

# **Analysis of Fish Harvested During the 2018 Chisago Lakes Lions Club Carp Festival**



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## **Project Background**

Common carp *Cyprinus carpio* are a wide-spread invasive species that negatively affect aquatic vegetation, water clarity, and native fish abundance (Bajer and Sorenson 2010; 2012). Common carp have been introduced into many aquatic ecosystems throughout the Midwest and recent research at the University of Minnesota has focused on reducing and controlling populations through various management techniques (Bajer et al. 2011; Bajer et al. 2009). Reducing carp abundance through commercial harvest is one of the most promising management strategies (Weber et al. 2011); however, the effects of tournament harvest on common carp population dynamics remain largely unknown.

Trophy and tournament fishing for carp, while extremely popular in Europe, has only recently become popular in the United States (Phillips 2005). Tournament harvest of common game species like walleye and bass has shown that tournaments can significantly impact the population size and structure of these species (Willis and Hartman 1986; Hayes et al. 1995). Similar population effects might also occur as a result of recreational harvest of common carp.

Collection of data from fishing tournaments can provide useful information for fisheries management, but tournament data is not commonly collected by fisheries managers. The low cost to collect large amounts of data from tournaments is often in contrast to the unknown biases of data collected by anglers. Although fish collected in tournaments show a bias toward larger fish, catch rates typically reflect size structures of fish captured with other sampling gears (Willis and Hartman 1986). We also observed similar patterns in size structure of common carp harvest during the 2016 Chisago Lakes Lion Club Carp Tournament (Lallaman 2016). Tournament data can also be useful for analyzing regional or long-term trends if multiple events are recorded. Tournament data alone cannot provide sufficient information for fisheries management; but it can provide useful information and important socio-political benefits (Willis and Hartman 1986).

## **Data Collection**

Employees of Emmons and Olivier Resources, Inc. collected data on all fish brought to the tournament weigh-in at Frankie's Live Bait & Marine the morning of June 2nd, 2018. All common carp were measured for total length in cm, weighed to the nearest one-hundredth of a kg, and scales were collected from a random sample of common carp for age analysis. In the laboratory, carp scales were aged under a dissecting microscope by two independent readers. If the ages disagreed, the average age was calculated.

## **Analysis of Carp Data**

A total of 219 common carp were measured during the 2018 tournament. Catches of common carp between lakes appear to be highly variable between years (Figure 1). North & South Center, Rush and Sunrise Lakes all saw high amounts of harvest in 2017 and while these lakes saw high harvest in 2018, Green and Goose Lakes also saw much higher harvest in 2018 compared to previous years. Small harvest from other lakes like Horseshoe, Comfort, and Chisago Lakes remain a minor proportion of the overall carp harvest.

Comparison of catch data across the past three years is difficult to compare due to inconsistent effort and harvest across all three years, however some patterns in the data are observable. Trends in carp size distributions were compared between Center Lakes and Rush Lake (Figure 2). Center Lakes show a slight increase in overall total lengths harvested, consistent with an increase in carp sizes between years and no recruitment of a new year-class. Rush Lake shows an opposite trend of decreased lengths consistent with an overharvest of larger fish (80-100 cm) and a recruitment of younger fish into the harvest (55-70) in 2018. These trends suggest that changes in carp populations in the Chisago Lake area, reflected in the harvest, are lake specific. No other lakes had sufficient catches between 2017-2018 for additional

comparisons, and these observations are tentative as differences in harvest effort could also result in the changes between years.

Consistent with an aging population, overall average lengths of common carp significantly increased over time: 2016 = 63.9 cm, 2017 = 67.9 cm, and 2018 = 71.9 ( $F_{2,458} = 433.09$ ,  $P = 0.012$ ) (Figure 3). Average carp length is also significantly different among lakes, with Chisago, North and South Center, and Comfort Lakes having the smallest average carp and Rush Lake having the largest size carp ( $F_{6,458} = 474.53$ ,  $P = 0.000$ ) (Figure 3).

