Accelerate 77:
Accelerating Green Initiatives in Chicago's 77 Community Areas

Project Sponsor:
The Institute of Cultural Affairs

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GEO 242

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Project Summary:

The Institute of Cultural Affairs (ICA) is a non-governmental organization in Chicago whose mission is to promote positive sustainable social change. In line with this mission, ICA is coordinating a three-year initiative called "Accelerating Green Initiatives in Chicago's 77 Community Areas", also known as "Accelerate 77". This project aims to identify all the green or sustainable environmental initiatives in Chicago so that anyone interested in environmental sustainability can find, connect, share and engage with others across the city. A conference in September 2012 titled "Sharing Approaches That Work" will be an opportunity for representatives of green initiatives from each community area to formally meet and share with other organizations.

ICA desires to create an online mapping product that will have the most complete and current spatial information of all the green initiatives in Chicago as well as attribute data, such as community area and contact information for each. Our role was to take the partial database that ICA had compiled and produce a variety of mapping product examples that may fit ICA's needs for "Accelerate 77".

With any technical project, some of the difficulties we encountered resulted from determining how to break ICA's idea of a large, city-wide mapping project down to a scale that we could manage with our time and data constraints, while also giving them a product that would be useful to them. ICA explained that data collection was ongoing and that in the future they would also like to be able to update the mapping product which may or may not be done by someone with access or skills in ArcGIS. It was difficult to determine how to work with incomplete data sets to create usable end products for ICA. This process may have taken as much time as the creation of the final products.

We determined that to create several examples of mapping products for ICA, we would need to treat the data as if it was complete. We cleaned the data and reorganized their database so new data would be entered properly. This data was moved into an MSAccess database, imported into ArcGIS, geocoded and displayed. We determined inaccuracies in the self-reported community areas and used ArcGIS to properly identify where each organization was based on spatial information. We created three maps using ArcGIS to show ICA how this program is capable of displaying the database in a variety of way; a simple point map of each initiative by community area, a choropleth map to show the number, or density, of initiatives by community area, and a map using a "query" to show how information can be displayed by non-spatial attributes.

Additionally, we explored other mapping products that may be useful if ICA lacked access to ArcGIS or needed a more user friendly program for updating the maps. We created a Google map of the green initiatives by creating a .kml file of the database. We also used a free online program called BatchGeo to create a map with non-spatial attributes like contact information. These programs may prove to be useful if ICA determines they would like more user friendly or open source platform.

By exploring and producing several different mapping products using a variety of programs, our aim was to show ICA how geographic information systems can be powerful tools to convey and display their data. We hope that ICA can use our project results to help determine how to best proceed with data collection, attribute information and final mapping products.

Table of Contents:

I. Introduction:

The Institute of Cultural Affairs (ICA) is a supporter of environmental sustainability, peace, and justice. They promote these ideals through "empowering cultural dimensions of the social process." They focus on local organizations and communities to build projects and plans of action to meet their needs. Inside the ICA our project engulfs the Accelerating Green Initiatives in Chicago's 77 Neighborhoods. This portion of the ICA is working to create communication between green initiatives (organizations, foundations, companies, government agencies, and individuals) in the Chicago-land area. The reasoning of increasing communication between initiatives is to empower communities and individuals within communities to create a more sustainable and just world.

The general project goal was to create multiple visual information products so illustrate to ICA the many mapping products that could work with their data in the future. With the initial database given by ICA our goals were to organize, simplify, and normalize data to create a database easily used to produce mapping products. Once organization of the database was accomplished our goal was to spatially display data on information products such as maps.

This report includes the needs assessment, system requirements, data acquisition, and data analysis and visualization of the overall project. The needs assessment explores the goals and objectives of the project. System requirements involve specifying data requirements and processing requirements. Data acquisition is the process of acquiring and use of data. And data visualization is the process of the generation of visual information products.

II. Needs Assessment:

Background

Meeting with the project client

The two point persons on the ICA project that we will be in communication with are Seva Gandhi and Nina Winn. Their ultimate goal is to make the map and data as open to all of the green initiatives in Chicago as possible. Therefore the main users of the map and data that we will be working with are the green initiatives in Chicago. These organizations will use the maps and data to communicate with other organizations in either their community and/or surrounding communities to collaborate on environmental ideas.

Meeting with the ICA representatives we determined their goals and also expressed what exact services we were able to provide under the time and software restraint that we are under. To find the deliverables we asked the clients what they want to achieve with our help, what products they are looking for, if they were looking for a digital or paper product, and if they were looking to edit it in the future. The clients expressed interest in a live map that can be added to in the future and that can be accessed online. They want an active online map that can deliver information such as where an organization is located, contact information, and what type of work they specialize in. We determined that with the time and resources that we have that we can create a editable database on Microsoft access file that they can work with, create layers on ArcGIS and create example maps, format the layers to a .kml file which can be uploaded to google maps, and also create an example map using freeware. This process is further explained in the information products of the Needs Assessment.

Our project deadlines will be as follows:

Now-Feb. 13th: Create a survey to be completed by community organizations, get approved by ICA, and send out to organizations
P2 (Feb. 13th): Categorize all organization's responses into a database
P3 (Feb. 22nd): Normalize all data in database
P4 (Feb. 29th): Analyze data and create layers in ArcGIS
March 5th: Create ArcGIS maps, convert excel data into a .kml file and connect to google maps
March 12th: Project due

Literature Review

In trying to assist the ICA in their mapping project for the 77 communities in Chicago, it is imperative that a clear understanding of their mission is understood. The ICA is trying knit together a grass roots movement through the utilization of a GIS project. There are specific parameters that organizations can run into when trying to implement a GIS project due to the cost and access to the utility. Many non-profit and grassroots organization do not understand in detail what may expected from and what can be useful to their organization in regards to mapping products. The ability to quickly display and coordinate disparate information into an impactful product may not be the first thought in data application. The commitment of the end user to the maintenance of a GIS application and or mapping project for the long term success of such a venture may not always be applicable. Considering all of the options available is always that best solution for an organization that may have limited budgetary concerns. (Sieber, 2000)

Clearly understanding how non-profit and grassroots organizations can benefit from mapping technology but realizing that ArcGIS may be cost prohibitive, is crucial to using mapping products and technology in the best possible way. Envisioning the uses in planning, geocoding and spatial representation that are used by ArcGIS in the creation of mapping products led the project group to find ways that ICA could make use of the mapping information that ArcGIS produces and to find alternative sources of creation that is financially feasible for ICA. The creation of a database of the information that we have utilized from them and which is easily updateable will allow them to keep their information current and use ArcGIS from multiple sources at single point intervals. The updated and corrected information format that we have used will allow ICA to create their own maps using free resources like Batchgeo.com. This will allow easily updateable map links to be incorporated in their website and other documents as the needs arise. (Nelson, 2012)

There are various opportunities for environmental and green groups in using the technology available through ArcGIS. Even though the cost of using ArcGIS permanently may not be feasible at the current time, the types of data and information that can be conveyed visually is worth knowing. Understanding what type of information can be illuminated and the connections between data that can be shown by ArcGIS products is a process worth knowing. This article shows how disparate information can be brought together by ArcGIS in a very insightful and impactful way for environmental and green groups. (Beckwitt, 2010).

An understanding of the basic types of maps and the information that people can readily grasp from them is useful both in the creation of mapping products and envisioning the need and use of a map product for an organization. Correctly interpreting spatial representation of the information contained in our mapping products helped the group decision to use batchgeo. Com for ICA to be able to create their own maps. Basic representations of the geocoded information that was tested from the ICA data and which ICA can easily use to produce their own maps of the green initiatives as they continue to update their information appears to be a workable

solution to the fact that ICA does not have ArcGIS readily available. Using point data and showing initiative density from the article and the batchgeo website was tested and is easily accomplished. (Buckley, 2012)

Since the ICA does not have access to ArcGIS except through another party such as this class at DePaul, the group wanted to give ICA as much functionality and control over representation of their data as possible. The ability to represent their data quickly and easily themselves will free the ICA of using ArcGIS constantly and will give them the option of only using it for especially detailed and complicated projects. All of the articles used are saved in PDF format and copies will be made available along with the links in a data package that the group will present to ICA.

