age.

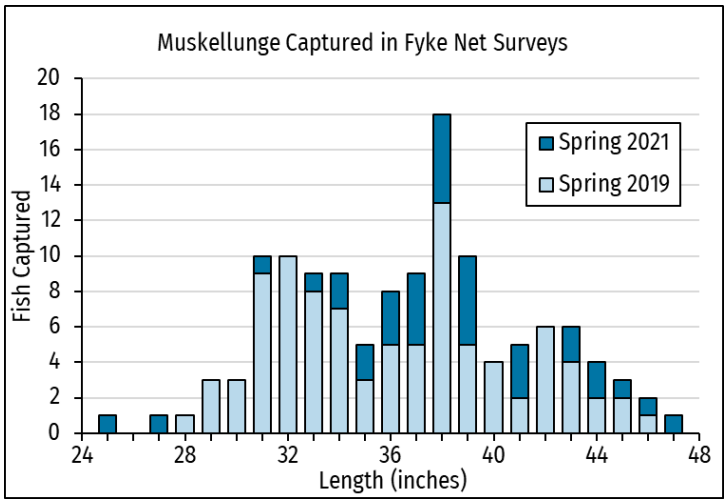


At low population density, walleye fisheries established and maintained by stocking typically have higher-than-average proportions of large fish. Fifty-four percent of the walleyes ≥ 10 inches captured in fyke nets in 2019 were quality-size fish at least 15 inches long. Thirty-five percent of walleyes in that sample grew to preferred size 20 inches or longer, and 16% were at memorable-size fish at least 25 inches long. A daily bag limit of three walleyes from 15 inches but less than 20 inches long may be kept, except one of the three may be over 24 inches. Eighteen percent of walleye in our fyke net sample were legal-size fish from 15.0 to 19.9 inches long, and 20% were legal-size walleyes over 24 inches. The proportion of walleyes ≥ 15 inches captured in fyke nets in the spring of 2021 increased to 77% as the 12-inch walleyes that were abundant in 2019 grew to quality and legal size. The share of preferred size fish also increased to 39% in those two years. Our fyke net samples from both years show that Potato Lake's walleye population outdid its size structure objective to have 10-20% at least 20 inches long.

MUSKELLUNGE

Fyke netting in spring 2019 captured 110 muskellunge at a rate of 1.25 muskies per net-night. The 93 unmarked muskies in that sample ranged from 28.3 to 46.7 inches and averaged 36.5

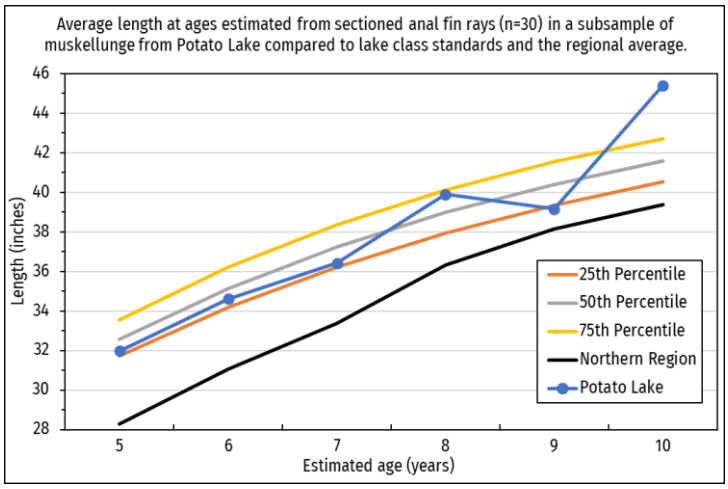
inches long. Two years later in the spring of 2021, fyke nets captured 36 muskies at a catch rate of 0.35 fish per net-night. Excluding one fish marked and recaptured in 2021, their length ranged from 25.1 to 47.5 inches and averaged 38.4 inches long.[2] Among lakes in the complex-warm-dark lake class, the netting catch rate in 2019 ranked between the 75th and 90th percentiles and nearly matched the median class value in 2021. By comparison, fyke nets captured 53 muskellunge in 12 net-nights at a much higher rate of 4.4 muskies per net-night in the spring of 2013. That very high catch rate depicted a higher-than-desired number of muskies that prompted us to reduce the stocking rate by one half in 2015.



The coronavirus pandemic interrupted our standard protocol for estimating muskellunge population density from fyke net samples typically gathered in consecutive years. Most fishery surveys were suspended statewide in the spring of 2020 as a safeguard against human disease transmission. Based on nontypical samples separated by two years, we estimated that Potato Lake had 221 adults ≥ 20 inches (95% confidence interval=138-303; coefficient of variation=0.191) or 0.41 adults per acre. This estimate of musky abundance met our goal to have a muskellunge population at a moderate to high density of 0.3 to 0.4 adults per acre in Potato Lake.

