Rankin Lake
(Geographic Township of Foley)

Synoptic Trapnet Survey Report
Summer 2000

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Executive Summary:

A synoptic trapnet survey consisting of 12 overnight sets using eight-foot trapnets was conducted on Rankin Lake from July 24 – 28, 2000. The purpose of the study was two fold: 1) to evaluate the status of the resident smallmouth bass population and 2) to assess the survival of rainbow trout planted in the spring of 1999 to create artificial fishing opportunities.

A total of 126.8 kilograms of fish were caught, for a *Catch (wt.)-Per-Unit-Effort* (C.U.E.) of 10.57 kg. per net set. This index of fish productivity is well below the average of 16.19 kg. / net set from 15 other synoptic trapnet surveys recently conducted in the Parry Sound Area. Smallmouth bass comprised 82% of the total catch weight followed by northern pike at 10%. Largemouth bass, rock bass, pumpkinseed and common white sucker together comprised only 8%. We stress that catch composition is not representative of fish community composition due to gear selectivity.

Smallmouth bass C.U.E by number was 6.9 ± 1.2 (standard error) bass per net night. This is well above average for lakes similarly surveyed in the Parry Sound Area and relative to these lakes is indicative of a high abundance of smallmouth bass for Rankin Lake. Biosampling data suggested good reproduction and recruitment by the smallmouth bass population. The total mortality rate was undetermined but appeared to be low. We conclude that the smallmouth population of Rankin Lake is in a very healthy and sustainable condition.

The complete absence of any rainbow trout in the catch suggests 1) that these fish have experienced very high mortality since they were planted in 1999; or 2) the gear was highly ineffective at capturing this species. Anecdotally, not a single rainbow trout has been reported caught in the sport fishery. We speculate the former conclusion is most likely.

Gear selectivity resulted in insufficient data for other species from which to draw any reliable conclusions.

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1.0 Introduction:

Rankin Lake is located in the Geographic Township of Foley (now part of the Municipal Township of Seguin). Incoming water primarily originates from surrounding landform drainage. It has a single drainage outlet at the north end that leads into Little Otter Lake. It forms part of the relatively small Boyne River watershed.

It is medium-size lake with a surface area of 140 hectares (346 acres). Maximum depth is 20.1 metres (66 feet) and mean depth is relatively deep at 7.8 metres (25.6') (OMNR, 1972). The lake has a moderately irregular shoreline that is 12.1 kilometers in length (Figure 1). The lake is mesotrophic in nature with mean secchi disc readings of 4.7 metres, mean chlorophyll a levels of 2.3 μg/l. and total phosphorus ranging from 15 – 25 μg / litre (Keller & Conroy, 1975).

The lake is readily accessible by numerous private access roads as well as public access adjacent to Rankin Lake Road at the north end of the lake. It is well developed with an undetermined number of cottages, but 66 were present at the time of the 1972 lake survey. Fishing pressure is unknown, but not believed to be high on the lake as it lacks any reputation for providing good fishing.

The 1972 OMNR lake survey indicates that the fish community is comprised of smallmouth bass, largemouth bass, pumpkinseed, rock bass, brown bullhead, bluntnose minnow, rainbow smelt and cisco. Lake trout were also listed but are now considered extirpated from the lake. Yellow perch and "suckers" were also previously recorded in a 1927 Lands & Forests survey of the lake.

There is considerable uncertainty as to the origin of some fish species in this lake. Lake trout plantings commenced in 1940, but it is not known if this was an introduction or supplemental stocking. A 1927 Lands & Forests survey makes no mention of lake trout – suggesting they were probably not native to the lake. Lake trout plantings ceased in 1966. Splake were planted annually between 1983 and '85 but discontinued thereafter due to poor survival (Hill & McIntyre, 1988). There are several plantings of smallmouth bass that commence in 1937 and terminate in 1964. It is unknown if smallmouth bass were native to the lake or introduced by these plantings. It is unknown, but likely that smelt entered the lake some time prior to 1972 via its use as bait.

