Addendum

Muskegon Lake Area of Concern Habitat Restoration Project: Socio-Economic Assessment

December 2011

The purpose of this addendum is to validate some of the forecast changes predicted in the report. The report predicted that housing values would increase by $11.9 million as a result of the improved lakeshore. In addition, as a result of additional visits, the value of the recreation would increase adding $35.6 million in additional value for people that use the lake over 15 years. However, the hedonic value change used preferences for natural shoreline prior to the improvements, and the travel cost estimate used user stated beliefs that they would use Lake Muskegon more often as a result of the remediation. By the summer of 2012 most of the effects could now be seen by individuals using the lake, so the estimates calculated earlier could be compared to the actual changes seen since the report was finished.

Travel Costs

During the summer of 2012 the survey sites used in the report (figure 1) were resurveyed.

Figure 1

The survey was adjusted to not only calculate the value of recreation for the average user, but to also ask 4 new questions (the survey is attached at the end of the write-up). The four new questions were:

1. Did you come to Muskegon Lake before the restoration took place? YES NO
2. If you answered "YES" to Question 10; Is Muskegon Lake a more desirable place to visit because of the restoration?
3. Because of the restoration, have you visited Muskegon Lake
4. If you answered "LESS" or "MORE to Question 12; How much more or less do you visit Muskegon Lake now?

The results of these questions are summarized in Table 1.

Table 1

Results of 2012 Survey

Average added visits per person	4.82
Percentage of respondents coming more often because of restoration	47%
Percentage of respondents who say yes, the lake is better off because of the restoration	79%
Total responses	138

These questions allow us to determine if the expected outcomes that people reported prior to the restoration match the reality.

In the report the number of additional visits was created by using information from the contingent valuation survey. In the original survey, 49.8% of the people surveyed in Muskegon County said that they would use Lake Muskegon more often. This number was applied to the population of Muskegon County by assuming that more often meant once more per year. The 2012 survey of users found that 47% of respondents say they use the lake more often, which is not statistically different than the number found in the original survey. However, the added value of recreation assumed a single additional visit. The 2012 survey suggests that this assumption was conservative as the average user was coming to the lake 4 additional times per year. Given the small sample size, 138 users, and a sample that is representative of only a few types of recreation, I will leave the conservative estimate for the value calculations; but the new survey results suggest that the original calculations did underestimate the additional users to the lake.

HEDONICS (Housing Values)

There are many statistical ways to try to determine how a price for a house of the same quality changes over time. One way to do this is to use a technique called a fixed effect regression. This technique basically

compares the price change over time for individual houses. Using data from the Muskegon assessor's offices, the sale prices for every house sold more than once between 1995 and July 2012 are compared. Although there might be things such as renovations or an owner that does not keep up maintenance that affect the change in the price for a particular house, this technique will find the cumulative effect of all houses across the entire city. The author will provide the exact calculations upon request.

The index indicates for every 100 dollars spent on a particular house in 2000 how many dollars would need to be spent in another year to buy the same house. Looking at the graph of the price index (Figure 2), it can be seen that houses close to the lake are behaving differently than those further from the lake on the lake's south side (49441). However, on the north side of the Lake (49445) there is no statistical difference between how prices are changing (only that houses close to the lake cost more – figure 3). This is consistent with a stable north side where there has been little improvement over this time vs the south side where substantial environmental improvements have occurred recently.