In a combined sample of muskies ≥ 20 inches from both years, 46% were preferred-size fish at least 38 inches long, 24% were legal-size fish ≥ 40 inches and 17% were memorable-size fish 42 inches or longer. Potato Lake's musky population met its size objective to have 10-20% of muskellunge attain memorable size.

Based on ages estimated from cross-sectioned anal fins rays collected in 2019, one male musky grew to 33.9 inches in five years. Females attained 35.6 inches in six years and 38.5 inches in 7 years (*Appendix 2*). In an aggregated sample of 10 males, 10 females and 10 muskies whose gender was unknown, growth outpaced the northern regional averages by 1.0 to 6.0 inches at ages 5 to 10 (weighted average = 3.1 inches).



[2] Detections of uniquely coded Passive Integrated Transponder (PIT) tags revealed that 11 muskellunge captured in spring 2019 were captured again in spring 2021. The length statistics and chart data for 2021 include those 11 muskies recaptured after two years.

Within the complex-warm-dark lake class, the average length of Potato Lake's muskies trended between the 25th and 75th percentile values at ages 5-9 in samples larger than one.

PIT tag recoveries shed light on the population's growth rate by comparing the length of individual fish between capture events. This method of growth assessment relies on length measurements at the beginning and the end of a period, rather than subjective interpretation of annular marks on bony structures. Of the 116 muskies that we and trained anglers PIT-tagged in Potato Lake since 2019, 33 were recaptured in subsequent survey visits. We recaptured 22 tagged muskies after only 1-33 days of a previous encounter, so those detections provide no useful information on musky growth. The total length of 11 recaptured muskies increased 1.2 inches on average in about two years. A 33.4-inch female registered the largest gain (3.8 inches) in 731 days. In contrast, a 39.1-inch male had no change in length after 718 days at large, perhaps due to injury or measurement error. PIT tags detected in our surveys scheduled in 2026 will provide additional information on muskies' growth and survival in Potato Lake.

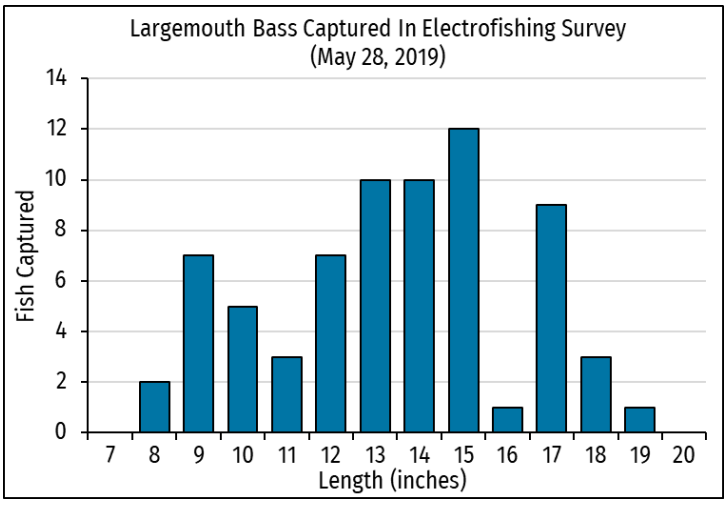
Electronic records show that the DNR and partners have stocked 28,860 muskies into Potato Lake since 1972. The stocking frequency, stocking rate and the size/age class of the stocked fish varied widely in that period. Most recently, we stocked muskellunge in odd-numbered years at a rate of 0.25 large fingerlings per acre. Their average length ranged from 11.9 to 13.9 inches in the last three batches stocked from the DNR's hatchery. In 2022 and 2023, the First Wisconsin Chapter of Muskies, Inc. purchased Chippewa strain muskies from a private fish farm and stocked them into Potato Lake to offset shortfalls in the DNR's musky production goals.