Goal(s)

Our group will work with the Institute of Cultural Affairs (ICA) to explore an appropriate way to develop a large database and mapping system from data collected by others about sustainable initiatives in Chicago to put shared publicly online. The database will be a tool to be used along side a conference in September 2012 called "Sharing Approaches That Work" that aims to bring together three community-based sustainability initiatives from each of the 77 neighborhoods. ICA envisions an online database and map system that can be used by community members, organizations, government or anyone who is interested in exploring green initiatives across the city of Chicago.

The Institute for Cultural Affairs requested our help to develop a database and geographic information product in the goal to connect sustainable and green initiatives across the City of Chicago in a sharable online format. Our initial goals were (1) to work with ICA to explore the ways the collected data could be used in an effort to (2) begin the development of a database that will fit ICA's vision. We have also added a third specific goal to (3) spatially represent database in a way that will demonstrate how GIS can be used to create maps that can help organizations connect with each other. We have continued to work towards these goals however our specific objectives have changed in response to determining that we need a more realistic scope for this time period.

Objectives

To help ICA with their project to create a city-wide online database and mapping system of every communities' sustainable initiatives, we have narrowed our scope to the following goals. These goals are (1) To work with ICA to explore the ways the collected data could be used in an effort to (2) begin the development of a database that will fit ICA's vision (3) spatially represent database, developed in a way that will visually explain many different aspects of green initiatives in Chicago's community areas.

Initially to achieve the first goal, we were going to work with ICA to develop classification categories for the organizations to help users of the database and geographic information product to find specific or similar organizations in particular green fields. Examples of that could be farmer's market, urban agriculture, sustainable transportation methods or companies that promote or use green technologies. We determined that our scope needed to be narrowed to eliminate this aspect of categorization from our work and to pass this responsibility back to ICA. The creation of categories and categorization of these organizations that we are not familiar with not only would have been time consuming but also may have resulted in errors regarding the true characteristics of these organizations.

To accomplish the first goal we will need to:

*Discuss with ICA the limitations that we have regarding the issue of categorization
*Determine the type of software that ICA can also use to ensure that the database is able to be updated in the future

The second goal is to development a database that will fit ICA's vision as well as to develop several geographic representations of this database to be presented to ICA as representations of what this database and GIS together can produce. Our objectives for the second goal are as follows:
*Normalize, clean and prepare the data for geo-coding
*Determine inaccuracies in the neighborhood and community areas data
*Correct ICA's original data by matching the locations of the organizations with their true community areas and/or neighborhoods
*Update database with new data as it becomes available

For the third goal, which is to spatially represent the database in a way that will demonstrate how GIS can be used to help organizations connect with each other, we have outlined the following objectives:
*Organize the spatial attributes of the data
*Create geographic information products that show the spatial attributes of the data across the city of Chicago in a variety of ways
-By location in Chicago in regards to community areas
-Density of organizations by community areas
-Location of a type of organization by name using query
*Create other geographic information products that ICA can use
-.kml file of the data that can be used in Google Earth
-ArcExplorer product with spatial data of green initiatives

Information products

The relative complexity of the ICA project has challenged our group to decide on a portfolio of end-products that will create progress towards the ICA's final goals, but also reasonable enough to fall within this course's overall scope. We are unable to fully accomplish their goals within the allotted time frame and therefore have worked with ICA to develop several products, some that will serve as examples of the functionality of ArcGIS and others that will be examples of what freeware can accomplish. Information products are being constructed with the intention of being transferable as the ICA project develops beyond our own involvement. We have thus developed the following list with an anticipation of what their final products will be.

1) *Editable Database*
Using Microsoft Access, we will construct an editable geodatabase containing numerous green-organizations and their attribute data. Desired attributes will be confirmed with the ICA according to their expectations regarding organizational demands and sortability. This database will be used within some of the proceeding products, as well as included by itself so the ICA may continue to add or edit it.

2) *Examples of ArcGIS map-products*
We will construct three examples of what their database will be capable of once the project is completed. The types will be chosen based on their ability to demonstrate GIS concepts, such as layering, buffering, project management capabilities, and statistical representations. The maps

that will be created are a point symbol map mapping the locations of the green initiative organizations, a choropleth map showing the density of organizations in a community area, a query map showing a particular element in a number of organizations name such as the query of "market".

3) *.kml file*
This file type, usable in google maps, will be included to demonstrate the transferability of the data into platforms outside of ArcGIS.

4) *Examples of freeware applications*
A freeware option, such as ArcExplorer or BatchGeo, will be used to demonstrate future applications of the standalone database. We will produce at least one statistical representation from the database using an internet-based GIS freeware client.

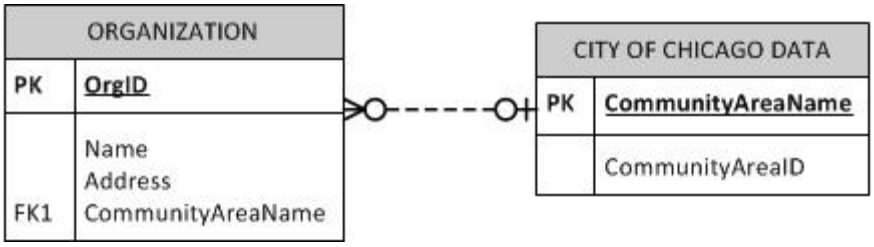
III. System Requirements:

Introduction:

The ICA GIS database project has been honed to fall better within the scope of this course. Our approach will produce a series of incremental steps toward the client's final expectations, ending in a comprehensive database with the data that was originally received by us. We plan to build a dynamic and adaptable GIS model to exhibit future capabilities of a final GIS, and inspire new ideas from the ICA. Attribute data will include existing data provided to us from the ICA, as well as secondary sources from the City of Chicago.

Information products will include maps showing locations of the ICA's green initiatives database and their respective community areas. This will entail a significant amount of data entry and preparation, before finally geo-coding locations from existing street addresses in the ICA database. Data transfer also represents a large proportion of our processing requirements; this will primarily call for transferring prepared data between MSExcel, MSAccess, ArcGIS, and freeware. These "cleaned up," consolidated databases will be provided as information products to the client, with the intention of serving as a tutorial to guide development for the larger-scale GIS.

Data Requirements:



Processing Requirements:

Objective: Map Green Initiative Organizations locations by Community Area
Data entry: enter all data onto excel file
Download: download community areas from Chicago Census data
Normalization of entities: organization, category, and community areas

Data transfer: transfer data from excel onto ArcGIS database, creating an organization layer
Geocoding: organizations (address matching) and community area locations
Mapping: add community area data to ArcGIS and add as layer to organization layer, create a point map showing location of organizations

Objective: Point symbol mapping of types of organizations using query
Query: query map Green Initiative Organizations to fit a specific type (ex: Market)
Export: export selected features to a new feature class for specific type
Thematic Mapping: add thematic shapes to show an organization's category/type

Objective: Density Map of Chicago Community Area Green Initiative Organizations
Spatial Join: join geocoded address database of organizations with community areas
Spatial Join with sum: join spatial join 1 with community areas and sum amount of organizations within a community area
Chloropleth Mapping: map the sum of organizations for each community area by color

.kml File of Green Initiatives locations map:
Export: export map as a .kml file
Upload: upload file onto Google Earth

Free Online Mapping System Green Initiatives Locations Map:
Clean Data: clean data for accuracy
Upload: upload data onto batchgeo.com
Geocode: geocode data on website to map
Map: map located on a URL link with information of organizations

IV. Data Acquisition

Introduction

The scope of this project was to create maps that show the physical location of each initiative provided they already includes geographical information and link these locations with community areas boundaries as set by the City of Chicago. In this section, we describe the fitness of our data sets for our project, while also acknowledging the constraints we face in acquiring the data.

