Long-Term Temperature Trends in Big Platte Lake, MI

This report analyzes temperature data for Big Platte Lake to determine if long-term increases or decreases have occurred over the last 25 years.

The Platte Lake Improvement Association and the Platte River State Fish Hatchery have been measuring the Lake temperature at several depths every 2 weeks when weather and ice conditions are safe.

Measurements are taken at the surface and at depths of 7.5, 15, 30, 45, 60, 75, and 90 feet.

Approximately 3,400 temperature measurements have made over the 25 year study period.

All data are recorded in an ACCESS database. Figure 1 shows measured temperature at each of the 8 depths for 2010 and 2012. Note that more winter data are available for 2010 compared to 2012, and therefore it would not be appropriate to compare all the measurements in 2010 with all the measurements in 2012. This bias is avoided by only considering measurements between day 125 (May 4th) and 275 (October 1st) as shown by the red vertical lines.

Each data point in Figure 2 is a volume weighted average of the 8 depths. This is the appropriate way to represent overall temperature conditions in the Lake. Figure 3 shows the same data as Figure 2 but summarized by the minimum, maximum, and average temperature for each year during the 125 to 275 day interval.

In both representations it is seen that the regression trend line is nearly horizontal and decreases slightly of the 25 year study. Thus, it is observed that on average, the temperature of Big Platte Lake has decreased slightly over the last 25 years.

It is important to note that the volume-weighted lake water temperature is better way to detect long-term changes in climate compared to measurements of air temperature directly. This is because water temperature integrates the affect of short term fluctuations in air temperature and cloud cover.

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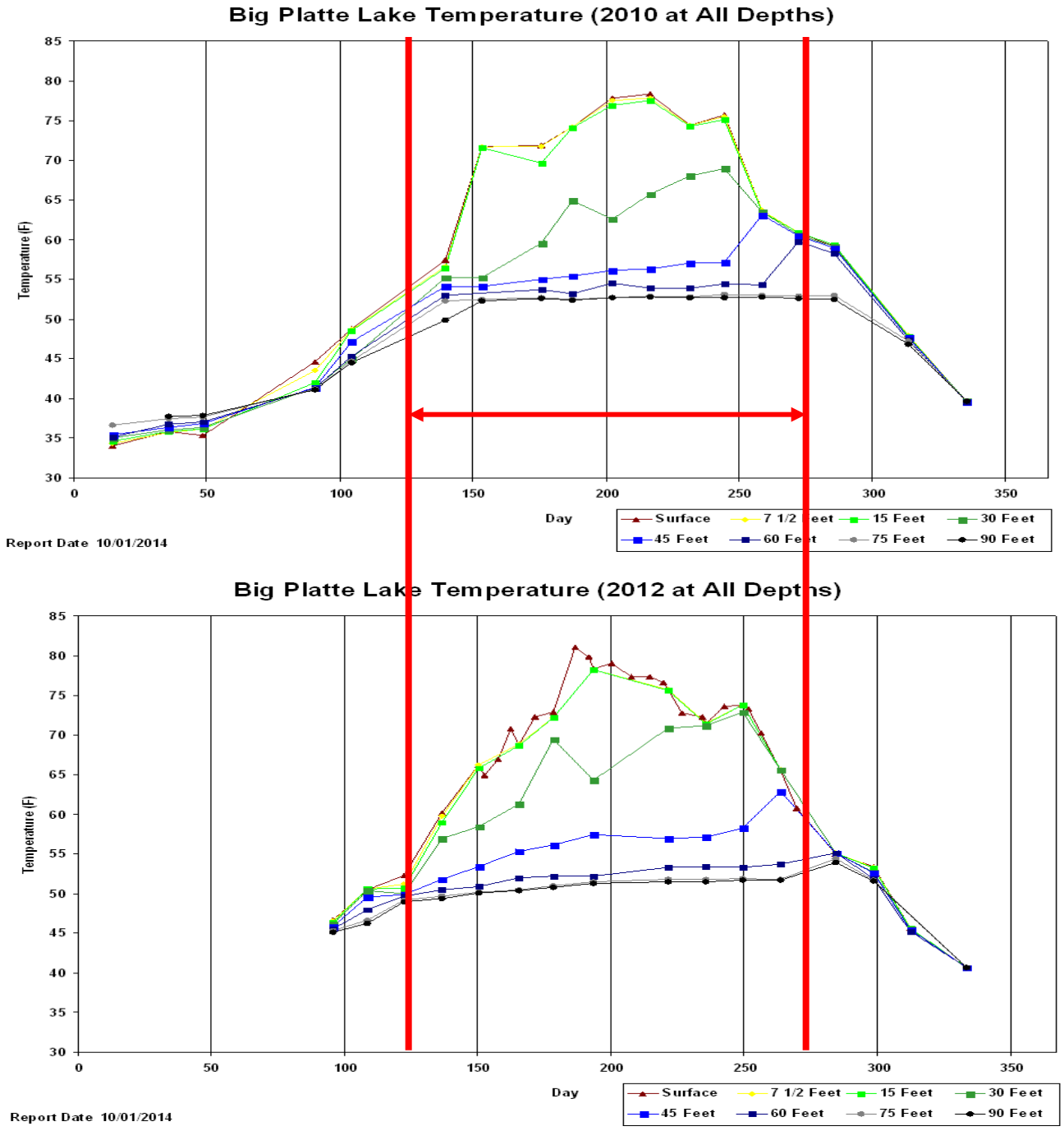
Big Platte Lake Temperature (2010 at All Depths)
Temperature (F)
Day
Surface
7 1/2 Feet
15 Feet
30 Feet
45 Feet
60 Feet
75 Feet
90 Feet
Report Date 10/01/2014
Big Platte Lake Temperature (2012 at All Depths)
Temperature (F)
Day
Surface
7 1/2 Feet
15 Feet
30 Feet
45 Feet
60 Feet
75 Feet
90 Feet
Report Date 10/01/2014