Past fisheries investigations on Rankin Lake have primarily focused on assessment of lake trout and splake plantings in this lake. Gill-net assessment surveys conducted in 1978 (unreported raw data in OMNR fisheries file) and 1987 (Hill & McIntyre, 1988) both indicated that survival of lake trout and splake were low. Subsequently, plantings of lake trout and splake were discontinued.

In 1999, the Ministry of Natural Resources introduced rainbow trout into Rankin Lake with the specific intention of providing artificial angling opportunities. At about the same time as this planting, the Ministry received comments regarding poor fishing quality on the lake. This synoptic trapnet survey was conducted with the dual purpose of:

1. Evaluating the status of the resident smallmouth bass population, and
2. Evaluating survival success of rainbow trout planted in 1999.

Figure 1 on this page

2.0 Methods:

"Synoptic surveys" are intended to provide a 'snapshot in time' of the status of the fish community and individual populations that comprise it. We selected 8' trapnets as the gear of choice due to the non-lethal

nature of the gear and it's proven effectiveness at capturing smallmouth bass – which was the particular species of interest in this survey. Results must be viewed in light of 'species selectivity' of the gear. This is further discussed in the *Results and Discussion* section of the report.

Netting sites were chosen by the field crew using the following guidelines:

- The site had to be suitable for the net to fish effectively. (Consequently – factors such as: contours of the lake bottom, absence of obstructions, depth, sufficient lead length, etc. were considered.)
- Nets were intended to fish all habitat types in approximate proportion to their abundance on the lake in order that the catch would reflect the 'whole lake' as accurately as possible.
- Nets were to be set far enough apart such that they were not competing with each other.
- Nets were to be approximately randomly distributed throughout the study area.

Net locations are indicated in Figure 1. As is quite typical in these surveys, there were extensive portions of shoreline that were unsuitable for the gear.

In this report the unit of effort is recorded as a "net set" – and approximates a set of 24 hours duration. Nets were relocated daily and no site was fished more than once.

The survey was conducted from July 24th – when the nets were initially set, to July 28th when they were removed from the water.

Complete catch enumeration was conducted for all sets (Appendix A). Only fish captured in the "house" of the net were included in the catch. Fish caught in the wings or gilled in the lead were not considered part of the catch.

Biosampling data (total length, fork length, round weight) was collected from smallmouth bass (Appendix B), northern pike (Appendix C) and largemouth bass (Appendix C). For non-game fish, round weights were randomly recorded (Appendix C) in order that a mean and total weight captured could be determined for these species (Appendix A).

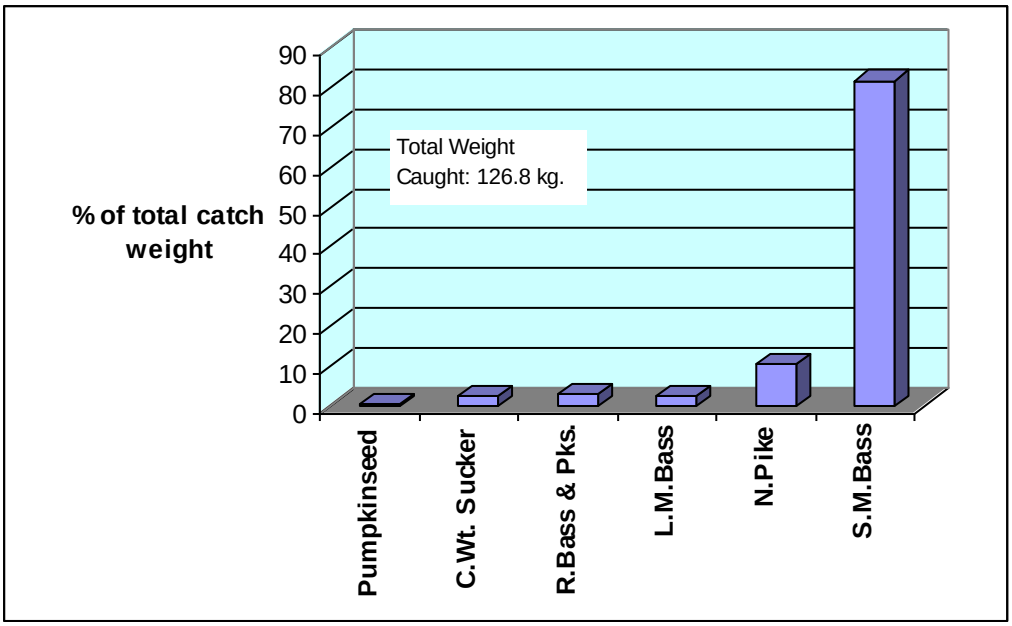
3.0 Results and Discussion:

3.1 Catch Composition and Productivity

From 12 trapnet sets, we captured a total of 83 smallmouth bass, 7 northern pike, 29 rock bass, 3 largemouth bass, 3 common white suckers and 3 pumpkinseed (Appendix A). Cumulatively, these fish weighed 126.8 kilograms (Appendix A). The Catch-Per-Unit-Effort (CPUE) by weight was 10.567 kilograms of fish caught per trapnet set. Relative to 15 other synoptic trapnet surveys recently conducted in the Parry Sound Area, this CPUE by weight ranks 11th, well below the average of 16.191 kg. / net. Consequently, relative to these other surveys, over-all fish productivity on Rankin Lake is below average.

Ninety-four point seven percent (94.7%) of our catch weight was game fish (smallmouth bass, largemouth bass and northern pike combined) (Figure 2 and Appendix A). Coarse fish (suckers) and pan fish (rock bass and pumpkinseed) comprised a meagre 5.3% of the total catch by weight. Relatives to the 15 surveys mentioned above, our 94.7% of the catch weight being game fish ranks third and well above the average of 67.7% for the other surveys.

Figure 2. Catch composition by weight for a synoptic trapnet survey conducted on Rankin Lake during the summer of 2000.



We caution the reader that the catch composition results from our nets are not representative of species abundance in the fish community. Eight-foot trapnets exhibit species selectivity in their catch. Species such as walleye and smallmouth bass are highly vulnerable to the gear, but panfish species as well as brown bullhead and northern pike are not particularly vulnerable. Indeed, we didn't catch a single brown bullhead or yellow perch although both are present in the lake. Furthermore, even for species that are highly vulnerable, the gear tends to select for adult fish and is not truly representative of the various size and age classes within the population. This is particularly true for smallmouth bass and northern pike in our survey.

Species diversity was low in our survey with only 6 different fish species being captured (Appendix A).

3.2 Relative Abundance and Biosampling Data

Since 1982, the Ministry of Natural Resources has conducted over 30 synoptic trapnet surveys on various lakes throughout the Parry Sound Area. The primary focus on these investigations has been to assess the status of walleye and smallmouth bass populations and secondarily those of other species in the fish community. The catch rate or *Catch-per-Unit-Effort (C.U.E.) by number* is the statistic used to indicate the abundance for a particular species. We call this a "relative abundance index" because it does not specifically delineate the size or the population. Rather the C.U.E. statistic by individual species generated on one lake is compared - "relative" to that generated on a number of other lakes. Hence the abundance of a fish species on one lake is based on its position relative to a host of others.

Biosampling data, is fish attribute or size data. It is not conclusive, but helps to give us some insight regarding reproductive, recruitment and mortality rates for a particular fish population in the lake.

3.2.1 Smallmouth Bass

We caught a total of 83 smallmouth bass in 12 net sets for a C.U.E. of 6.9 ± 1.2 (standard error) bass per net set (Appendix A). Compared to 34 other synoptic trapnet surveys conducted in the Parry Sound Area since 1981, this ranks 10th and well above the average of 4.85 bass per net set. From this we conclude that smallmouth bass abundance on Rankin Lake is "well above average" for lakes surveyed in the Parry Sound Area.