Data Dictionary

Data Set Name: ICA List of Green Initiatives
File Name: ICAgreenintiatives.shp
Description: Data on green initiatives in Chicago as identified by ICA associates containing name, address, community area, neighborhood, and time stamp of when data was collected

Source of Data: Institute for Cultural Affairs, Seva Gandhi, sgandhi@ica-usa.org
Processing Steps:
1) Data cleaning
   a) remove several columns of data that is not relevant to our database as discussed with ICA
   b) create new data columns that distinguish between physical and mailing addresses

c) clean physical addresses to eliminate apartment numbers, address ranges (ex. 600-610 Michigan Ave.), and other mailing information like % 1st Lutheran Church
d) remove addresses outside of Chicago and without physical addresses to a separate excel sheet for ICA to investigate further

2) Data processing

Description: Data on green initiatives in Chicago as identified by ICA associates containing name, address, community area, neighborhood, and time stamp of when data was collected

a) Cleaned data is imported from Microsoft excel into a dBase file in MSAccess
b) dBase file is joined to GPS point data

Spatial Object Type: point

Attributes:

-ID - Organization ID number
-Field Name - Name of Initiative
-Physical Address - Street address
-City - City
-State - State
-Zip - Zip
-Community Area - Name of community area in Chicago
-Neighborhood Area - Name of neighborhood in Chicago
-Time Stamp - Time/date that data was added by ICA affiliates

Data Format: shapefile

Data Set Name: Chicago Community Areas

File Name: CommAreas.shp

Description: Boundaries - Chicago Community Areas

Source of Data: City of Chicago, http://www.cityofchicago.org/content/city/en/depts/doit/dataset/boundaries_-_communityareas.html, Contact: GIS_Team@cityofchicago.org

Processing Steps:

1) Download from City of Chicago website
2) Extract files
3) Open in ArcGIS

Spatial Object Type: Polygon

Attributes:

-FID - Field Identity Number
-Shape - shape of data - polygons
-AREA_NUMBER - unique number associated with community areas
-COMMUNITY - name of community area
-SHAPE_AREA - area of polygon
-SHAPE_LEN - perimeter of polygon

Data Format: Shapefile

Data Set Name: Chicago Neighborhoods

File Name: Neighboorhoods.shp

Description: Boundaries - Chicago Neighborhoods

Source of Data: City of Chicago, http://data.cityofchicago.org/Facilities-Geographic-Boundaries/Boundaries-Neighborhoods/9wp7-iasj, Contact: GIS_Team@cityofchicago.org
Processing Steps:
1) Download from City of Chicago website
2) Extract files
3) Open in ArcGIS
Spatial Object Type: Polygon
Attributes:

-FID - Field Identity Number
-Shape - Data shape - polygon
-OBJECT ID - unique number associated with neighborhood
-PRI_NEIGH_ - Primary Neighborhood id number
-PRI_NEIGH - Primary Neighborhood Name
-SEC_NEIGH_ - Secondary neighborhood id number
-SEC_NEIGH - Secondary neighborhood name
-SHAPE_AREA - area of polygon
-SHAPE_LEN - perimeter of polygon

Data Format: Shapefile

Data Set Name: Bing Hybrid Basemap
File Name: Bing Map Hybrid
Description: Aerial map with overlaid streets and labels
Source of Data: ArcMap 10
Processing Steps: N/a
Spatial Object Type: Raster/Line
Attributes: N/A
Data Format: Basemap

Fitness for Use
Data Set Name: ICA List of Green Initiatives
File Name: ICAgreenintiatives.shp
Description: Data on green initiatives in Chicago as identified by ICA associates containing name, address, community area, neighborhood, and time stamp of when data was collected

- The data was collected recently by students working with the ICA associates.
- The data is not complete and some addresses and information was amended and others were removed as not applicable to the project.
- The information was converted through Microsoft Access into a dbf file and then into a shapefile for use in ArcGIS.
- The data is a listing of physical addresses that ICA would like to be geocoded so that they may be correctly represented on a map of Chicago communities.
- There are limitations of this dataset due to possible inaccuracy of data, this was shown when geocoding the data where 15/156 organizations could not be geocoded due to lack of information such as a physical address.

Data Set Name: Chicago Community Areas
File Name: CommAreas.shp

- The dataset is in current usage and shows the boundaries of the community areas of Chicago.
- Uses the NAD 1983 StatePlane Ilinois East Fips1201 feet.
- This data set correctly represents the geocoded physical addresses as they are located within the physical boundaries of the community areas as they are recognized by the city of Chicago.
- The Dataset is complete. There are no values missing. Spatial consistency. Test data falls within the correct neighborhoods and Community areas. This information is logically and spatially consistent with expectations of the project.

Data Set Name: Chicago Neighborhoods

File Name: Neighboorhoods.shp

- Dataset is in current usage and was downloaded from the city of Chicago .org website.
- The coordinate system was translated to match the community area data set that was obtained prior.
- Application of the two data sets shows that the Neighborhood boundaries do match up with the community area boundaries that are in the previous data set.
- Both datasets are being retained for the project but the main focus of the representation of the data obtained from ICA will primarily be projected onto the larger community area data set.
- Both the Community Area and Chicago Neighborhood data set utilize the Foot US Linear Unit.
- Test Measurements fall within spatial coordinates of the map and within the community areas in which they are located. Spatial consistency.

Data Set Name: Bing Hybrid Basemap

- The Bing Hybrid Basemap was obtained through ArcGIS.
- It provides a smooth background base map with no errors that we will utilized with our other data.
- The basemap of Chicago that was chosen is in current usage and had projected roads and features that are current for ArcGIS.
- The metadata for this basemap is currently not available from ArcGIS, but a general statement was found. The basemap layer contains one or more layers that provide a high performance background for your map. The contents of the basemap layer are automatically cached locally to provide fast drawing performance. You can add additional layers into this basemap layer or remove layers from it.
- This data set may not be used if the representation of the physical addresses within the community areas is too cluttered. It is still being retained if the client desires a more literal representation of the clusters of information that they have obtained is desired for projection on a more physical representation of the city other than within designated community area polygons.

Data Acquisition Constraints

We were unable to acquire information on the classification of organizations from the ICA. This would add another layer onto our project to give our clients a more holistic view of the

data. By acquiring the data to classify each organization into a specific category (such as urban gardening, renewable energy, or aquaponics), we would give the client a choice of how to locate organizations whether it be by area or by category. Without this information we have one less layer to our map and less information to create a new way to navigate the information and map. For some organizations we were given addresses that would not geocode. The reasons for this were various. Some had extra information in the mailing address that needed to be removed so that we could geocode them (e.g. apartment numbers, address range. Some did not include an address at all or simply listed a P.O. Box. To have the organizations with only P.O. Box addresses we either found their physical addresses online or did not use that data while mapping to avoid inaccurate locations. With the organizations that have no address affiliated with them we cannot include a specific location for their organization without further information at this time. Because a lack of a physical address the clients will not be able to locate or physically visit this organization.

These data acquisition constrains have influenced our objectives and direction of our project. In the preliminary phases of our project we had the understanding that the data had been organized with a classification and all included physical addresses. This thinking gave us the confidence to believe we could create five maps, the first mapping all organizations by community areas (through spatial join), the second being that we map organizations by querying the organization, third that we map community areas by the number of organizations (through spatial join), fourth that we create a .kml file and upload onto Google Earth and fifth that we use a free online mapping system such as BatchGeo. The percent complete of information is hard to tell because the amount of green initiatives in each community is unknown. While geocoding 15/156 organizations could not be geocoded. With the lack of addresses we are not able to map all of the organizations. And by missing a categorization of organizations we are unable to create a category map that the clients expect but instead we will create the map using query for a certain name in the organizations such as '%Market%', using the "LIKE" operation in the attribute query.

V. Data Analysis and Visualization

Introduction

This section details the GIS functions needed for creating information products. It includes explanations on the resulting information products generated for the project. Process diagrams showing the processing steps of each information product and data visualization including the map projection, map symbols, map type, data classification, normalizing data, and map elements are also contained in this section of the report.

Information Products:

MS Access Database – Derived from an original rough Excel file given by the ICA, we will provide an ArcGIS ready database file containing relevant green initiatives information needed to organize and categorize by name, location, contact information, and area of focus. This database will be cleaned up and geocoded to be easily opened with GIS software. The database will also serve as a template for the ICA to add to over the years.

Chicago-Area Green Initiatives Locations Map – This basic map will express visually the ICA's database for locations of green initiatives in the Chicago area. This will be produced with

the intention of providing a simple baseline understanding of where the green initiatives are located in Chicago.

Chicago Community-Area Green Initiative Density Map – This map will take spatial distribution of green initiatives one step further by more clearly identifying the relative density of green initiative activity in each community. This product will help address the demands for collaboration between green organizations by grouping them by community affiliation.

