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INTRODUCTION

A quantitative, economic cost-benefit study associated with restoring water quality at North Beach in Racine, WI was performed to demonstrate to beach managers, elected officials, policy makers, and the general public that the economic value of beach restoration can outweigh the associated expenses. Prior to restoration, posting of advisories and closures at the beach gave the public the perception that it was unsuitable for swimming and, therefore, the beach was underutilized (<400 visits per weekend day). Over a 10-year period, pollution sources were identified and storm water engineering controls and best management practices techniques implemented, resulting in water quality improvements. Advisories and closures now occur at a rate of <10% per swimming season. Engineering controls and best management techniques were actualized with an initial investment of \$1 million dollars; ongoing annual maintenance equal to \$120,000. Restoration benefits were calculated using beach attendance records (# of beach visits multiplied by "value of a day at the beach"), revenue generated from hosted events (registration fees and hotel stays), adjacent property value increases, and beach user surveys (user satisfaction and stated preference). Fully comprehending the economic impact of recreation at a beach is particularly complex. However, based on these limited sources, the direct impact of North Beach on the local economy is estimated at \$5 million dollars annually and an estimated \$32 million benefit based on travel for the county and regional area. Explicitly quantifying costs associated with improving water quality and the returned economic benefits of such efforts, to the greatest extent possible, clearly demonstrates the significant role beaches play in driving local economies. Devoting funding towards beach restoration is a sound investment for the environment, economy, and local citizens.

EVENTS HOSTED AT NORTH BEACH

- Research has supported the hypothesis that revenue is retained within the local economy from the staging of events (Walo, Bull, & Breen, 1996). These events are particularly important because they bring in tourist dollars that most likely would not have been generated without the annual events held at North Beach.
- The largest event that North Beach has hosted every year since 2007 is the Ironman 70.3 Racine Triathlon (Figure 1). Over 2,000 athletes participate in the triathlon each year, bringing, on average, three additional people with them. In 2009 the economic benefit was estimated at \$1 million dollars, based on hotel stays alone. In 2013, over 1,200 of the participants came from outside the state of Wisconsin. Including their companions, that's over 8,000 visitors to Racine for that event alone, selling out all hotels and having a \$2 million impact on Racine's economy (Real Racine, 2014).
- The EVP Pro Beach Volleyball tour is another event hosted annually at North Beach, attracting an estimated 6,000 visitors (both participants and spectators). Over the two day event held in June 2012, EVP Pro Beach Volleyball Spike'n Splash had a \$400,000 impact on Racine's economy (Real Racine, 2014).
- Other events, such as the U.S. Grand Prix Watercross and the annual 4th of July activities (Figure 2), are hosted at North Beach. Real Racine estimates that the 2009 event brought \$200,000 into the local economy.
- Real Racine used a Wisconsin Department of Tourism study from 2009 to estimate the aforementioned economic impacts (\$150 per day per person for visitors who stay overnight and \$46 per person per day for day trips). Those estimates are inclusive of lodging, merchandise, food, beverages, fuel, and other consumer goods/services.



Figure 1. Ironman Triathlon hosted at North Beach.

Figure 2. Fourth of July event at North Beach.

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TRAVEL COST METHOD

- North Beach user survey's conducted summer of 2014 by City of Racine Health Department staff
 - 472 zip code respondents = 93.9% response rate
 - 4 visitors from outside the United States were disregarded, due to using automobile associated costs in the travel cost method formula.
- Zip codes were used to attain the direct distance between North Beach and visitor's home
- The travel cost method (TCM) is used to estimate the economic value of recreational activities
- TCM produces more reliable estimates than other valuation techniques because it uses observed, rather than hypothetical data to generate results.
- There are limitations to a TCM: assume individuals take the trip for a single purpose, measuring the opportunity cost of time or the value spent traveling, availability of substitute sites, and exclusion of other complementary goods.
- The zonal travel cost approach was applied to this study, using zip codes gathered by a beach user survey 2014.
- $V = (T \times w) + (D \times v) \times Va$
 - V=Estimated travel cost
 - T=Travel time (hours)
 - w=Wage rate (per hour) <http://www.bls.gov/news.release/empsit.t19.htm>
 - D=Distance traveled (miles) <http://www.melissadata.com/lookups/zipdistance.asp>
 - v=vehicle operating cost (per mile)
 - Va=Average number of visits per year