Figure 1

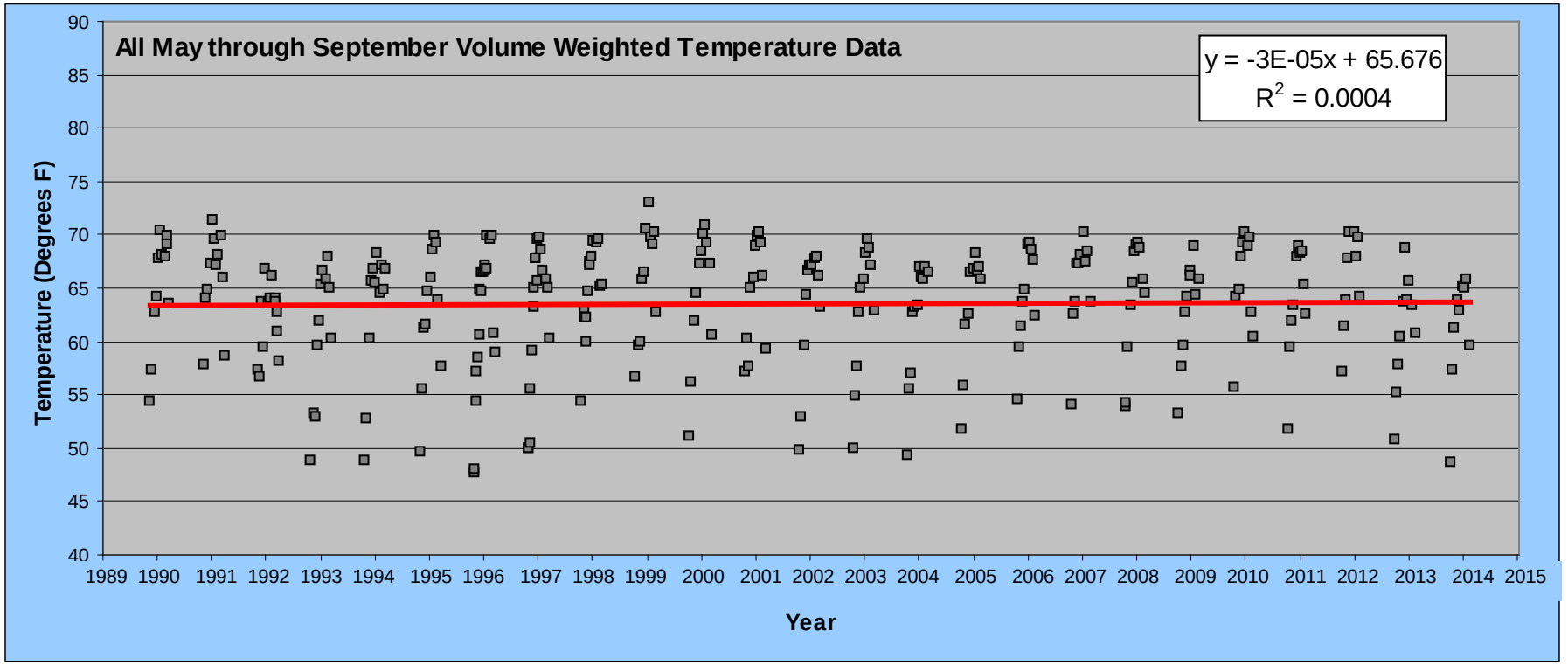
All May through September Volume Weighted Temperature Data
y = -3E-05x + 65.676
R2 = 0.0004
Temperature (Degrees F)
90
85
80
75
70
65
60
55
50
45
40
1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015
Year