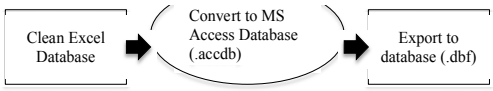
Chicago "Market" Query Green Initiatives Map – To further facilitate collaboration, we will use a query function to identify all green initiatives relating to "market," and then display their locations on a Chicago-area map. This information product provides an example of the capabilities of using GIS in managing their database. Since the ICA will be continuing this project after our course is finished, we hope this product will inspire ideas for different kinds of categorization through query, which they can perform after our course is finished.

.kml File of Green Initiatives Locations Map – The basic green initiatives location map will be exported into .kml format for use in Google Earth. This platform is more familiar to those working at the ICA, and we intend for this product to provide diverse capabilities for their use internally, on their website, and to distribute to other organizations.

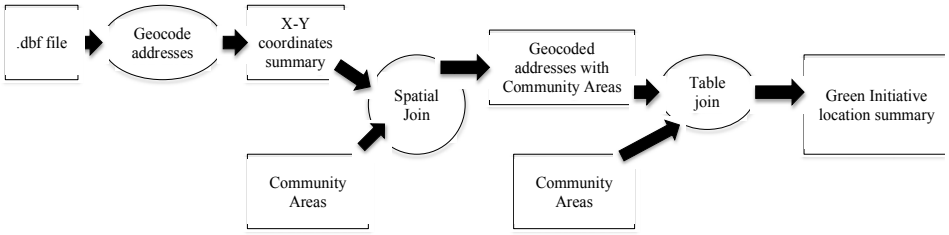
Arc Explorer Green Initiatives Locations Map – Similar in purpose to the Google Earth file, an Arc Explorer map will be produced to show locations of green initiatives in the Chicago area. This product will provide another example of a versatile format perhaps more easily used within the ICA compared to an ArcGIS file. We expect the web-based format to be very useful in facilitating collaboration between multiple organizations.

Data analysis

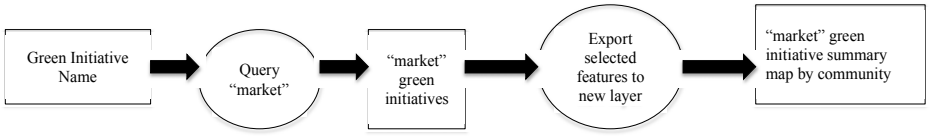
MS Access Database:



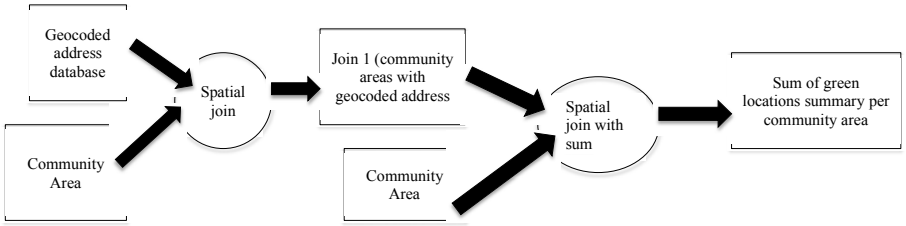
Chicago-Area Green Initiatives Locations Map:



Chicago "Market" Query Green Initiatives Map:

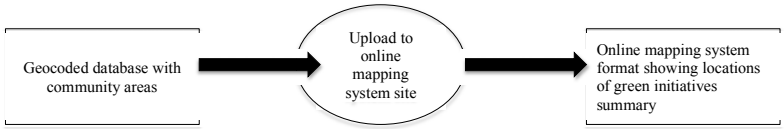


Chicago Community-Area Green Initiative Density Map:



.kml File of Green Initiatives Locations Map:

Free Online Mapping System Green Initiatives Locations Map:



Data Visualization

Map of Green Initiatives by Community Areas (Choropleth Map):

The ICA and others who view their website are looking for information of the mapping of Green Initiatives within the 77 Community Areas of the City of Chicago. The information is the self-designation of a green initiative and a physical location. Not all areas of Chicago have been canvassed yet to collect and correlate this data. The use of a choropleth map will allow for the categorization of Community Areas that have not been contacted, area densely represented and those that are somewhat represented. The map cannot show areas of the city that have no Green Initiatives in progress because this is an unknown quantity. It can however show which Community Areas of the city do have at least some functioning green Initiatives represented and their relative location.

Map Projection: NAD_1983_StatePlane_Illinois_East_FIPS_1201_Fee. The State plane coordinate system is the best representation for the data contained for this section of Illinois.

Map Type: A Choropleth map may be useful to the client to show the density of coverage that has been achieved by contacting the grass roots green initiatives that they are focusing on for their project. The density coverage will be found by summing the geocoded addresses with community area layer in a community area layer and spatially joining it in ArcGIS. This type of map will also allow them to identify areas of Chicago that are underreported and that they may wish to explore. A Choropleth map for a specific Community Area could also be color coded to show the activity density of specific neighborhood that lie within that Community Area.

Data Classification: Due to the incomplete coverage of the Chicago area and the number of Community areas that have no representation within the data, the use of natural breaks would seem to be the best choice. About 5 classes using natural breaks would show the highest density and the mainly underreported areas of the city. The additional three classes generated would give ICA some idea of the level of coverage in the participating areas.

Normalize Data: The data consists of point data for the given geographic area of Chicago, Illinois. The density will be found by dividing the number of green initiative organizations in a community by that community area, which will be 1 community area. This will be done by spatially joining community area to a previous join of the geocoded addresses and community area and summing it. The data does not need to be normalized because much about the initiatives represented is not known. Since the information is individual locations and point based, the choice of a continuous representation is not applicable to this data. Choropleth representation would allow density and areas with unknown variables to be adequately mapped for the uses of the ICA projects.

Map Elements: The Community areas are very large known spatial areas. The boundaries of Community Areas and the lesser known neighborhood areas associated with them will be a large component of the map. Having a scale and compass direction would allow those less familiar with some of the neighborhoods and official boundaries between Community Areas to gauge distance when utilizing the data contained in the map. The labeling of each Community Area with its name will allow for proper identification of the areas of the city. Knowing how to go

somewhere in the city is very different from know exactly where it is located within the city or Community area.

Green Initiatives Location Map:

A neighborhood map representation for the areas with the densest collection of point locations for Green Initiatives would allow for the best representation of the data. The data points displayed on an aerial city background with street and coordinate data would allow the viewer to correctly and spatially locate the initiatives within the neighborhood and Community areas in which they are located. Even if the person is not intimately familiar with the area, the location of major buildings, landmarks and road system will allow for the user to arrive at the location of the point data.

Map Projection: NAD_1983_StatePlane_Illinois_East_FIPS_1201_Fee >. State plane coordinate system was deemed best to use for Chicago and would minimize distortion.

Map Symbols: The ICA has not given the group references to categorize the data that we are working with. The data is varied and comprises a wide range of groupings under the term "Green Initiative". A simple designation point symbol will be used to show the location of each individual initiative since there is not enough data known about the individual initiatives for the use of more specific symbols or graduated symbols at this time.

