



Survey of Common Carp Populations Using Boat Electrofishing in East and West Lake Winona

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Abstract

The objective of this project was to determine if populations of Common Carp (*Cyprinus carpio*) in East Lake Winona varied from West Lake Winona carp populations in abundance and age-size structure. Field work included boat-electrofishing along shorelines of East and West Lake Winona, extracting 3-4 scales, weighing, and measuring length of each Common Carp caught. Lab work included determining ages of Common Carp based on scales by using a dissecting microscope, fine-tip permanent marker, and calipers to measure the distance of each growth ring from the center of the scale. A total of 58 Common Carp were sampled during the study, 27 fish from East Lake Winona and 31 individuals from West Lake Winona. West Lake had a Common Carp density of 116.0 fish/hectare and East Lake had a density of 66.3 fish/hectare. Age-size structure showed a difference in the Common Carp populations between East and West Lake Winona.

Introduction

Lake Winona has a total area of 319 acres and is separated into two distinct basins. The East basin is deep with abundant habitat and biodiversity, covering 230 acres, whereas the West basin is 89 acres, shallow, and extremely vegetated. The objective of this study was to analyze Common Carp densities in both East and West basins of Lake Winona during early fall 2018 to determine whether management of carp may be necessary. It was hypothesized that the West basin of Lake Winona showed a significantly higher abundance and age-size structure compared to the East basin.