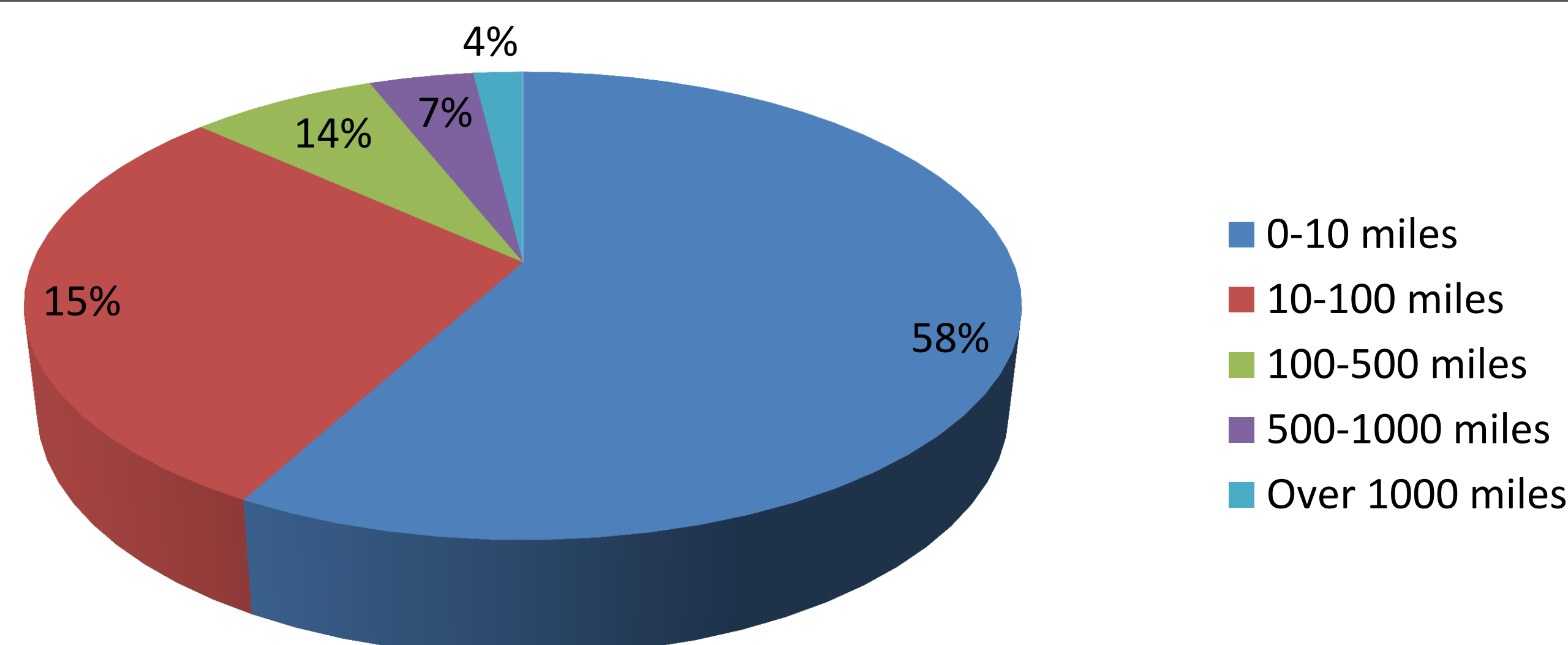


Figure 3. Zonal distance breakdown of users to North Beach.

Travel Distance	Visits per year	Travel Price per visit
0-10 miles	116,000	\$17.84
10-100 miles	30,000	\$56.34
100-500 miles	14,000	\$605.17
500-1000 miles	8,000	\$1,390.58
over 1000 miles	4,000	\$1,854.10

Table 1. Zonal representation of visitors to North Beach and estimated travel cost of visit.

