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# Summary of Rainbow Trout Co-op Angler Data Collected in 2008

## Upper Great Lakes Management Unit

## Author

Bobrowicz, S.M. Ontario Ministry of Natural Resources, Upper Great Lakes Management Unit, Lake Superior. 435 James Street South, Suite 221e, Thunder Bay, Ontario, Canada, P7E 6S8

Correspondence: Steve.Bobrowicz@Ontario.ca; phone: (807) 457-1374

## Acknowledgement

The Lake Superior Co-Operative Angler Sampling Program would not be possible without the volunteer efforts and financial support of the North Shore Steelhead Association.

The Co-operative Angler Sampling Program (hereafter referred to as 'the Co-op Program') was originally initiated in 1991 as a three year partnership between the North Shore Steelhead Association (NSSA) and the Ontario Ministry of Natural Resources (MNR), to assess the health of rainbow trout (*Oncorhynchus mykiss*) populations in Canadian tributaries of Lake Superior. The original program generated over 3000 samples from 58 tributaries, and was essential to the review and revision of angling regulations for rainbow trout in Lake Superior and its tributaries. Changes to the regulations were made in 1996 and 1999. Findings of the 1991-1994 Co-op Program are summarized in George (1994) and MacCallum et al (1994).

The findings of the original Co-op Program were also used by the Rainbow Trout Working Group to establish targets for rainbow trout tributaries across the lake:

- Maintain a wide range of year classes
- Ensure each of three year-classes represent 15% or more of the adult population
- Maintain a high percentage of repeat spawners (greater than 55%) in rainbow trout populations
- Ensure that there are trophy or large fish (>65 cm fork length) in rainbow trout populations

The Co-op Program was re-established in 1998, as a tool to evaluate the success of the regulation changes. The results of the 1998-2004 surveys are summarized in MacIntosh (2005); since 2005, the Upper Great Lakes Management Unit has produced annual summaries.

Participation in the program has varied since its inception in 1991; at its peak, several angling clubs were involved, with samples being submitted from tributaries all over the Canadian side of Lake Superior. Today, NSSA is the sole partner in the program, and sampling has been concentrated in the western tributaries (i.e. west of Marathon). Figure 1 illustrates the total number of samples submitted to the Co-op Program in each year since its reactivation in 1998; figure 2 illustrates the total number of tributaries sampled each year. While these figures cannot be taken as an accurate measure of effort, they do provide a gross indication of interest and participation in the program over the course of eleven fishing seasons.

The McIntyre River Mark-Recapture Project is a new sub-component to the Co-op Program that was initiated in the 2008 field season. In addition to their regular duties as Co-op Program volunteers, six NSSA members concentrated their efforts on the McIntyre River, applying an adipose fin clip to all fish they captured (147 of the 164 fish sampled on the McIntyre in 2008). The number of adipose clipped fish recaptured in 2009 will be used to estimate the size of the McIntyre River population. Fish captured as part of this project in 2009 will receive a right-ventral clip.

The 2008 Co-op Program included samples from twenty tributaries, the greatest number of sample sites since the program was reinitiated in 1998. However, as in previous years, a minimum sample size of forty individuals is required to permit an adequate assessment of any single tributary; in 2008, only the Cypress, Jackpine, McIntyre and Prairie Rivers achieved this minimum sample size. Figure 3 shows the total number of samples submitted for each of the

twenty tributaries in 2008; detailed information on the four aforementioned tributaries is presented in the results section.

The MNR is particularly interested in maintaining data for seven key tributaries: McIntyre, Wolf, Coldwater, Jackpine, Cypress, Steel and Prairie. 2008 data were insufficient for the Wolf, Steel and Coldwater tributaries, and was marginal for the Prairie.