Ages were estimated from 94 common carp from Chisago, Goose, Green and Sunrise Lakes, and with the exception of Green Lake, did not have ages estimated from past tournaments. Similar to previous years, ages between 5 and 8 are the most commonly harvested, likely due to younger fish not actively harvested and fewer older fish in the population (Figure 4). Sunrise and Goose Lakes appear to have slightly higher growth rates, although few old fish were aged, and these growth rates could be overestimated. A larger examination of lake specific habitat and harvest rates in relation to carp growth may help to understand specific growth rate differences in the Chisago Lakes area (Pietsch and Hirsch 2015; Faust and Hansen 2016).

## **Conclusions**

Results of the 2018 Chisago Lakes Carp Festival expands the current understanding of fish populations and harvest in Chisago area lakes. Tournament harvest rates of common carp were intermediate in 2018 compared to low harvest in 2016 and high harvest in 2017. This suggests that inter-annual harvest rates are strongly dependent upon multiple factors (i.e. weather) and continued data collection from the annual tournament would be useful for understanding harvest variability.

No data on other species harvested was collected in 2018, preventing any analysis of native species harvested. This data would be useful to collect in future years, as an index to track the response of native fishes to tournament harvest and environmental changes over time.

Specific effects of tournament harvest on the carp populations within each lake requires additional study. The differences in size structure changes observed in Rush and Center Lakes present evidence that carp populations may be influenced by different lake conditions. Greater information about population specific exploitation rates (i.e. a tagging study or long-term tournament analysis) could help determine how tournament harvest specifically is having an impact on populations.

### **Acknowledgments**

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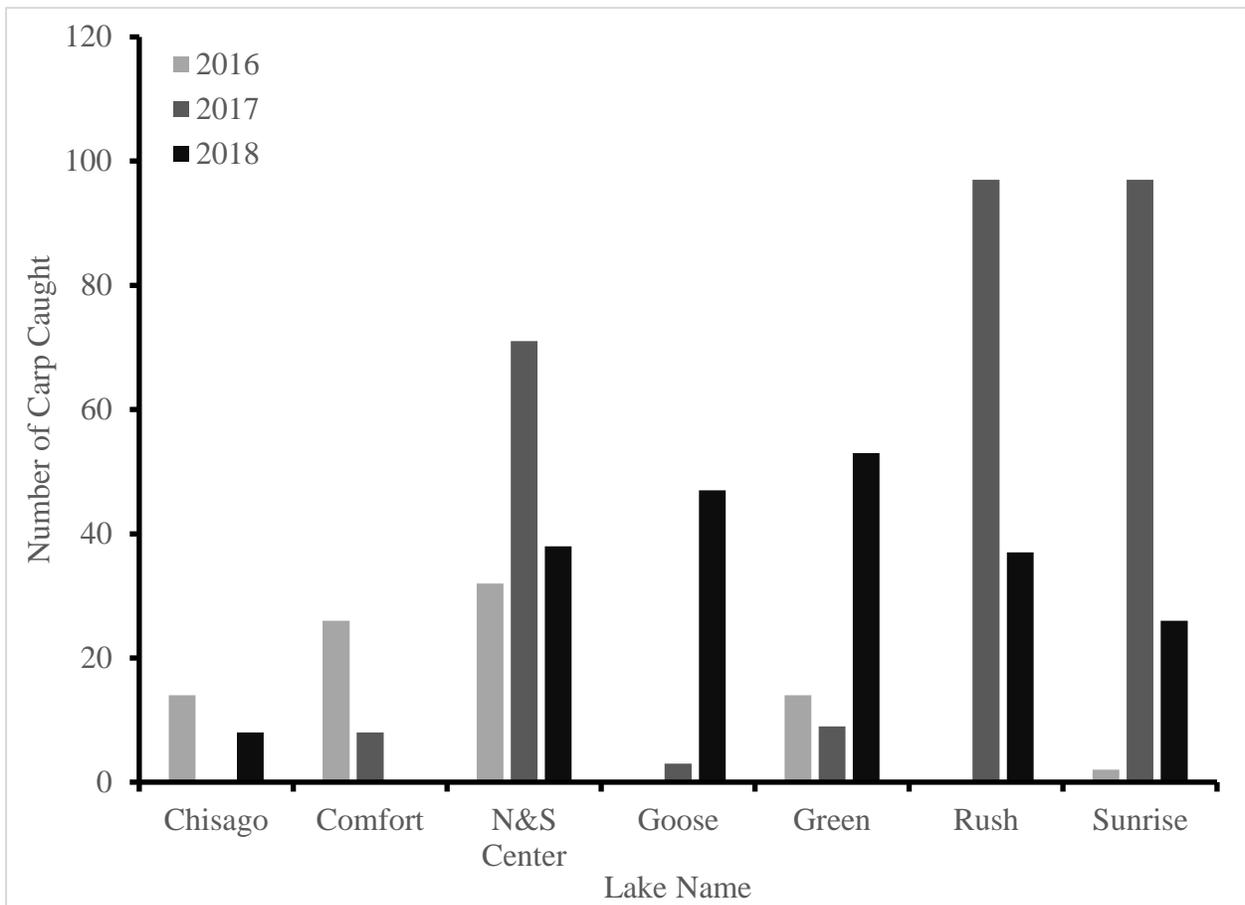