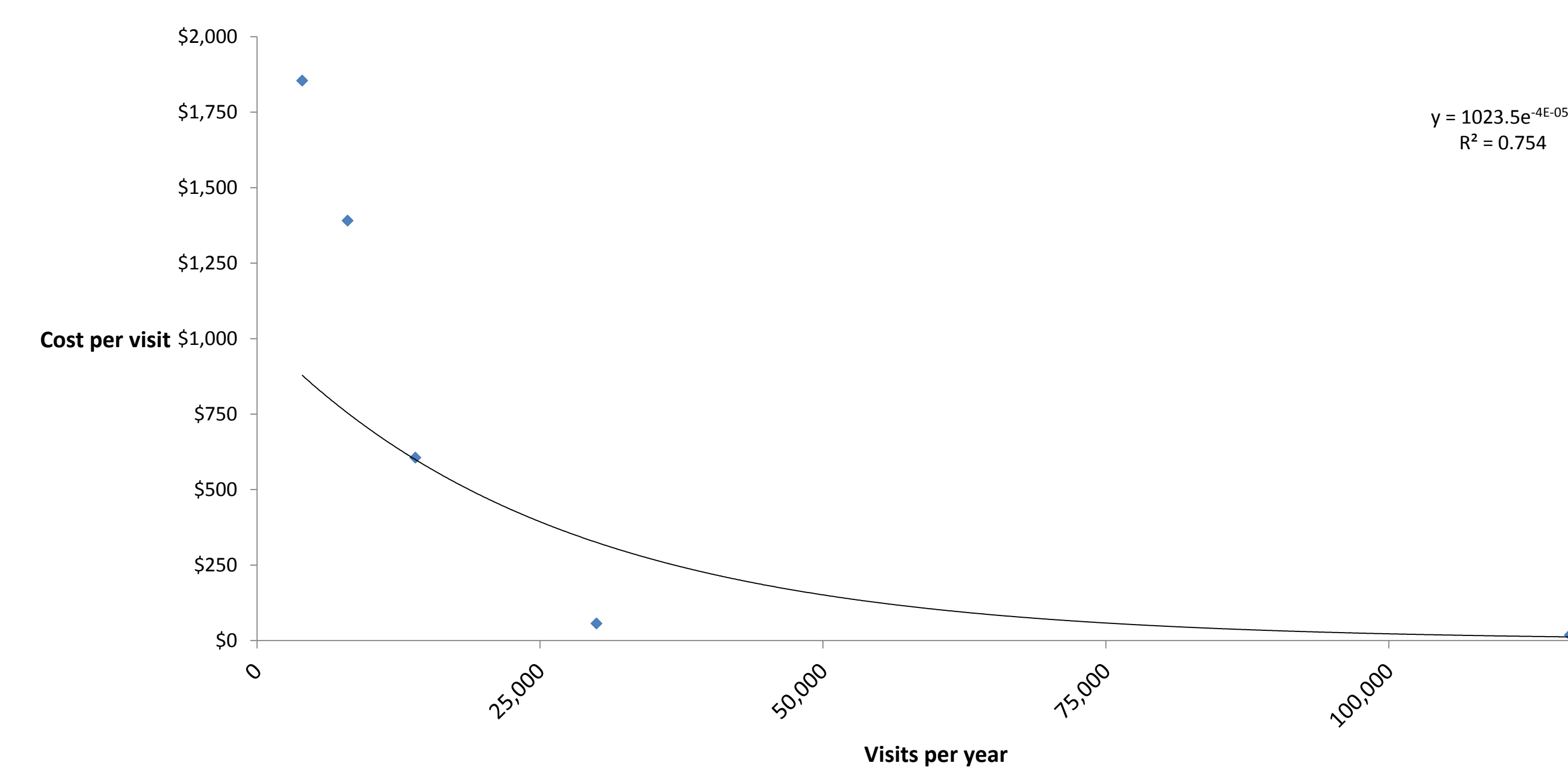


Figure 4. Zonal Travel Cost Demand Curve for North Beach.

