# Summary of Data from the Atikokan Bass Classic on Marmion Lake
# 2008-2012

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## Introduction

2012 marks the fifth year that the Atikokan Bass Classic (ABC) tournament was held on the Marmion Reservoir after being held on the Dashwa/Crowrock/Turtle system from 1994-2004. Marmion Reservoir is a large (9460 ha) waterbody divided into Lower Marmion (3985 ha) and Upper Marmion (Upper Floodwaters) (5475 ha) by the Marmion sluiceway (Figure 1). Smallmouth bass first appeared in Marmion in the late eighties, likely from downstream movement of fish introduced into an adjacent lake. By 2000, they could be found throughout both lakes and had become abundant throughout the system by 2005.

Along with the change of location, the tournament was expanded from ~60 teams to over 100 teams. One of the expected results was that bass size would increase with the move. It was also expected that the increase in size of fish would mean higher stress on fish in live wells (more weight of fish in the same volume of water). Partially because of this, the daily limit was reduced to 5.

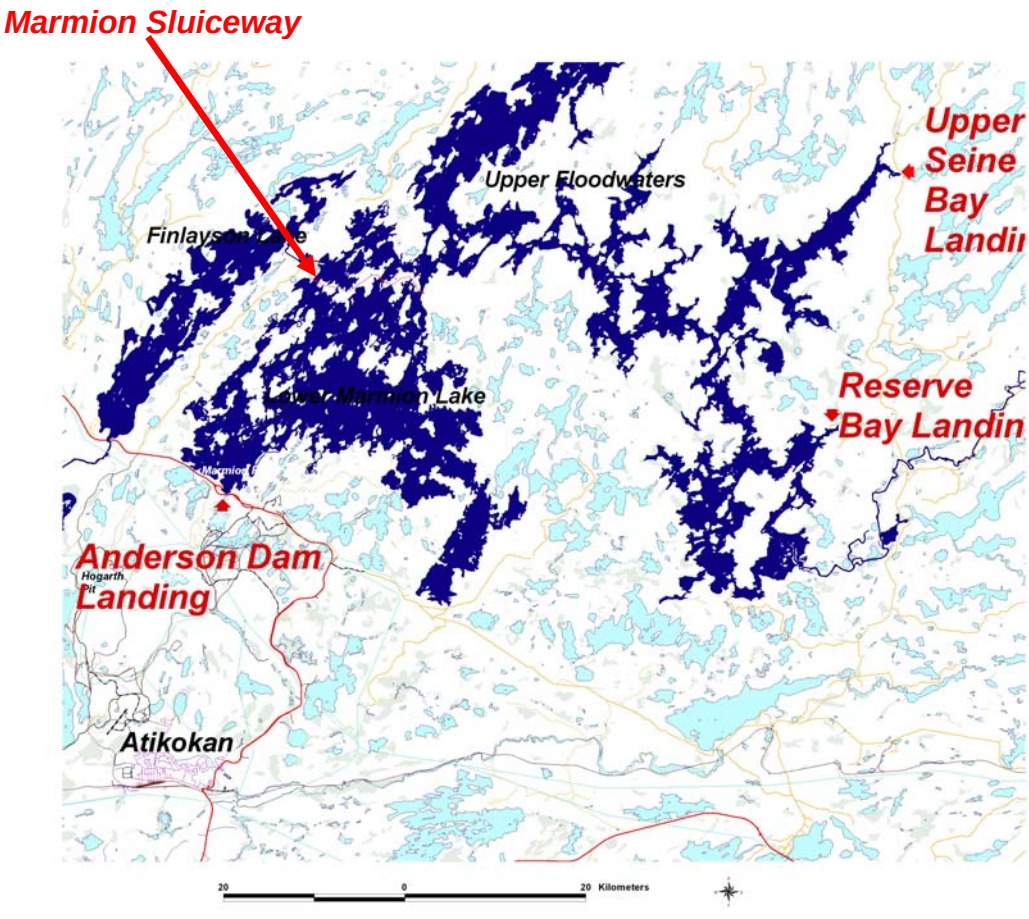



Figure 1: Marmion Lake showing the Upper Floodwaters and Lower Marmion Lake.

## Results

A total of 109 teams (up one team from 108 in 2011) started the 2012 Atikokan Bass Classic (www.atikokanbassclassic.com) which was held on August 17th and 18th, 2012. In response to questions about general fishing location, approximately 41% of teams reported that they fished only on Lower Marmion on Day 1 of the tournament. Day 2 saw an increase to 46% of teams fishing on only Lower Marmion. The number of teams fishing on both upper and lower Marmion decreased from Day 1 (41%) to 30% on Day 2, while the number of teams fishing the Upper Floodwaters increased slightly from Day 1 (20%) to Day 2 (22%). There has been a trend in recent years for more anglers to fish on the Upper Floodwaters or on both lakes (Figure 2). Angling was very successful with 95% of anglers weighing full limits on day 1 and 96% on day 2.

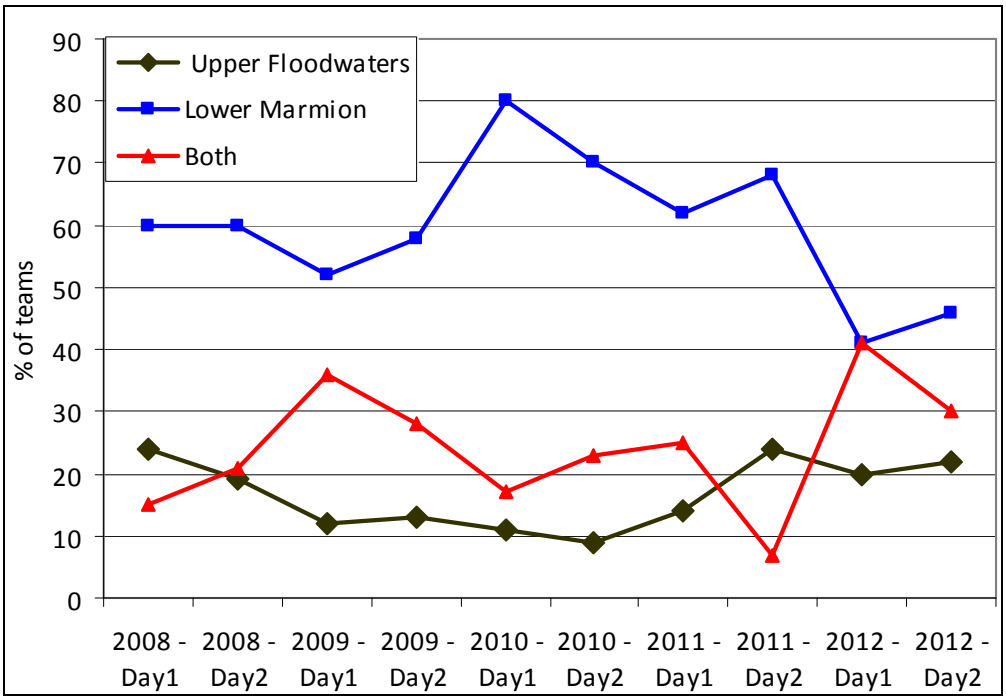


Figure 2: Angler reported fishing location by day for Atikokan Bass Classic

## Tournament Weigh-in Data

Table 1: Number and weight of smallmouth bass weighted at the Atikokan Bass Classic from 2008 to 2012

| Year | # of teams | # of fish | total weight (lbs) | average weight (lbs) | average weight (kg) |
|---|---|---|---|---|---|
| 2008 | 91 | 884 | 2321 | 2.6 | 1.19 |
| 2009 | 108 | 1038 | 3039 | 2.9 | 1.33 |
| 2010 | 109 | 1061 | 2950 | 2.8 | 1.26 |
| 2011 | 108 | 1029 | 2807 | 2.7 | 1.24 |
| 2012 | 109 | 1035 | 2893 | 2.8 | 1.27 |

The average weight of fish weighed at the tournament has been fairly consistent over the last 5 years with a 5-year average of 2.76lbs (1.26kg). The total number of fish caught during the tournament has also been fairly consistent during the last 4 years; the average number of fish caught and weighed per team has been very consistent with a 5-year average of 9.6 fish/team.

