



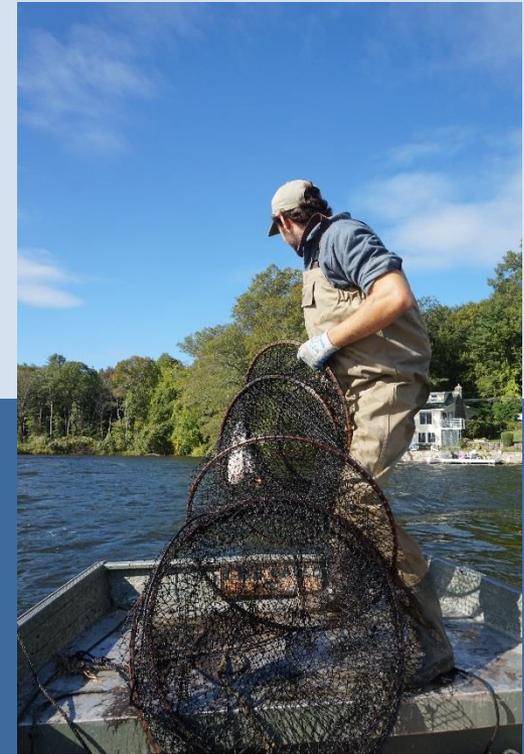
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Summary of the Fall 2017 Connecticut DEEP Fisheries Division's Lake and Pond Night Electrofishing Fish Survey and Channel Catfish Aging Work Performed at Lower Bolton Lake, Bolton/Vernon, Connecticut



By: Christopher P. McDowell
Title: Fisheries Biologist 1



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Your Fishing License Fees Matter!

Anglers- ALL

of your dollars invested in a fishing license go to support fish and wildlife!



State law (CGS 26-15a) requires **100% of the fees collected from the sale of sporting licenses** to be allocated from the General Fund to the Department of Energy and Environmental Protection, Bureau of Natural Resources.

Your investment makes a difference. Thank You.

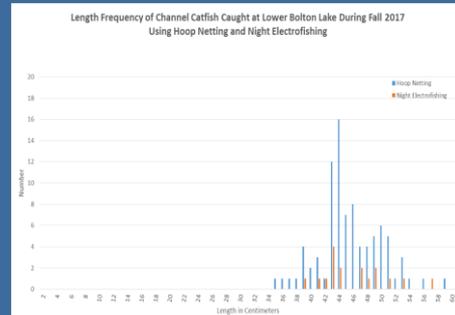


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Monitoring Warmwater Fish Populations In Lakes

A Little Background - Why Do We Do It?

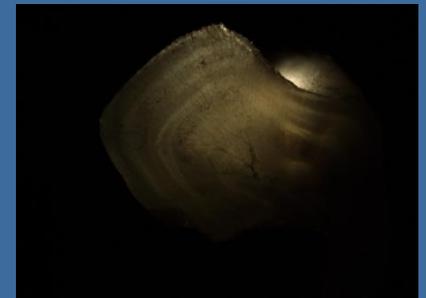
- Lakes are dynamic systems and information on parameters such as **fish density**, **population size structure**, **growth**, **mortality**, and **water quality indices** must be current to make educated management decisions.
- Information derived from the Warmwater Monitoring Program is critical to making informed management decisions.
 - Data is collected using: Night time electrofishing and angler surveys.
 - Analyses using these data have:
 - aided species-specific management programs (e.g. bass, Northern Pike, Walleye, Channel Catfish and trout).
 - identified Statewide trends in fish species abundance and distribution.
 - assessed the effects of anthropomorphic perturbations (e.g. winter lake drawdowns).



Monitoring Warmwater Fish Populations In Lakes

Electrofishing...How Do We Do It?

- The Fisheries Division (FD) samples fish populations in lakes using a boat electrofisher at night, following standardized sampling protocols.
 - The electrofishing boat is deployed at night in the nearshore areas of the lake between 3-6 feet.
 - The boat is driven at slow speed (typically < 2 mph) and DC current is pulsed into the water.
 - Stunned fish are netted, counted and measured, then released back into the lake (electrofishing is non-lethal).
- We also collect scale samples or other boney structures (such as pectoral spines or otoliths) on certain fish species for later age and growth work.