Figure 1. Number of carp harvested from lake each over the past three years. Goose and Green Lake show increased harvest in 2018 compared to past years, whereas other lakes show a decrease in carp harvest.

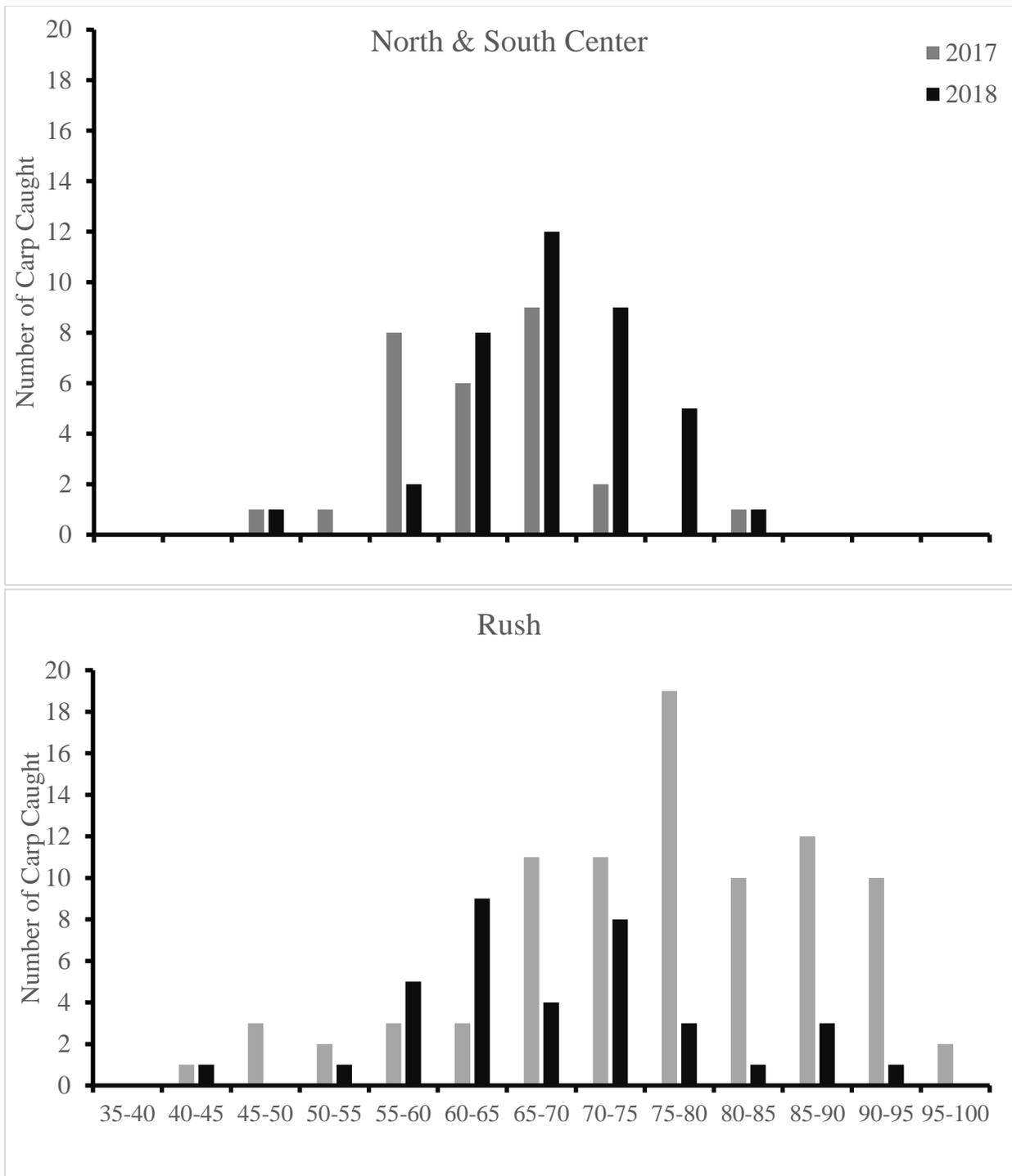


Figure 2. Comparison of length frequency of common carp harvested