ILLINOIS STATEWIDE PROPERTY BUYOUT DATABASE PROJECT

Process Report

IEMA 089774 PDM
University of Illinois D5769

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Prairie Research Institute, Illinois State Water Survey

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Sally McConkey and Lisa Graff (Illinois State Water Survey) wrote the grant awarded to the Illinois State Water Survey for this set of IEMA projects and together with Kingsley Allan provided project oversight. Conor Healy and Brad McVay (Illinois State Water Survey) retrieved and scanned the IDNR files from Springfield. Jasmine Thomas (University of Illinois, graduate student) and Mary Richardson (Illinois State Water Survey) worked through the scanned documents and populated the database. Zoe Zaloudek (Illinois State Water Survey) and Janet Camarca (Illinois State Geological Survey) geocoded the location sites. Zoe and Brad also provided oversight to the schema of the geospatial database. The authors would like to acknowledge the contributions made by Paul Osman and Ron Davis (Illinois Department of Natural Resources/Office of Water Resource), Curtis Caldwell (Illinois Emergency Management Agency), and Linda Bowen (CDM Smith).

Table of Contents

INTRODUCTION

The Illinois Emergency Management Agency (IEMA), Illinois Department of Natural Resources/Office of Water Resources (IDNR/OWR), Illinois Department of Commerce and Economic Opportunity (DCEO), and the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) have all taken a proactive approach to reduce exposure to flood hazards by working with communities in Illinois to perform several different mitigation activities. Examples of these activities include the acquisition of flood-prone properties through buyout programs, elevating structures above the 1 percent annual chance base flood elevation, and encouraging communities to adopt higher floodplain management standards.

A report released by the National Institute of Building Sciences (NIBS) in 2017 indicated that mitigation funding could save the nation $6 in future disaster costs for every $1 spent on hazard mitigation (http://www.nibs.org/page/mitigationsaves). Having a record of properties mitigated through buyout or acquisition in the State of Illinois will allow the State to demonstrate the cost-effectiveness of these projects and the savings achieved by investment in mitigation. A loss avoidance study provides a detailed estimate of the economic savings Illinois has realized by its proactive mitigation and use of higher standards. Loss avoidance study results provide a monetary measure of Illinois actions and promote continued dedication of state and local resources to reduce flood damages.

In support of loss avoidance studies in Illinois, the Illinois State Water Survey (ISWS) has collected available information on structure buyouts in Illinois and prepared a geospatial database with available information on each buyout structure. The geospatial database is in ESRI file geodatabase format and is structured for use with Hazus in order to perform loss avoidance studies in the future. Structure buyout records typically have, at a minimum, the following information: address, county, assessed value, acquisition cost, and disaster number. Addresses provided in the records were used to determine latitude and longitude upon which a geospatial database (*BuyoutPoints_Statewide*) was developed using ArcGIS.

DATA SOURCES

ISWS compiled the database from structure buyout data provided by IEMA, IDNR/OWR, DCEO, and the MWRDGC. The information from IEMA covered projects funded through Federal Emergency Management Agency (FEMA) Hazard Mitigation Assistance (HMA) and Hazard Mitigation Grant Program (HMGP) funds. IDNR/OWR works with IEMA and provides state funds for mitigation buyouts that are used as the local match for FEMA grants. In many cases the IDNR/OWR match is counted as a statewide contribution through independently conducted buyouts. DCEO and MWRDGC have their own buyout programs.

HMA and HMGP Acquired Properties data

IEMA provided structure buyout data as a .dbf file on June 7, 2018. This file was named *HMA Acquired Properties20180607* and included HMA acquired properties as of the end of

May 2018. Although the ISWS had been notified that this data had been reviewed, information was still missing.

The *Statewide Buyout Inventory* spreadsheet was created and patterned after the *HMA Acquired Properties20180607* spreadsheet. Data from the IDNR and DCEO sources were entered into this file. This spreadsheet is not a project deliverable, but the data from it were ultimately imported as the attribute file for point locations in the *BuyoutPoints_Statewide* geodatabase, which is a project deliverable.