Monitoring Warmwater Fish Populations In Lakes

What Do We Do With The Data We Collect

We calculate:

- **Relative abundances** of each species expressed as catch-per-hour (CPH) of electrofishing time. For most fish species, FD calculates CPH for two size-classes:
 - **“Stock size” or larger** = defined as the smallest size commonly caught by anglers in public lakes
 - **“Quality size” or larger** = defined as the smallest size which most anglers consider desirable to catch.
- **Proportional size density (PSD)** is an index of size structure that describes the percentage of stock-size fish that are also quality-size or greater.
 - This can be thought of as an index of the percentage of “big” fish within a population.

Species	Metric (cm)		English (inches)	
	Stock Size	Quality Size	Stock Size	Quality Size
Top-Level				
Largemouth Bass	20	30	8	12
Smallmouth Bass	20	30	8	12
Chain Pickerel	25	38	10	15
Mid-Level				
Black Crappie	13	20	5	8
Yellow Perch	13	20	5	8
Brown Bullhead	15	22	6	9
Yellow Bullhead	15	22	6	9
Channel Catfish	20	30	8	12
Bluegill	8	15	3	6
Pumpkinseed	8	15	3	6
Green Sunfish	8	15	3	6



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Monitoring Warmwater Fish Populations In Lakes

“Top-Level” Fish Species

- These are predatory fish that reach large sizes and prey primarily on other fish.

Largemouth Bass



R Jacobs

Smallmouth Bass



R Jacobs

Chain Pickerel



R Jacobs



Monitoring Warmwater Fish Populations In Lakes

“Mid-Level” Fish Species

- These are fish species which reach intermediate sizes and may consume fish prey.

Brown Bullhead



R Jacobs

Yellow Bullhead



R Jacobs

Channel Catfish



R Jacobs

Yellow Perch



R Jacobs

Black Crappie



R Jacobs



Monitoring Warmwater Fish Populations In Lakes

“Mid-Level” Fish Species

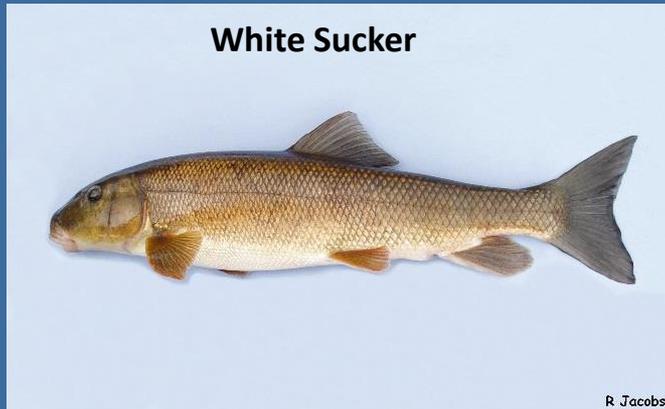
- These are fish species which reach intermediate sizes and may consume fish prey.



Monitoring Warmwater Fish Populations In Lakes

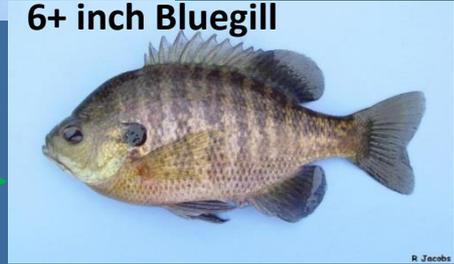
“Low-Level” Fish Species

- These are fish species which are variable in size and prey primarily on invertebrates.



2017 Nighttime Electrofishing Results for Lower Bolton

- FD sampled Lower Bolton Lake on the night of October 31, 2017 using our boat electrofishing unit.
- Species composition in Lower Bolton Lake was consistent with past samples and is typical of most Connecticut lakes, in that Lower Bolton Lake contains a diversity of warm water fish species
- Of note from the October 31, 2017 sample, when compared against the applicable statewide average for public lakes :
 - All stock-size fish species sampled are considered “Below” average, except for **Yellow Perch**, which were considered “Above” average.
 - All quality-size fish species sampled are considered “Below” average, except for **Yellow Bullhead**, which were considered “Average”.
 - The proportion of quality size individuals (PSD) were all considered “Below” average, except for **Pumpkinseed**, which were considered "Average" and **Bluegill** which were considered “Above Average”.



