Brook trout population parameters from angling catch from Big Five Bridge and Moores Lake, 2004.   Summary of Initial Results.

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The Inland Fisheries Division of the Nova Scotia Department of Agriculture and Fisheries is responsible for managing the recreational fishery for brook trout (*Salvelinus fontinalis*). Habitat loss and over fishing have contributed to a 60% decline in the annual catch of brook trout since the early 1980s. Angling regulations to control harvest and improve the fishery for anglers are an important management strategy.

Development of effective regulations depends on understanding fish habitat (water quality, predators, available food, etc), exploitation of fish populations, and the needs of anglers. Habitat conditions and over fishing can influence the growth rates of fish, size of catch, and the number of fish in a population. Anglers have often reported that the number of large fish caught has declined in many rivers and lakes and have recommended that changes in regulations are needed to improve certain fisheries.

Brook trout, brown trout (*Salmo trutta*), and Atlantic salmon (*Salmo salar*) are members of the salmonid family and require cool water to survive. Brook trout are one of the most sensitive salmonids to warm water and avoid temperatures greater than 20^0C. The baseline study on Big Five Bridge lake and Moores lake indicated good growth rates, especially when compared to other brook trout populations in Nova Scotia. Initially it seems that the growth rates of brook trout in these systems are more similar to growth of sea-run brook trout. One reason for this may be the availability of prey in the lakes. Both lakes contain a good forage of minnows. Another possibility may be the absence of competitor species (white/yellow perch, bass or pickerel). The competition from other species in these lakes for food and space is quite low, allowing more habitat for brook trout. The average size of brook trout in the two lakes based on 110 samples was 28.7 centimeters, approximately 11 inches.

In our departments Trout Management Plan for the province we have classified our lakes and streams into three categories. Class A waters are good trout lakes, Class B are moderate and Class C are poor. Big Five Bridge and Moores lakes fall into the Class B category because of the low pH. These two lakes are in the B category based on water quality and have a thermocline, and are absence of competitors. Water chemistry results indicate good area of cool water below the thermocline, which provides cool water refuge for the trout in the warm summer months. Big Five Bridge lake has a little better summer habitat as the area of cool water and good dissolved oxygen is greater in this lake.

Overall, the study gave us a better understanding of the brook trout population and habitat parameters associated with the strong growth rates in these systems. More work is needed to properly assess the population size. Catch rate is used as an index of abundance and would be needed to indicate the population size. Our staff can use catch rate, length frequency, and growth data to assess the status of fish populations and to monitor them over time. Changes in these parameters can reflect changes in environmental conditions and management strategies.
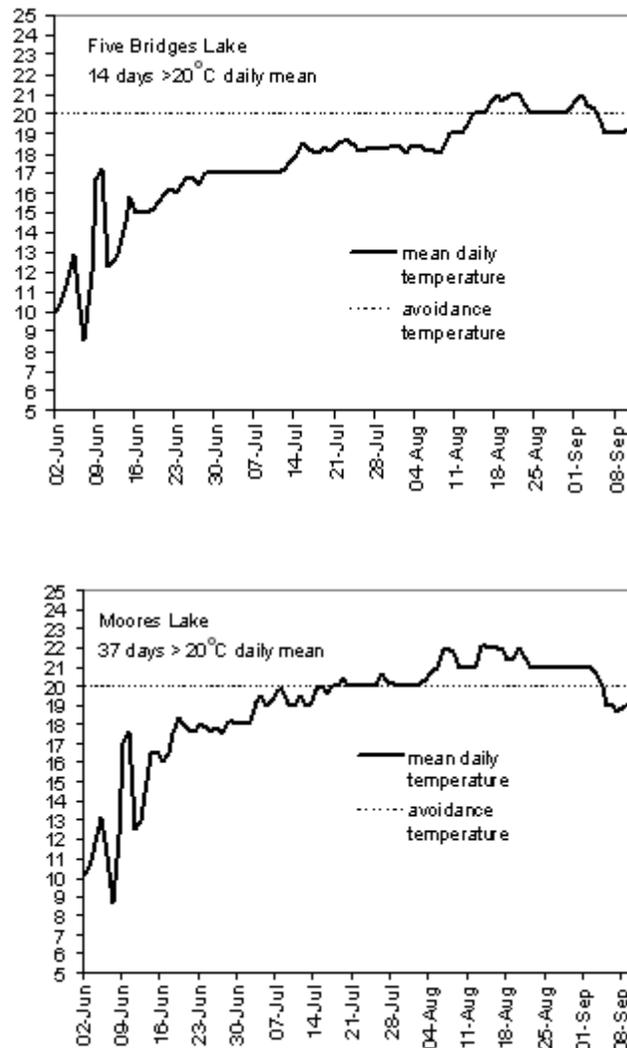

Figure 1. Mean daily water temperatures in Five Bridges Lake and Moores Lake, 2004.

