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Introduction

- Grass Carp are herbivorous fish stocked for nuisance plant control
- They can live more than 30 years
- Song Lake and Crooked Lake both stocked with Grass Carp
- 2,500 stocked in Song Lake 1995-2005, with interest in removing Grass Carp
- 800 stocked in Crooked Lake 2013-2017 with goal of maintaining 400 fish
- Population models constructed to guide future stocking decisions or identify numbers for removal efforts

Methods

- Exponential growth model used in to project abundance
- $$N_t = N_{t-1}e^{(-M)} + R_t$$
- Where N is abundance in time t, M is natural mortality R is recruitment (additions through stocking)
 - Mortality rates and 90% CI based on literature
 - Stocking density assumed to be 5 fish/ha
 - Max age of 31 based on literature values

Results

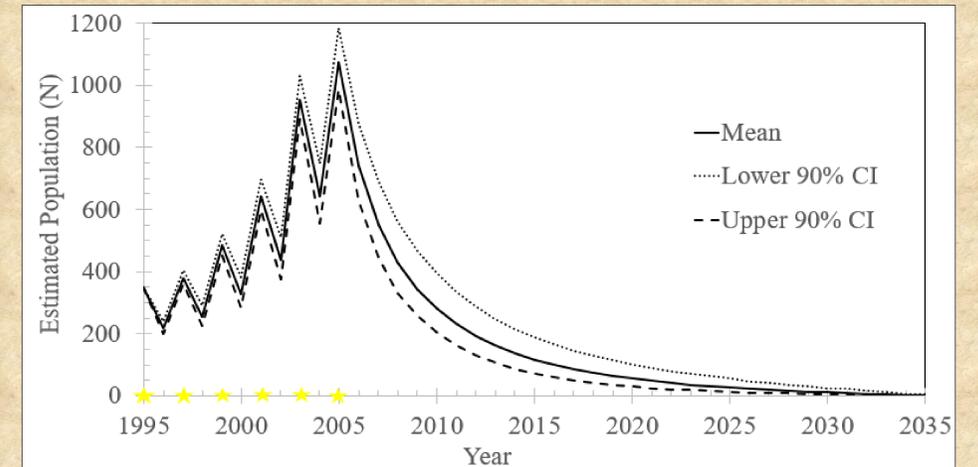


Figure 4. Estimated population of Grass Carp in Song Lake (Cortland County). The yellow stars denote years of stocking (Figure 2).

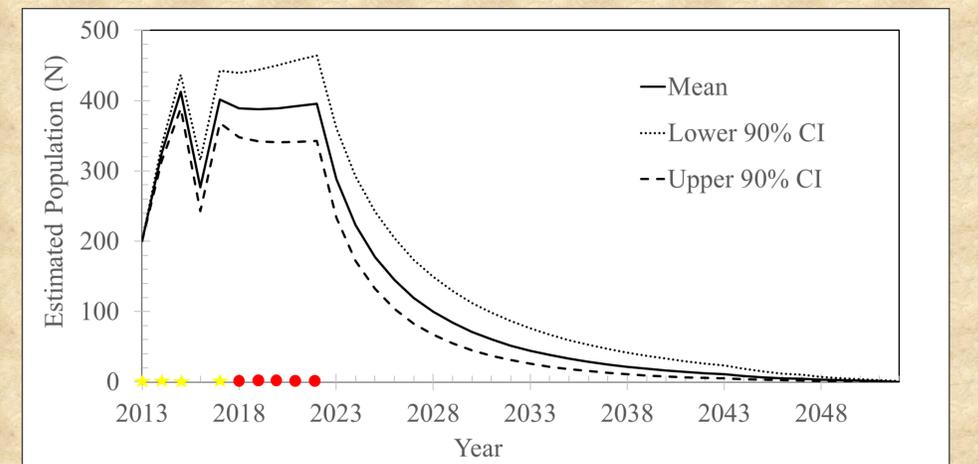


Figure 5. Estimated population of Grass Carp in Crooked Lake (Onondaga County). The yellow stars represent years of stocking, and red stars represent future stocking events (Figure 3).

Discussion

Song Lake

- 40-130 Grass Carp that can persist into the mid-2030's
- May affect NYS threatened plant species, Lake Cress (*Rorippa aquatica*)

Crooked Lake

- 350-450 Grass Carp, may persist through 2050
- Stocking should continue at 110 individuals for the next 5 years

Acknowledgments

A special thank you to the Cortland-Onondaga Federation of Kettle Lake Associations for information regarding stocking and for assistance