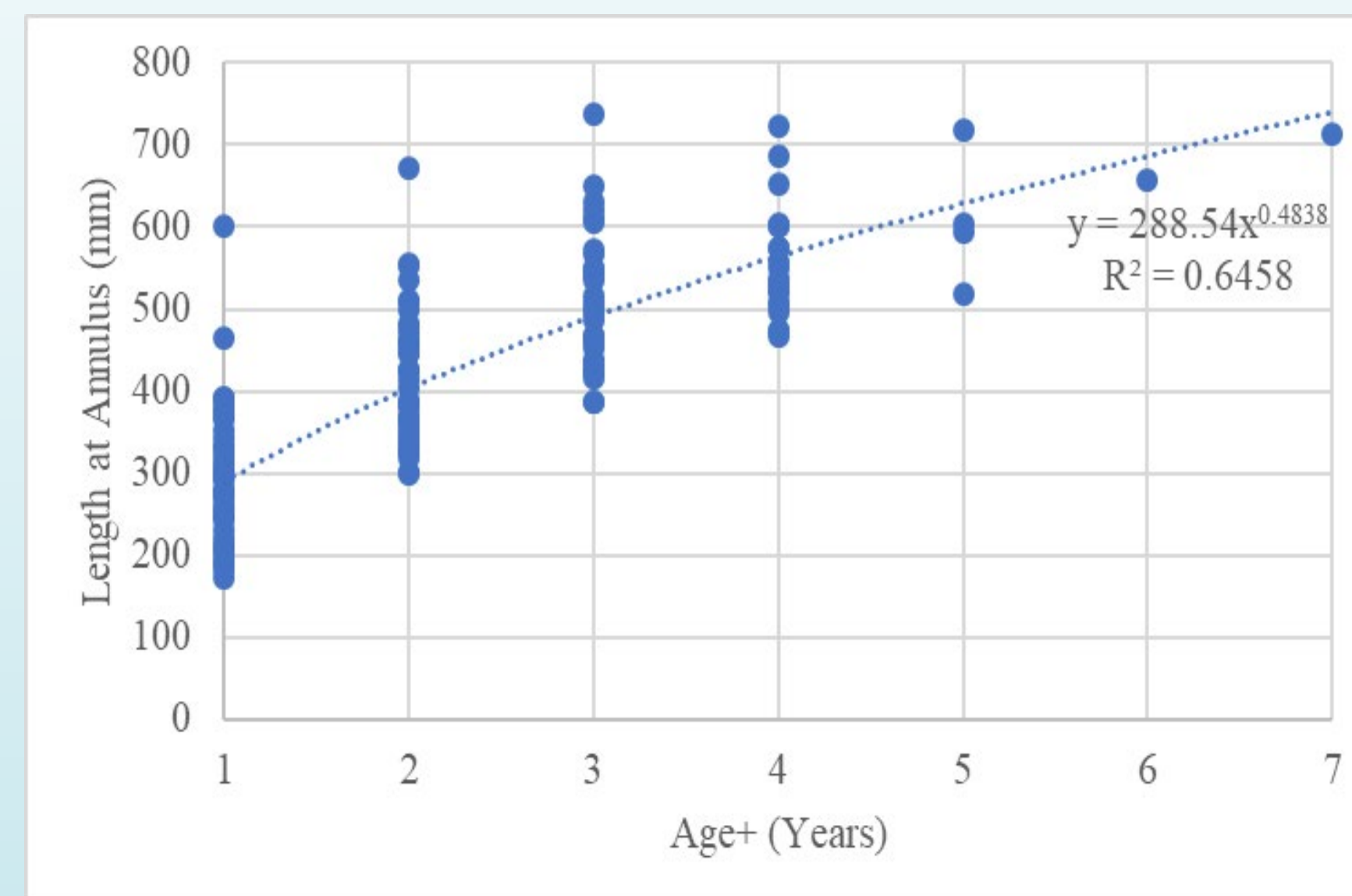


Figure 1. Length of Common Carp at each year of growth in East and West Lake Winona in Winona, MN. Back-calculated lengths are based on measurements of fish length and scale annulus from sampled Common Carp.