**Figure 1: Co-Op Angler Sampling Program - Total Number of Samples (All Tributaries) 1998-2008**

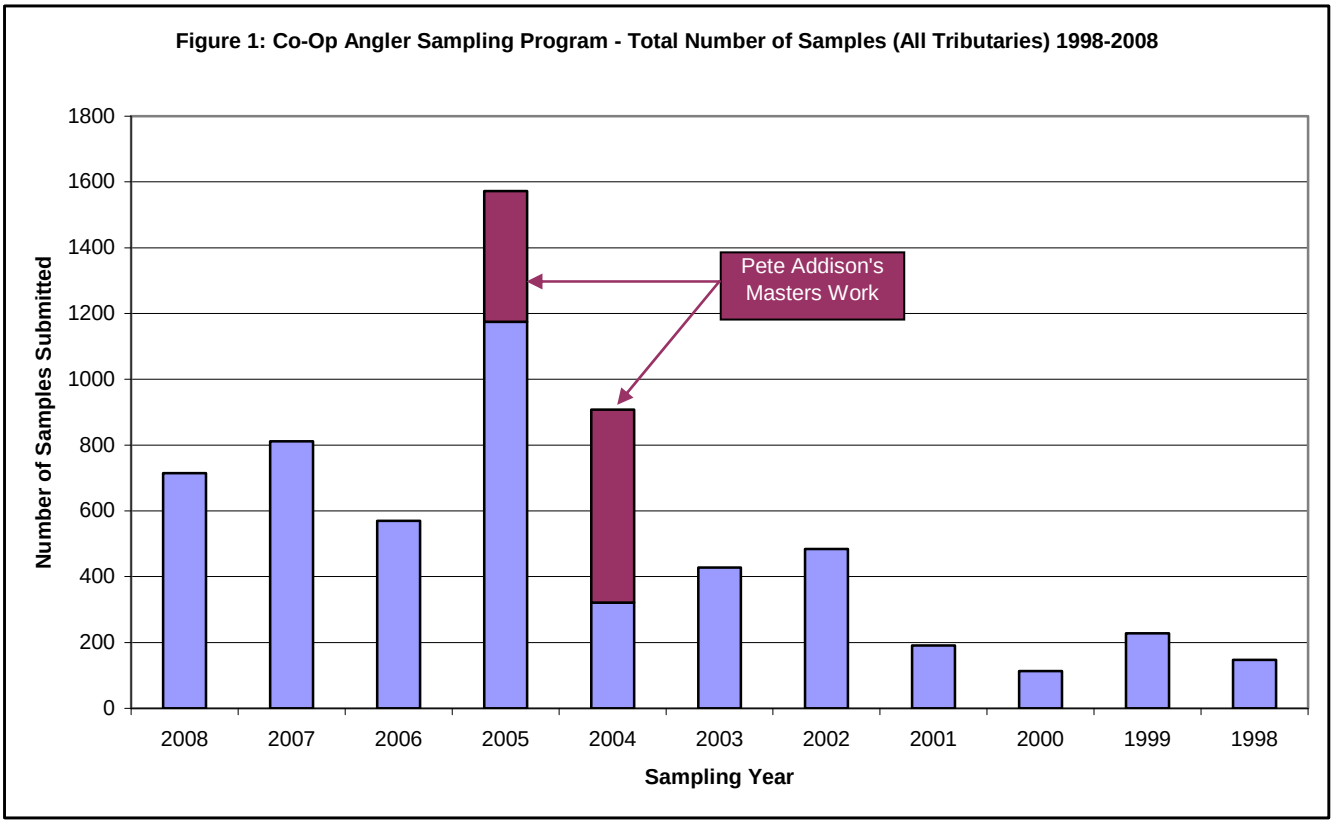


**Figure 2: Co-Op Angler Program - Number of Tributaries Sampled, 1998-2008**

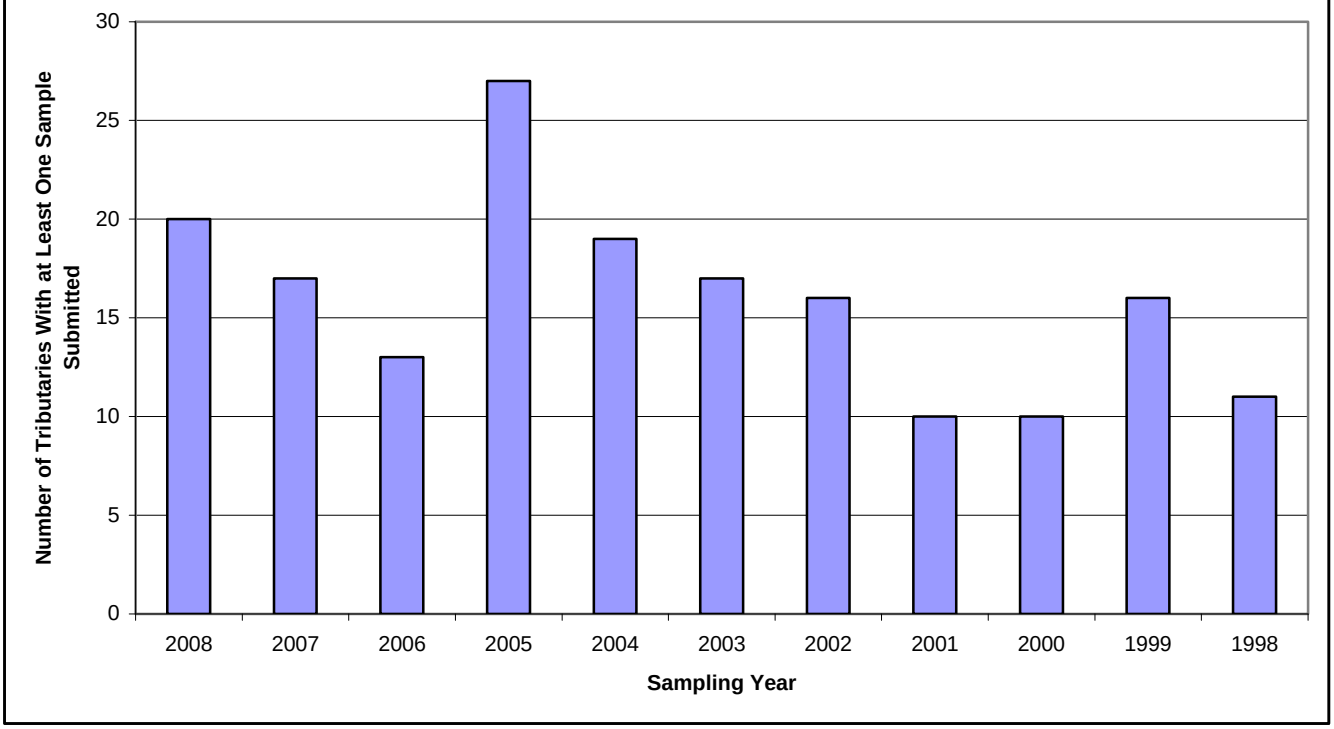
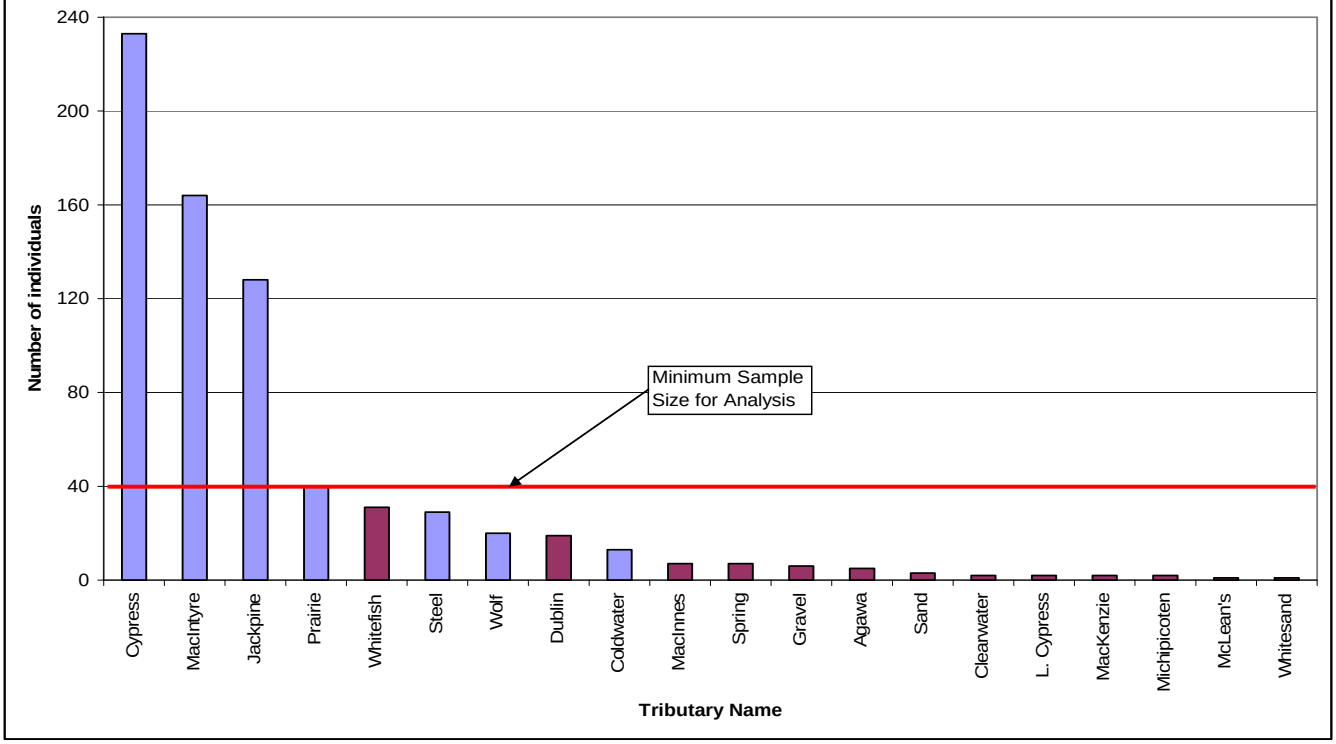



**Figure 3: 2008 Co-Op Angler Sample Sizes**
**Key tributaries identified in blue**



# Results

## Explanation of the parameters measured in the study

(adapted from McCallum et al 1994)

### Length Distribution

A summary of the length distribution of the catch is shown in this figure. As a quick index of the status of the stocks a wide range in the length distribution in the catch is a good sign. The length distribution is also useful in evaluating the success of size limits in protecting the bulk of spawning fish (e.g. McIntyre River)

### Age Class Distribution

Year class strength is thought to be controlled by environmental conditions such as amount of rain, water levels and temperatures, more than by the number of spawners. Larger streams probably have less variation than small ones. The graph allows strong year-classes to be identified, which affects estimates of repeat spwaners. A wide range of year classes in the catch is an indicator of a healthy population.