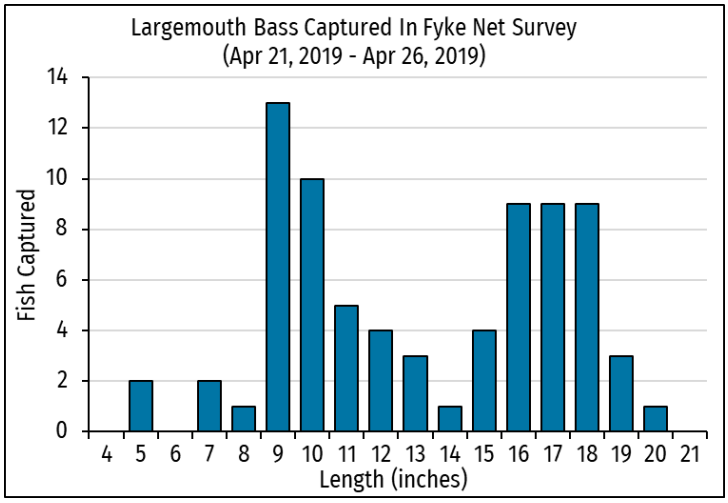
We suspect that the new recruits added to the muskellunge population stem from stocking and natural reproduction, though we do not know the relative contributions of these sources. Quantitative assessments of natural recruitment are more challenging in musky populations than in walleye populations because age-0 and age-1 muskies are difficult to sample with our traditional methods. In all surveys completed since 2001, we found no young muskies whose size did not overlap the average size of the large fingerlings stocked into Potato Lake in the same year. We cannot infer that in-lake production and recruitment occurs in this population, based on the expected size difference of natural fingerlings versus hatchery-reared fingerlings. Laboratory analysis of fin tissue taken from muskies captured in our surveys would allow us to match the genetic makeup of broodstock and their stocked offspring to verify their hatchery origin. Tissue samples from muskies whose genetic signatures do not correspond to their parents used in hatchery production are presumed to have natural origin. This comparison relies on having a complete reference library with the genetic markers for all broodstock used over 15-20 years of propagation to cover the age range of muskies at large in Potato Lake. Alternatively, we could distinguish natural versus hatchery origin, estimate adult density and evaluate the musky population's survival, growth and recruitment rates by PIT tagging all fingerlings in 4-6 stocked year classes at the hatchery before they're released into Potato Lake. Subsequent PIT tag detections in our netting and electrofishing surveys and by an established group of trained and equipped anglers would provide valuable information on known-age fish as they mature, grow and die, allowing us to adjust our management strategy as needed to maintain the desired abundance and size structure in the musky population.

Currently, in the Northern Management Zone, anglers may keep a daily bag limit of one musky at least 40 inches long in the open-water period from the Saturday closest to Memorial Day through December 31. However, we suspect that most anglers release the muskies they catch. If a rule change proposal is approved, the musky fishing season will open on the first Saturday in May each year, beginning in 2026.

LARGEMOUTH BASS

Anglers should find better-than-average fishing opportunity for largemouth bass in Potato Lake. The most recent measures of largemouth bass abundance and size distribution met or exceeded the goals we set for the population in Potato Lake. Electrofishing in late spring of 2019 captured 70 largemouth bass, ranging from 8.8 to 19.0 inches and averaging 13.9 inches long. The electrofishing catch rate of 37.5 bass ≥ 8 inches per hour was near the upper end of the objective range (20-40 bass per hour) and the median value among lakes in the complex-warm-dark category. The catch rate of 17.5 bass per mile was nearly identical to the 50th percentile value for that lake class. Comparing late-spring electrofishing catch rates in our last two surveys, the relative abundance of largemouth bass has doubled since 2013 when we captured 8.8 bass per mile and 22 per hour.





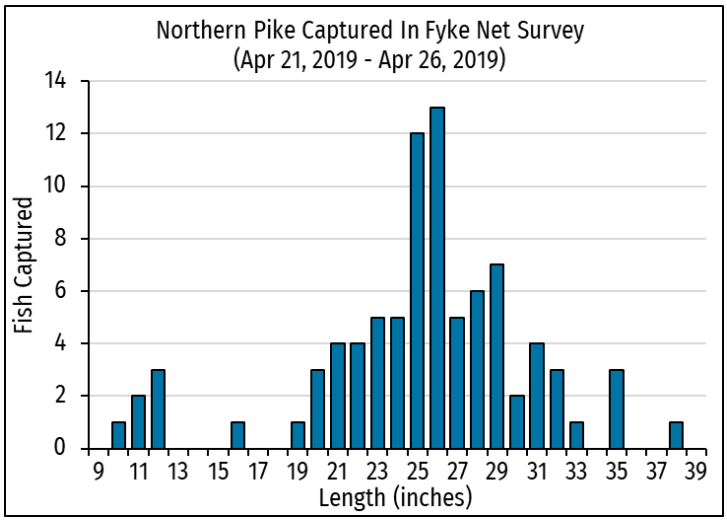
In 2019, 37% of the bass captured by electrofishing were preferred-size fish 15 inches or longer, so the population's size structure is within the objective range (30-50% ≥ 15 inches). The average length of largemouth bass in Potato Lake ranked between the 99th and 100th percentiles of the complex-warm-dark lake class. Largemouth bass are usually not vulnerable to capture in fyke nets, but our netting effort directed toward walleye in early spring captured 77 largemouth bass that ranged from 5.5 to 20.6 inches and averaged 13.6 inches. The longest largemouth bass in our samples, a 21.3-inch specimen captured in fyke nets set for muskellunge, exceeded the lake class's 100th percentile by 0.8 inches.