The weight of the 10 bass weighed as part of the winning catch decreased slightly from 2011 and averaged 1.83kg (4.03lbs) compared to 1.94kg (4.26lbs) in 2011. However, it was slightly higher than the year before (1.74kg (3.83lbs) in 2010). To place in the top 3 teams, anglers need to have bass that averaged around 1.8 kg (3.98lbs).

The largest bass weighed in 2012 was 2.56kg (5.6lbs), smaller than the largest bass weighed in 2011 of 2.81kg (6.2lbs) but larger than the largest fish from 2010 of 2.38kg (5.2lbs). The largest bass ever weighed previously at the ABC tournament when it was on Dashwa/Crowrock/Turtle was 1.82 kg (4.0 lbs) in 1998.

**MNR Sampling Data**

Table 2: Number and size of smallmouth bass sampled at the Atikokan Bass Classic – 2008-2012.

| Year | Sample Size | Avg. Wt (g) | Avg. Wt (lbs) | Avg. Fork length (cm) | Average total length (cm) | Avg. age (yrs) | Condition Index (rwt@400mmFL) |
|---|---|---|---|---|---|---|---|
| 2008 | 177 | 1261 | 2.78 | 40.9 | 43.3 | 8.0 | 1152 |
| 2009 | 212 | 1324 | 2.92 | 41.7 | 44.0 | 8.7 | 1146 |
| 2010 | 211 | 1282 | 2.83 | 41 | 43.3 | 8.5 | 1168 |
| 2011 | 182 | 1403 | 3.09 | 41.8 | 44.3 | 9.4 | 1202 |
| 2012 | 203 | 1276 | 2.81 | 40.9 | 43.3 | 8.3 | 1165 |

Bass sampled in 2012 averaged about 1 cm shorter than fish sampled in 2011 and were the same average length as in 2010 and 2008. The greatest average total length of bass was seen in 2009 with an average length of 44 cm. The size range has remained relatively consistent with most fish being weighed at the tournament ranging fro 40 to 48 cm in length (Figure 3).

Fish Quality Index (FQI) in 2012 was 256, very similar to previous years of 265 in 2011, 256 in 2011, 262 in 2009 and 254 in 2008. This is much higher than previous levels from Dashwa/Crowrock/Turtle of 90 -165 (1994-2007) and at the high end of the range from Rainy Lake bass which had FQI values of 188-250 between 1995 and 2009.

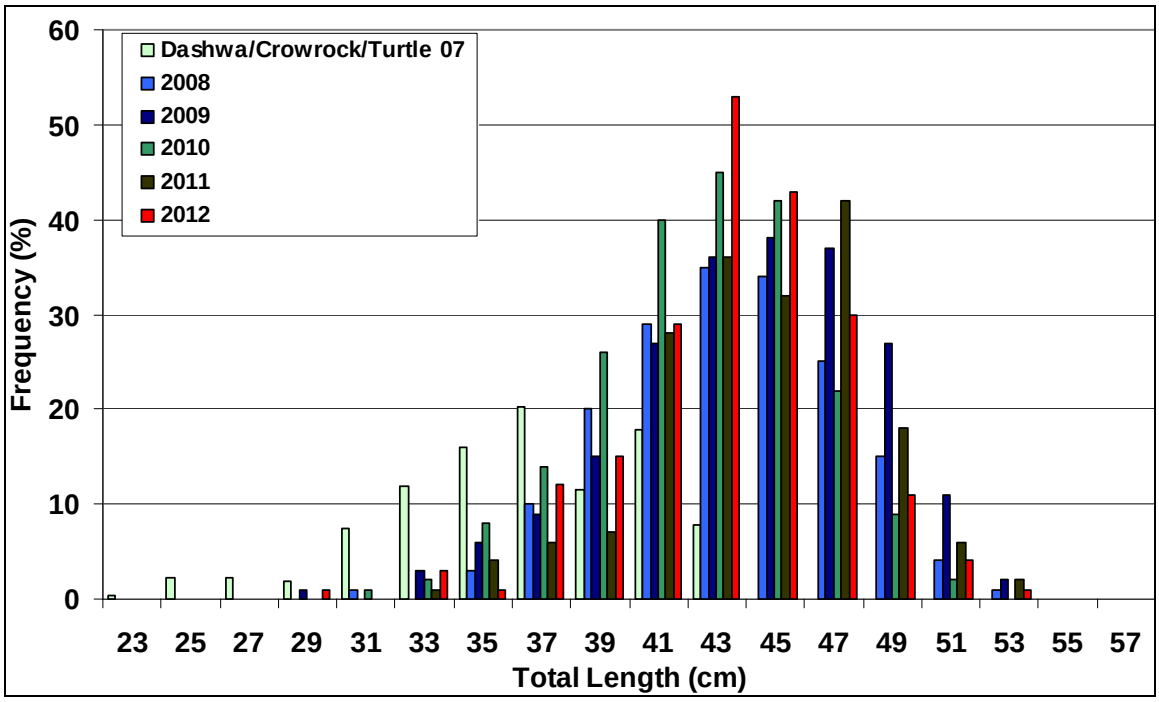
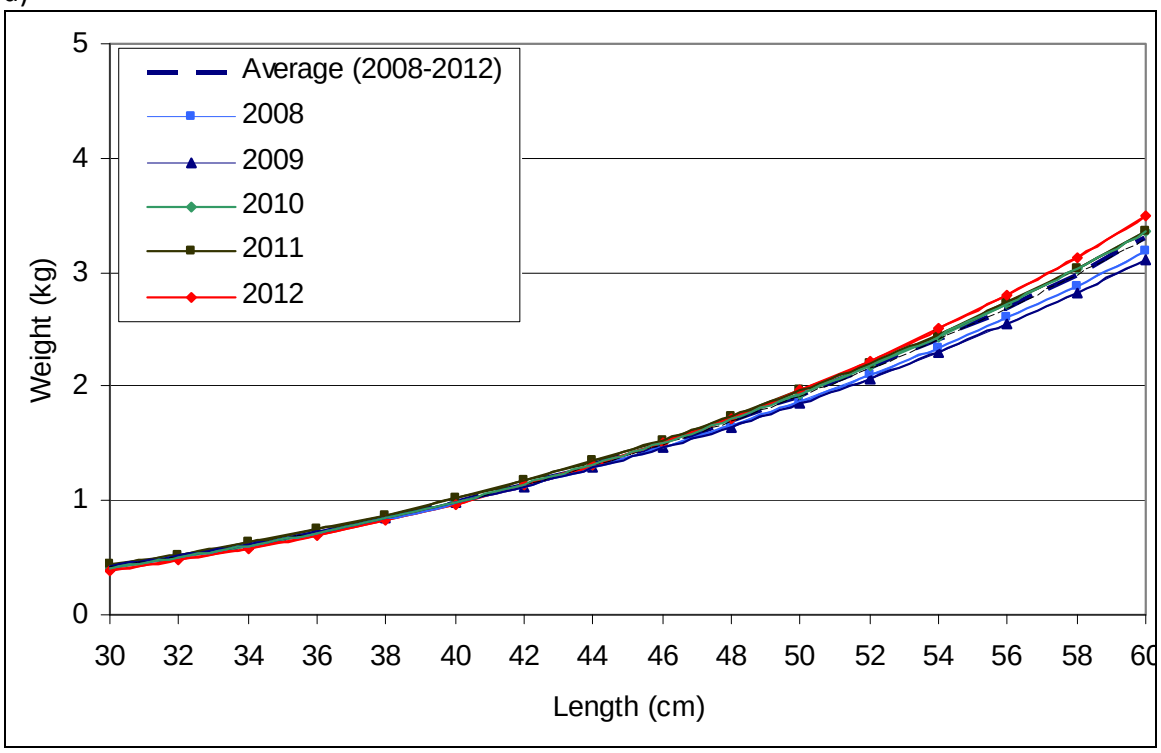



