

Memorandum

To: Programs, Projects, and Operations Subcommittee
From: Paul Woodward, Water Resources Engineer
Date: May 31, 2007
Re: UNO Research Proposal for Impact of Omaha Area Reservoirs on Residential Property Values

District Board Members and Staff were contacted by Professor Steven Shultz of the University of Nebraska Real Estate Research Center about the possibility of conducting a research study to evaluate the impact of Omaha area reservoirs on surrounding residential property values. Results of such a study would be of interest to the NRD for the purpose of negotiating real estate benefits realized on new private and public partnerships.

A proposal for the study entitled "The Impact of Omaha Area Lakes/Reservoirs on Residential Property Values" has been prepared by Dr. Schultz and is attached for the subcommittee's review and recommendation. The purpose of the study will be to quantify the financial impact that 4 existing man-made lakes/reservoirs in the Omaha metropolitan area have had on nearby residential property values. These lakes/reservoirs include Standing Bear, Zorinsky, Candlewood and Walnut Creek.

The study will utilize an existing real estate transaction database prepared by UNO over the period of 2000 to 2006 and GIS regression analysis. The evaluation will also take into account several variables which affect local real estate values and work to hold those variables constant to effectively show the impact lake views and recreational access have. If pursued by the NRD, the research study will be completed by October 2007 for a total fixed cost of \$15,000.

In summary, the proposed research study will help demonstrate the economic benefit regional lakes created by flood control reservoirs have on adjacent property values. The study will be conducted by the University of Nebraska at Omaha Real Estate Research Center within 3 months for a total cost of \$15,000.

Management recommends that the subcommittee recommend to the Board that the General Manager be authorized to execute an agreement with the University of Nebraska Omaha to conduct a research study entitled "The Impact of Omaha Area Lakes/Reservoirs on Residential Property Values" for a total cost of \$15,000.

The Impact of Omaha Area Lakes/Reservoirs on Residential Property Values

***A Research 'Pre-Proposal Submitted to the
Papio-Missouri NRD *
(May 18, 2007)***

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* This an unofficial '*Pre-Proposal*' which is currently being reviewed by UNO administrators.

Executive Summary:

This proposed study will quantify the financial impact that existing man-made lakes/reservoirs in the Omaha metropolitan area (hereafter referred to simply as 'Lakes') have had on nearby residential property values.

Hedonic based multiple regression analysis will be used to: 1) quantify the contribution (i.e. marginal effect) of lake views and/or frontage have on single-family housing values, and 2) measure how close proximity to lake-based recreation amenities impacts neighborhood level property values.

Attempts will also be made to evaluate when housing based price premiums accrue over time. This will be useful in determining who captures the economic benefits of lake views.

The proposed analyses will evaluate four specific Omaha area man-made lakes (Standing Bear, Zorinsky, Candlewood and Walnut Creek Lake), over the 2000 to 2006 time-period. The primary data source for this study is a geographic information system (GIS) based real estate transaction database recently compiled by the UNO Real Estate Research Center.

The results of the study are expected to be useful for demonstrating the economic value that Omaha area residents place on lake amenities, and to estimate the economic benefits generated by the construction of different types of new lakes in the Omaha area in the coming years. As well, the results of this study might be a useful tool for negotiating 'fair-market' financial contributions, which real estate developers (who build single-family residences adjacent to and/or nearby future lakes), should make to the future dam construction efforts.

The study will be completed in three months for a cost of \$15,000. This will be a fixed-fee contract that includes a 10% facilities and administration charge to UNO.

Background.

A recent ('preliminary') hedonic price (multiple regression) analysis by the UNO Real Estate Research Center found that lake views/frontage increased the value of single-family homes at Lake Zorinsky by 8% and by 7.3% at Standing Bear Lake over the 2000 to 2006 period.. This corresponds to an average per house impact \$43,000 at Zorinsky and \$19,000 at Standing Bear.

However, these 'preliminary' results need to be further verified using alternative modeling approaches and by classifying the type and quality of lake views associated with different housing sales. It is also considered important to include year 2006 sales in the analysis. As well, an evaluation of how housing values appreciated over time around the Lake needs to be made in order to assess when, and to whom, price premiums may have been captured by. For example, it is not yet known whether price lake front housing premiums were captured by original owners and/or developers established at the outset of lot and housing development, or whether these premiums developed gradually over time and were captured by a both past and present homeowners. And, the 'preliminary' study did not attempt to value the impact of proximity and access to lake based recreational amenities on nearby (but non-frontage/view) property values.

However, it is not known how the similar the lake amenity housing values relationships at Zorinsky and Standing Bear are to other lakes and properties in the Metro Area. Therefore, this newly proposed study with funding being requested from the PM-NRD, will involve the estimation of more detailed and refined hedonic price analyses of lake views/frontage at Zorinsky and Standing Bear, and evaluate the spatial and temporal aspects of price premiums. This will include the addition of year 2006 sales. As well the neighborhood (nearby but non-view/frontage) impacts on housing prices will be quantified, and the entire set of research procedures will be applied to two additional Omaha area Lakes (Candlewood and Walnut Creek) to quantify how different types of lakes impact property values.