IDNR Files

The IDNR data came to the ISWS as file boxes of paper documents. Each document was scanned into digital format, and the original documents were returned to IDNR/OWR in Springfield, Illinois. Each scanned document was reviewed for content and was renamed to be identifiable with the contents of that file. For example, if the document was a list of properties it was renamed as *Property List* to make it easy to reference and extract the data for entry into the *Statewide Buyout Inventory* spreadsheet. Each IDNR Buyout Properties Documents folder contained either a single community or was countywide; the content of each folder was, therefore, quite variable in size as well as actual information presented. There was a total of 40 folders with a total of 655 files. Where a folder contained multiple files, those files named "summary" or "property lists" were examined for content first. The addresses, parcel numbers, and property value data could usually be obtained from these files. The file named "residential appraisal" or "application form" was examined for the structure-specific information (occupancy, foundation, etc.). All the remaining files in each of the folders were reviewed and read to extract the information pertinent to this project.

DCEO Files

DCEO provided spreadsheets with detail data on structure buyouts. The DCEO\Closed Grants buyout data was added to the *Statewide Buyout Inventory* spreadsheet. The same protocol established for the IDNR data was used to identify data in the 11 folders. A complete set of basic data was researched as part of the loss avoidance study for Keithsburg and Ottawa, thus data for these two communities are more complete than for the other communities.

The DCEO project folders were well organized. Each community/county folder had a "Close out" folder as well as a "summary of the property floodplain buyouts" folder. With the community/county folder, there was a folder with "individual property" files. These files gave detailed information about each property. Both the "Close out" and "Property Files" folder contained a complete scan file copy with all of the documents from the folder in one file, thus expediting the data entry.

MWRDGC Files

MWRDGC provided a spreadsheet of 154 buyouts in various stages of planning and acquisition for the Cook County communities of Riverside, Lyons, Des Plaines, Northlake, Franklin Park, Leyden, and Glenview. These properties were imported into the

BuyoutPoints_Statewide geodatabase using the latitude and longitude included in the spreadsheet. The 17 properties in Glenview were already part of the *Statewide Buyout Inventory* spreadsheet so these were not added to the *BuyoutPoints_Statewide* geodatabase. Of the 137 properties imported only 35 were populated with the acquisition year and labeled as acquired in the MWRDG spreadsheet. Because buying out properties is a long process, it was determined to include all 137 properties in anticipation on these progressing eventually to demolition and being useful in future loss avoidance studies.

DATA MANAGEMENT

To keep track of progress, *HMA Acquired Properties Progress* spreadsheet was created. This spreadsheet listed each of the folders, the number of files in each folder, the cumulative files, and the completed percentage. Every two weeks a Buyout Progress Check-in meeting was held to discuss progress and address questions and concerns. Midway through the data-entry process, two quality reviews were performed to ensure that the correct types of data were being extracted from the files, the correct format of that data was being entered into the *Statewide Buyout Inventory* spreadsheet, as well as to address any errors and missing information.

Once all available data had been entered, the *Statewide Buyout Inventory* spreadsheet was reviewed for duplicate property entries; missing data that could easily be filled, such as ZIP code and state, were completed. There was insufficient time to research and address all missing data issues. Once the spreadsheet was reviewed, the buyout entries were geocoded for spatial reference.

Location of Points

The *Statewide Buyout Inventory* spreadsheet contains the addresses for most properties that have participated in buyout programs, as well as other owner and claim information. The exact location of each property was desired in order to represent the data visually and to facilitate future geographic analysis of the data.

To create a GIS point feature for every address, the geocoding results from an Address Locator created with U.S. Census Bureau TIGER/Line (Topologically Integrated Geographic Encoding and Referencing) street centerline data were compared to the geocoding results from a Python script that referenced the Google Geocoding API. Both of these methods interpret a line of text with an address and create a GIS point feature, either on top of the structure or near the structure.

After comparing the results, the Google geocoding method was selected, due to the flexibility in Google's geocoding to accept addresses in multiple forms. For instance, Google will interpret partial combinations of names and abbreviations (i.e. West or W, Lane or LN, Hill St or West Hill Street, and so on). For this reason, Google was more successful than using an address locator that referenced TIGER/Line data, requiring an exact address structure. Also, the Google geocoder attempted to place the points on top of the intended structure when possible, as opposed to the TIGER/Line address locator, which only placed points along the street centerline.

The *Statewide Buyout Inventory* spreadsheet was converted to CSV format and read by the Google Geocoding Python script, which produced the *BuyoutPoints_Statewide* geodatabase containing a point feature class. The script also imported all data from the *Statewide Buyout Inventory s*preadsheet and assigned these attributes to the points in the geodatabase. While the script derived latitude/longitude data in order to place the points, these values were not saved to the output feature class. Any latitude/longitude data included in the resulting points came from the original files. Lastly, further edits were made after the geodatabase had been created by the Google Geocoding Python script. Points were updated or created as needed using more refined data developed for loss avoidance studies for the cities of Keithsburg and Ottawa.