Figure 3: Length distribution of smallmouth bass sampled from Marmion Lake during the Atikokan Bass Classic from 2008-2012 compared with 2007 tournament data from Dashwa/Crowrock/Turtle.

Condition (i.e. weight at a given length or how fat the fish are) for Marmion bass based on 2008 to 2012 data is provided in Figure 4. The general trend has been an increase in condition of bass with a 50 cm (19.5”) bass weighing about 100 g (0.2lb) more in 2012 than in 2008.

a)

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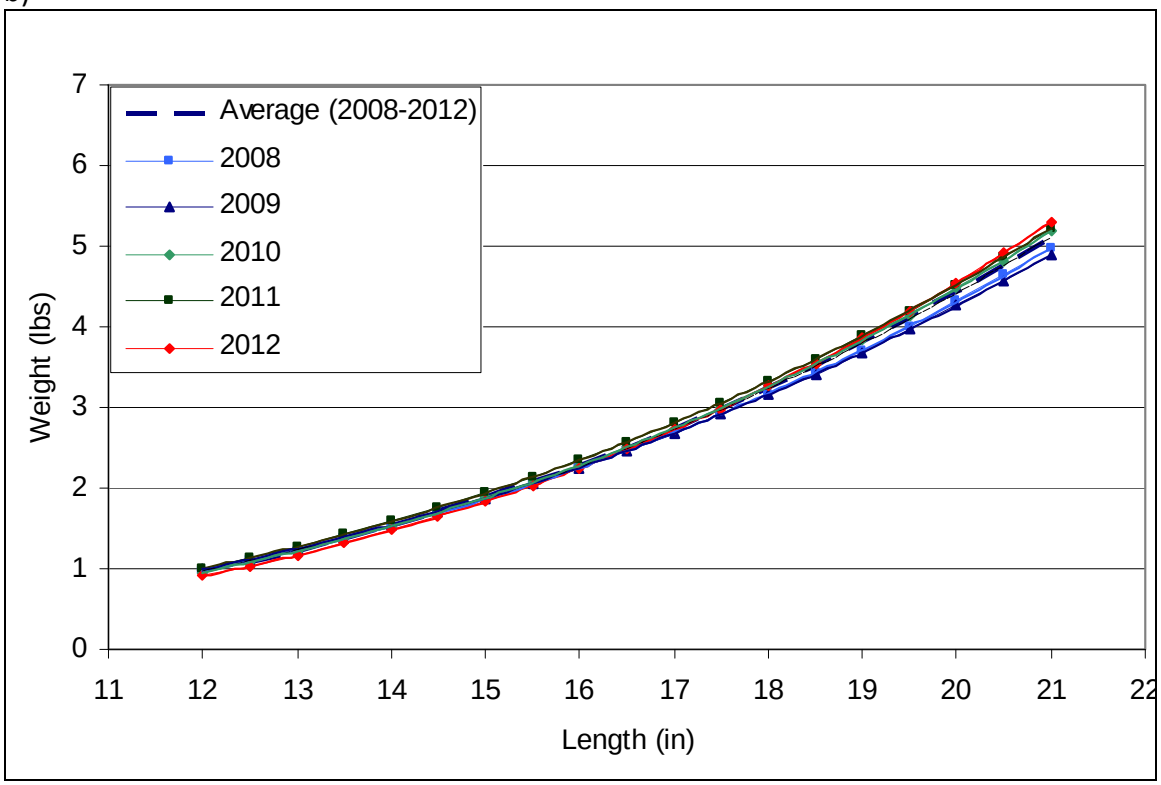


Figure 4: Weight at length for smallmouth bass from Marmion Lake based on 2008 to 2012 Atikokan Bass Class data in a) kg/cm and b) lbs/inch

## Age Data

Bass sampled from Marmion in 2012 were dominated by age 8 and 9 fish . Age distribution of bass has been relatively similar between years except for the 2008 sample which had a higher proportion of 5-7 years olds. The average age of fish sampled was 8.3 years, lower than 9.4 yrs in 2011 but similar to previous years.

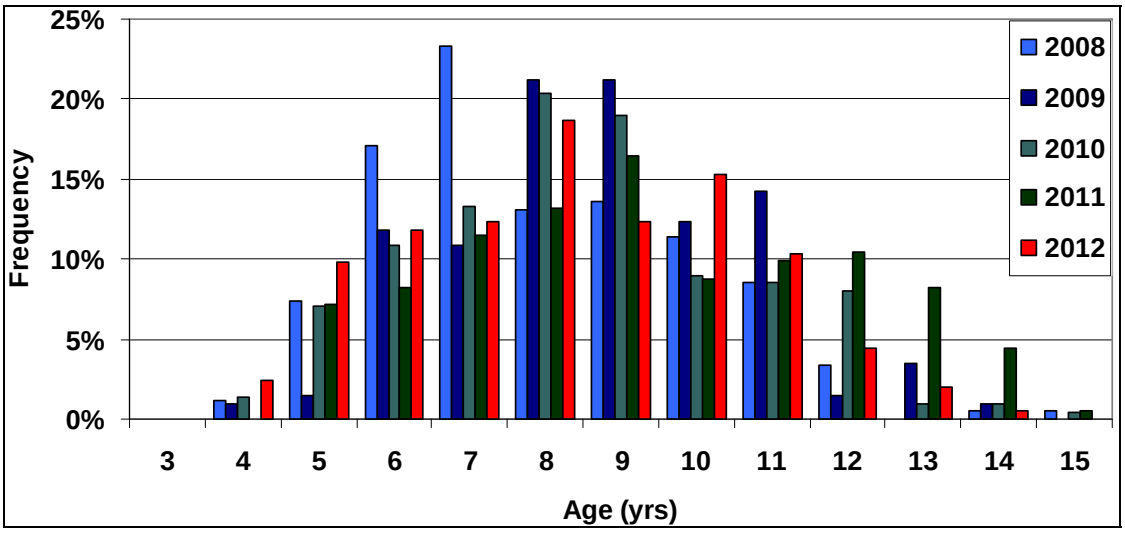


*Figure 5. The age distribution of smallmouth bass sampled from Marmion Lake during the Atikokan Bass Classic – 2008-2012.*

Growth of smallmouth bass from Marmion has remained similar since 2008 with a recent trend for somewhat faster growth in younger fish and growth slowing down in older fish compared to previous samples (Figure 6).