Anglers may keep a daily bag limit of five largemouth bass, but they must be at least 14 inches long. Half of the bass captured by netting in early spring and by electrofishing in late spring attained legal size. The proportions of legal- and preferred-size fish increased since the spring of 2013 when 43% of largemouth bass captured by electrofishing were 14 inches and 19% were at least 15 inches long.

NORTHERN PIKE

In 2019, early spring fyke nets set for spawning walleye in Potato Lake incidentally captured 94 northern pike at a rate of 2.4 pike per net-night. That catch rate ranked between the 50th and 75th percentile values for northern pike in warm, dark lakes with complex fish communities. By comparison, spring fyke netting captured 1.2 pike per net-night in 2013.

Applying Schnabel's equation[3] to the number of pike marked and recaptured in seven successive fyke netting visits from April 22 to May 1, 2019, we estimated that the pike population in Potato Lake had roughly 354 adults (95% confidence interval = 211–1,093) or about 0.7 adults per acre. Fyke nets directed at spawning muskies captured 96 northern pike in 104 net-nights of survey effort in the spring of 2021 when water temperature averaged 50° F.



Partly due to the high biological productivity and habitat diversity this system offers, anglers have opportunity to catch large pike in Potato Lake. In our fyke net sample from early spring 2019, northern pike ranged from 10.7 to 38.8 inches and averaged 25.7 inches long. Their mean length ranked between the 95th and 99th percentiles and their maximum length was between the 99th and 100th percentiles of those values in the complex-dark-warm class of lakes. The proportions of preferred- and memorable-size pike 28 and 34 inches or longer were 34% and 5%, respectively. Potato Lake's northern pike met our objectives to have a low-density population at 0.5-1.0 adults per acre with a high proportion (5-10%) of memorable-size fish.

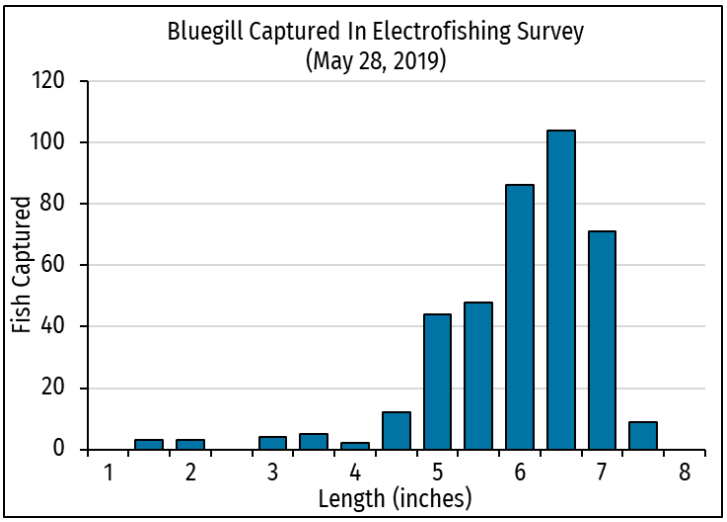
In our last survey, 12 net-nights of fyke netting effort captured 14 northern pike ranging from 20.4 to 29.8 inches and averaging 25.6 inches in the spring of 2013 when water temperature varied from 55 to 61° F. In that smaller sample, 21% attained preferred size, but none grew to memorable size. Comparing catch statistics from spring netting samples in 2013 and 2019, the relative abundance of northern pike doubled, and their size structure improved. The plentiful, intermediate-size pike between 24 and 27 inches should satisfy anglers who wish to keep a meal. Anglers may keep a daily bag limit of five northern pike of any size.