between 2017 and 2018 in Center Lakes and Rush Lakes.

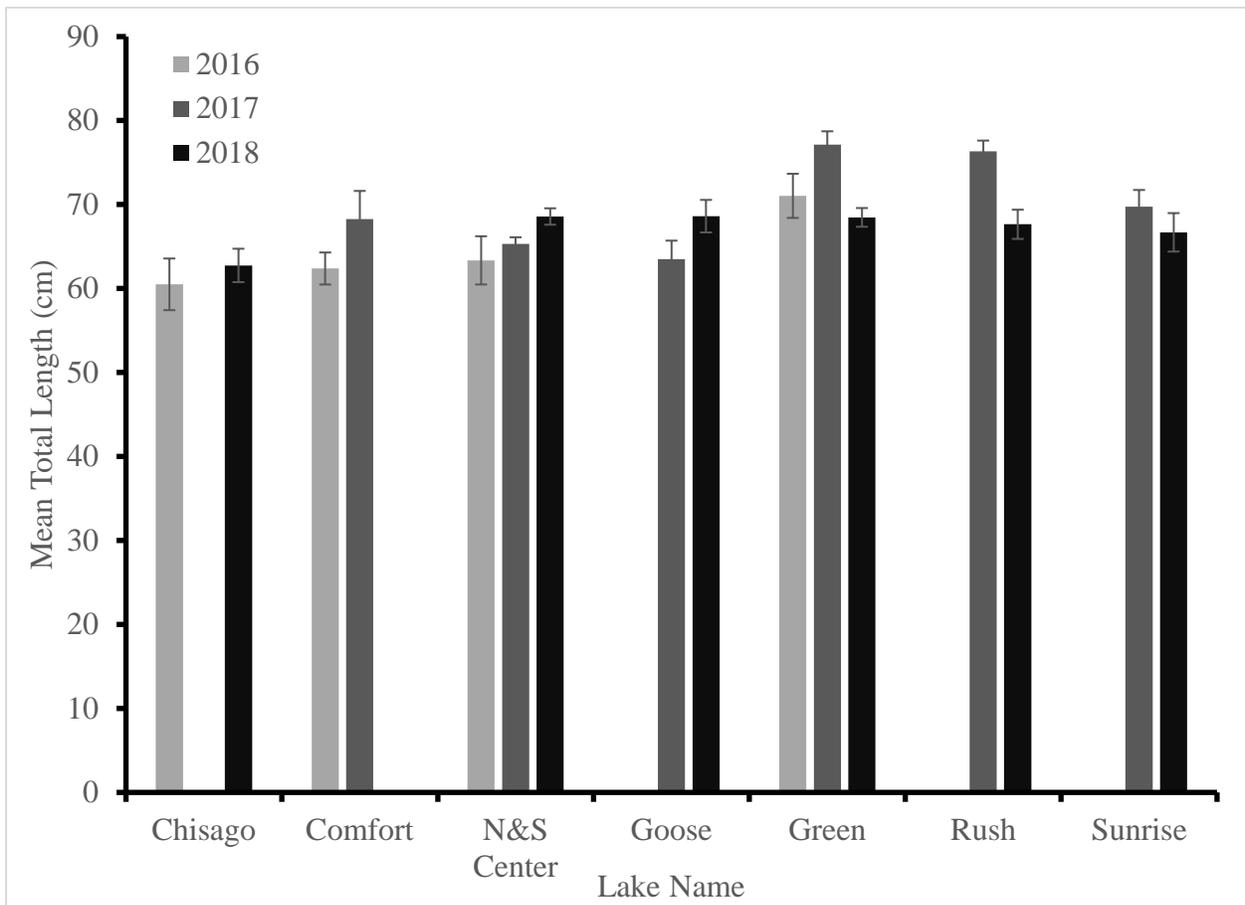


Figure 3. Mean total length of carp harvested from each lake over the past three years (+/- 1 standard error). Average carp size generally increases with year and is also significantly different among lakes.