DATA LIMITATIONS

There were a number of communities that were listed on the *HMA Acquired Properties20180607* spreadsheet that did not have information in the IDNR or DCEO files. Thus for a number of properties only minimal information was available: the address, parcel number, acquisition, and appraisal cost that were listed on the *HMA Acquired Properties20180607* spreadsheet. There were also 10 communities with information on buyouts in the IDNR files that were not in listed on the *HMA Acquired Properties20180607* spreadsheet.

Missing/incomplete data, etc.

Many of the files received had insufficient basic data for this project. Some of the files, such as the "individual property data" form, were completely filled out for some properties and blank for other properties. This variation between the quantity and quality of the documents also made it difficult to determine if the buyout information was unavailable or just not properly documented. For example, some of the community folders had one file and others had as many as 52 files. These files ranged from property photographs to warranty deeds to summary sheets.

Although some files were organized, there were still important data that were not included, such as first floor elevation, occupancy class, building replacement value square footage (BRV SF), content costs, and important dates (appraisal, acquisition, demolition, etc.).

The *BuyoutPoints_Statewide* geodatabase has entries for all identified and validated structure buyouts; however, because basic data was missing from the source documents, many of the fields for these entries are empty. The fields for these entries still need to be completed before a loss avoidance study can be performed for all properties.

Data Discrepancy

The data coming from different sources required resolution of conflicting or unclear information. While filling in the data, a running document of general comments and

questions about the data was kept on file. These questions include, but are not limited to, mismatch addresses, different values (demolition, acquisition, total project cost, etc.), and unclear column headers and abbreviations. In some cases, the data were represented differently for individual communities. One example: The number of stories of a property was represented as a numeric value for most of the communities, but for Peoria Heights, the City of Peoria, and the City of Clinton the number of stories was listed as text (low, high, etc.). Such varying data were discussed at the Buyout Progress Check-in meetings to ensure consistency within the working spreadsheet entries. If the data were not clearly stated on the basic document, they were entered into the spreadsheet based on best judgment. Notes are in the comments column of the geodatabase and on the documents themselves to make it easy to locate any questionable data.

Data Location Limitations

Multiple difficulties were encountered while geocoding the data. There were 3,482 initial property addresses to process. For six addresses, the Google Geocoder returned zero results and no point was created. This could have been due the lack of an address being listed, new construction, or the lack of a specific address (i.e. NE corner of lot, etc.). These six points were added manually. In instances where only a community was provided (with no specific address), the point was placed in the community.

While data capture was as complete as possible, there were 669 properties in the spreadsheet with no street address. Over 200 more included only block/lot or rural route mailbox designations, without a specific street address. Generally, the Google Geocoder would place the point within the community or county, but this was not always the case. Effort was made to ensure that each point fell within the correct county, at a minimum.

Another obstacle to geocoding is the fact that many of these properties, and their associated street addresses, no longer exist. While not a problem for all removed structures, it was more evident in the vicinity of older and more extensive buyout projects, such as Valmeyer, Illinois, and Birds, Illinois.

RECOMMENDATIONS

Although there are over 3,600 buyout properties in the database, the database is by no means complete. Several steps need to be taken before the data are viable for loss avoidance studies for specific locations.

Next steps:

- Additional time and resources are needed to review the scanned files and other data sources to find the missing data and clarify what some of the text meant on the scanned files.
- The scope of this project simply did not allow time for examination of every point. Use of historical aerial photos and parcel data will likely be helpful with locating properties where the Google Geocoder had difficulty due to structure

removal. Specifically for Valmeyer, 1993 buyout-inventory information should be used to confirm the locations of the 346 properties listed within that community. Most of these were mapped at a coarse scale as part of the Illinois 997 Hazard Mitigation Grant Program.

- Further QA/QC of the spatial location for each property is highly recommended.
- Structure-buyout information should be collected from other state, county, and municipal agencies.
- A protocol should be established to update the database each year with buyout records from all agencies.
- Consistent recording of basic data should be established with a predetermined set of required fields (e.g. cost, address, and parcel location) and format to be determined in coordination with IEMA, IDNR, DCEO, and ISWS.
- The stewardship of this database should be established in consultation with IEMA, IDNR, DCEO, and ISWS.