BLUEGILL

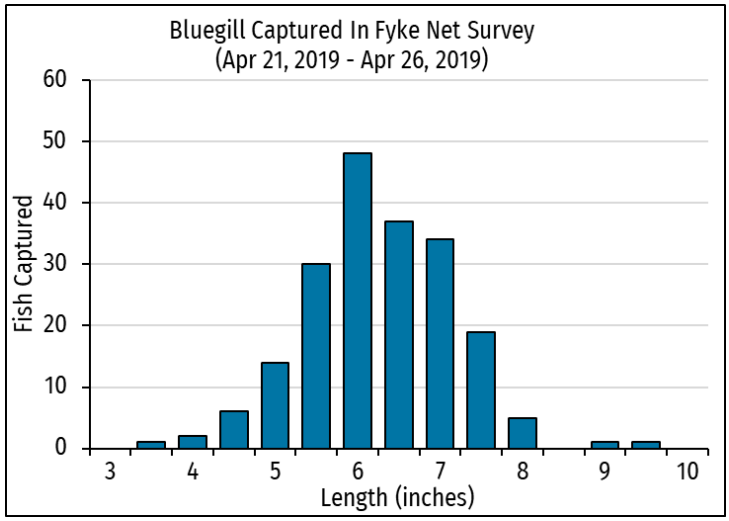
Electrofishing in the late spring of 2019 captured 391 bluegills per mile or 809 per hour. Those catch rates, ranking between the 90th and 99th percentile values among lakes in the complex-warm-dark category, point to high bluegill abundance in Potato Lake. The population did not achieve the benchmark set to describe the desired moderate abundance (a late spring electrofishing catch rate of 50-100 bluegills ≥ 3 inches per hour) and size distribution (5-10% ≥ 8 inches). The relative abundance of bluegills has increased 2.3-2.6

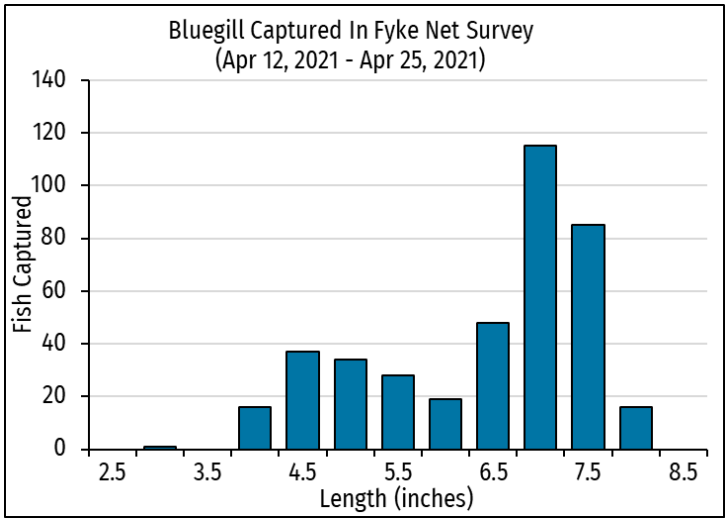
[3] Ricker, W.E., 1975, *Computation and Interpretation of Biological Statistics of Fish Populations*, Fisheries Research Board of Canada, Bulletin 191.

times since our last measures in the spring of 2013 when electrofishing captured 170 bluegills per mile or 309 per hour.



Twenty-one percent of the bluegills captured by electrofishing in spring 2019 were keeper-size fish at least 7 inches long, but none attained preferred size ≥ 8 inches. Sometimes, fyke nets can catch the larger bluegills that go undetected in electrofishing surveys. In a subsample of 198 bluegills measured from fyke nets targeting walleye in spring 2019, 30% attained keeper size and 3.5% reached preferred size. Among 399 bluegills measured from fyke nets set for muskies in the spring of 2021, 54% were at least 7 inches and 4% were 8 inches or longer. The abrupt decline in the length distribution of the contemporary electrofishing sample suggests two possible scenarios. Despite several indications of Potato Lake's high biological productivity, high population abundance, crowding and intense competition for food may suppress their growth rate so much that few bluegills live long enough to reach preferred size ≥ 8 inches long. Or, anglers may be selectively harvesting the largest bluegills faster than the population can produce keeper- and preferred-size fish as replacements, under current fishing regulations that allow anglers to keep 25 panfish of any size and species in aggregate per day. We did not extract bony structures to estimate bluegill age and model their growth trajectory. And, we do not have estimates of angling pressure and harvest from a creel survey to help decide whether panfish harvest restrictions could help to increase bluegill size. To estimate their age and analyze their growth, we recommend that earbones should be extracted from a subsample of five bluegills per half-inch length group in the next surveys scheduled in 2026. If bluegill growth is fast or satisfactory, then limiting angler harvest to no more than five bluegills in a daily bag limit of 25 panfish may increase the proportions of keeper- and preferred-size fish and





perhaps produce some memorable size bluegills ≥ 10 inches. If bluegill growth rate is slow, then predation from largemouth bass, walleye, northern pike and muskellunge is not sufficient to control bluegill numbers, and harvest restriction would not improve the population's size structure.