**2017 CT DEEP FD Night Time Boat Electrofishing Catch Per Hour (CPH) Sampling Results Compared to 2013-15 CPH
Average at Lower Bolton Lake and Compared to Statewide Average CPH**

Fish Species Category	2017 CPH at Lower Bolton Compared to average CPH at Lower Bolton from 2013-15		2017 CPH at Lower Bolton Compared to Statewide Average CPH	
	Stock Size	Quality Size	Stock Size	Quality Size
Top-Level				
Largemouth Bass				
Smallmouth Bass				
Chain Pickerel				
Mid-Level				
Brown Bullhead				
Yellow Bullhead				
Channel Catfish				*NV
Black Crappie				
Bluegill				
Green Sunfish				NV
Pumpkinseed				
Yellow Perch				
Low-Level				
Golden Shiner		^NC		NC
Banded Killifish		NC		NV
White Sucker		NC		NC

Green Bars = Increasing trend/Above average

Blue Bars = No change/Average

Red Bars = Decreasing trend/Below average

***NV** = No value calculated. Not enough public lakes contain this species in sufficient enough abundances to create a statewide average.

^**NC** = FD does not typically employ stock- & quality-size cutoffs for these species..

2017 Nighttime Electrofishing Results for Lower Bolton

- The diversity and abundance (CPH) of “Top-Level” predatory fish species sampled at Lower Bolton Lake is low.
 - The only “Top-Level” fish species sampled during the October 31, 2017 sample was the Largemouth Bass.
 - Smallmouth Bass, which had been sampled at low levels up until 2011 were again not captured during the October 31, 2017 sample.

Largemouth Bass

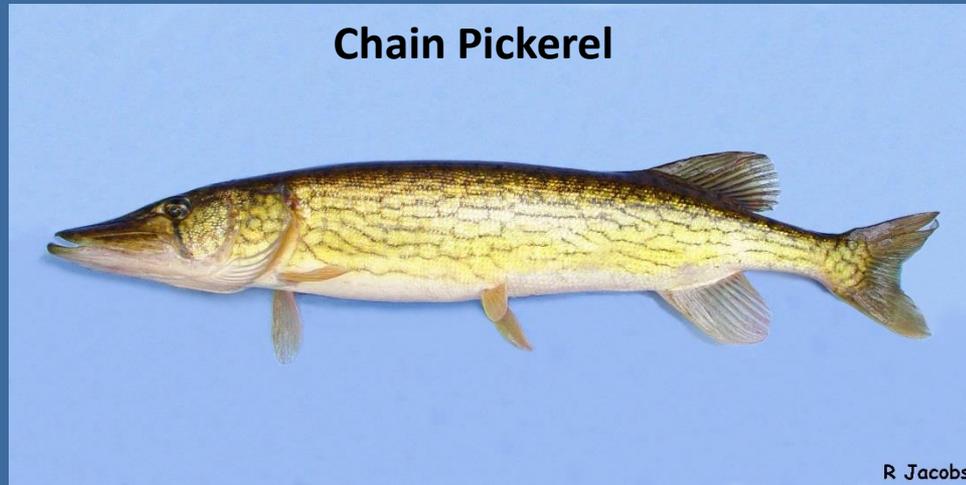


Smallmouth Bass



2017 Nighttime Electrofishing Results for Lower Bolton

- “Top-Level” predatory fish species sampling results continued:
 - Chain Pickerel, which had been consistently sampled at low levels within the lake since 1996 were not found during the October 31, 2017 sample.



2017 Nighttime Electrofishing Results for Lower Bolton

- Bluegills and Yellow Perch dominated the “Mid-Level” fish species category for this lake during the October 31, 2017 sample.

Bluegill



Yellow Perch



- Golden Shiners, an important “Low-Level” species that is considered a forage fish, which had been consistently sampled in the lake since 1996, though at fluctuating levels, were for the first time not collected during the October 31, 2017 sample.

Golden Shiner



Results of Aging Work Performed On Channel Catfish Captured From Lower Bolton Lake, Bolton/Vernon, Connecticut During Fall 2017



By: Christopher P. McDowell
Title: Fisheries Biologist 1

Seasonal Resource Assistant Chris Finch with a large Channel Catfish collected at Lower Bolton Lake, Bolton/Vernon in 2013. Photo by Seasonal Resource Assistant Eric Lindquist.



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Channel Catfish In Connecticut

- First introduced to CT in the early to mid-1900's.
- Naturalized populations found in large rivers, but not in lakes/ponds.
- CT DEEP Fisheries (FD) initiated an annual stocking program in 2007 to diversify angling opportunities.
- FD annually purchases and stocks commercially raised Channel Catfish throughout CT (Figure 1).