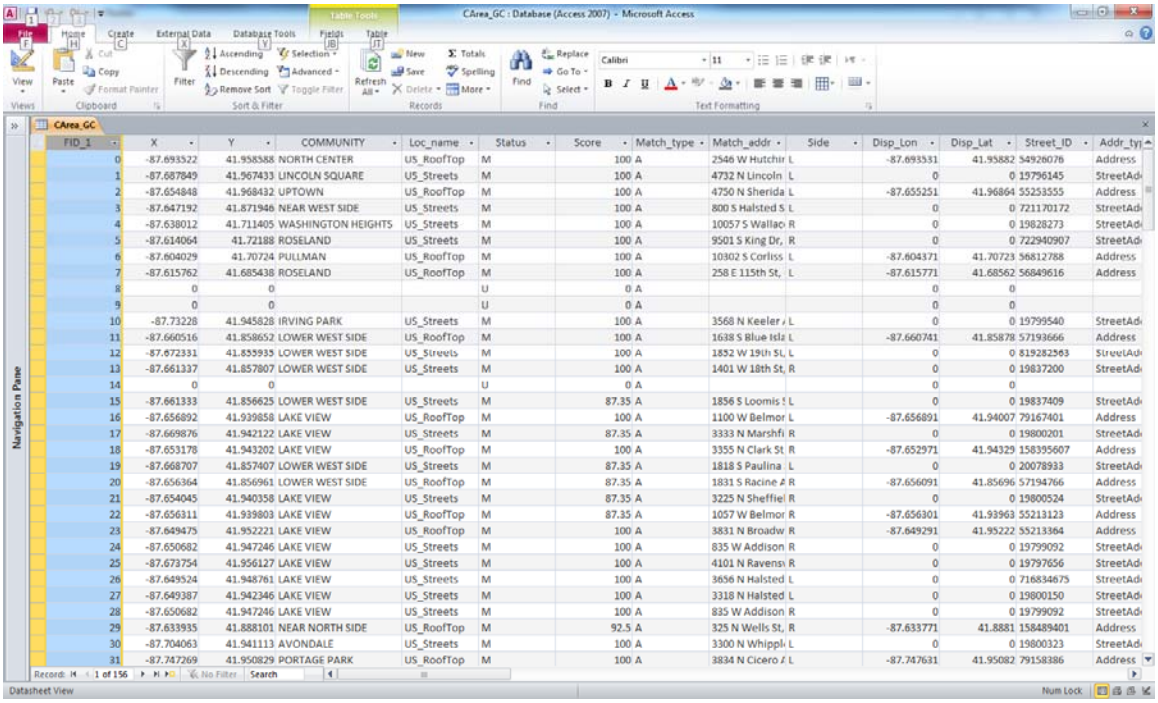
Map Type: A point symbol map representation on a Bing map city background would be best to show the data that was made available to us by ICA. There is not enough information to categorize the data to allow for a graduated symbol map. Simple points that can show the geocoded physical addresses that were provided are the best representation for the data.

Data Classification:
Normalize Data: The continuous Bing map representation of the city of Chicago is compatible with the coordinate system used for the boundaries of the neighborhoods and Community Areas. The normalization of the data is also not necessary, the same layer was used for the geocoding of the addresses used for the point data that will be represented on the map.

Map Elements: Point symbols to show the location within the densest Community Areas with the Bing map city background showing landmarks, buildings and streets from an aerial view, would allow for the customer and other users to adequately place point locations with the neighborhood or Community Areas. This map would also use a scale to gauge distance and a compass symbol so that the location and direction of points and streets can be adequately placed in the mind of the person using the map.

VI. Results:

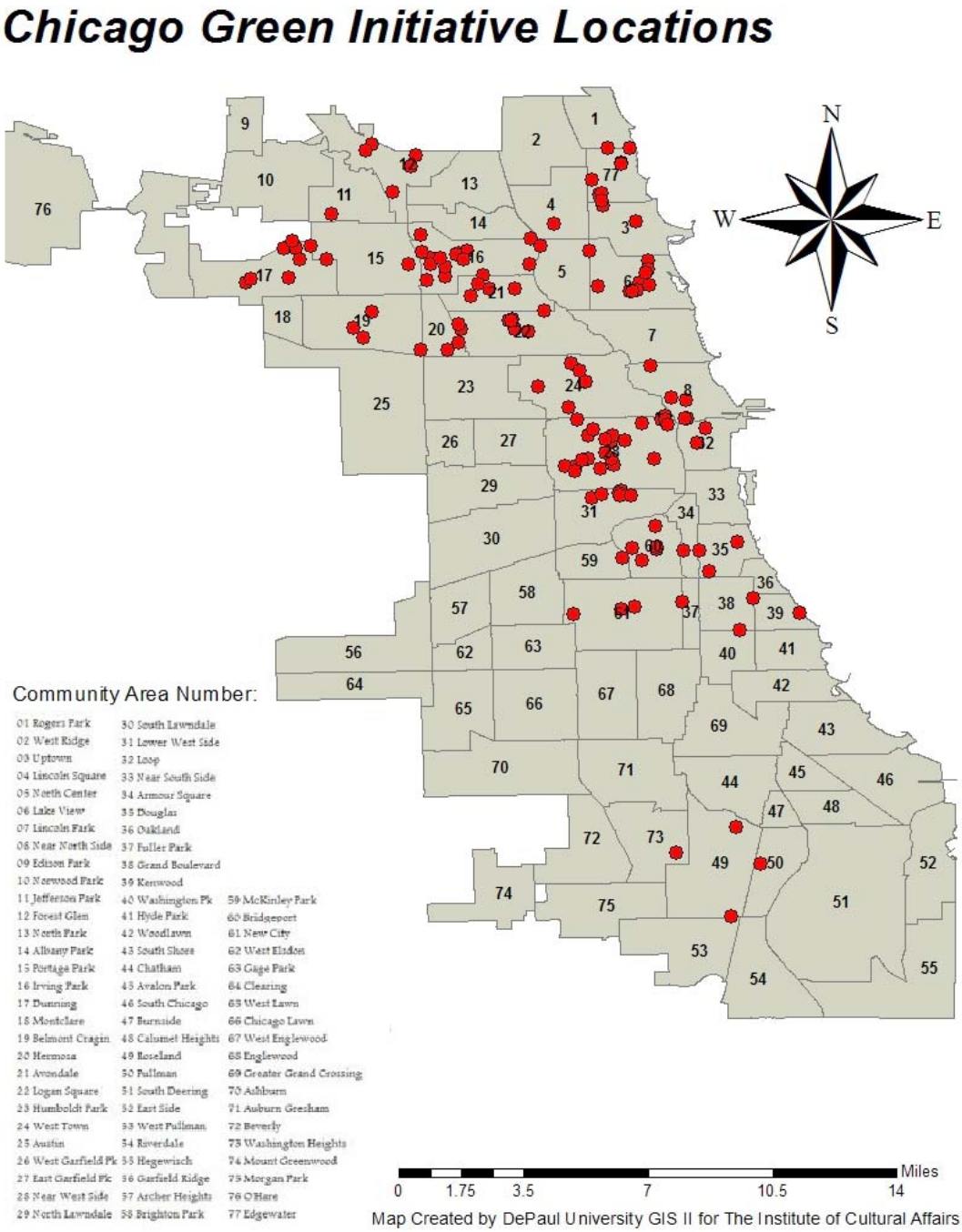
Below are discussions of the information products created throughout this project. All content was imported from an original spreadsheet provided by the ICA containing green initiative names and addresses, in addition to public neighborhood area information provided by the City of Chicago. The following should be presented in specific order, as each item generally builds upon those previous to it.