Figure 2

Three Year Moving Average Housing Price Index in 49441

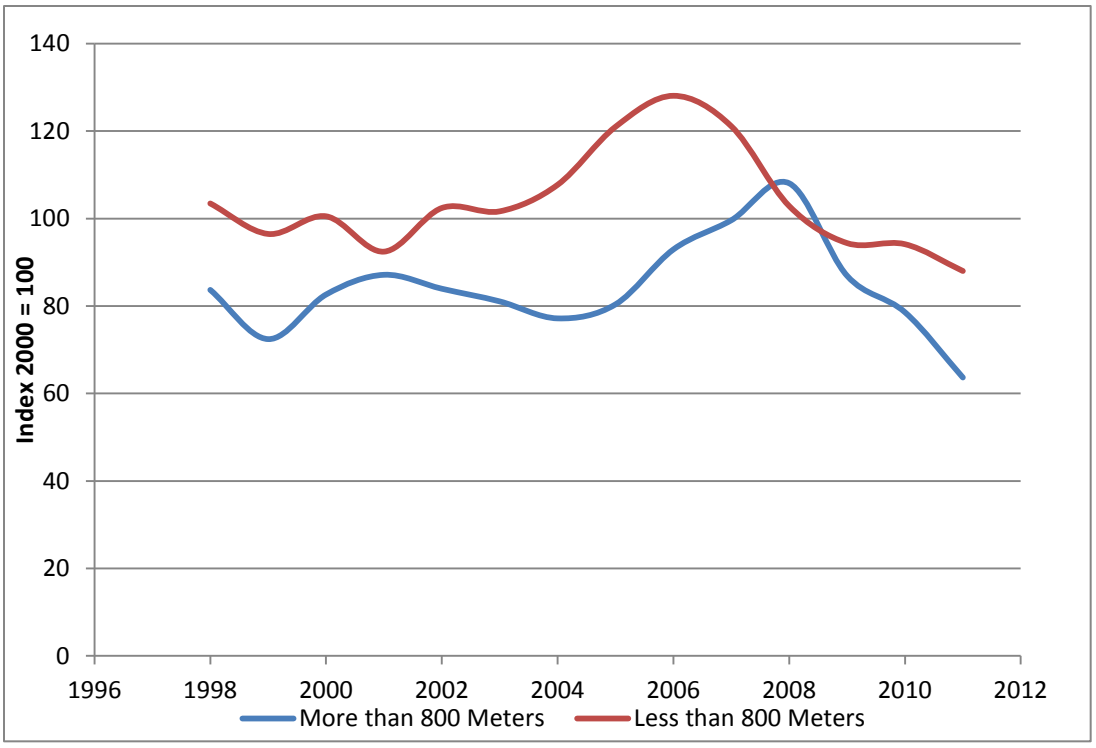
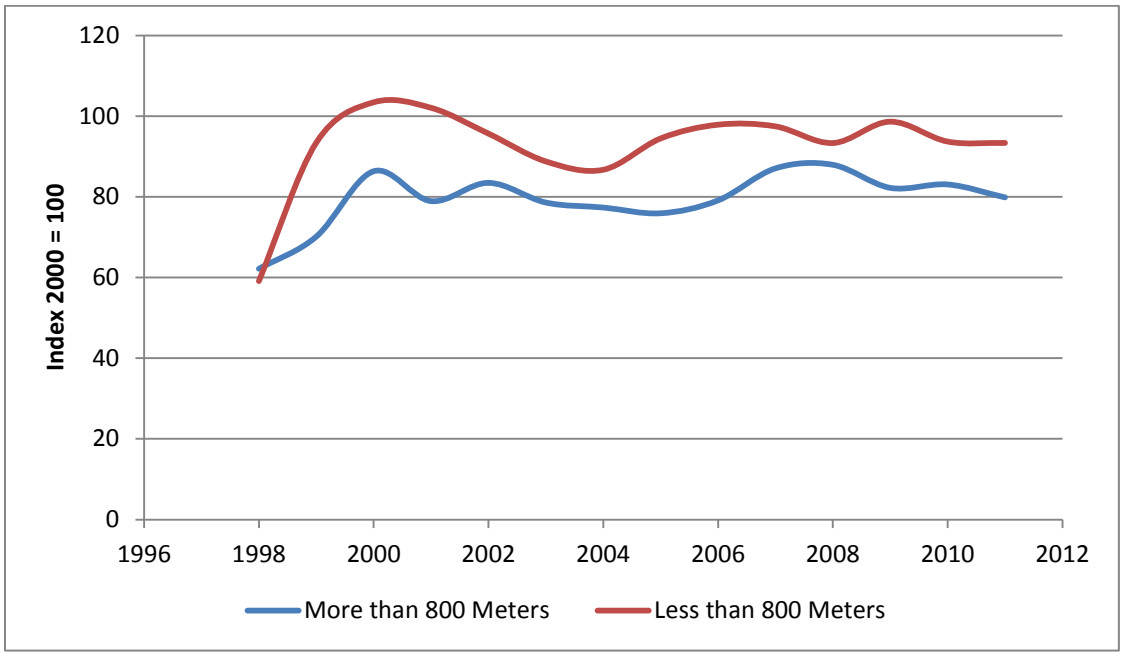


Figure 3

Three Year Moving Average Housing Price Index in 49441



Statistically, there is no difference between the price indexes for either location until after the remediation in 2011-2012 on the south side of the lake. There the index is statistically different at the 94% confidence level with the value across 49441 dropping by 24% away from the lake and by 15% near the lake. When this difference is applied to the value of housing in Nims, where there are 897 houses within 800 meters of the lake with an average sales price in our sample of $78,346 in 2010, the value of the housing is higher by $6.1 million in the areas around the remediation along the southern lake shoreline. This number is statistically consistent with the predicted increase of $4.8 million in the Nims neighborhood.