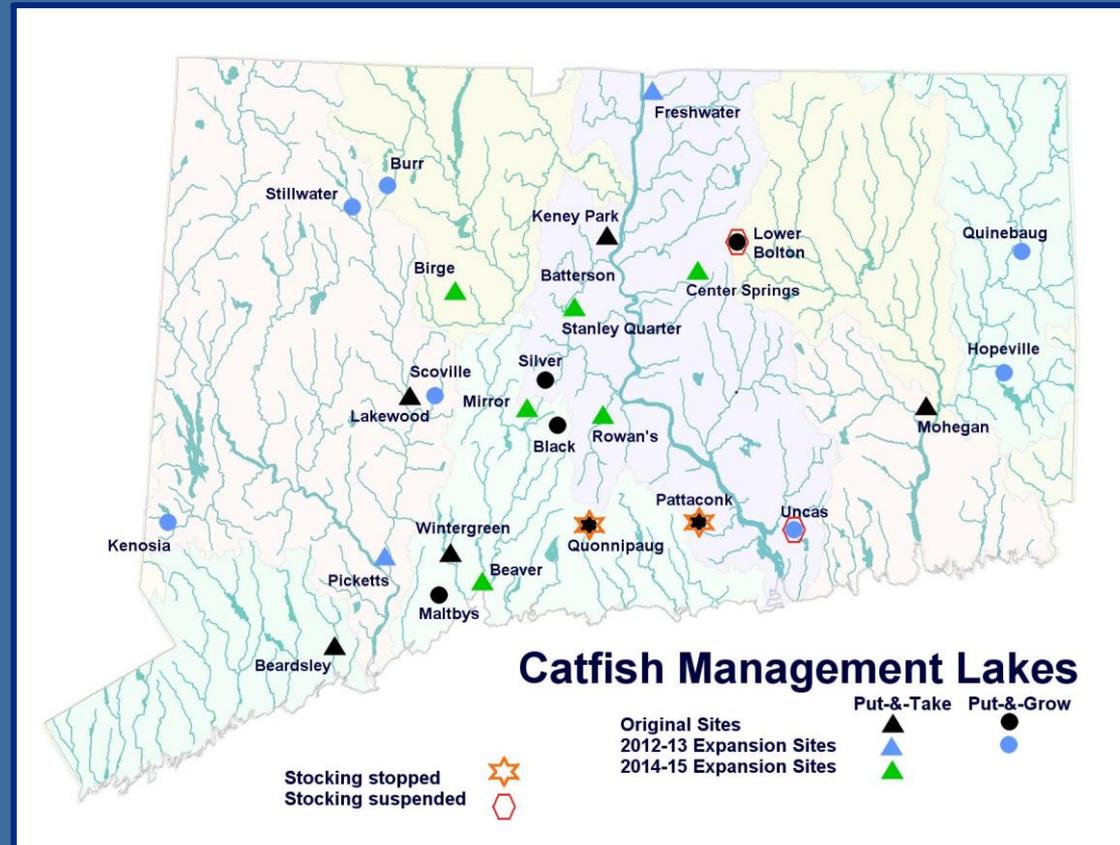


Figure 1. Locations of Channel Catfish Management Lakes in Connecticut.



Lower Bolton Lake Channel Catfish Stocking History

- Began in 2007; suspended after 2012.
- Yearling size (9-11 inch) Channel Catfish stocked in all years.

Year	Channel Catfish Stocked	Number Stocked Per Acre
2007*	2,836	16
2008	2,800	16
2009	2,800	16
2010	2,800	16
2011	2,800	16
2012**	2,667	15

**In 2007, 207 adult (14-18 inch) Channel Catfish were also stocked along with the yearlings, which equates to 1.2 adults per acre.*

*** After 2012 stocking was suspended because of concerns from residents living on Lower Bolton Lake that water quality was being adversely affected by the Channel Catfish.*



2017 Channel Catfish Hoop Netting



WHY: In response to a concern expressed by some of the residents living on Lower Bolton Lake regarding the possibility that Channel Catfish are reproducing naturally within the lake (i.e., reports were that small Channel Catfish were still evident in the lake).

Purpose: To capture and age small (less than 16 inch) Channel Catfish.

Rationale: To answer the question of “are there Channel Catfish in the lake that could be young enough to have been naturally spawned in the lake?”