Methods and Procedures:

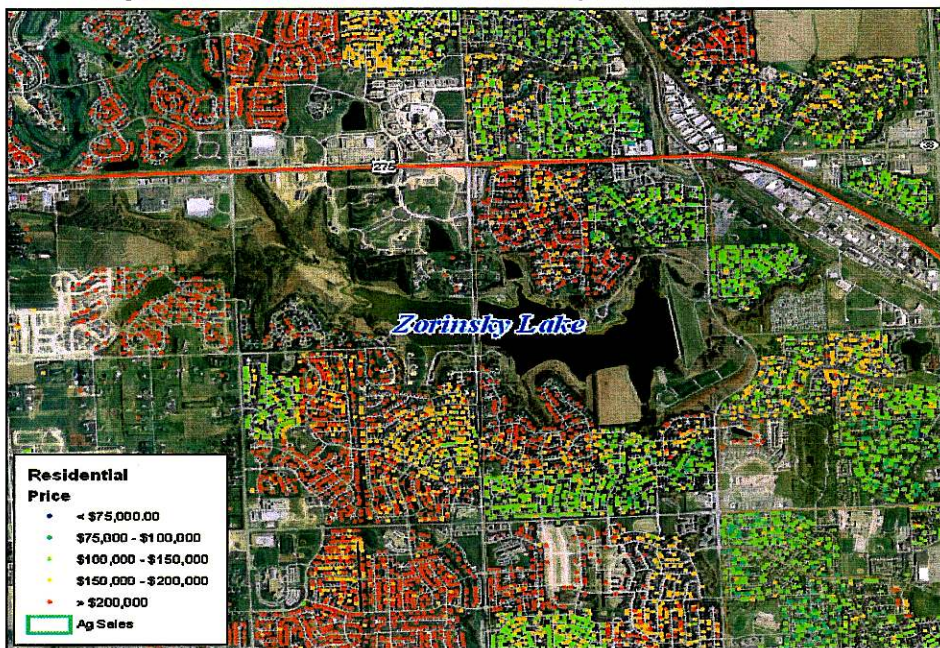
The prices of homes sold in Omaha between 2000 and 2006 will be regressed against structural, neighborhood, and environmental (lake) characteristics associated with individual home in using the following hedonic based model.

$$P_h = f(Z_s, Z_n, Z_e)$$

where P_h = Sale price of a house,
 Z_s = Structural Variables,
 Z_n = Neighborhood Variables,
 Z_e = Environmental Variables (lake views/proximity)

Sale prices and structural characteristics of homes will be taken from the UNO Real Estate Center Omaha Residential Data series (Vol. 1). In fact, most of this data has already been compiled by the staff working in the UNO Real Estate Research Center

Figure. 1. Recent Residential Housing Sales Near Zorinsky Lake



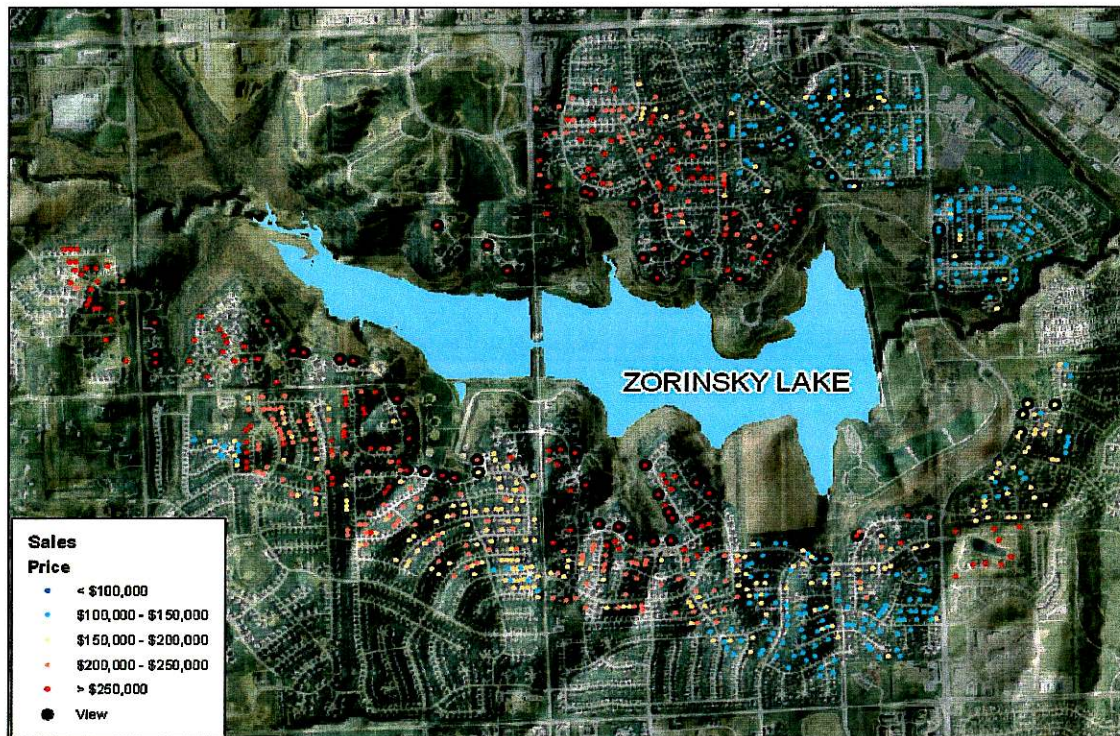
Neighborhood variables including housing densities, nearby land uses, school districts, and traffic flow patterns etc will be obtained using GIS analyses which are possible as the UNO real estate GIS database is parcel-based.