Marmion Lake bass tended to be faster growing than both bass from Dashwa/Crowrock/Turtle and Rainy Lake. (Figure 7). A smallmouth bass at the age of 10 yrs from Marmion was 46.5 cm, while the average length of the same aged bass sampled between 1994 and 2007 from Dashwa/Crowrock/ Turtle would average 42.5 cm and Rainy Lake bass sampled between 1995 and 2010 averaged just over 43 cm.

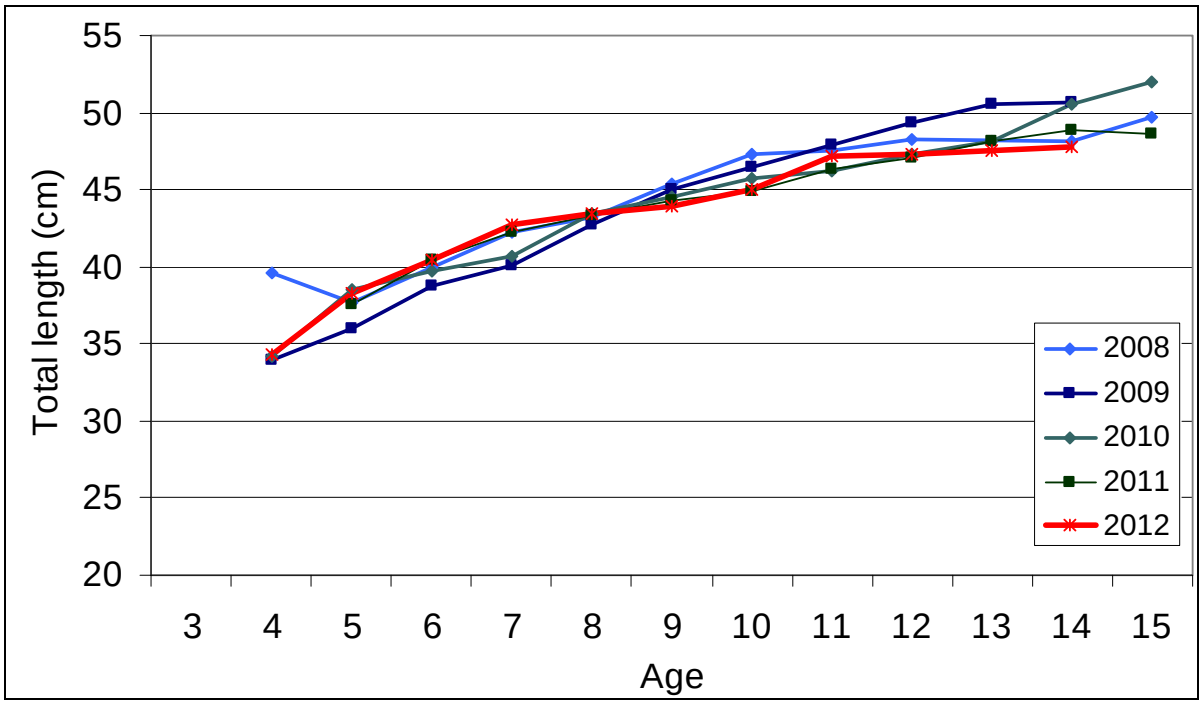


*Figure 6. The average total length (cm) at age for smallmouth bass from Marmion sampled at the 2008 to 2012 Atikokan Bass Classic.*

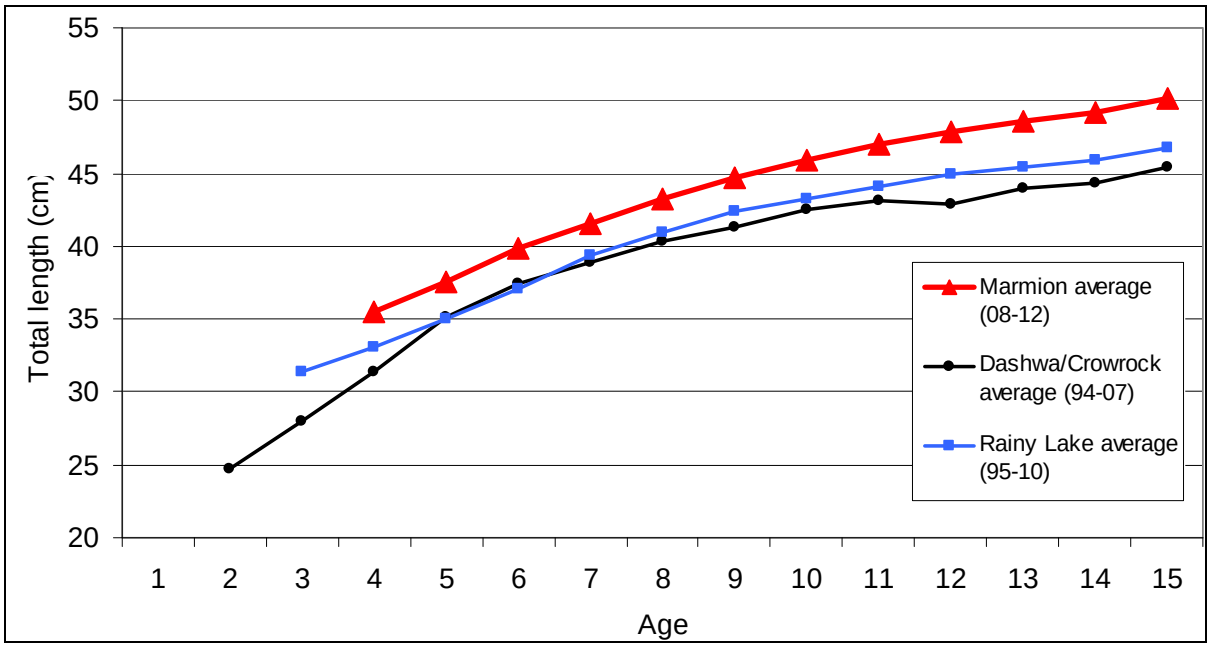


*Figure 7. The average total length at age for smallmouth bass from Marmion compared with fish sampled from Dashwa/Crowrock/Turtle (1994-2007 average) and Rainy Lake (1995-2010 average).*

## Dissolved Oxygen and Temperature Data

As in previous years, temperature and oxygen levels of competitor's livewells were measured at the landing prior to leaving the lake and in town prior to the weigh in. Oxygen was added to livewells at both locations if needed.

Conditions during the tournament were cooler than past years with maximum air temperatures of 20.2°C for Friday and 19.6°C for Saturday being reported by Environment Canada for Atikokan. Temperatures for the 2012 tournament were the lowest observed since 2008 (Figure 8).