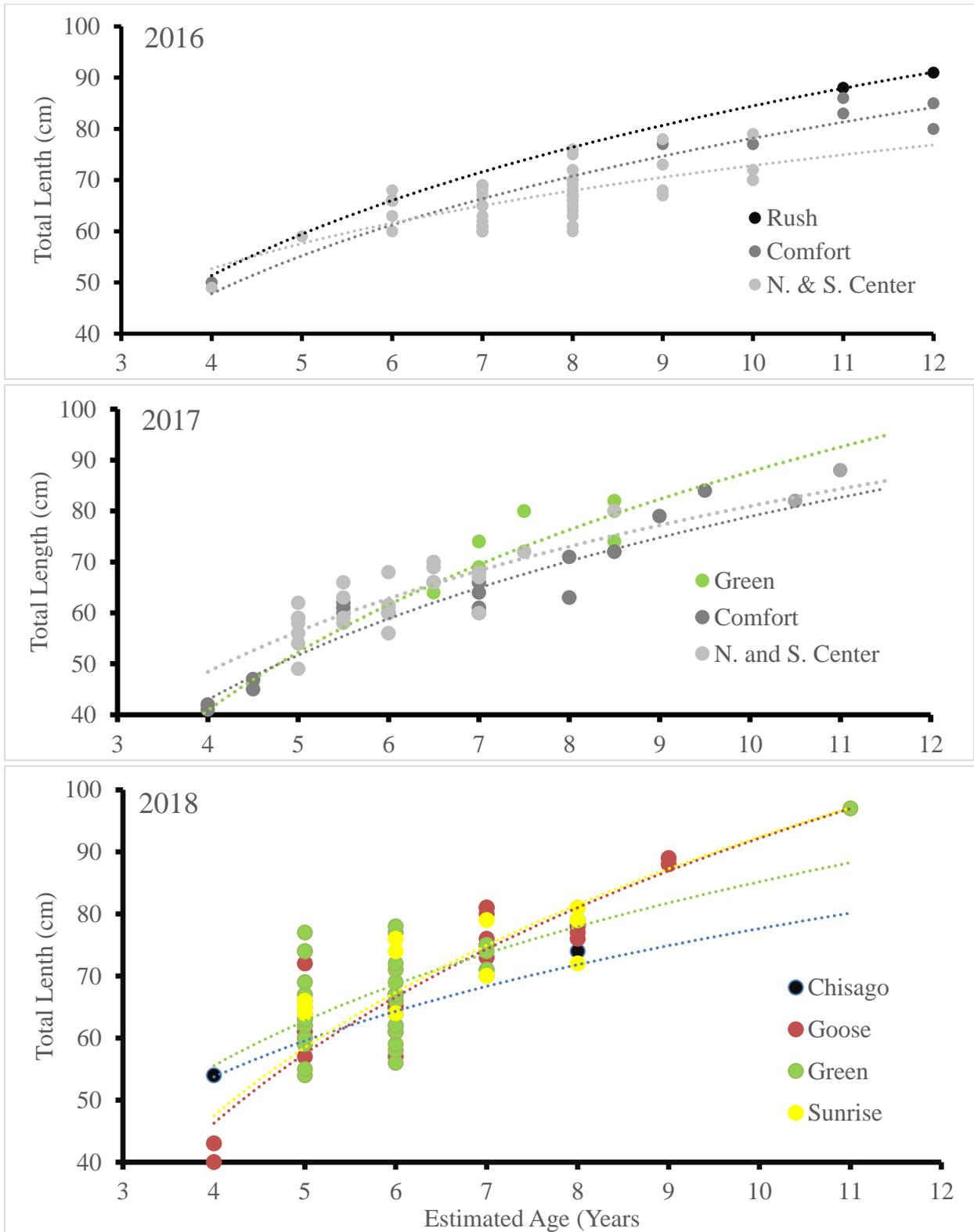


Figure 4. Estimated ages of carp harvested in 2018 plotted against their total length (cm).