2017 Channel Catfish Hoop Netting



WHEN: September 2017

HOW:

- 11 total individual nets.
 - 4 gang sets of 2 tandem nets.
 - 1 gang of 3 tandem nets.
- Nets fished for 7 days.
- 88 Channel Catfish were captured.



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2017 Channel Catfish Hoop Netting

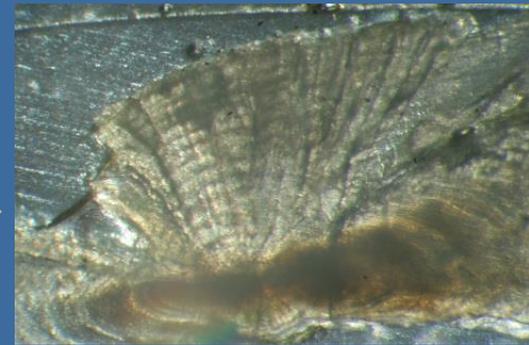
WHAT HAPPENED:

- Catch Rate of 1.14 fish/net-day.
- Length range of **14.1-23.2 inches**.
- Eight fish were **less than 16 inches** (range: 14.1-15.9 inches) and were retained for aging as they could be within the size range of fish naturally spawned in the lake.
- Seven of the fish were aged. One fish could not be aged due to broken spines. This fish was not the smallest fish.



Aging Fish

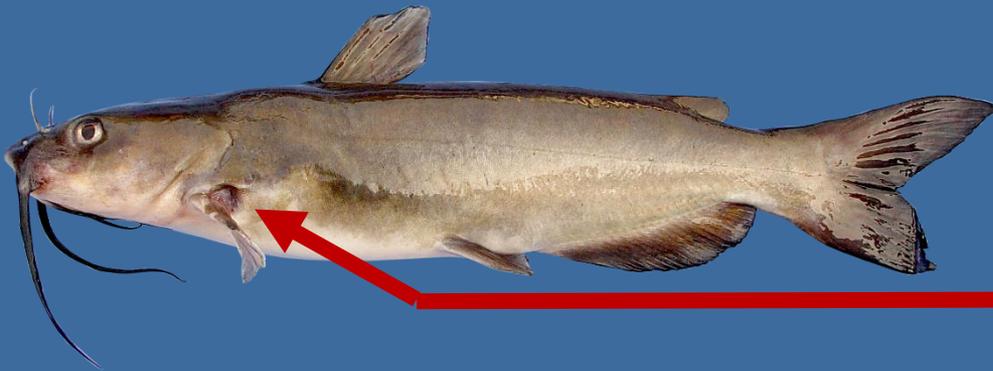
- Fish can be aged by counting the number of “Annuli” found on bony structures (like a ring on a tree).
- The structures used for aging fish include:
 - A. **Scales** (nonlethal procedure)
 - B. **Otoliths** (a small ear bone; lethal procedure to obtain)
 - C. **Pectoral spine(s)** (a nonlethal procedure)
- Catfish do not have scales



The Aging Process For Channel Catfish

Pectoral spines (what we used to age the 2017 Lower Bolton Channel Catfish)

- Processing is a very labor intensive process, the spine is sectioned with a saw, then polished repeatedly with sandpaper then mounted into a retention medium.
- Specialized equipment is needed to view the annular rings.
- Preferred over the otoliths as they are more robust.
- From past aging analysis of Connecticut Channel Catfish using spines and otoliths performed at Lower Bolton Lake, Bolton/Vernon and Silver Lake, Berlin/Meriden (Davis et al. 2016) no indications were found of substantial disagreement in the ages between these two different bony structures so spines were used for aging for the fish obtained in 2017.



Sectioned and polished pectoral spine of a Lower Bolton Lake Channel Catfish captured in September 2017 viewed under a microscope.