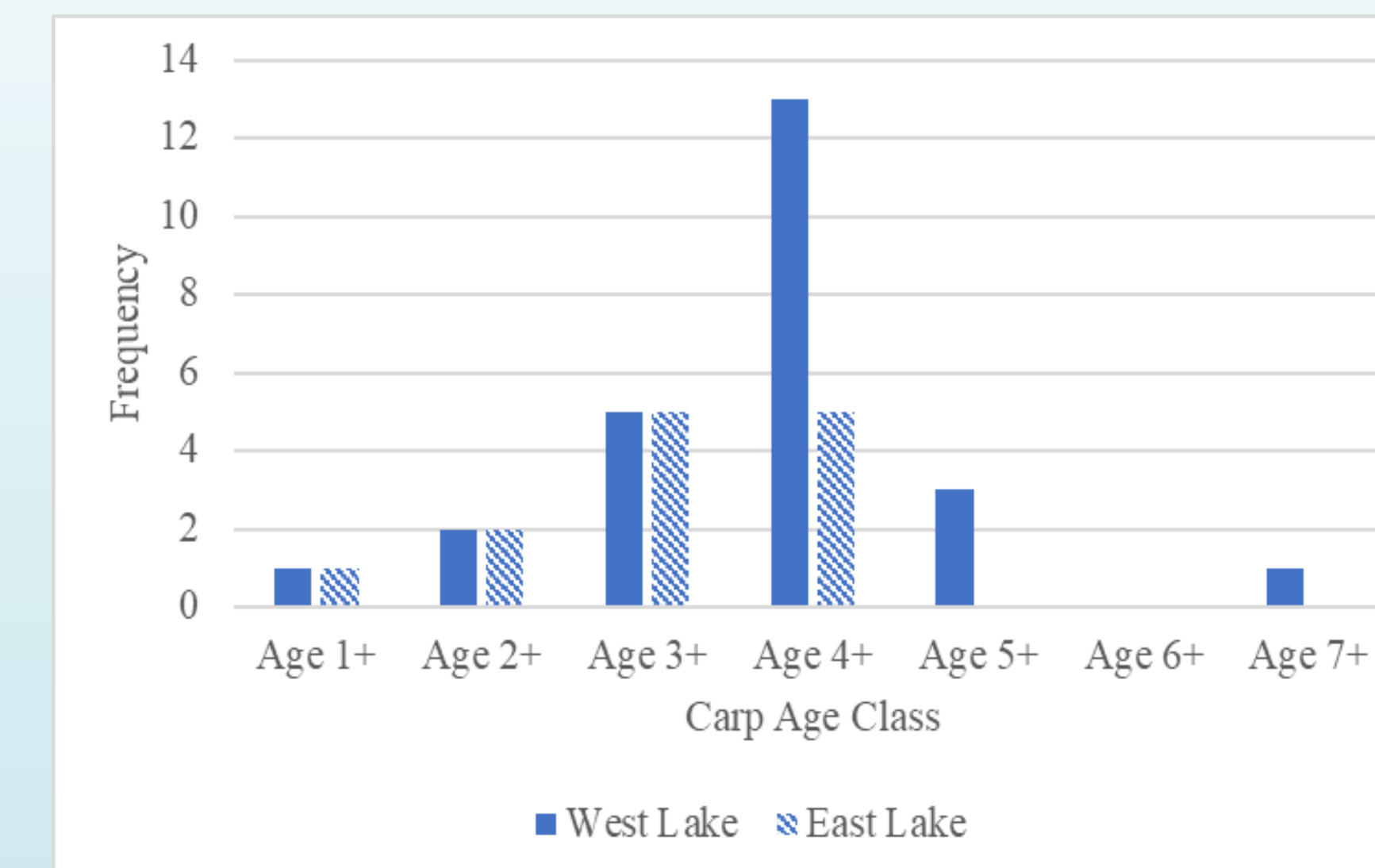


Figure 2. Age class of Common Carp (years) and frequency of that age class sampled from East and West Lake Winona during September and October 2018 in Winona, MN.



Figure 3. Mean catch per unit effort (CPUE, fish/hour) and density (fish/hectare) of Common Carp from East and West Lake Winona during September and October 2018 in Winona, MN. Standard error bars are shown for each and were determined using multiple transect data.

