

Spring 2021

Introduction:

Fisheries management is a dynamic process and continued monitoring and analysis is needed to maintain a level of fishing that is desired by the community. Goose Lake recognizes this, and through their effort has been able to compile data on all of their lakes, which now includes Lincoln Lake. Ongoing data collection assists biologists with evaluating trends in the fishery. This monitoring allows biologists to make changes, if needed, to the fishery to maintain the quality of fishing the membership has come to expect.

JadEco, LLC was contacted to collect data on the fisheries for Goose Lake Association, and spring 2021 was scheduled for Lincoln Lake. Lincoln lake is a deep basin, long lake making it difficult to sample for the fishery. With this morphology, we conducted both day and night surveys in an attempt to get the best information for this lake. This data collection occurred on May 28, 2021 (day and night).

To assess the fishery, we utilize several indices in fisheries management as tools to interpret the population structure and condition of the fishery. Data analysis tools such as Catch Per Unit Effort (CPUE) provide information on the abundance of species. The quantity of fish collected within a certain amount of time determines the CPUE. This is used for the collection as a whole, or per species comparisons. Proportional stock density (PSD) is also analyzed on important game species. This is a fisheries assessment tool used to determine the size distribution of the fish within a population. Relative weights (Wr) are calculated to provide insight into the condition of the fish in a population or fish community. They also provide an understanding of the size structure of game species within the lake, and provide information on length to weight relationships to better understand if your game fish are relatively fat, or relatively thin. Potential changes in the predator / prey relationships and available forage can be interpreted through these metrics. Combined, these metrics provide information on the game fish community, species density, and potential trends in the fishery.

Lincoln Lake:

Day and night DC Electrofishing was conducted for 50 minutes at night and 85 minutes during the day. Sampling was conducted throughout much of the lake on May 28, 2021. A total of 10 species were represented during the survey, seven of which were considered important game species, including largemouth bass, bluegill, channel catfish, walleye, redear sunfish, rock bass, and pumpkinseed sunfish. Those considered non-game or invasive were common carp, quill back, and yellow bullhead. A total of 797 fish were collected during the sampling effort. There was a lot of variability between day and night surveys with a much great night time CPUE at 10.36 fish per minute, while the day time survey collected only 3.27 fish per

minute. As previously stated, this is why we performed day and night surveys on Lincoln Lake.

Good water clarity was observed the day of the survey with over 12 feet of clarity. Air temperature was at 50°F and water temperature was at 67.6°F. It was a colder day with overcast conditions and raining off and on through the day and night.

Summary of Fisheries Data Collected - Spring 2021:

The following is a summary and interpretation of the data from the Spring 2021 fish survey. This report breaks much of the data into day and night results as a comparison to the two sample sets.

Over all, the health and condition of the fish collected during the survey was good. We collected a total of 119 largemouth bass that comprised 15% of the overall collection. Bluegill comprised 63% of the collection with 502 fish collected. Daytime collection of bass only was at 0.48 fish per minute compared to 1.56 fish per minute at night. This is due to the bass coming into shallow waters after dark. Future surveys should include night work. Bluegill collections increased from 1.85 fish per minute during the day to 6.90 fish per minute collected at night. Redear were the next highest overall collection at 118 fish. The remainder of the collection consisted of carp (13) channel catfish (11), walleye (4), rock bass (18), quill back (1), yellow bullhead (10), and pumpkinseed sunfish (1). Average relative weight (Wr) for all fish were all within objective ranges, with the exception of walleye at 85.

Largemouth Bass:

Lincoln Lake is a deep basin lake that provides much opportunity for bass to go deep during the day, making daytime surveys more difficult. The collection rate for largemouth bass was quite variable with a CPUE of 0.48 fish per minute daytime and 1.56 fish per minute at night. We were substantially under our CPUE for bass during the day, and within our objective (1-2.5 fish per minute) at night. Average relative weight (Wr) of bass collected was decent at 94. While this is within our objective range, it is at a lower length to weight. Bass Wr ranged from 78 to 176. The average length bass collected was 9.8" with a range from 3" to 19.3".

The PSD or 'proportional stock density' metric to analyze the size structure of the bass population was used. This is a comparison of the stock (>8") to quality (>12") size bass in the sample. The objective range for largemouth bass PSD is 40-70. The PSD for Lincoln Lake was at 32 (day/night combined), and 37 day and 32 night. These are all slightly below our objective range, indicating the need for larger bass in Lincoln Lake. The RSD14 is an evaluator of how many bass are over 14" in proportion to the total number over stock size at 8". Only 9 largemouth bass were collected over 14" in length (2 day and 7 at night). The RSD14 for largemouth bass

was at 11 and 12 (day and night) and falls within our objective range (10 to 20). This would indicate a decent number of bass greater than 14" in the fishery.

The population distribution appears to be a good distribution throughout year classes, up to the 4-year old class. However, there is a proportionally high number of bass between 10" and 12.9". The lower Wr and higher density of bass could be causing slower growth rates for those bass. Selective harvest of this size class, temporarily, can allow the fishery to improve. Over all, the bass fishery at Lincoln Lake appears to be doing well, but could use some improvement in larger, older year classes through reducing the midsize bass under 13" in length.

Bluegill:

Bluegill comprised 63% of the total fish collected during the survey, with the majority of the collection after dark. The objective range for bluegill is between 2 and 4.5 fish per minute, and we collected 1.85 fish per minute daytime, and nearly 7 fish per minute at night.