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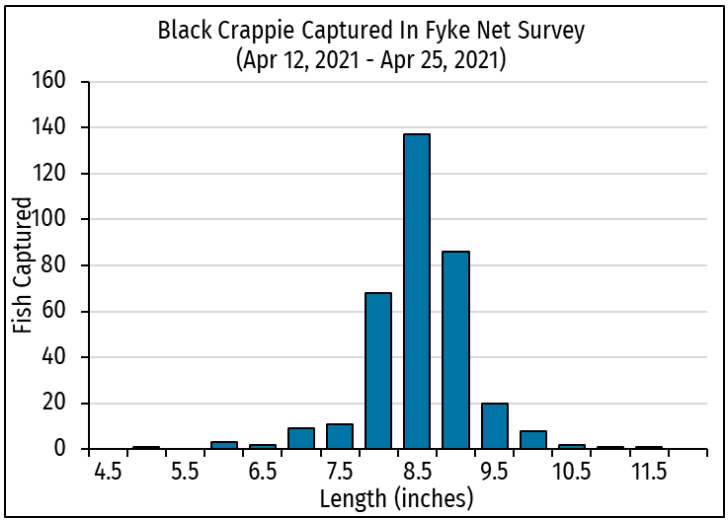
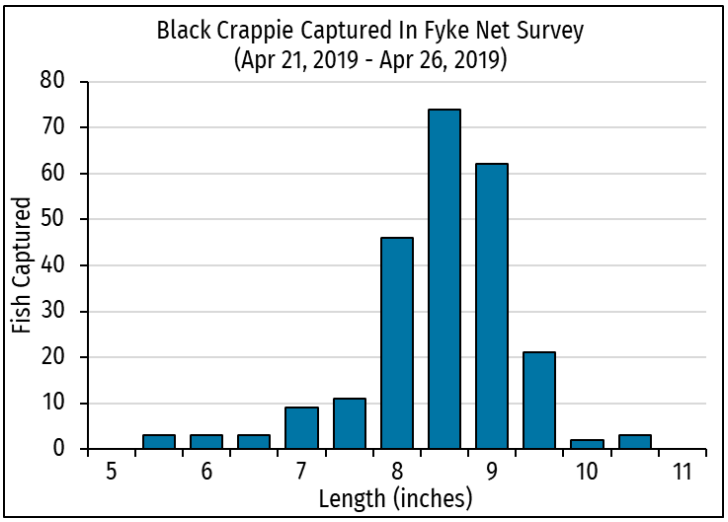


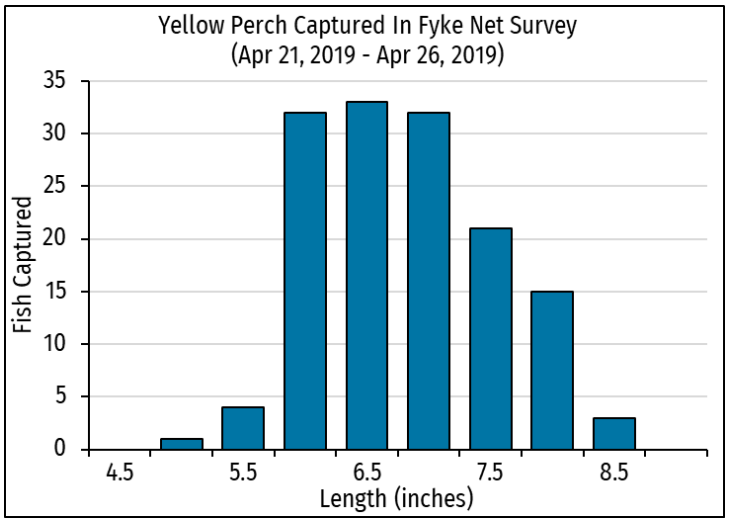


Fyke nets set for spawning muskies in mid-spring of 2021 captured 402 black crappies at a rate of 10.1 fish per net-night. The netting catch rate ranked between the 50th and 75th percentiles of the complex-warm-dark lake class. From this sample we can infer that Potato Lake's crappie population narrowly attained the desired moderate abundance (10-20 crappies ≥ 5 inches per net-night), but certainly not the desired size distribution (20-30% 10 inches or longer). The 349 crappies that we measured in our 2021 musky survey ranged from 5.0 to 11.8 inches and average 8.7 inches long. Two-thirds were keeper-size fish ≥ 9 inches, but only 3.4% attained preferred size at least 10 inches long. Fyke nets directed toward spawning walleyes shortly after the ice thawed in 2019 captured 1,187 crappies or 46 per net-night, indicating higher crappie abundance between the 90th and 95th percentiles of the lake class, but with the same disappointing size structure found in 2021. In a subsample of 237 crappies whose length we measured in 2019, their average length was 8.7 inches, 37% were ≥ 9 inches, and 2.1% were 10 inches or longer. In 2019 and 2021, the mean length of Potato Lake crappies ranked between the 95th and 99th percentiles, and their maximum length was between the 75th and 95th percentiles among lakes in the complex-warm-dark category. These upper-end class standings show that Potato Lake is capable of producing crappies that exceed the class medians for average and maximum length, but the population lacks the desired proportion of preferred-size fish. Crappie size structure was similar or further below the objective in fyke net samples from the spring of 2013 and the fall of 2014.