Figure 2

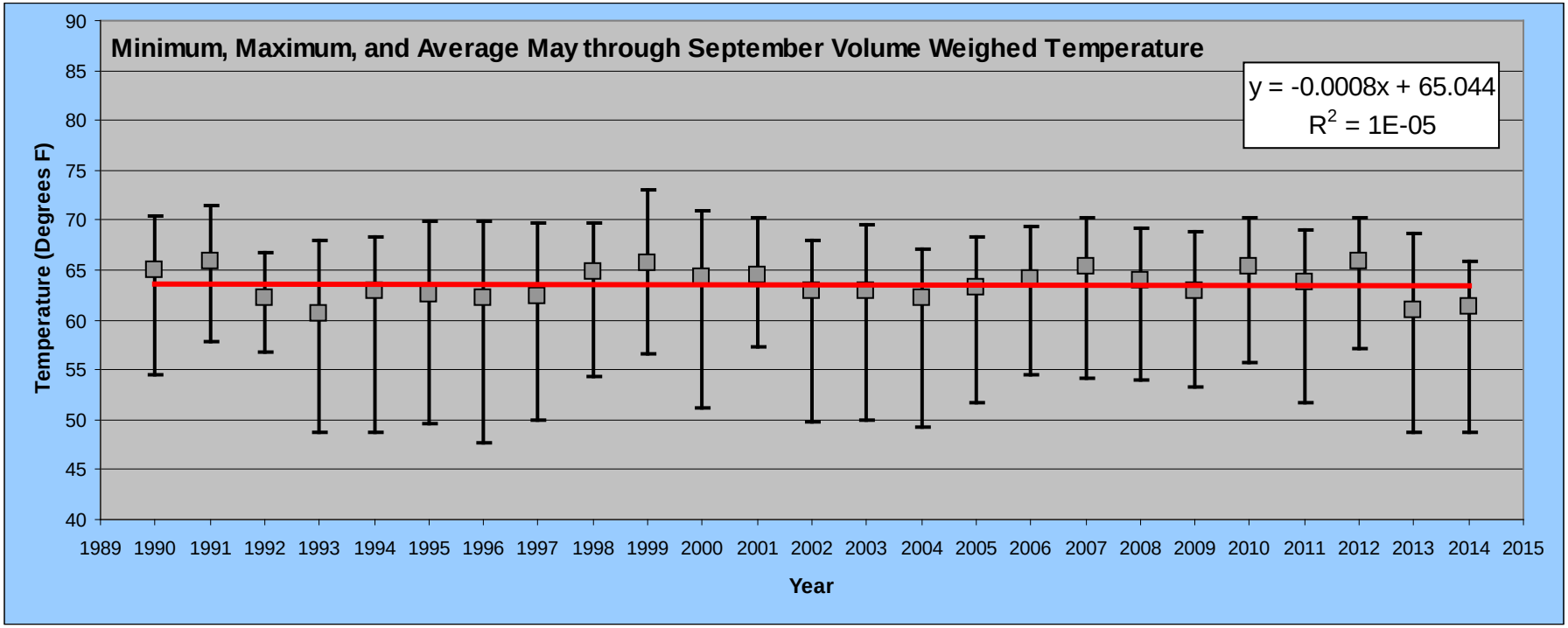
Minimum, Maximum, and Average May through September Volume Weighed Temperature
y = -0.0008x + 65.044
R2 = 1E-05
Temperature (Degrees F)
90
85
80
75
70
65
60
55
50
45
40
1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015
Year

Figure 3