### Number of Spawns by Sex

This graph shows the percentage of repeat spawners in the catch. The percentage of repeat spawners is equivalent to an estimate of annual survival, provided annual survival and recruitment of "maiden" fish to the spawning population are relatively constant. This statistic is the single most important one for judging the health of the stock. As a rule of thumb we use 50% as a critical value; populations with >50% repeat spawners are generally healthy, whereas <50% may indicate problems.

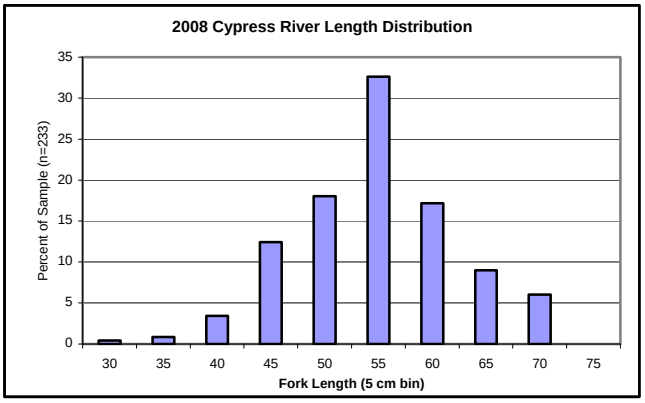
### Stream Years

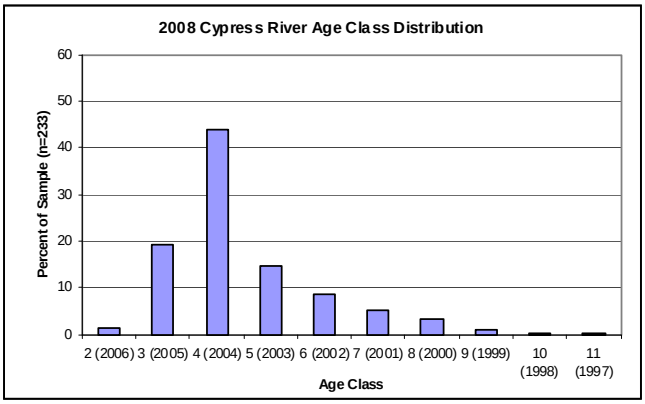
The number of years a rainbow trout spends in the stream is mainly a stream-specific trait. Streams can produce a greater number of smolts if the fish migrate to the lake after one year, than after two years; however, age two smolts are usually larger and have better survival rates than fish from the same stream that smolted after one year. The graph represents the number returning to spawn — not necessarily the proportion that smolt at a given number of stream years.

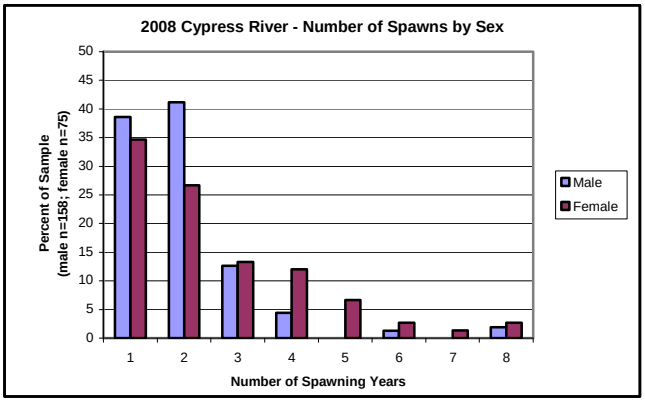
### Lake Years at Maturity

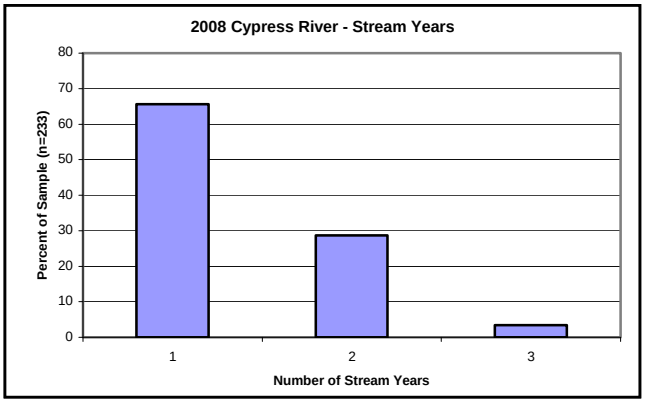
This graph illustrates the distribution of the number of years spent in the lake before the fish return to the stream to spawn for the first time. Because there are differences between males and females in this attribute, they are shown separately. Healthy populations tend to mature later (two or more lake years), allowing fish to put more energy into growth, which in turn increases the reproductive capacity and survival potential once the fish become mature.