To some extent, this is not surprising. Almost all of the other synoptic surveys conducted in the past in the Parry Sound Area had walleye present in the fish community. Although walleye and smallmouth bass do coexist harmoniously in many lakes throughout North America, they do prey upon and compete with one another to some extent. In the case of Rankin Lake where walleye are not present, one might expect that smallmouth bass production would be higher that in other lakes where walleye occur along with smallmouth bass.

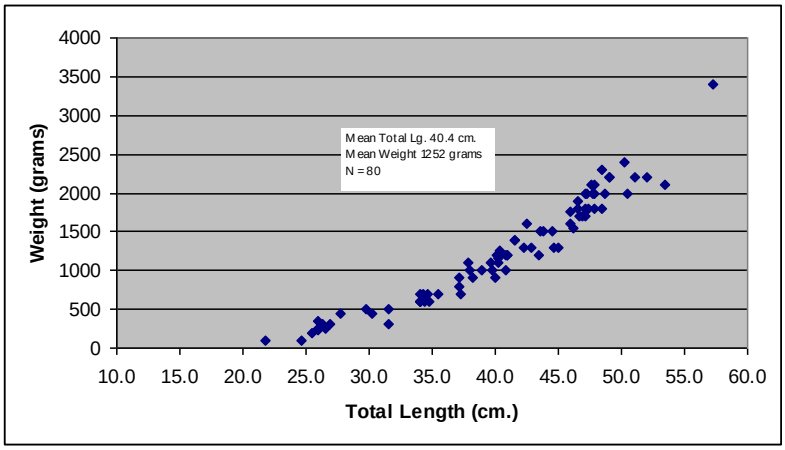
From 80 smallmouth bass sampled, mean size was determined to be:

- mean total length: 40.4 cm. (15.9 inches)
- mean fork length: 38.3 cm. (15.1 inches)
- and mean weight 1,250 grams (2.8 pounds) (Appendix B).

This is a large mean size for smallmouth bass. There was also a wide distribution of size classes in our catch (Figure 3). This suggests that reproduction and recruitment rates were good and that total mortality is rather low – thereby allowing bass to attain a large size and correspondingly older mean age. (Interestingly, we caught one smallmouth bass that was 3.4 kilograms or 7.5 pounds! It was one of the largest bass we've ever seen in our Area. The Ontario record is 9.8 pounds.)

We conclude that at the time of this survey, the smallmouth bass population on Rankin Lake was in a very healthy and sustainable condition.

Figure 3. Size distribution of smallmouth bass sampled from the Rankin Lake Synoptic Trapnet Survey conducted during the Summer of 2000.



3.2.2 Northern Pike

We captured 7 northern pike in 12 trapnet sets for a C.U.E. of 0.6 ± 0.19 (standard error) pike per net set. This index of abundance ranks 21st (tied with 3 other lakes) out of 30 lakes similarly surveyed that contained this species. The mean pike C.U.E. for these surveys is 1.26 pike per net set. Consequently, the abundance of northern pike on Rankin lake is "well below average" relative to 30 other lakes surveyed in the Parry Sound Area.

We caution the reader however that this index of abundance for northern pike has a much lower degree of reliability than the same index for smallmouth bass. Northern pike are not particularly vulnerable to eight-foot trapnets and are under-represented in the catch relative to their actual abundance in the fish community. This is because pike are "ambush feeders" and do not actively seek their prey and consequently are less likely to contact the gear. The low 'catchability' of pike is reflected in the low C.U.E. statistic for this species observed in many surveys. For the 30 surveys previously mentioned, the median C.U.E. (i.e. the mid point where 50% of samples are above and 50% below) is only 0.7 pike per net set. This is very close to our observed pike C.U.E. of 0.6 per net set. Consequently, it is quite possible that northern pike abundance on Rankin Lake could well be described as "normal".

From our observations of habitat while on the lake, there was not a high abundance of northern pike habitat present, although in specific locations it was extensive and quite good.

From a meagre sample of only 7 pike we do not feel there is enough information to make any inferences regarding reproduction, recruitment or total mortality. Our pike had a mean total length of 64.2 cm. (25.3 inches) and a mean weight of 1,871 grams (4.1 pounds) (Appendix C).