ADJACENT PROPERTY VALUES

- One measure of economic benefit derived from improved water quality is residential property values. Studies have shown that parks and open space have a positive impact on nearby residential values (Irwin, 2002). A spatial study on water quality and housing prices in Ohio found that the greater the distance to the closest beach, the greater the negative impact on the housing prices, i.e. home owners preferred living closer to a Lake Erie beach than elsewhere (Ara, Irwin, & Haab, 2006).
- However, coastal real estate values can be affected by a variety of factors and attributing direct variation as a function of water quality advisories can be challenging. Even so, the possibility remains that constant beach advisories could depress the demand for real estate and adversely impact property values over the short and long term. If that is true, local government revenue derived from property taxes could also suffer.
- Changes in assessed property values adjacent to North Beach were analyzed from 2000-2012 and compared to another lakefront area. Both areas increased at the same rate (180%) over that time period. While there wasn't a significant increase in property values adjacent to North Beach versus other lakefront properties, there was significant capital investment in the way of additions, renovation and new construction (Figure 5 and 6).



Figure 5. Property adjacent to North Beach in 2006 before investment.

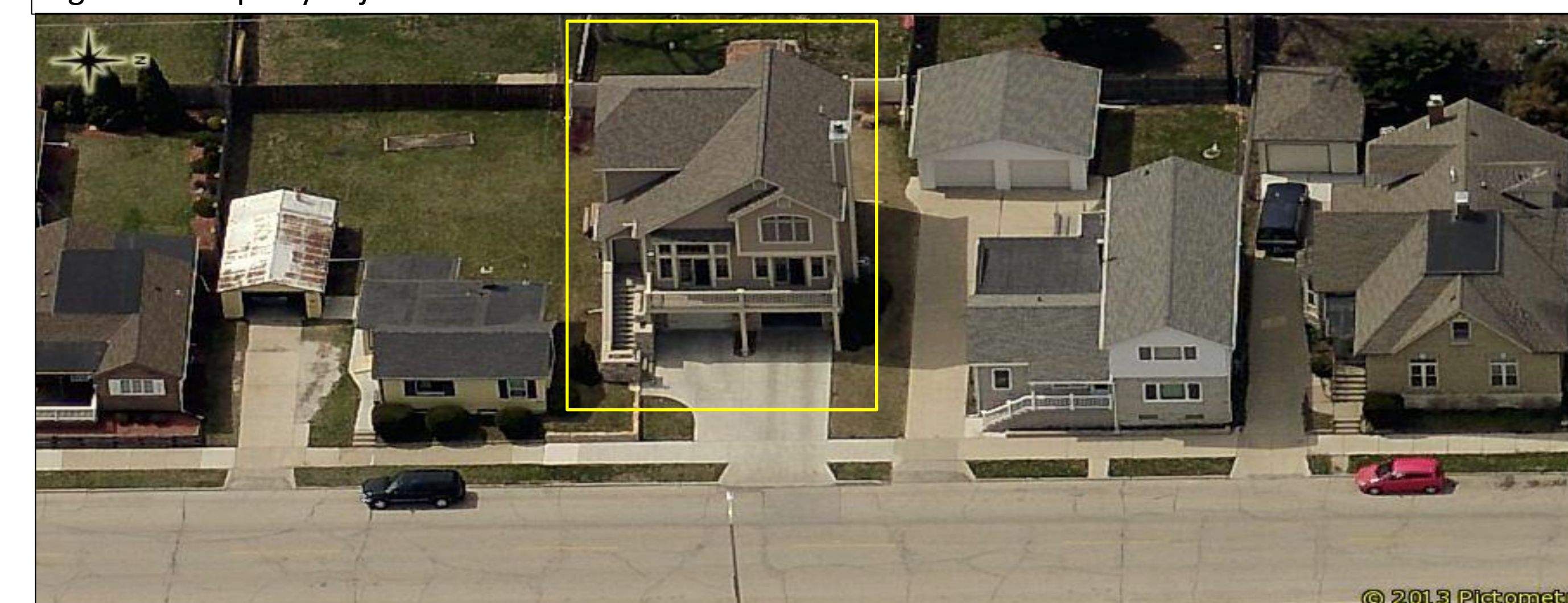


Image 6. Same property adjacent to North Beach in 2013 after investment.

TOTAL ECONOMIC BENEFIT

- The direct economic impact of North Beach to the community of Racine \$5 million based on attendance, hosted events, and hotel stays.
- The Travel Cost estimate revealed a \$32 million regional economic impact based on travel time and cost of users to North Beach during the summer of 2014.
- There is clear evidence that beaches throughout the world have an enormous economic impact on the community, as long as the necessary resources are allocated to maintain water quality and recreational amenities.

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