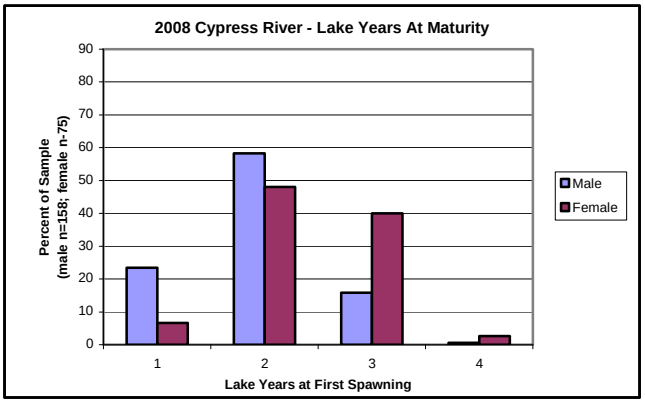
# Cypress River



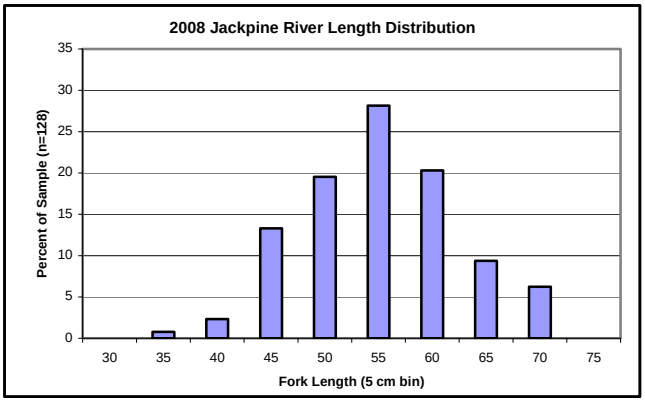



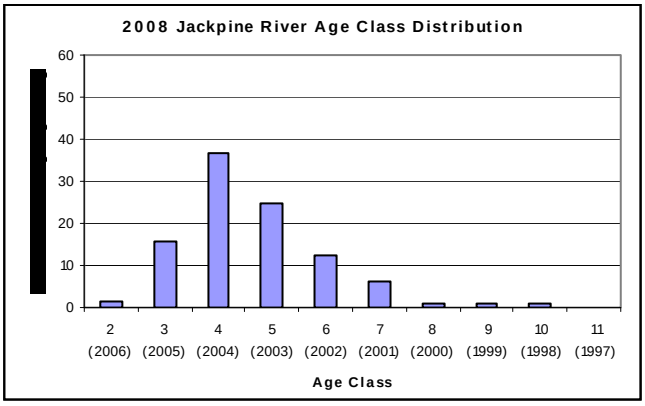



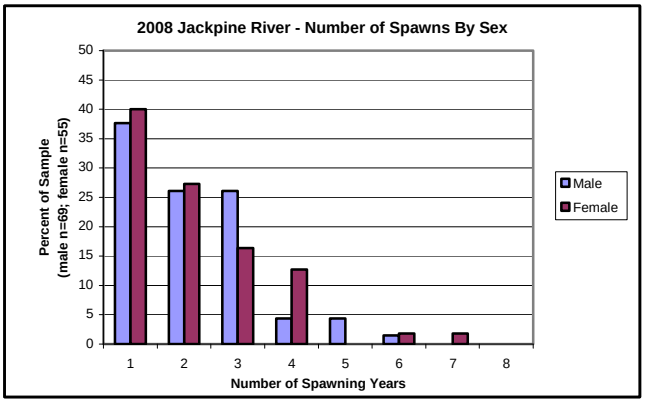

| | |
|---|---|
| Total Catch | 233 |
| Males Sampled | 158 |
| Females Sampled | 75 |
| Unknown sex | 0 |
| Mean fork length (cm) | 54.9 |
| Maiden Spawners (%) | 37.3 |
| Repeat Spawners (%) | 60.5 |

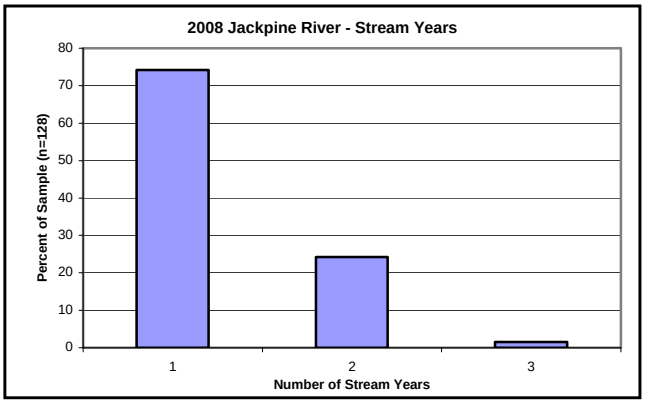
All parameters indicate that the Cypress River is supporting a healthy population of rainbow trout.