**Brook Trout Distribution from Big Five Bridge and Moores Lake, 2004**
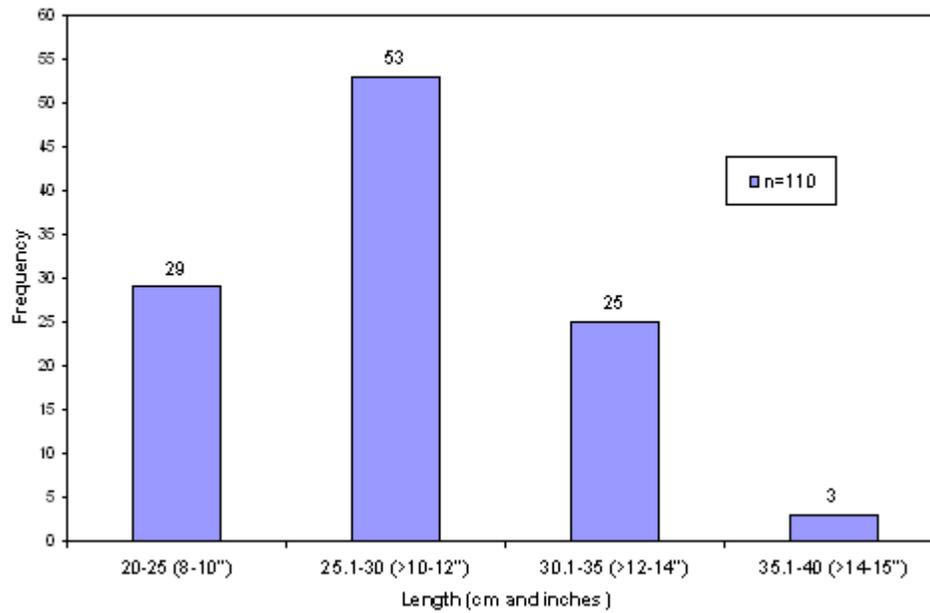
Figure 2. Forklength distribution of trout caught in Big Five Bridges and Moores Lakes, 2004.
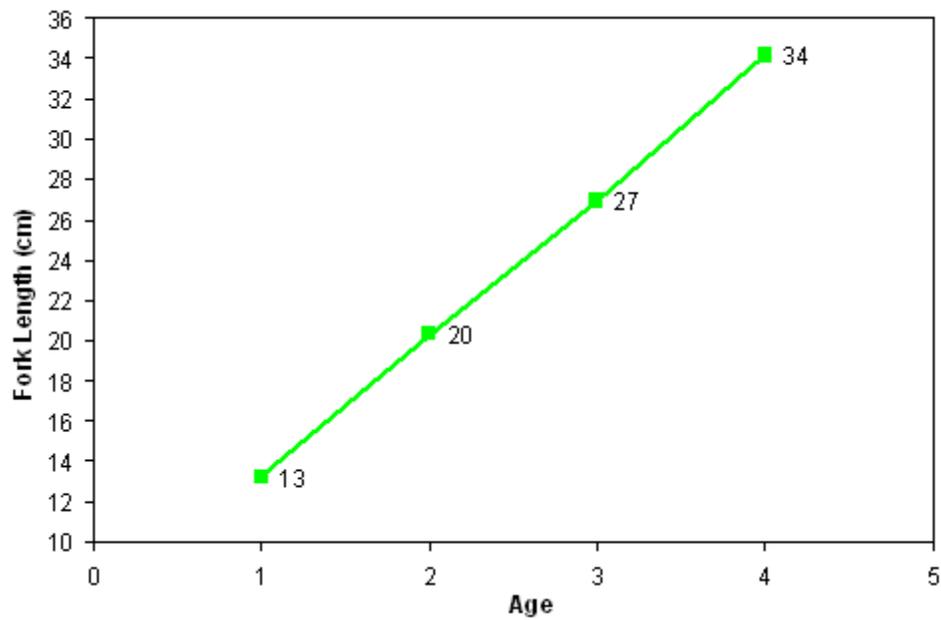
Figure 3. Mean length at age of brook trout from Big Five Bridge and Moores Lakes, 2004.
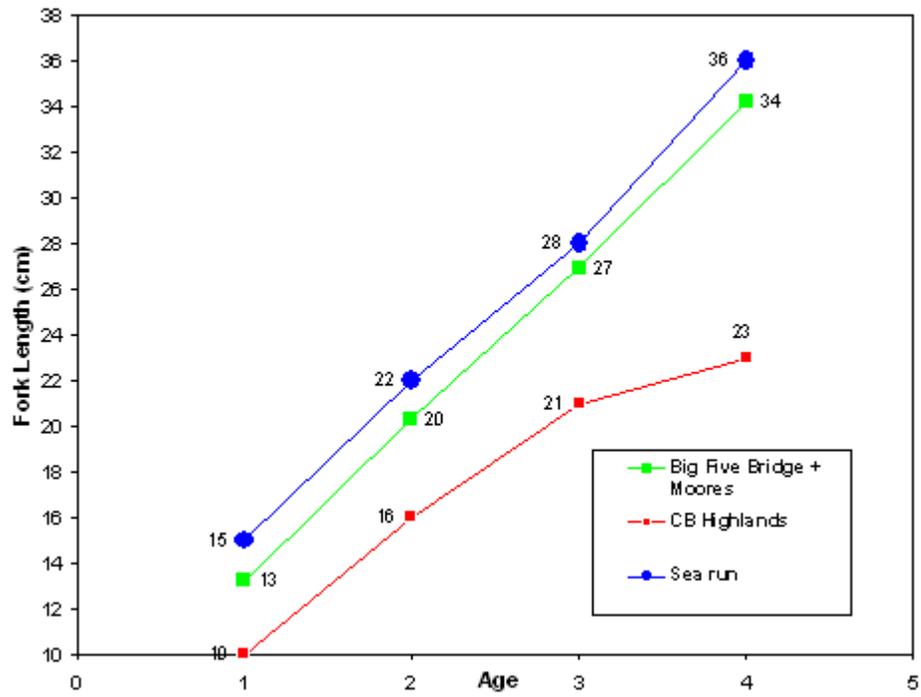
Figure 4. Growth of brook trout from Big Five Bridge and Moores Lakes, sea run populations, and Cape Breton Highlands, 2004.