FID_1	X	Y	COMMUNITY	Loc_name	Status	Score	Match_type	Match_addr	Side	Disp_Lon	Disp_Lat	Street_ID	Addr_ty
0	-87.693522	41.958588	NORTH CENTER	US_RoofTop	M	100	A	2546 W Hutchir	L	-87.693331	41.95882	54926076	Address
1	-87.687849	41.967433	LINCOLN SQUARE	US_Streets	M	100	A	4732 N Lincoln	L	0	0	19796145	StreetAd
2	-87.654848	41.968432	UPTOWN	US_RoofTop	M	100	A	4750 N Sherida	L	-87.655251	41.96864	55253555	Address
3	-87.647192	41.871946	NEAR WEST SIDE	US_Streets	M	100	A	800 S Halsted S	L	0	0	721170172	StreetAd
4	-87.638012	41.711405	WASHINGTON HEIGHTS	US_Streets	M	100	A	10057 S Wallac	R	0	0	19828273	StreetAd
5	-87.614064	41.72188	ROSELAND	US_Streets	M	100	A	9501 S King Dr,	R	0	0	722940907	StreetAd
6	-87.604029	41.70724	PULLMAN	US_RoofTop	M	100	A	10302 S Corliss	L	-87.604371	41.70723	56812788	Address
7	-87.615762	41.685438	ROSELAND	US_RoofTop	M	100	A	258 E 115th St,	L	-87.615771	41.68562	56849616	Address
8	0	0			U	0	A			0	0		
9	0	0			U	0	A			0	0		
10	-87.73228	41.945828	IRVING PARK	US_Streets	M	100	A	3568 N Keeler /	L	0	0	19799540	StreetAd
11	-87.660516	41.858652	LOWER WEST SIDE	US_RoofTop	M	100	A	1638 S Blue Isla	L	-87.660741	41.85878	57193666	Address
12	-87.672331	41.835935	LOWER WEST SIDE	US_Streets	M	100	A	1852 W 19th St,	L	0	0	819282563	StreetAd
13	-87.661337	41.857807	LOWER WEST SIDE	US_Streets	M	100	A	1401 W 18th St,	R	0	0	19837200	StreetAd
14	0	0			U	0	A			0	0		
15	-87.661333	41.856625	LOWER WEST SIDE	US_Streets	M	87.35	A	1856 S Loomis S	L	0	0	19837409	StreetAd
16	-87.656892	41.939858	LAKE VIEW	US_RoofTop	M	100	A	1100 W Belmor	L	-87.656891	41.94007	79167401	Address
17	-87.669876	41.942122	LAKE VIEW	US_Streets	M	87.35	A	3333 N Marshfi	R	0	0	19800201	StreetAd
18	-87.653178	41.943202	LAKE VIEW	US_RoofTop	M	100	A	3355 N Clark St	R	-87.652971	41.94329	158395607	Address
19	-87.668707	41.857407	LOWER WEST SIDE	US_Streets	M	87.35	A	1818 S Paulina	L	0	0	20078933	StreetAd
20	-87.656364	41.856961	LOWER WEST SIDE	US_RoofTop	M	87.35	A	1831 S Racine A	R	-87.656091	41.85696	57194766	Address
21	-87.654045	41.940358	LAKE VIEW	US_Streets	M	87.35	A	3225 N Sheffiel	R	0	0	19800524	StreetAd
22	-87.656311	41.939803	LAKE VIEW	US_RoofTop	M	87.35	A	1057 W Belmor	R	-87.656301	41.93963	55213123	Address
23	-87.649475	41.952221	LAKE VIEW	US_RoofTop	M	100	A	3831 N Broadw	R	-87.649291	41.95222	55213364	Address
24	-87.650682	41.947246	LAKE VIEW	US_Streets	M	100	A	835 W Addison	R	0	0	19799092	StreetAd
25	-87.673754	41.956127	LAKE VIEW	US_Streets	M	100	A	4101 N Ravensv	R	0	0	19797656	StreetAd
26	-87.649524	41.948761	LAKE VIEW	US_Streets	M	100	A	3656 N Halsted	L	0	0	716834675	StreetAd
27	-87.649387	41.942346	LAKE VIEW	US_Streets	M	100	A	3318 N Halsted	L	0	0	19800150	StreetAd
28	-87.650682	41.947246	LAKE VIEW	US_Streets	M	100	A	835 W Addison	R	0	0	19799092	StreetAd
29	-87.633935	41.888101	NEAR NORTH SIDE	US_RoofTop	M	92.5	A	325 N Wells St,	R	-87.633771	41.8881	158489401	Address
30	-87.704063	41.941113	AVONDALE	US_Streets	M	100	A	3300 N Whippl	L	0	0	19800323	StreetAd
31	-87.747269	41.950829	PORTAGE PARK	US_RoofTop	M	100	A	3834 N Cicero /	L	-87.747631	41.95082	79158386	Address

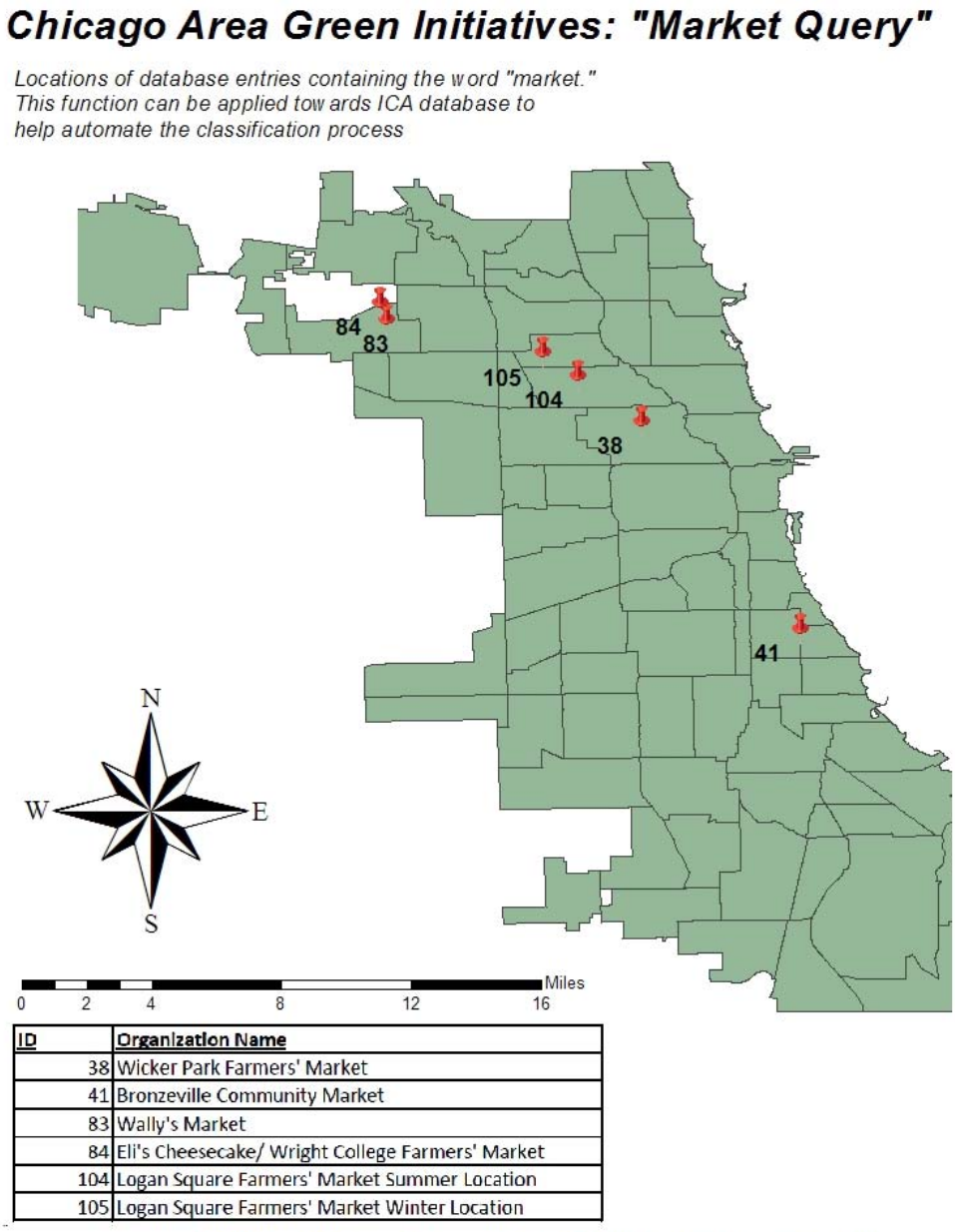
1) Geocoded ICA Green Initiative Database:

The original Excel spreadsheet provided to us has been cleaned up into a format more friendly and universal in programs such as ArcGIS and Microsoft Access. The street addresses for each entry have now been "geocoded" such that they are easily usable in a variety of mapping platforms including ArcGIS, but also web-based platforms such as Arc Explorer and BatchGeo. There were some incomplete entries that could not be successfully geocoded, however the entries still remain within the database (this means of course, that these entries will not appear on any subsequent maps). The format that remains in this database should be replicated for any new entries to ensure compatibility when importing into other software platforms.



2) Chicago Green Initiatives Map –

This map serves as a foundational resource for the ICA while interpreting opportunities to facilitate collaboration and communication between green initiative projects in the Chicago area. This map is intended to be a simple, easy-to-understand visualization of where ICA-documented green initiatives are located. Official community-areas and their respective numbers are also displayed. While reviewing the other map-products from this project, it is worth noting that everything has been produced from the same set of information represented here, only applied in different ways to stimulate new contexts for organizing the data.