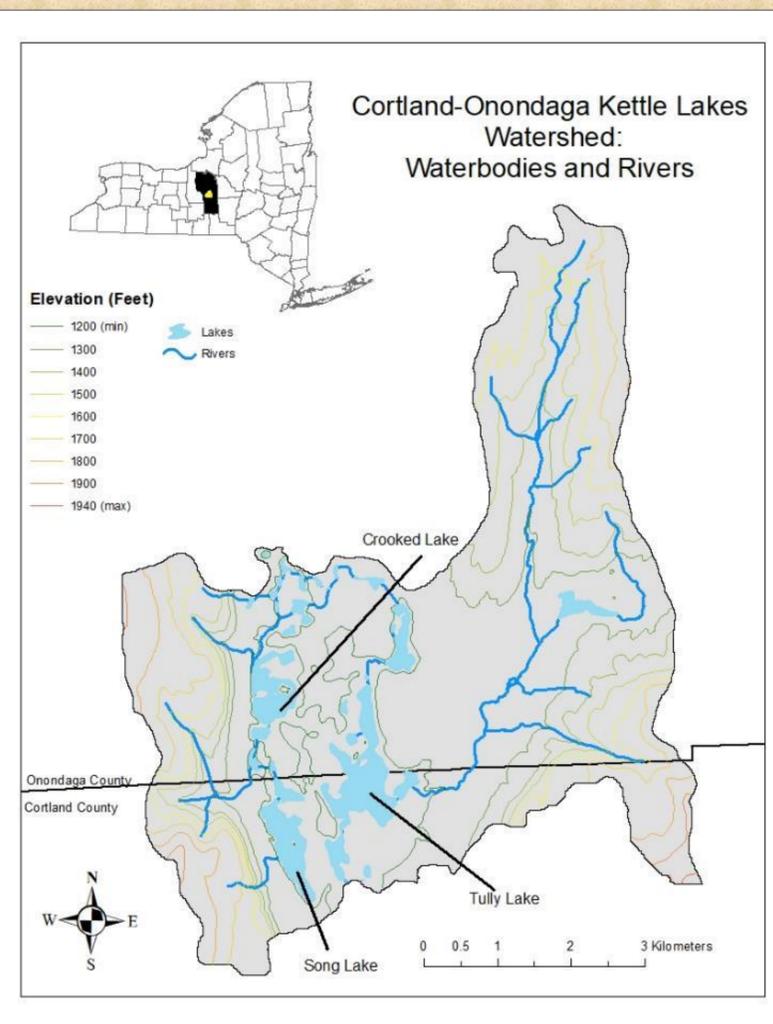


Figure 1. Map of the Tully kettle lakes watershed.

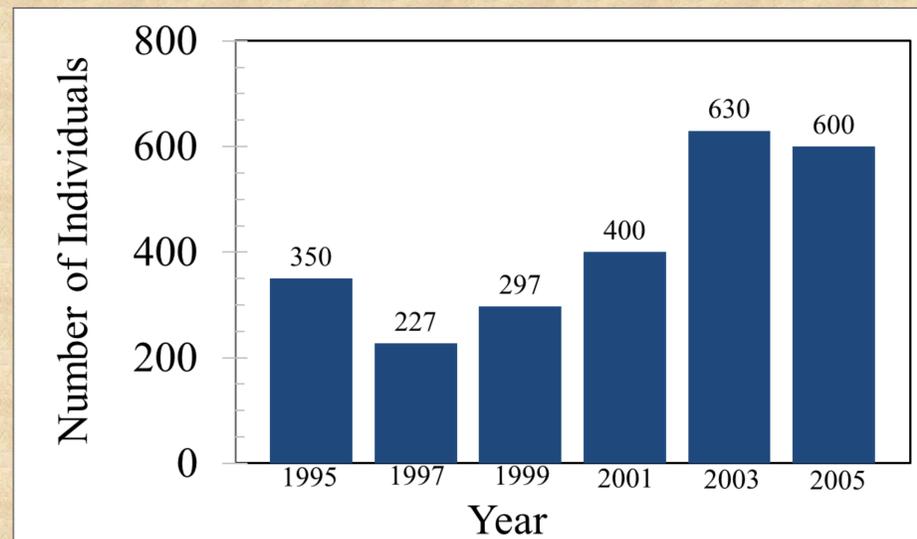


Figure 2. Grass Carp stocking history in Song Lake.

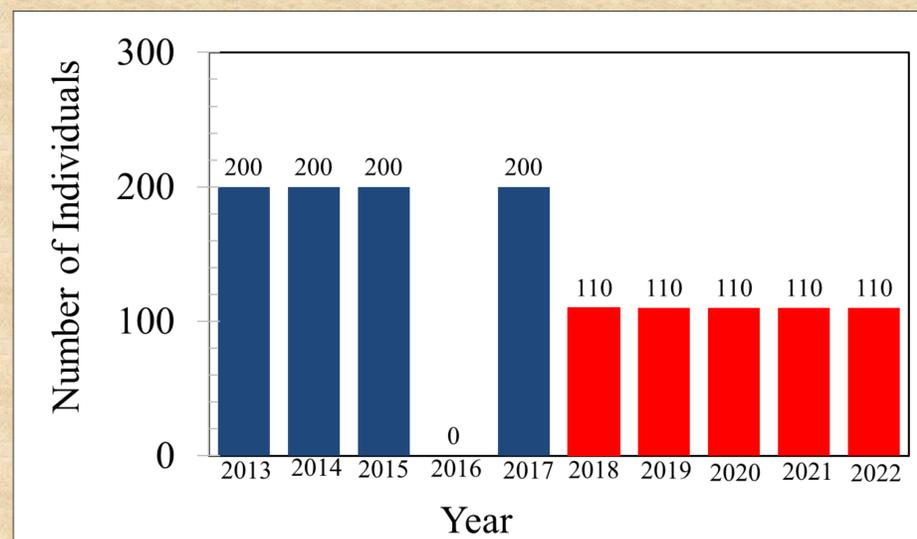


Figure 3. Stocking values for Crooked Lake. Blue values are the values of Grass Carp actually stocked, whereas the red values are for future stocking.