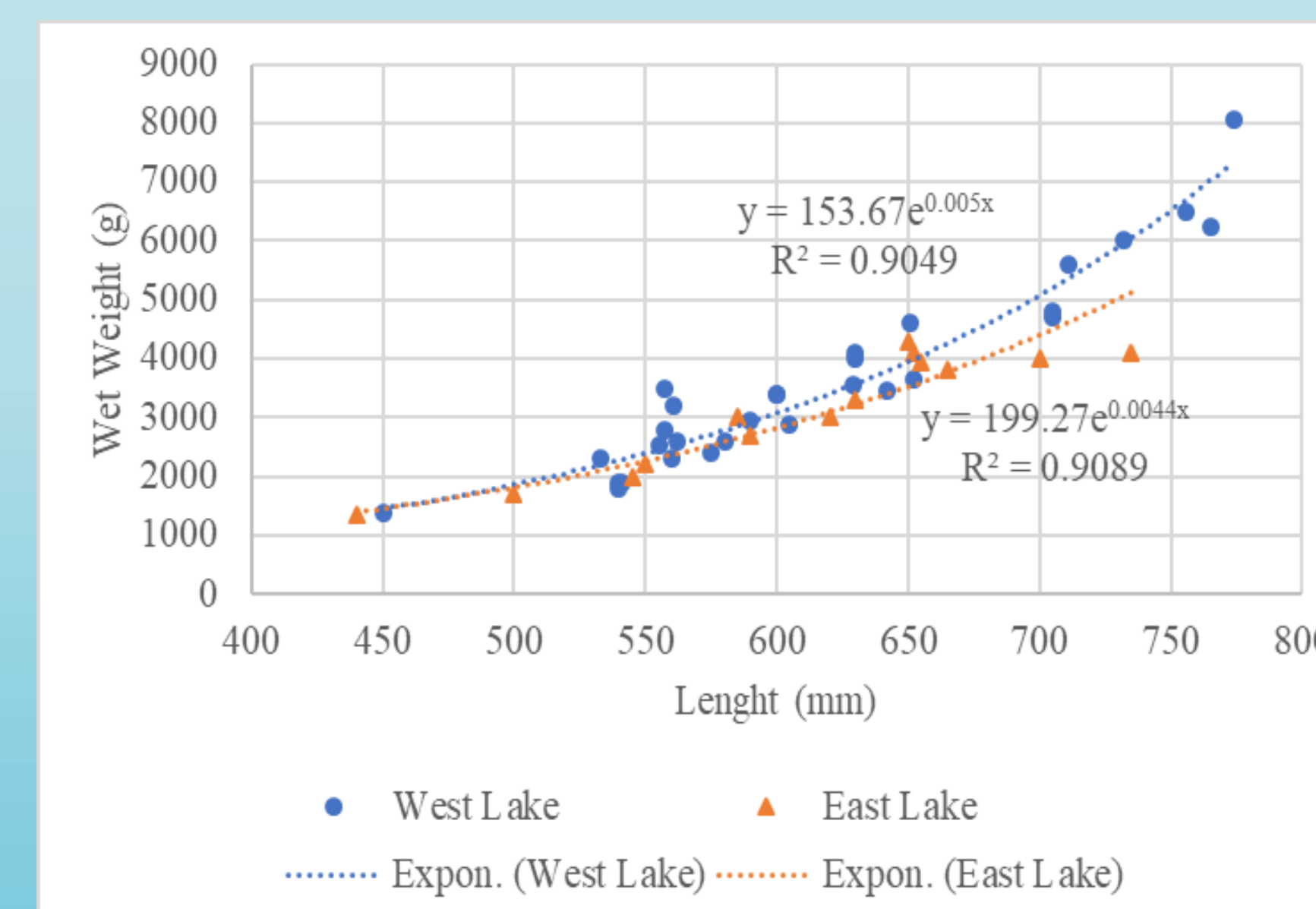


Figure 4. Length (mm) versus weight (g) of Common Carp sampled from East and West Lake Winona during September and October 2018 in Winona, MN. Exponential trendlines are shown for populations in East and West Lake Winona, including R² values and line equations.

| Basin Sampled | Transects Surveyed | Total Effort (min) | Number Adults | CPUE (Carp/hr) | Density (Carp/hectare) |
|---------------|--------------------|--------------------|---------------|----------------|------------------------|
| East Lake | 5 | 120.72 | 27 | 13.43 | 66.27 |
| West Lake | 4 | 77.58 | 31 | 23.98 | 116.01 |
| Total/Average | 9 | 198.3 | 58 | 18.705 | 91.14 |

Table 1. Summary of electrofishing results from East and West Lake Winona during September and October 2018 in Winona, MN. Totals are shown for both basins for transect numbers, total effort, and number of adults. Averages are shown between both basins for catch per unit effort (CPUE) and density (carp per hectare).

Acknowledgements

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Methods

Field work

- Boat electrofishing along shorelines of East and West basins, 1-2 timed transects Stunned carp were netted and placed into water-filled buckets while awaiting data collection.
- Carp were counted, measured for total length (mm) and weight (g), and three scales were extracted.

Lab work

- Scales collected were examined for growth back-calculations.

Analyzing data

- Catch per unit effort (CPUE, fish/hour) converted to density (carp/hectare) using a conversion factor developed by University of Minnesota researchers.

Results

- Growth of Carp slows as they age (Figure 1).
- Class 4+ was most prevalent between basins (Figure 2).
- CPUE and density of Carp were greatest in West Lake (Figure 3).
- Length-weight relationships are similar between basins (Figure 4).
- Colder water as sampling dates progressed (Figure 5)
- Summary of Carp electrofishing efforts (Table 1)

Conclusion

- Although expected that common carp density in West Lake would be higher than East Lake, no difference in density was observed during this survey.
- Age-weight regression shows that carp in West Lake put on weight faster than carp in East Lake.
- Carp populations harm ecosystems, but current need for management in Lake Winona is not dire.