Alternative lake amenity variables that will be evaluated include views and proximity. Views will be determined using a GIS-based viewshed analysis based on 10 meter resolution digital elevation contours and confirmed through site visits. For example homes sold between 2000 and 2006 with direct views of Lake Zorinsky (based on viewshed analyses) are shown in Figure 2. Distances between homes and both the lakes and lake-based recreation areas will be calculated using the GIS-based 'Near' command.

Sold homes in close nearby (within $\frac{1}{4}$ and $\frac{1}{2}$ miles from lakes) and those within 1 to 2 miles from lakes will comprise the study sample. Sample sizes of sold homes are expected to be 2,500 (Zorinsky), 3,000 (Standing Bear), 1,500 Candelwood Lake, and 1,600 at Walnut Creek Lake.

Once the multiple regression models are estimated, implicit prices measuring how housing prices change with one-unit increases in explanatory variables (holding all other variables constant) will be estimated. Such implicit prices are also commonly referred to as marginal price effects and are intended to isolate the impact of particular housing characteristics on housing values while controlling for other factors.

Figure 2. Sold Homes with Direct Views of Zorinsky Lake (based on viewshed analyses).



Finally, an assessment of how residential housing based price premiums accrue over time will be made in order to determine who may be capturing the benefits of lake views will be accomplished by three approaches: First, property valuation appreciation among lake view, nearby (close proximity) and nearby (but non-lake area) homes will be estimated and reported annually from 1996 to 2006. Second, an analysis of changing property values over time of a sample of lake view and non-lake view homes will be undertaken by conducting title searches. Third, the historical sale price of a sample lots surrounding lakes (with and without views) will be compared to the sale price on nearby but non-lake lots.

Proposed Timeline, Deliverables and Project Costs.

Timeline: 3 months (June 1, 2007 to September, 31, 2007)

Cost: \$15,000 (as a 'Fixed-fee' meaning that no cost extensions are allowed and no expenditure reporting by UNO to the funding agency are required).

Funds will be used for faculty summer salaries, student salaries, equipment and supply purchases, travel and dissemination (publication) costs. The requested funds also include a 10% UNO overhead and facilities charge (reduced by 31% the PM-NRD is a local-government entity).

Deliverables:

- A Complete project report (paper and electronic versions).
- A poster summarizing project results
- Up to two presentations of project results

Other Rights and Privileges of the Project Sponsors (PM-NRD)

- Right of prior (advance) review of all study results and reports before they published and/or released to the public.
- Acknowledgements in all related publications regarding financial assistance provided by the agency to the research effort (optional at the discretion of the funding agency).

Other Research Projects Undertaken by UNO Real Estate Center Staff:

***2007. USDA-NRI (Water & Watershed Program).** Payment Incentives Required for Irrigation Retirement Programs (\$95,000).

*** 2007. USGS 104B Nebraska Water Research Center.** Improving Estimates of the Value of Irrigated Land in the Republican Watershed (\$13,000).

*** 2007. NIFA Housing Study Grant Program.** 'Community Development and Property Value Appreciation in Omaha (\$35,000).

*** 2005. USGS 104G-Nebraska Water Research Center.** The impact of Rural Water Supply Projects on Property Values (\$63,000).

*** 2003-04. National Agricultural Statistics Service.** The Quantification and Correction of Differences in Agricultural Land Value Statistics (\$26,000).

*** 2003. ND State Water Commission.** Reduced Recreational Opportunities on Lake Sakakawea due to USACE Missouri River Management Plans (\$43,000).

*** 2000. United States Fish & Wildlife Service.** Wetland easement study in the Prairie Pothole Region (\$81,000).

*** 1997-1999. International Joint Commission.** "The feasibility of wetland restoration for flood control in the Red River Valley" (\$94,000).