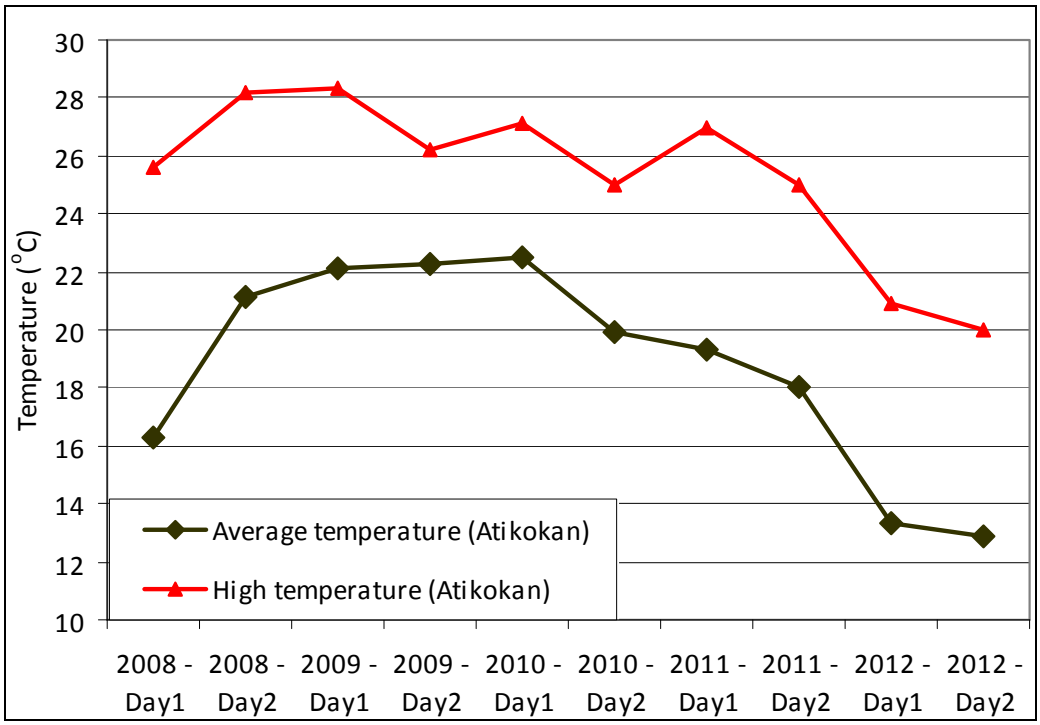


*Figure 8. The average and maximum daily recorded temperature at Atikokan (Environment Canada data).*

## Marmion Landing Data

Livewell temperatures measured at the Marmion landing on Day 1 and Day 2 were lower than previous years following the pattern of lake surface temperatures (Figure 9). Dissolved oxygen levels in competitors livewells averaged 6.1 mg/l on Day 1 (range from 1.7 mg/l to 8.5 mg/l), the highest average levels recorded since 2008 (Figure 10). Dissolved oxygen levels measured on Day 2 were also higher than the previous 4 years' average (5.87mg/l). The dissolved oxygen measured at the surface of Lower Marmion was slightly higher than the average for the previous 4 years. The percentage of

livewells with low levels of oxygen (below 4 mg/l) was the lowest recorded since 2008 with only 10% of the livewells having low oxygen levels on day 1 and 17% on day 2 (Figure 11). In previous year's tournaments between 2003 and 2007, the average number of boats at the Dashwa landing with less than 4.0 mg/l dissolved oxygen was only 12%, possibly reflecting the lower oxygen demand of the smaller bass captured from that lake. At dissolved oxygen levels less than 5.0 mg/l, bass have been found to have effects related to increased stress and levels below 4.0mg/l begin to result in increased mortality.

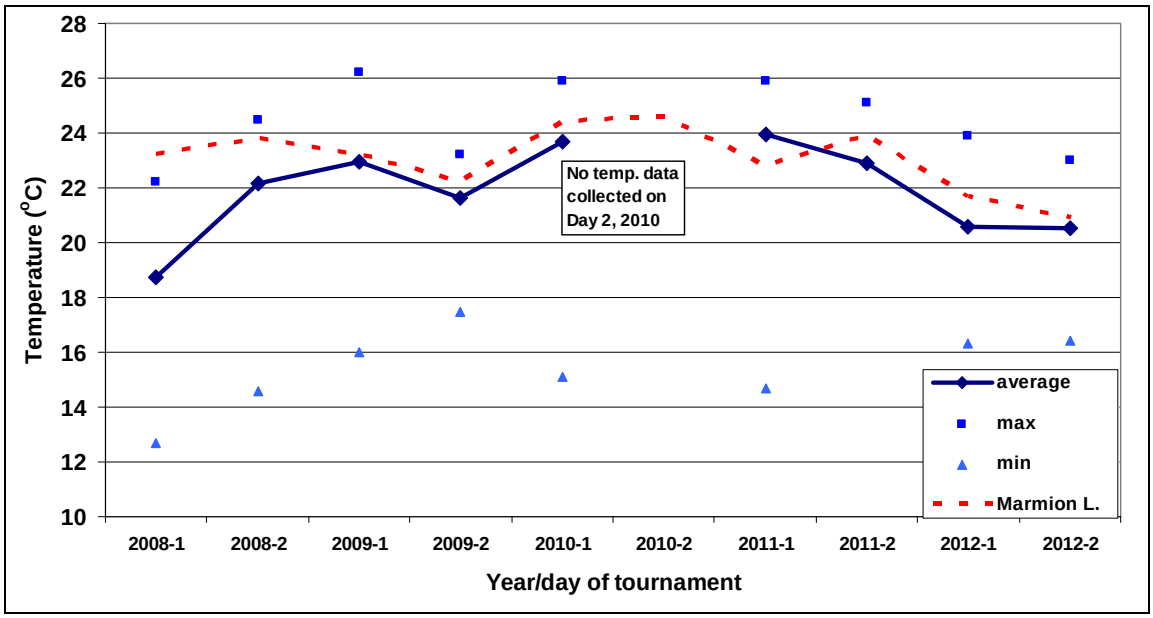


*Figure 9: Livewell temperatures measured at Marmion landing for ABC competitors, 2008-2012*