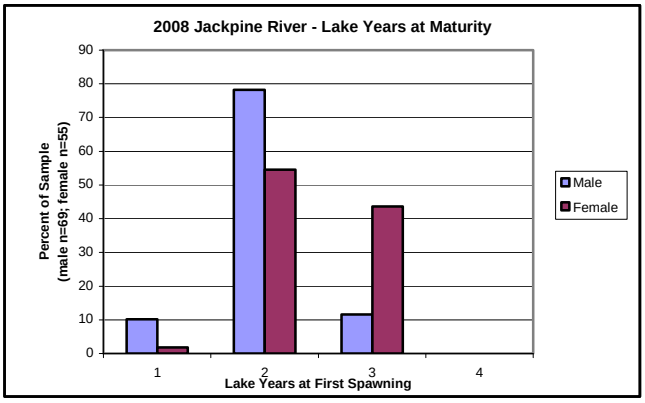
# Jackpine River



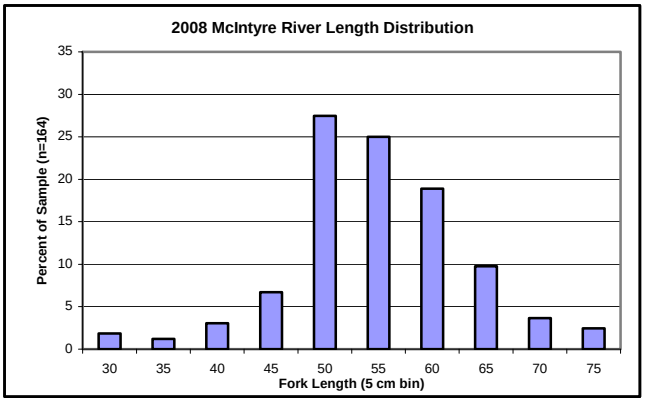



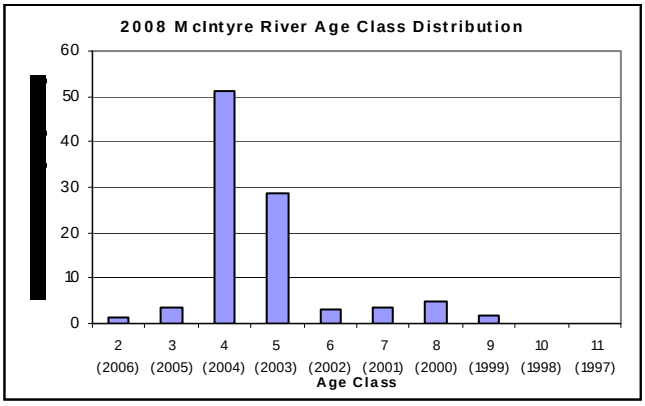



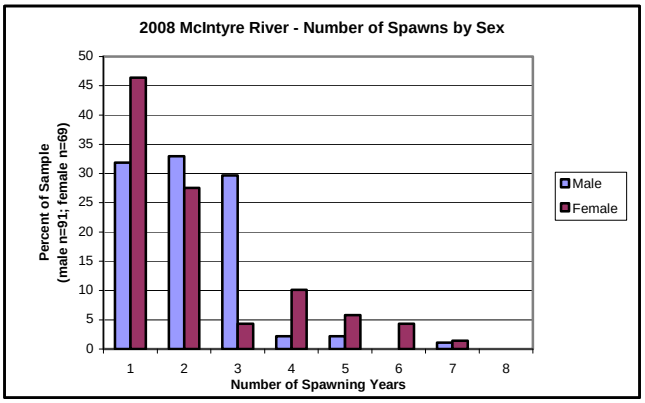

| | |
|---|---|
| Total Catch | 128 |
| Males Sampled | 69 |
| Females Sampled | 55 |
| Unknown sex | 4 |
| Mean fork length (cm) | 55.22 |
| Maiden Spawners (%) | 38.28 |
| Repeat Spawners (%) | 61.72 |

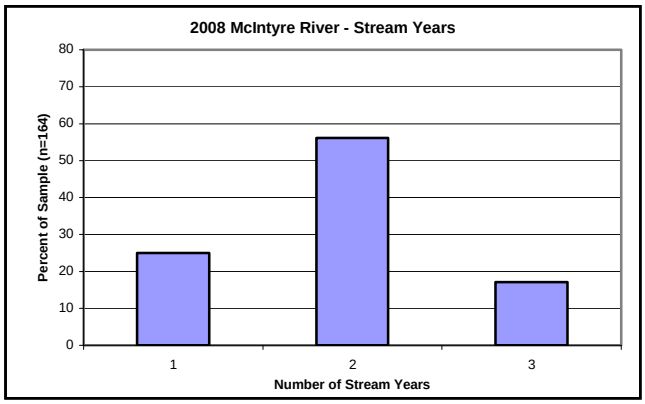
All parameters indicate that the Jackpine River is supporting a healthy population of rainbow trout.