Table 1. Depth profiles and water chemistry data, Big Five Bridge Lake, July 2004

Depth (m)	Temperature °C	Dissovled Oxygen mg/l	Dissolved Oxygen % Saturation	pH	conductivity
0	20.2	8.6	94	4.8	25.2-27.8
1	20.3	8.6	94		
2	19.9	8.4	92		
3	19.6	8.2	89		
4	19.3	8	86		
5	18.7	7.6	82		
6	17.8	7.4	77		
7	17.5	7.1	73		
8	16.3	6.6	68		
9	14.2	6.6	64		
10	12.6	5.8	54		
11	12.1	5	46		
12	N/A	N/A	N/A		

Note: Water samples taken and sent to Environmental Chemistry Laboratory Services of QEII Health Science Center, 2 surface samples, 1 at thermocline, and 1 off the bottom

Table 2. Depth profiles and water chemistry data, Moores Lake, July 2004

Depth (m)	Temperature °C	Dissovled Oxygen mg/l	Dissolved Oxygen % Saturation	pH	conductivity
0	21.3	8	91	4.7	33.2-35.6
1	20.8	7.8	86		
2	20.2	7.7	87		
3	20.1	7.8	85		
4	20	8	86		
5	18.6	6.8	72		
6	17.9	5.5	58		
7	17.4	5.4	56		
8	14.9	4	40		
9	14	2.9	27		

Note: Water samples taken and sent to Environmental Chemistry Laboratory Services of QEII Health Science Center, 2 surface samples, 1 at thermocline, and 1 off the bottom