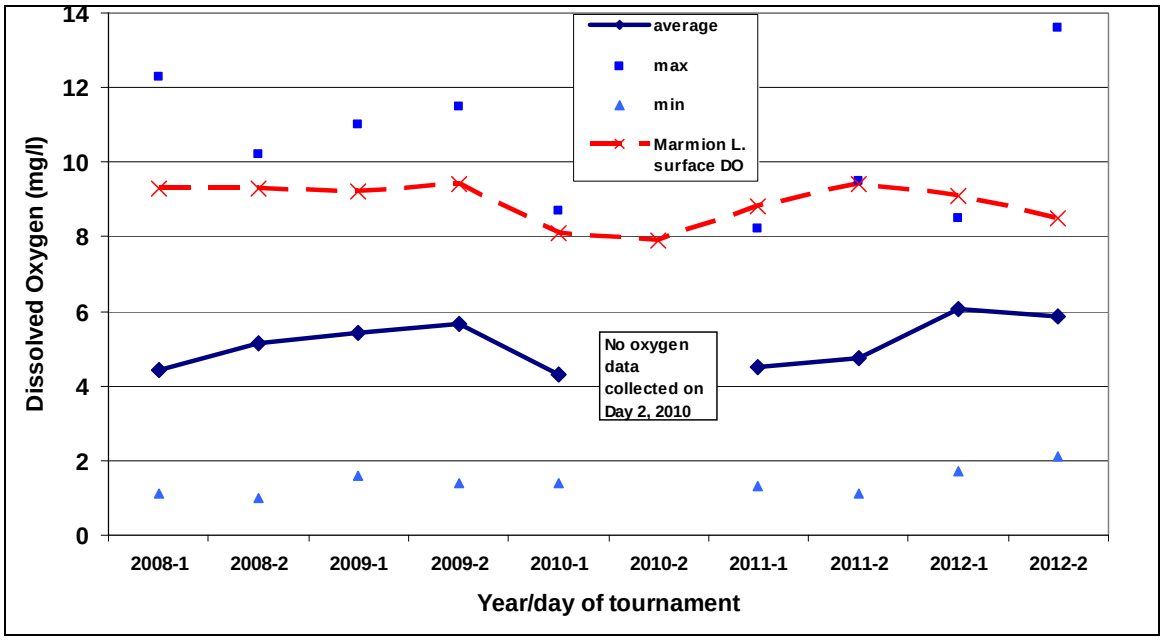


*Figure 10: Livewell dissolved oxygen levels at Marmion landing for ABC competitors, 2008-2012*

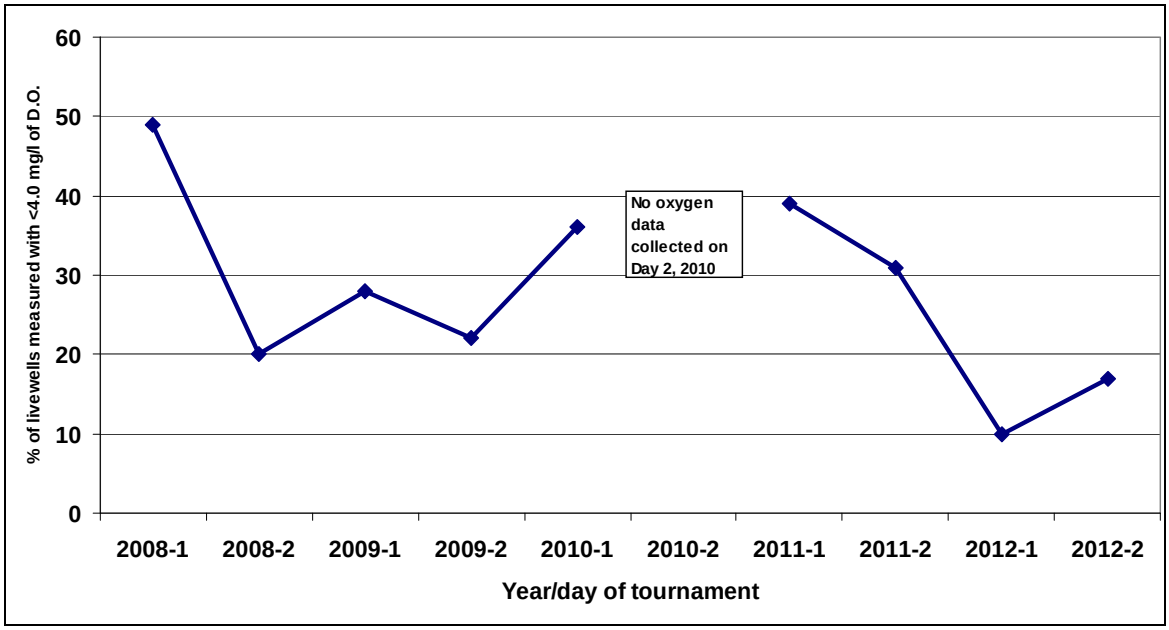


*Figure 11: Percent of livewells with dissolved oxygen levels less than 4.0mg/l at Marmion landing for ABC competitors, 2008-2012*

## Atikokan Monitoring Station data

The time between having livewell temperature and dissolved oxygen assessed at the Marmion landing and at the Atikokan station averaged 27 minutes on Day 1 and increased slightly to 31 minutes on Day 2 (Figure 12). This continues a general pattern of reducing travel time between the two oxygen stations since the tournament was moved

to Marmion Lake. Notably, the maximum time that it took for a boat declined so that no boat took longer than 51 minutes on Day 1 in 2012. Unfortunately, on Day 2 the maximum travel time increased to 90 minutes. However, this time is still less than the maximum travel times recorded in 2011 for both days. Travel time between Dashwa and Atikokan between 2004 and 2006 averaged 61 minutes.

Livewell temperatures decreased between Marmion and Atikokan about 4°C on both days, similar to what was observed in previous years (Figure 13).

In 2012, there were few issues with livewell dissolved oxygen. The percentage of livewells with dissolved oxygen below 4mg/l (the concentration at which bass begin to show signs of stress) once they reached town was the lowest recorded with only 1% of teams showing DO levels below 4mg/l on Day 1 and only 14% of teams recording similar levels on Day 2. Fortunately, these values are lower than in 2011 when 63% of teams had low DO values on Day 1 and 49% of teams had low values on Day 2.

Unfortunately, dissolved oxygen readings taken from livewells in town during both days in 2010 appear to be incorrect. In 2008 and 2009, livewell dissolved oxygen levels had declined about 4 mg/l from the 8mg/l they started with at the landing and about 50% of the boats had low oxygen levels (less than 4 mg/l) (Figures 14 and 15).

For comparison, the percentage of livewells with less than 4.0mg/l between 2004 and 2006 on Dashwa was only 5% and for the last year measured (2006), no livewells were found with dissolved oxygen levels below 4.0 mg/l.

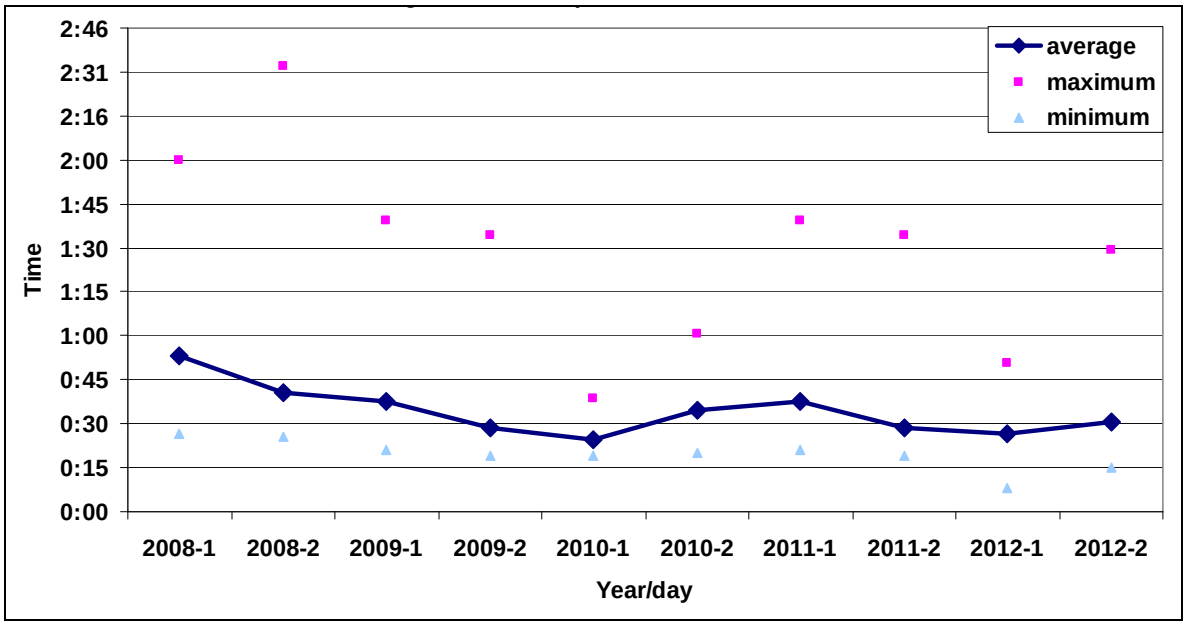


*Figure 12: Travel time between having livewell water quality measured at Marmion landing and in Atikokan for ABC competitors, 2008-2012*