The overall bluegill PSD was at 39 for this survey and is within our objective range (20-60). Daytime only was at 39, and night time was at 48. This would indicate that of the fish greater than 3" in length (stock size), there are approximately 40% greater than 6". The Wr for bluegill averaged 96, and is within our objective range. The average bluegill length was at 5.8" with a range from 0.6" to 9.6" in total length.

Bluegill (over 8") were well represented during this survey with an RSD at 9 daytime and 6 at night. There is a need to protect the larger bluegill to improve the fishery, but the fishery is currently in balance.

Redear Sunfish:

We collected 118 redear sunfish with an average length of 8.8" and a range from 4.1" to 13.6". The last record for stocking of redear was in 2019 with 2" to 4" stocked. The collection of smaller redear is an indicator that natural spawning and recruitment could be occurring on Lincoln lake. The CPUE for redear was very good at 0.61 fish collected per minute daytime and 1.32 fish per minute at night. The average Wr for redear was at 94. This is within our objective range. Redear should be providing an excellent fishing opportunity for anglers at Lincoln Lake.

Walleye:

We collected a total of 4 walleye (3 at night) with a CPUE at 0.01 daytime and 0.06 fish per minute at night. Of the 4 walleye collected, they averaged 14.3" with a range from 10" to 18.1". Overall, the walleye were thin, with low relative weights at 85 and ranging from 77 to 90.

Other Species:

We also collected rock bass (18) and pumpkinseed sunfish (1) that both provide a diverse fishery for anglers.

Undesirable Species:

Carp (7 day and 6 night), quill back (1 day), and yellow bullheads (6 day and 4 night) were all represented in the survey.

Recommendations:

The following recommendations for Lincoln Lake are based on the data collected and the population distribution of various fish within the community.

Size and creel limits:

- A temporary creel limit to reduce bass under 13" in length would help improve the fishery at Lincoln Lake. Allow the harvest of 3 bass under 13" and Catch and Release of any larger bass.
- Bluegill: **Encourage** anglers to release bluegill larger than 8", or harvest no more than 5 over 8" in their daily limit. I can assist with an educational program on this bluegill management philosophy.
- Walleye: Allow 3 per day at 16" or larger.
- Channel catfish: Allow up to 6 per day with no size limit.
- Muskie should be a trophy opportunity at 1 over 48" daily.
- Northern Pike – No change
- Rainbow Trout – No change

Continue to monitor the fish community and population structure through electrofishing data collection to make changes to the creel and size limits as needed. It is critical to monitor the fish numbers and community changes with changing harvest regulations.

Stocking:

- Muskie: Stock 12" to 14" at a rate of no more than 30 per year.
- Channel Catfish: Stock up to 10 per acre 8" to 10" annually.
- Walleye: Stock 6" to 8" at a rate of no more than 10 per acre annually.
- Smallmouth bass can be stocked to ensure year classes are recruiting into the fishery. Stocking of 4" to 6" smallmouth bass at a rate of no more than 10 per acre annually.

Table 1: Catch Per Unit Effort (CPUE) by species on Lincoln Lake, Spring 2021

<i>Species:</i>	<i>Number:</i>		<i>Fish / Minute</i>		<i>Obj. (fish/min)</i>
	<i>21s Day</i>	<i>21s Night</i>	<i>21s Day</i>	<i>21s Night</i>	
Bluegill:	157	345	1.85	6.90	2.0-4.5
Carp:	7	6	0.08	0.12	Below 0.25
Channel Catish:	8	3	0.09	0.06	-----
Largemouth Bass:	41	78	0.48	1.56	1.0-2.5
Walleye:	1	3	0.01	0.06	-----
Rock Bass:	5	13	0.06	0.26	-----
Quill Back:	1	---	0.01	---	-----
Yellow Bullhead:	6	4	0.07	0.08	-----
Pumpkinseed:	1	---	0.01	---	-----
Redear Sunfish:	52	66	0.61	1.32	-----
Total CPUE	279	518	3.27	10.36	6.00 plus

Table 2: Proportional Stock Density by species on Lincoln Lake, Spring 2021

<i>Species:</i>	<i>Proportional Stock Density (PSD)</i>		<i>Objective</i>
	<i>2021 Day</i>	<i>2021 Night</i>	
Largemouth bass	37	32	40-70
Bluegill	39	48	20-60

Table 3: Relative Weight by species on Lincoln Lake, Spring 2021

<i>Species:</i>	<i>Wr (Ave)</i>	<i>Range:</i>	<i>Objective</i>
	<i>2021s</i>	<i>2021s</i>	
Bluegill:	96	74-137	90-110
Carp:	97	87-119	90-110
Channel Catish:	106	94-119	90-110
Largemouth Bass:	94	78-176	90-110
Walleye:	85	77-90	90-110
Rock Bass	108	91-13	90-110
Yellow Bullhead:	105	82-122	90-110
Pumpkinseed:	102	102	90-110
Redear Sunfish:	94	73-119	90-110

Table 4: Length Range by species on Lincoln Lake, Spring 2021

<i>Species:</i>	<i>Length:</i>	<i>Average:</i>
	<i>2021 Spring</i>	<i>2021 Spring</i>
Bluegill:	0.6"-9.6"	5.8"
Carp:	17.5"-27.9"	23.9"
Channel Catish:	9.9"-21.3"	15"
Largemouth Bass:	3"-19.3"	9.8"
Walleye	10"-18.1"	14.3"
Rock Bass	2.4"-9"	6.3"
Quill Back:	22.9"	22.9"
Yellow Bullhead:	6.2"-13.1"	10.6"
Pumpkinseed:	6.7"	6.7"
Redear Sunfish:	4.1"-13.6"	8.8"