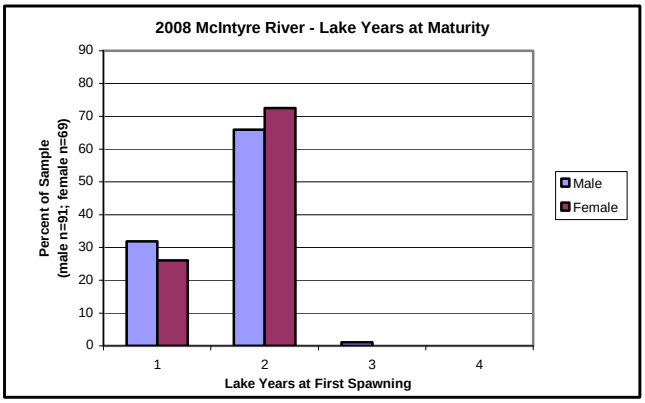
# McIntyre River



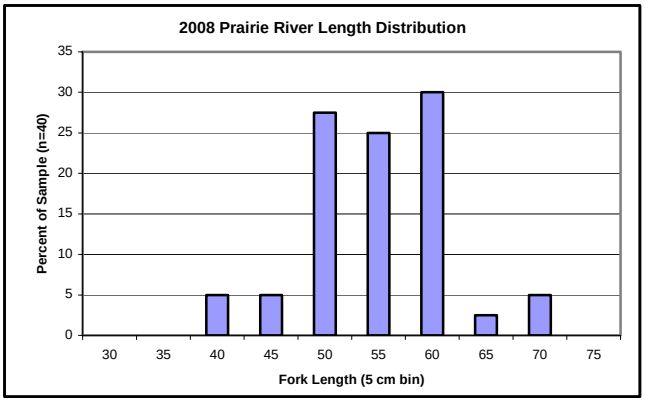



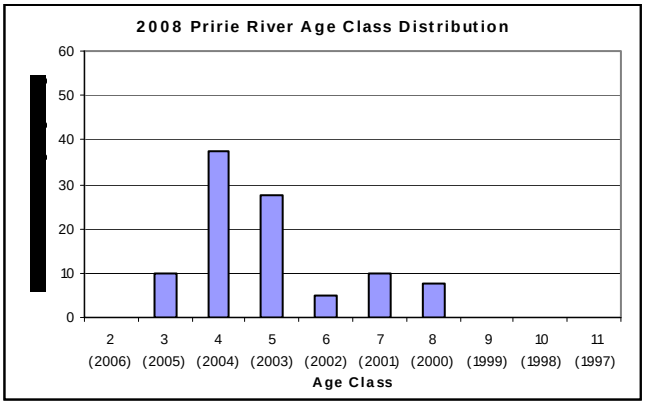



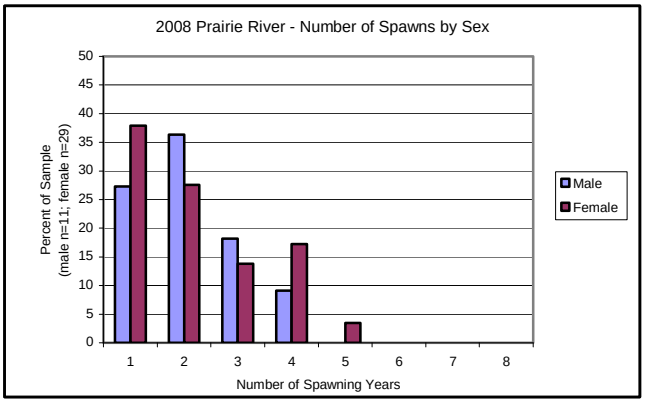

| | |
|---|---|
| Total Catch | 164 |
| Males Sampled | 91 |
| Females Sampled | 69 |
| Unknown sex | 4 |
| Mean fork length (cm) | 54.44 |
| Maiden Spawners (%) | 39.02 |
| Repeat Spawners (%) | 59.15 |