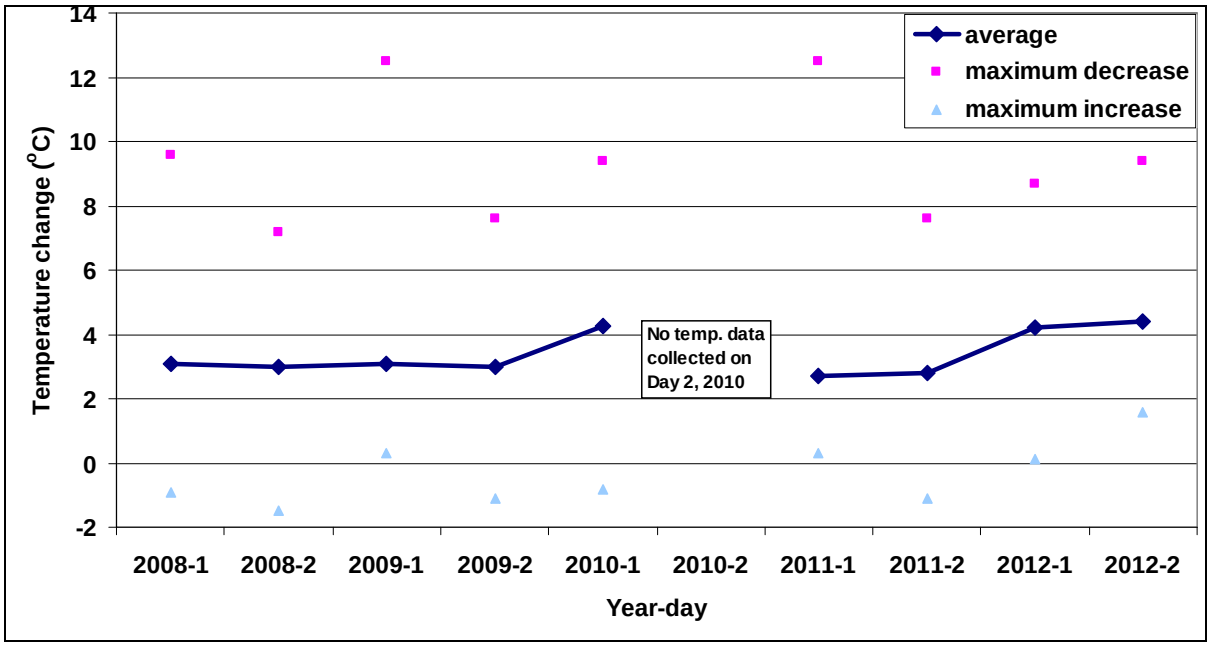


*Figure 13: Average decrease in livewell temperatures measured at Marmion landing and Atikokan for ABC competitors – 2008 to 2012*

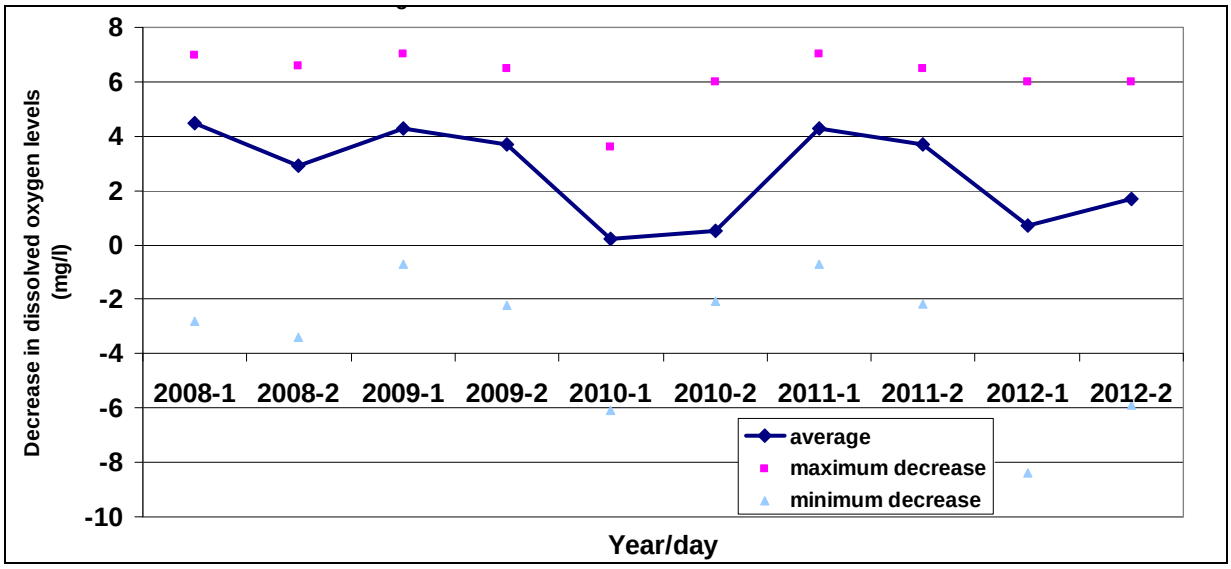


*Figure 14: Decrease in oxygen levels measured at Marmion landing and Atikokan for ABC competitors – 2008 to 2012. Note there were issues with dissolved oxygen data collected in town in 2010.*