If anglers are selectively keeping the population's largest individuals, as panfish anglers often do, then a compulsory or voluntary harvest restriction of no more than five crappies in a daily bag limit of 25 panfish could serve to increase the share of crappies at least 10 inches long and distribute the harvest more equitably among anglers. Our Fisheries Management

Team should obtain another fyke net sample to characterize the crappie population's size and abundance in the next surveys scheduled in 2026. We also recommend extracting the ear bones from a subsample of five crappies per inch group to estimate their age and model the population's growth trajectory. This information will help us decide if we should draft a formal fishing rule proposal to restrict crappie harvest in Potato Lake for presentation at the Wisconsin Conservation Congress's meetings in spring 2027. In the meantime, the Potato Lake Association could encourage anglers to voluntarily limit their crappie harvest to five or fewer crappies per day with a reasonable expectation that their self-discipline should bring about better crappie fishing within a few years.

YELLOW PERCH



It has been difficult for us to properly characterize the status of yellow perch populations by our traditional survey methods, mainly because our samples vary so widely within the same gear type and period. For example, fyke nets captured 729 perch, ranging from 5.3 to 8.8 inches and averaging 7.0 inches long, at a rate of 30 perch/net-night in the spring of 2019 when water temperature averaged 47°F. Under similar springtime conditions in 2021, fyke nets captured only 42 perch from 5.8 to 9.7 inches long at a rate of 1.1 perch per net-night. Quality-size fish ≥ 8 inches long comprised 13% and 24% of the perch captured in fyke nets in 2019 and 2021, respectively. Our recent fyke net samples had only one keeper-size perch ≥ 9 inches long in 2021 and none in 2019. Though the size distributions were similar in fyke net samples from both years, the nearly thirtyfold decrease in catch rates probably does not reflect a corresponding decrease in population abundance over two years. Until researchers can develop standardized methods to assess the status of yellow perch population in inland waters, the information that we glean from netting and electrofishing surveys will have limited usefulness to anglers and resource managers. Perch are the preferred food of walleye, northern pike and largemouth bass, mainly because their tube-like body shape makes them easier to swallow than platter-shaped bluegills, crappies, and pumpkinseeds. Adult pike, bass, muskies and walleye select the largest perch from the population to obtain an efficient food ration. Young perch are often the first meals when these species transition from planktivorous to piscivorous diets. Lucky anglers may find some larger perch that evaded our sampling gear and Potato Lake's predators.

Management Recommendations

FUTURE EVALUATIONS

- At a 6-year frequency, the next fishery surveys in Potato Lake are scheduled in 2026.

WALLEYE

- The DNR should continue stocking walleye at a rate of five large fingerlings per acre every two years to maintain adult population abundance at its objective level.
- Estimate adult walleye density in the spring of 2032.

MUSKELLUNGE

- Solicit financial and volunteer support from the 1st Wisconsin Chapter of Muskies, Inc. to PIT tag all large musky fingerlings stocked into Potato Lake from 2025 to 2037.
- Continue cooperation with volunteer anglers who are trained by DNR staff and equipped to detect and place PIT tags in Potato Lake's muskies to supplement data important for management decisions.
- Estimate adult musky density from consecutive spring fyke net samples in the mid-spring periods of 2031-2032 or 2032-2033.
- In 2032, collect somatic tissue for genetic analysis to identify the relative contributions from stocking and natural reproduction to musky recruitment, so that stocking can be optimized or eliminated.