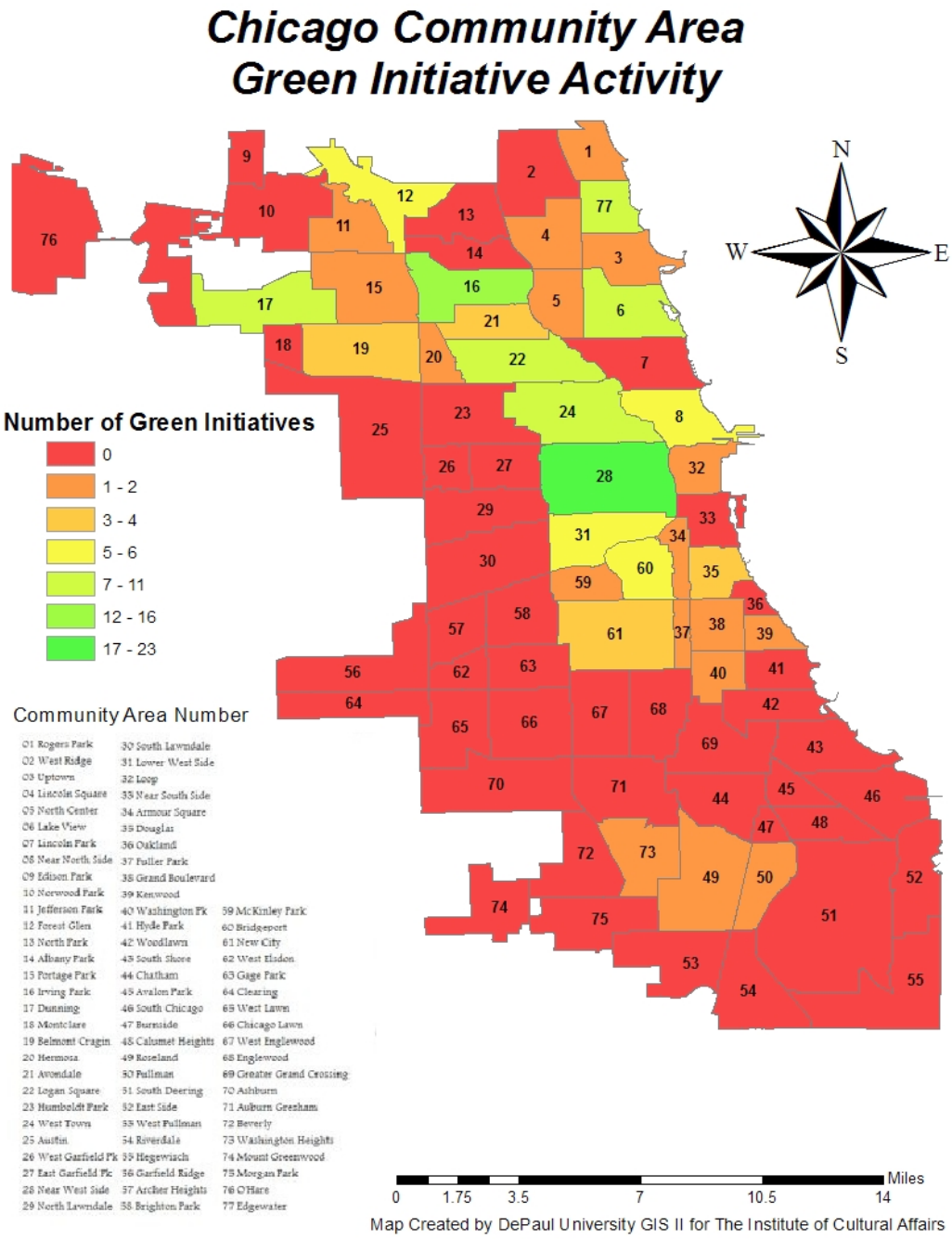


ID	Organization Name
38	Wicker Park Farmers' Market
41	Bronzeville Community Market
83	Wally's Market
84	Eli's Cheesecake/ Wright College Farmers' Market
104	Logan Square Farmers' Market Summer Location
105	Logan Square Farmers' Market Winter Location

Map Created by DePaul University GIS II for The Institute of Cultural Affairs

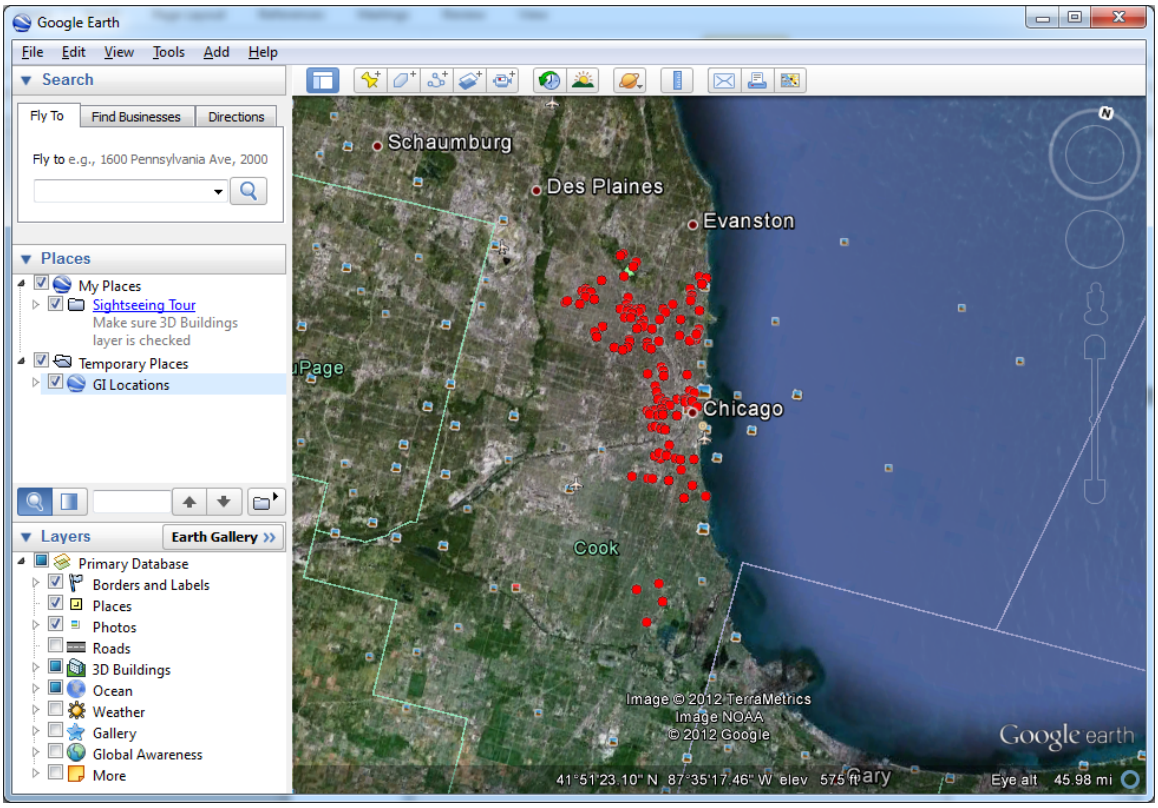
3) ICA Green Initiative Data Organized by Query Function – "Market"

This map contains the same database information manipulated via ArcGIS to only show entries containing the word "market." This concept can easily be applied to other desired categories in order to efficiently manage the ever-growing database. According to the present database, we see that geographically the majority of Chicago is without a sustainable/green market organization in close proximity. We do understand the database is an ongoing project, and query functions like this can help to distinguish which categories need to be elaborated on the most, and what geographic areas should be targeted for further growth in sustainable activity.