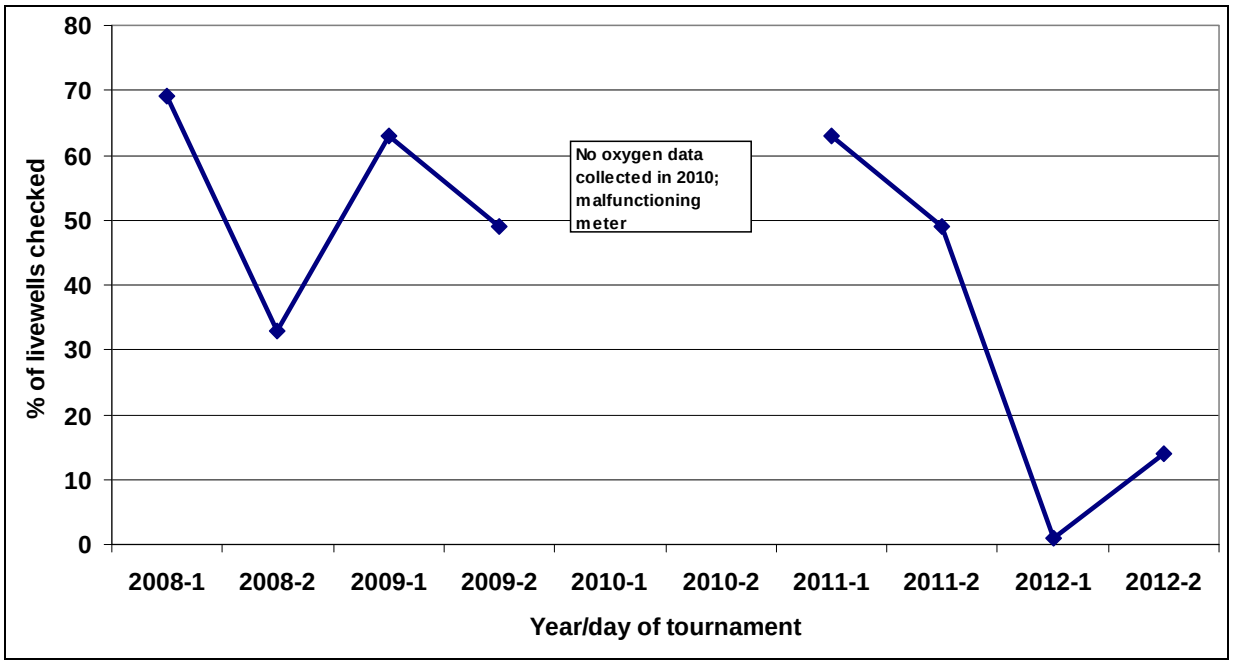


*Figure 15: Percent of livewells with dissolved oxygen levels less than 4.0mg/l at Atikokan for ABC competitors from 2008 to 2012. Note there were issues with dissolved oxygen data collected in town in 2010.*

Coinciding with reduced travel times in 2012, higher oxygen levels in livewells and cooler temperatures, observed mortality was lower in 2012 than observed in any previous year. Observed mortality prior to release was 1.3% on Day 1 (522 bass weighed) and 1.9% on Day 2 (513 bass weighed) compared to an average of 4.9% in the previous 4 years (Figure 16). Previous mortality levels between 2003 and 2007 on Dashwa system averaged ~2% and appeared to be mainly associated with hooking injuries. No study of post release mortality has been completed for the Marmion based tournament and this remains unknown. A study to look at mortality after release in 2003 at the Dashwa site found that no fish had died in the 48 hrs after release.

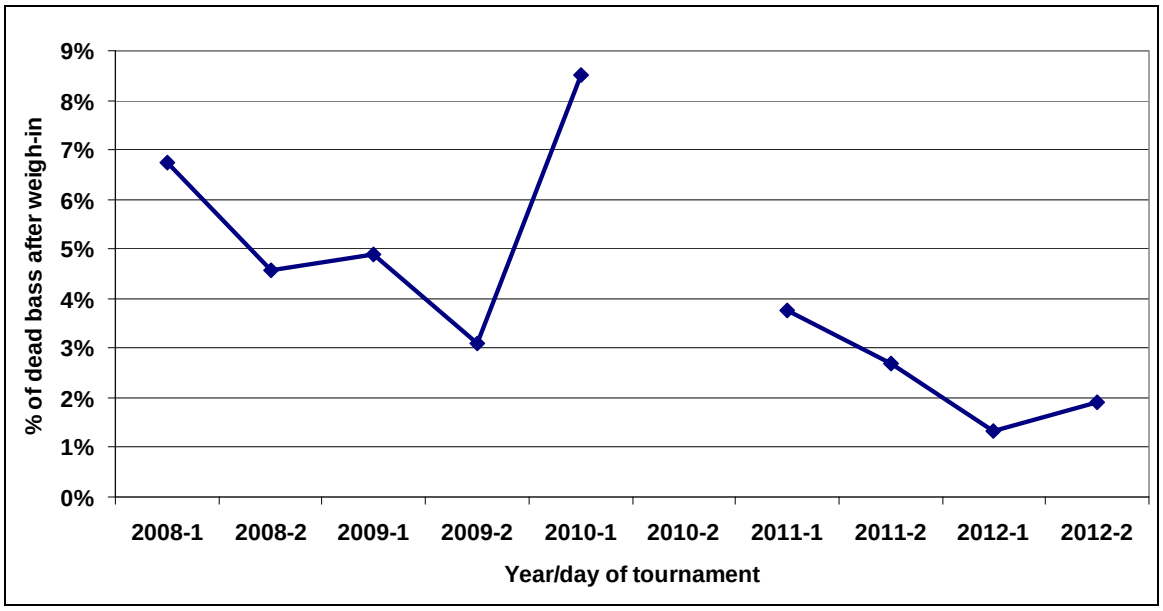


*Figure 16: Observed smallmouth bass mortality up to time of release – Atikokan Bass Classic, 2008 to 2012*

**Conclusions and Recommendations**

The fifth year of having the Atikokan Bass Classic on Marmion Lake confirmed many of the findings from the previous years. As expected, moving the tournament to Marmion resulted in more and larger bass being caught, becoming one of the top tournaments in the region in terms of catch and size. However, having more and larger bass in the same sized livewells has increased issues with bass health and survival. There have been some improvements in 2012, particularly with a reduction in travel time, which suggests that the organizers have dealt well with some of the bottlenecks affecting the amount of time fish spend in livewells and out of water. The decrease in overall mortality in 2012 suggests that handling methods may have also improved. In spite of that, there are still issues with the percent of livewells that have stressful levels of dissolved oxygen when competitors reach Atikokan (i.e. <4.0 mg/l). In looking at some of the factors that could affect the amount of dissolved oxygen remaining in livewells such as travel time or weight of bass in the livewell, the strongest relationship was the weight of bass in the livewell (more bass resulted in less oxygen remaining). Short of reducing the daily limit of bass, there would seem to be little that could be done to reduce this effect other than continuing to ensure temperatures and oxygen levels are maintained at suitable levels and minimizing travel times between oxygen stations at Marmion and Atikokan. Other factors that have not been measured include the differences in livewells between boats and, particularly, the volume of water in them.

The ABC committee should be commended for the efforts they undertake to improve bass survival. Several people involved with bass tournaments across Ontario and mid-west U.S. report that although there are other locations that measure oxygen and

temperature levels in angler's livewells, there are very few that take actions such as adding oxygen or cooling water in an effort to increase survival of the fish.

Recommendations

- Continue sampling bass catches at the tournament as it provides an invaluable data set to look at trends in bass populations, both from individual lake effects as well as impacts of large scale effects such as changes in temperature.
- Continue monitoring temperature and oxygen levels in livewells in an effort to continually improve the survival of bass caught and weighed in the tournament.
- MNR and ABC to conduct a delayed mortality study to look at longer term (48hr) survival of bass after release.
- Suggestions for tournaments organizers to improve bass survival include:
    - Look at ways of insuring adequate volume of water for bass while being moved (provide anglers with containers of adequate volumes of oxygenated water?)
    - Continue monitoring temperature and oxygen levels and adding oxygen to livewells at landing and at town and ensure that dissolved oxygen meters are properly calibrated.
    - Increased education to participants about the importance of maintaining the maximum volume of fresh oxygenated water in their livewells.

**Acknowledgments**

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