3.2.3 Largemouth Bass

We captured only 3 largemouth bass during the survey. This species is not particularly vulnerable to eight-foot trapnets. These nets are most often located well offshore in depths beyond the preferred habitat of largemouth bass. We suspect that our data highly under-represents the abundance of largemouth bass in this lake, but to what degree is wholly a matter of conjecture. As with northern pike, largemouth bass habitat appeared extensive and good in specific areas, which were areas we could not sample with our nets.

3.2.4 Other species – Rock Bass, Pumpkinseed and Common White Sucker

These species are also under-represented in the catch relative to their abundance in the fish community. As with largemouth bass, - rock bass and pumpkinseed inhabit shallower near-shore waters where 8-foot trapnets do not fish efficiently. Conversely, common white suckers are often found in cooler deeper waters well offshore and outside the range of 8-foot trapnets.

3.2.5 Rainbow Trout

Not a single planted rainbow trout was captured during the survey. In the spring of 1999, two thousand 'catchable size' (140 grams or 0.3 pounds) rainbow trout were planted in Rankin Lake. At the time of the survey, these fish should have been well over a pound in size.

This survey had the dual purpose of assessing the status of the smallmouth bass population in the lake as well as evaluating the survival of planted rainbow trout. We expected that eight-foot trapnets would be a suitable gear with which to capture rainbow trout as they occupy habitats very similar to smallmouth bass.

The total absence of rainbow trout in the catch suggests:

- Total mortality for these fish has been extremely high with very few (if any) survivors available to be caught; or
- We were incorrect in believing that eight-foot trapnets would be effective at capturing these fish and perhaps they occupied deeper, offshore waters than we anticipated.

We spoke with several cottage residents on anglers on the lake during the course of this survey. They reported that no rainbow trout had been caught in the sport fishery to their knowledge.

4.0 Acknowledgement:

Field operations were very capably supervised by Jim Palmer with assistance from Ken Molyneaux, Leslie Tabobandung , Annaleise Hettinger and Eric McIntyre. Many thanks to Bob Lockwood, a cottage resident on the lake, for his assistance and use of his docking facilities.

5.0 Literature Cited:

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Append ix A

8' Trapnet Catch Summary for Rankin Lake Synoptic Trapnet Survey, Summer, 2000

Trap Net Set No.	Northern Pike	S.Mouth Bass	L.Mouth Bass	Common Wt. Sucker	Rock Bass	Pumpkin-seed	
1	1	13	1	0	0	0	
2	0	10	1	1	16	1	
3	1	8	0	0	1	0	
4	1	3	0	0	5	0	
5	0	4	0	1	0	0	
6	1	9	0	0	6	0	
7	0	8	0	0	0	2	
8	2	14	1	1	0	0	
9	0	1	0	0	0	0	
10	0	8	0	0	0	0	
11	0	3	0	0	0	0	
12	1	2	0	0	1	0	
Sum	7	83	3	3	29	3	128
Mean (C.U.E.)	0.6	6.9	0.3	0.3	2.4	0.3	
Standard Error	0.193	1.240	0.131	0.131	1.373	0.179	
Confidence Level (95.0%)	0.425	2.729	0.287	0.287	3.022	0.395	
Standard Deviation	0.669	4.295	0.452	0.452	4.757	0.622	
Sample Variance	0.447	18.447	0.205	0.205	22.629	0.386	
Count	12	12	12	12	12	12	
Weight Caught	13.1	103.9	3.1	2.8	3.6	0.3	126.8
% of total weight	10.3	81.9	2.5	2.2	2.9	0.2	100
C.U.E. (by weight) (kg. / net set)	0.858	8.658	0.0258	0.0233	0.3	0.025	10.567

Appendix B

Smallmouth Bass Biosampling Data
Rankin Lake Synoptic Trapnet Survey, Summer 2000