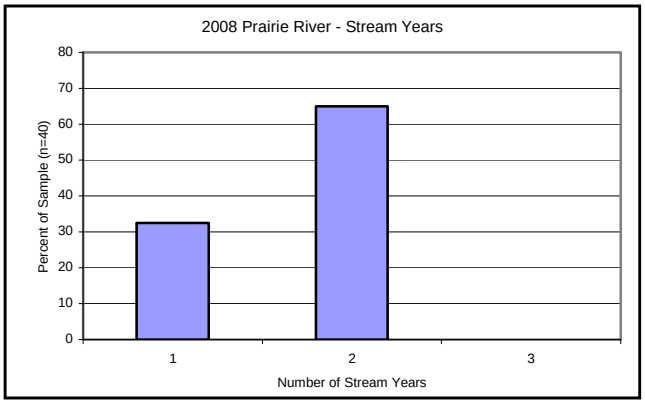
Parameters indicate that the McIntyre River population is currently healthy, but there are warning signs that warrant monitoring; while the proportion of repeat spawners is still above 50%, female maiden spawners were approaching this critical value (46%), a marked change over previous years. Further, the number of age 3 individuals in the sample was disproportionably low compared to the Cypress and Jackpine Rivers. This may indicate a weak 2005 year class in the McIntyre. It is also worth noting that only 7 of 164 fish caught (4%) exceeded the 69cm size limit for the McIntyre. The weakness of the 2002 year class has been noted in previous years, and has been attributed to severe winters in 2002 and 2003.

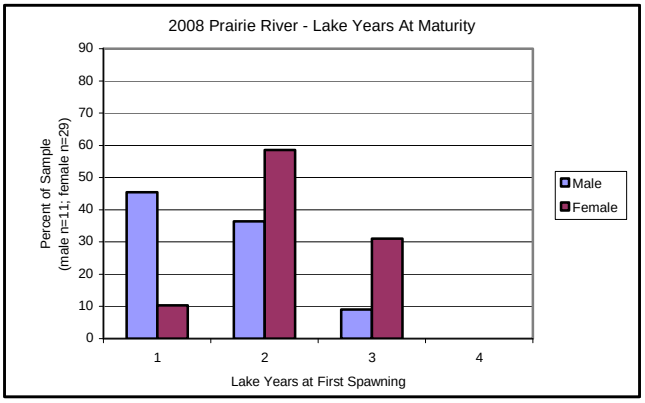
# Prairie River




| | |
|---|---|
| Total Catch | 40 |
| Males Sampled | 11 |
| Females Sampled | 29 |
| Unknown sex | 0 |
| Mean fork length (cm) | 54.73 |
| Maiden Spawners (%) | 35 |
| Repeat Spawners (%) | 62.5 |

Sample size for the Prairie River was the minimum required for data analysis (n=40); this small sample size may result in less reliability in the analysis. Despite this, all parameters indicate that the Prairie River supports a healthy population of rainbow trout. The weakness of the 2002 year class has been noted in previous years, and has been attributed to severe winters in 2002 and 2003.

## Issues and Recommendations

*Insufficient data for key tributaries*

The MNR is particularly interested in maintaining data for seven key tributaries: McIntyre, Wolf, Coldwater, Jackpine, Cypress, Steel and Prairie. 2008 data were insufficient for the Wolf, Steel and Coldwater tributaries, and were marginal for the Prairie. In the future, Co-op Program participants should be encouraged to collect data from these key tributaries.

*In-Year Recaptures*

One of the shortcomings of the current Co-op Program protocol is that fish are generally sampled and released with no unique mark or identification that they have been sampled in that season. Therefore, the possibility exists that an individual fish may be sampled multiple times in a single season, leading to bias in the analysis of the data; In 2008, of the 147 fish marked on the McIntyre River, 11 (7.5%) were recaptured later in the season.

In addition to bias in the data, in-year recaptures adds to the handling stress on individual fish. The NSSA is a conservation-minded organization, and seeks to minimize unnecessary handling of fish in order to improve their opportunities for survival.

*Measure of Effort*

The Co-op protocol does not currently include any measure of angler effort on a given tributary, which limits the utility of comparisons across several sampling years. In the future, the Co-op Program could include a simplified angler diary form, where participants can log their angling hours on each tributary.

*Unnecessary Aging Analysis*

In order to perform an adequate analysis of the data, the minimum number of samples required from an individual tributary in any given year is forty; this has been consistent since the inception of the original Co-op Program in 1991. However, it has been common practice for all fish samples to be submitted for aging analysis, regardless of which tributary the sample came from; in 2008, 150 fish were aged from tributaries which lacked the minimum sample size. At a cost of $6.50 per sample, this represents $975 from the project budget which has not produced useful data.

In the future, the sample size from each tributary should be determined prior to submitting the samples for aging, and only those tributaries that meet or exceed the minimum requirement should be put forward.

## References

George, J. 1994. The status of rainbow trout (*Oncorhyncus mykiss*) in the Canadian waters of Lake Superior based on frequency of repeat spawners 1991-1993. OMNR LSMU Rpt. 28 p.

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