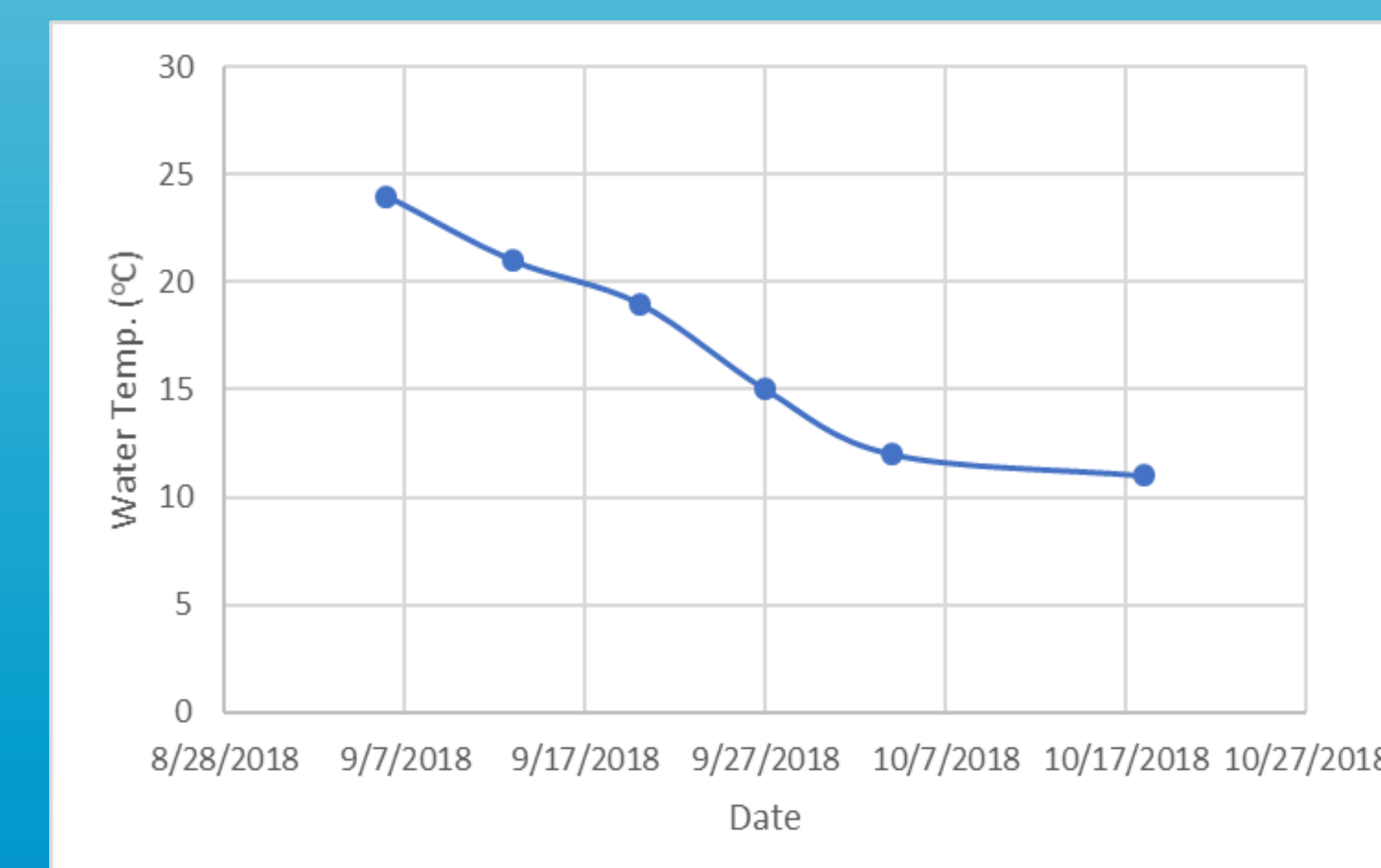


Figure 5. Water temperature of Lake Winona in °C on each sampling date during September and October 2018 in Winona, MN.