Total Length (cm.)	Fork Length (cm.)	Weight (grams)	Total Length (cm.)	Fork Length (cm.)	Weight (grams)	Total Length (cm.)	Fork Length (cm.)	Weight (grams)
48.5	45.7	2300	48.7	46.1	2000	45.0	42.5	1300
47.1	44.9	1700	46.2	44.0	1550	29.8	28.3	500
40.2	38.2	1200	40.2	38.1	1150	42.3	40.7	1300
27.7	26.5	450	47.1	44.5	2000	37.9	34.5	1100
39.8	37.7	1000	31.5	29.7	300	34.0	32.2	600
47.4	44.6	1800	24.6	23.2	100	47.8	45.6	2100
47.9	45.0	2000	52.0	49.3	2200	44.5	42.0	1500
38.0	36.0	1000	26.9	25.6	300	46.5	44.0	1900
43.6	41.7	1500	34.3	33.0	700	47.6	44.6	2100
26.0	24.7	230	21.8	20.8	100	47.7	45.1	2000
40.8	39.0	1200	46.0	43.0	1600	41.6	39.6	1400
38.9	36.6	1000	50.2	47.8	2400	35.5	33.6	700
46.0	44.5	1750	34.4	32.6	600	34.0	32.1	600
37.2	35.4	900	34.1	32.1	700	53.5	50.6	2100
47.9	45.9	1800	40.0	37.7	900	43.5	41.5	1200
43.8	41.9	1500	34.8	33.1	600	50.5	47.6	2000
57.3	54.4	3400	25.5	24.0	200	48.5	45.6	1800
46.9	44.4	1700	34.1	32.2	600	40.1	38.4	1200
37.2	35.4	800	26.0	24.6	350	47.3	45.1	2000
30.2	28.7	450	51.1	48.1	2200	42.5	40.3	1600
26.5	25.0	260	46.7	44.3	1700	38.2	36.3	900
31.6	30.2	500	42.8	40.3	1300	26.3	24.8	300
47.1	45.1	1800	49.0	46.3	2200	26.0	24.7	250
41.0	39.2	1200	40.8	38.9	1000	41.0	39.1	1200
39.6	37.6	1100	40.2	37.6	1100	44.6	42.7	1300
46.6	44.3	1800	34.7	32.8	700	37.3	35.2	700
41.6	39.6	1400	49.1	46.8	2200			

Mean	40.4	38.3	1252
Standard Error	0.893	0.847	76.305
Confidence Level (95.0%)	1.777	1.687	151.881
Standard Deviation	7.985	7.580	682.491
Sample Variance	63.768	57.454	465794.4
Sum	3232.7	3065.4	100140
Count	80	80	80

Appendix C

Biosampling Data For Other Species Captured
Rankin Lake Synoptic Trapnet Survey, Summer 2000

Northern Pike	Total Length (cm.)	Fork Length (cm.)	Weight (grams)
n. pike	65.3	61.4	1400
n. pike	72	68.5	2800
n. pike	53.7	50.3	1000
n. pike	71.1	67	2600
n. pike	64.6	61.1	2100
n. pike	62.5	59.4	1600
n. pike	60	58.5	1600
Mean	64.2	60.9	1871
Confidence Level(95.0%)	5.856	5.544	605.790
Standard Error	2.393	2.266	247.573
Standard Deviation	6.332	5.995	655.017
Sample Variance	40.099	35.938	429047.619
Sum			13100
Count	7	7	7

Largemouth Bass	Total Length (cm.)	Fork Length (cm.)	Weight (grams)
l.m. bass	32.5	31.3	550
l.m. bass	44.6	43	1550
l.m. bass	38.1	36.5	1000
Sum			3100

Rock Bass	20 rock bass weighed 2460 grams mean weight: 123 grams total weight caught: 29 x 123 = 3567 grams

Pumpkinseed	3 pumpkinseed weighed 325 grams mean weight: 108 grams total weight caught: 325 grams

Common Wt. Sucker	2 suckers weighed 1850 grams mean weight: 925 grams total weight caught: 3 x 925 = 2775 grams