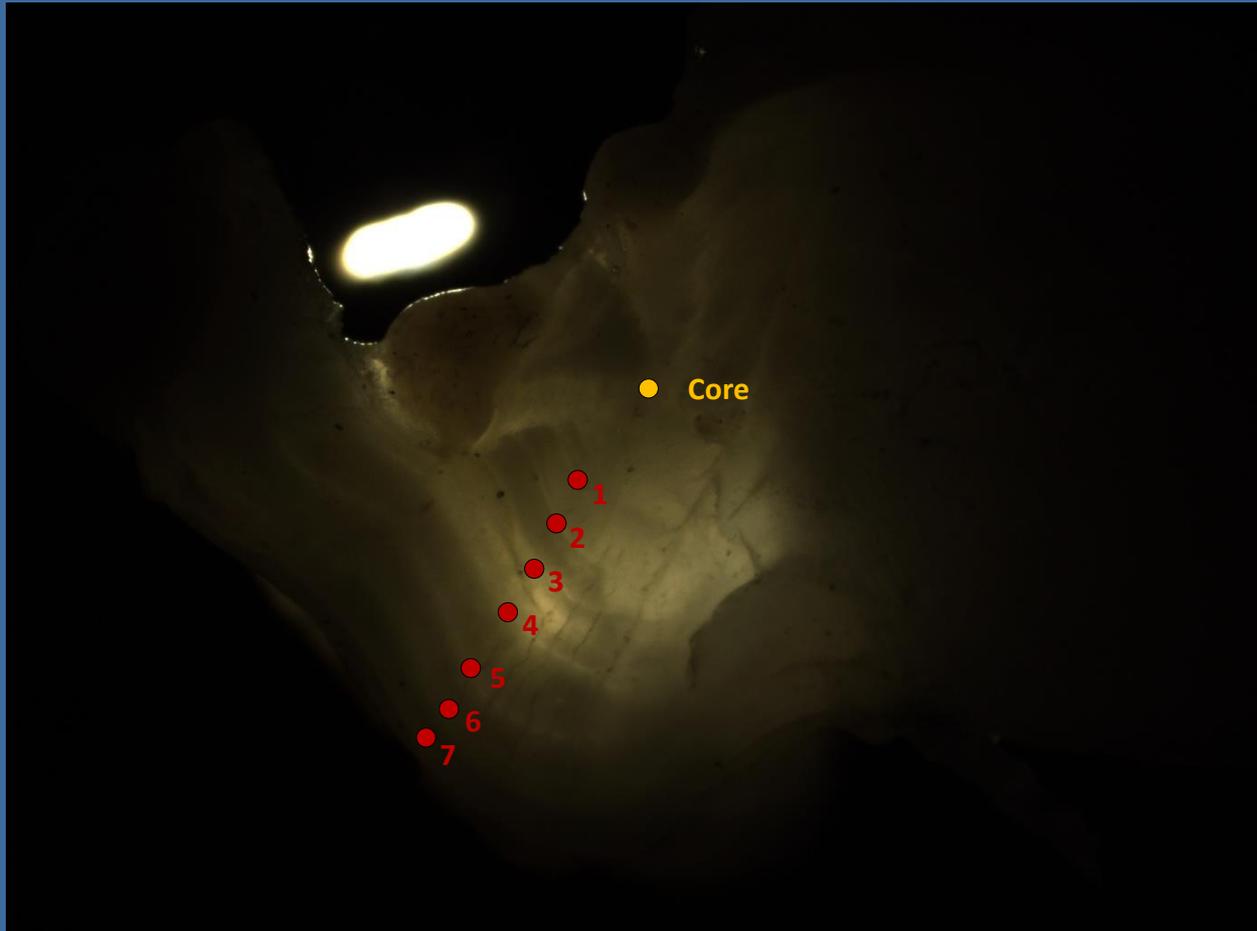
Aging Results: Smallest Sized Channel Catfish

- Fish Size = 14.1 inches. Age = 7 years old.



Aging Results: Largest Sized Channel Catfish

- Fish Size = 15.9 inches. Age = 7 years old.



Aging Results

- Seven Channel Catfish were successfully aged.
- All fish were 7 years old.

Length (inches)	Age (years)
14.1	7
14.2	7
15.0	7
15.2	7
15.2	Not able to age
15.5	7
15.6	7
15.9	7



Conclusions

None of the fish retained for aging purposes were naturally spawned in the lake.

- The last stocking of yearling Channel Catfish occurred in 2012. Those fish stocked at that time were already one year old (hence the term “yearling”).
- For a Channel Catfish to have naturally spawned within Lower Bolton Lake it would have to be less than 5 years old.
- All fish were age 7 years old.



Conclusions

- The presence of some small Channel Catfish within Lower Bolton Lake suggests that growth may be slightly below-average, with respect to other northern latitude populations, but is not overly concerning. This could be due to inadequately sized forage and/or intraspecific competition (from higher than needed stocking densities).





**Any
Questions?**



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