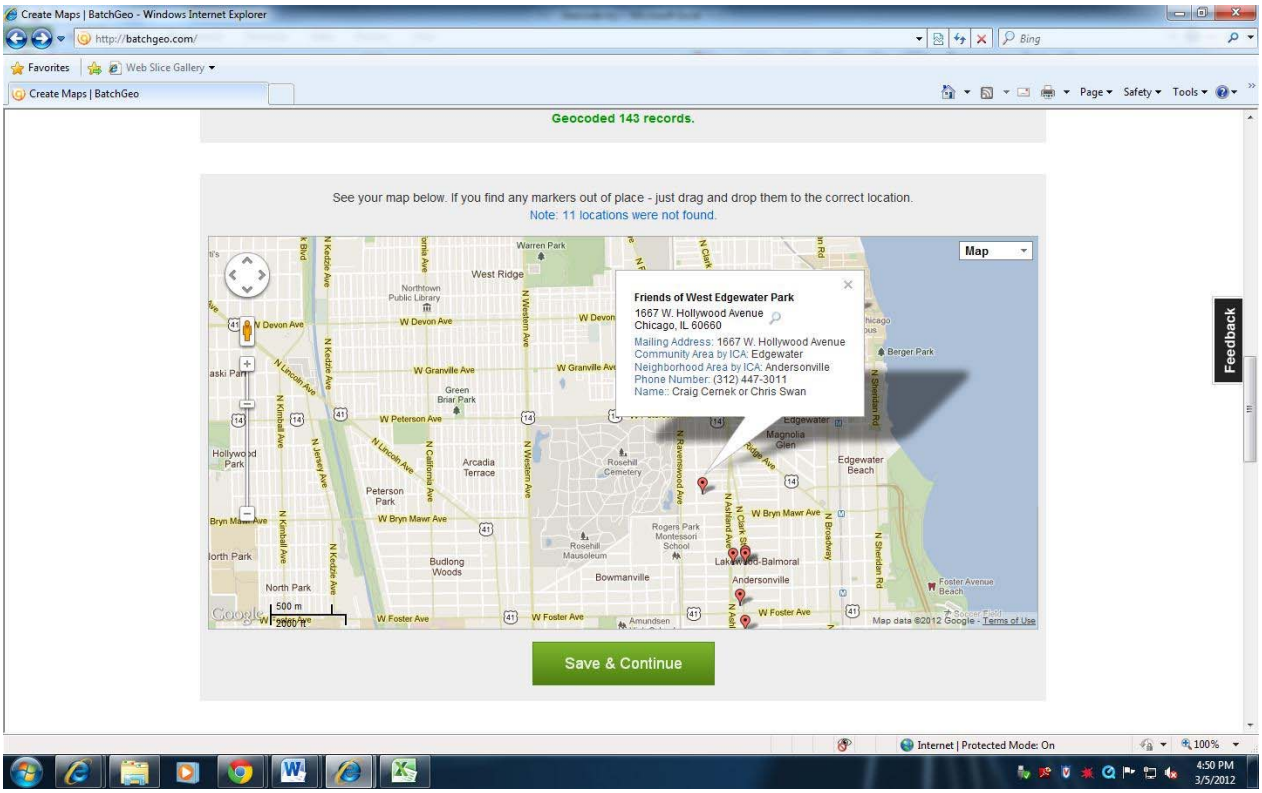


4) Community Area Map Showing Density of Green Initiatives

Here is another example of ArcGIS utility in organizing database information. The total number of green initiatives in each community area were added up and then attached respectively as an attribute. This enables us to then get rid of the individual location points of green initiatives, and look at the Chicago area purely from a neighborhood-to-neighborhood relationship. It is clear which neighborhoods are abundant or lacking in sustainable project activity, and this information may be used appropriately in targeting certain areas to drive communication between organizations, or for identifying new project areas to expand into.



5) Green Initiative Locations Exported to Google Earth-Ready 'kml" File
Our basic map showing green initiative locations was exported from ArcGIS into a kml file, which can be opened in Google Earth to quickly project the data points. The Google Earth platform is most likely more familiar to the ICA and any constituent organizations, so we anticipate this to be a well-accepted application of this overall geocoding – mapping process. We encourage the ICA to acquire their own ArcGIS license, as this exporting process, in addition to those described above are relatively simple tasks that can build significant value in the services the ICA provides.



6.) UTILIZING BATCHgeo FOR FUTURE DATA REPRESENTATION

BATCBgeo is a free online mapping tool that allows you to create maps of physical location utilizing any spreadsheet data. The Batchgeo website was tested using the original excel spreadsheet provided by ICA. Ongoing efforts of data collection and green initiative contact can by mapped and added to any email of website by ICA at no cost. The steps to coding your own data are very simple.

- Make sure that the data in your spreadsheet is clean and accurate
- Go to www.batchgeo.com
- Copy and paste data into Batchgeo spreadsheet section. Make sure that the first line of the spreadsheet with column headings is included for reference for the data. Make sure to include the name of the organization and it is also possible to add contact phone information.
- In the Batchgeo control section, validate the data and set options. Choose the city or representation that you would like to use and make sure that the data references are correct.
- Select map it and the website will geocode your physical addresses and map the references.
- Choose save and email the map to yourself. Batchgeo will email a URL to your map that can be added to webpages and emails.

VII. Summary, Conclusions, and Recommendations:

Summary

This paper represents the data, process, considerations and results of our partnership with ICA to develop a database and geographic information products to connect sustainable and green initiatives across the City of Chicago in a sharable online format. We consider our work an

exploration of several ways that ICA can take the database that we cleaned for them and create mapping products using a variety of available programs including ArcGIS, Google Earth, BatchGeo and MSAccess.

Conclusion

In conclusion, we feel that we accomplished the three goals we set out achieve which were (1) to work with ICA to explore the ways the collected data could be used in an effort to (2) begin the development of a database that will fit ICA's vision. We also added a third specific goal to (3) spatially represent database in a way that will demonstrate how GIS can be used to create maps that can help organizations connect with each other. We provided three different GIS products that ICA could use to represent their database. We also cleaned and corrected the available data so that it is prepared for either of the three products. For the amount of data and the time frame provided, we feel that the approach taken illustrates the variety of ways GIS and mapping products can work for ICA in the future.

Recommendations

Editable database: The original excel file was converted into Microsoft Access so that the information could then be converted into a dbase file for use in ArcGIS to geocode the data. The use of Access and keeping excel stored in the same relative place allows for the tables to remain linked as the original excel file is updated and the database will update itself from the original file. Keeping the two linked allows for the original excel file to be maintained and the access database to be copied and used for other projects.

ArcGIS Map Products: The products created for this project are static products that are related only to the information that has currently been provided. As the 77 Neighborhood project moves forward, the information that is collected can be geocoded and displayed in a mapping format that can also be added to your website. The creation of an interactive map product for this information is beyond the scope of this class and our current abilities. By correctly coding individual initiatives by zip code and sorting by the zip codes for individual neighborhoods, the sources can be easily mapped.

The website GeoBatch allows for raw address data to be copied from Excel and pasted into the web site which will geocode and display the locations on a map. This map can then be exported via email for addition to your web site. This url can be recreated for free and replaced on your website as your information updates. There is not contact information that listed, but the name of the initiative and the physical address of the organization is listed.

The individual maps that we have created are current and correct for the locations. The opportunities for display and interpretation of the data is greatly increased by the actual classification of the data. This was talked about in our initial meetings, but we not actually finalized. Our maps show location and density of individual locations for the areas in which they happen to be. If the classification of attributes of the individual initiatives were known or agreed upon, the representation of locations based on attributes would allow for the display of specific initiatives based on relation as well as location. Moving forward in your project this would allow for greater use and interpretation of your data.

i. References:

Beckwitt, Steve." Environmental Advocate Creates Path to More Informed and Effective Conservation Efforts". *ArcNews Online*. Fall 2010. www.esri.com

Buckley, Aileen." Make Maps People Want to Look At: Five Primary Principles of Cartography". *ArcNews Online*. Winter 2012. www.esri.com

Nelson, Emma. "Using Access or Excel to Manage Your Data. Access-Help. <office.microsoft.com >

Sieber, R. E."GIS IMPLEMENTATION IN THE GRASSROOTS",*URISA Journal,* Volume 12, Number 1, Winter 2000, Pages 15 –29.

VIII. Technical Appendices:

i. *Appendix A:*

Contact Information:

Gandhi, Seva	Program Coordinator	sgandhi@ica-usa.org	773.769.6363 ext. 312
Winn, Nina	Program & Website Coordinator	nwinn@ica-usa.org	773-769-6363 ext. 301

ii. *Appendix B:*

The Green Initiatives Program Information was a downloaded excel file from Google.docs was the original source data that was provided from ICA. A copy of this excel file is included in the attached data file.

Beckwitt, Steve." Environmental Advocate Creates Path to More Informed and Effective Conservation Efforts". *ArcNews Online*. Fall 2010. www.esri.com

Buckley, Aileen." Make Maps People Want to Look At: Five Primary Principles of Cartography". *ArcNews Online*. Winter 2012. www.esri.com

Nelson, Emma. "Using Access or Excel to Manage Your Data. Access-Help. <office.microsoft.com >

Sieber, R. E."GIS IMPLEMENTATION IN THE GRASSROOTS",*URISA Journal,* Volume 12, Number 1, Winter 2000, Pages 15 –29.