PANFISH

- Target bluegills by electrofishing and black crappies by fyke netting in spring 2026 to characterize their population abundance and size distribution.
- Extract otoliths from a subsample of bluegills and crappies to estimate their age and model their growth, then donate the carcasses to the local wildlife rehabilitation center.
- If our analysis of the 2026 survey results and local feedback show that fishing restrictions would be an effective and socially acceptable strategy to increase panfish size in Potato Lake, we will develop a formal rule-change proposal for presentation at the spring meetings of the Wisconsin Conservation Congress.
    - If crappies grow fast, then the proposal would limit angling harvest to no more than five crappies in a daily bag limit of 25 panfish.
    - If bluegills grow fast, then the proposal would limit angling harvest to no more than five bluegills in a daily bag limit of 25 panfish.
    - If crappies and bluegills grow fast, then the proposal would limit angling harvest to five or fewer crappies and five or fewer bluegills in a daily bag limit of 10 panfish.
- The Potato Lake Association should encourage anglers to voluntarily limit their crappie harvest to five or fewer crappies per day, until mandatory panfish harvest restrictions are in place.

FISHERY MANAGEMENT PLAN UPDATE

- Develop and distribute an online survey to determine if the goals, objectives and preferences in the draft fishery management plan for Potato Lake are still valid.

SHORELAND MANAGEMENT

- The Potato Lake Association should promote sound shoreland management practices and encourage shoreland owners to consider alternatives to placing riprap for erosion control, especially on low energy sites.
- The Potato Lake Association should investigate the variety of surface water grants that are available to help shoreland owners protect and restore important ecological functions in their riparian zone.

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Appendix 1. Average length at ages estimated from scales (n=10 ≤ 12 inches) or sectioned dorsal spines (n=211) in a subsample of walleyes from Potato Lake.

AGE	POTATO LAKE												COMPLEX-WARM-DARK		
	FEMALE			MALE			UNKNOWN			ALL SEXES COMBINED					
	LENGTH (inches)		COUNT	LENGTH (inches)		COUNT	LENGTH (inches)		COUNT	LENGTH (inches)		COUNT	PERCENTILES		
	AVERAGE	RANGE		AVERAGE	RANGE		AVERAGE	RANGE		AVERAGE	RANGE		25th	50th	75th
2							9.1	8.1 - 10.0	10	9.1	8.1 - 10.0	10	11.3	11.5	11.7
3				11.3	10.6 - 11.9	5				11.3	10.6 - 11.9	5	13.6	13.9	14.1
4				13.3	10.9 - 15.8	26				13.3	10.9 - 15.8	26	15.6	15.9	16.2
5				15.3	12.6 - 18.4	8	19.7	-	1	15.7	12.6 - 19.7	9	17.2	17.6	18.0
6	19.4	17.4 - 20.6	7	15.5	12.2 - 18.8	42				16.1	12.2 - 20.6	49	18.7	19.0	19.4
7	19.5	-	1							19.5	-	1	19.9	20.3	20.7
8	20.3	18.7 - 23.5	14	18.5	12.0 - 25.3	16	21.9	20.5 - 23.2	2	19.5	12.0 - 25.3	32	20.9	21.3	21.7
10	25.1	21.5 - 28.2	18	21.6	20.2 - 24.2	14				23.6	20.2 - 28.2	32	22.5	23.0	23.4
11	25.8	23.7 - 28.1	31	22.6	21.8 - 25.6	8				25.2	21.8 - 28.1	39	23.2	23.6	24.0
12				21.5	-	1				21.5	-	1	23.7	24.1	24.5
13	27.0	25.8 - 28.5	8	22.5	21.0 - 23.8	9				24.6	21.0 - 28.5	17	24.2	24.6	25.0

Appendix 2. Average length at ages estimated from sectioned anal fin rays in a subsample of 30 muskellunge from Potato Lake.

AGE	POTATO LAKE												COMPLEX-WARM-DARK		
	FEMALE			MALE			UNKNOWN			ALL SEXES COMBINED					
	LENGTH (inches)		COUNT	LENGTH (inches)		COUNT	LENGTH (inches)		COUNT	LENGTH (inches)		COUNT	PERCENTILES		
	AVERAGE	RANGE		AVERAGE	RANGE		AVERAGE	RANGE		AVERAGE	RANGE		25th	50th	75th
5				33.9	-	1	31.3	29.2 - 32.6	3	32.0	29.2 - 33.9	4	31.7	32.6	33.5
6	35.6	32.2 - 40.2	4	31.1	31.0 - 31.1	2	35.5	33.2 - 38.6	4	34.6	31.0 - 40.2	10	34.2	35.1	36.2
7	38.5	34.1 - 42.0	5	30.3	28.3 - 32.2	2	38.2	-	1	36.4	28.3 - 42.0	8	36.2	37.2	38.4
8				38.0	-	1	41.8	-	1	39.9	38.0 - 41.8	2	37.9	39.0	40.1
9				38.4	37.6 - 38.9	4	42.4	-	1	39.2	37.6 - 42.4	5	39.4	40.4	41.6
10	45.4	-	1							45.4	-	1	40.5	41.6	42.7