The statistical error on the price index is large since the number of houses sold multiple times over the last 15 years is relatively small these leads to several cautions. First, the results are susceptible to spurious results, meaning the change in value might be the result of something other than the shoreline improvements. Second, the confidence interval around the $6.1 million estimate for the Nims neighborhood much wider than that seen in the forecast prediction. However, since the same changes are not seen elsewhere on the

lake, and the result is statistically consistent with the forecast of $4.8 million it adds considerable support to the values predicted in the original report.

CONCLUSION

The two largest sources of possible error in the original calculations were in finding the number of new lake visits and using past data to predict housing price changes. Data gathered during the summer of 2012 lends support to the original calculations by verifying the number of users increasing use of the lake, but finds that the number of additional visits by these individuals was likely underestimated. Sales data for houses since the remediation reached a high level of completion show a change in value that is consistent with those predicted in the original calculations. In addition, this change in value was not seen anyplace else in the 49441 or 49445 zipcodes which further supports that the change is consistent with the improvements made during the restoration.

2012 SURVEY

GRAND VALLEY STATE UNIVERSITY
ROBERT B. ANNIS WATER RESOURCES INSTITUTE
www.gvsu.edu/wri

Muskegon Lake Area of Concern Habitat Restoration Post-Survey

For the purposes of this study, a trip is the total time you spent between leaving and returning to your home address. It includes all activities that you may have done in that time period. A trip includes no overnight stay.

1. When did you leave home? (Date/time) _____
2. When do you expect to return home? (Date/time) _____
3. What is the zip code at your home address? _____
4. What is the primary activity at Muskegon Lake today?
   a. Fishing _____
   b. Boating or Jet-Skiing _____
   c. Hiking _____
   d. Biking _____
   e. Bird-/Wildlife-Watching _____
   f. Festival/Special Event _____
   g. Other (specify) _____
5. How many people traveled with you on this trip? _____
6. Approximately how much money did you spend in total on this trip? $_____
7. Is this the first time you have been to Muskegon Lake? YES NO
8. How many times do you plan to come to this location (launch/nature preserve) this year?
   1 to 2 3 to 4 5 to 6 7 to 8 9 to 10 11 to 12 13 to 14
   15 or more (How many?) _____
9. How many times to you plan to go to any location on Muskegon Lake this year?
   1 to 2 3 to 4 5 to 6 7 to 8 9 to 10 11 to 12 13 to 14
   15 or more (How many?) _____
10. Did you come to Muskegon Lake before the restoration took place? YES NO

11. If you answered "YES" to Question 10; Is Muskegon Lake a more desirable place to visit because of the restoration?

    YES NO

12. Because of the restoration, have you visited Muskegon Lake:

    LESS MORE NO DIFFERENCE IN NUMBER OF VISITS

13. If you answered "LESS" or "MORE to Question 12; How much more or less do you visit Muskegon Lake now?

    - 15 or less (How many?) _____

    -14 to -13 -12 to -11 -10 to -9 -8 to -7 -6 to -5 -4 to -3 -2 to -1

    1 to 2 3 to 4 5 to 6 7 to 8 9 to 10 11 to 12 13 to 14

    15 or more (How many?) _____

14. What is your gender? _____ MALE _____ FEMALE

15. What is your age? _____ 18 - 25 _____ 26 - 35 _____ 36 – 45

    _____ 46 - 55 _____ 56 - 65 _____ 66 - 75 _____ Over 75

16. What is your annual income?

    a. Less than $20,000 _____
    b. $20,000 - $30,000 _____
    c. $30,000 - $40,000 _____
    d. $40,000 - $50,000 _____
    e. $50,000 - $60,000 _____
    f. $60,000 - $70,000 _____
    g. $70,000 - $80,000 _____
    h. $80,000 - $90,000 _____
    i. $90,000 - $100,000 _____
    j. $100,000 - $110,000 _____
    k. $110,000 - $120,000 _____
    l. More than $120,000 _____

17. How much of your annual household budget do you spend on recreation in a year?

    a. Less than 5% _____
    b. 6% - 10% _____
    c. 11% - 15% _____
    d. 16% - 20% _____
    e. 21% - 25% _____
    f. 26% - 30% _____
    g. 31% - 35% _____
    h. More than 35% _____

18. Have you answered this survey more than once? YES (How many times? _____) NO