12-15-2011

# Using pen Source Data Inputs to Map Food Insecurity in Cumberland County, Maine

Daniel Wallace
*University of Southern Maine, Muskie School of Public Service*

Muskie School of Public Service, University of Southern Maine

# Using Open Source Data Inputs to Map Food Insecurity in Cumberland County, Maine

Capstone for Master's in Community Planning and Development

Daniel Wallace
12/15/2011

## *Introduction*

In 2010, Mapping Food Insecurity's Project Director (PD) participated in "The Campaign to Promote Food Security in Cumberland County, Maine." The Campaign drew together a 60 member coalition to address rapidly increasing food insecurity challenges in the county. It produced a report with a series of recommendations grouped under six strategic community goals. One of the recommendations called for the use of 'mapping and connectivity software to determine location of vulnerable populations and services in order to plan best future delivery and use of food access services in Cumberland County.'

At the same time, the PD had begun graduate work in community planning and development at the Muskie School of Public Service due in part to a nascent interest in food systems planning. The confluence of the Campaign and his graduate studies led to an interest in 'Geographic Information Systems' (GIS) as a means to visualize the food environment. In coordination with his graduate advisor, the PD began to seek funding for a preliminary effort to use GIS to look at food access in Cumberland County. Two clients – the Good Shepherd Food-Bank and Healthy Lakes Communities Putting Prevention to Work, a health promotion program of the People's Regional Opportunity Program – stepped forward, to form a team to develop the work further.

A geographic information system is a means to manage, disseminate, visualize, and analyze all types of geographic data. GIS allows users to view and interpret data in ways that can reveal relationships, patterns, and trends. It is a widely used and powerful tool that the project team believed held great promise for the overlap of food security and public health realms. It was hoped that use of GIS could inform decision making by identifying gaps in services and unmet need on the part of emergency food providers but also to educate and engage community members in public health issues related to food broadly (nutrition, etc.) and food supply specifically (i.e. where does it come from?).

The project was essentially exploratory in nature due to the level of expertise within the project team and the available budget. It was loosely designed around the broad categories of data that the Campaign had revealed would be important to a comprehensive approach to food insecurity. But as the application of GIS to this problem is relatively untried the learning curve was steep and many design questions needed to be handed initially. While the project was pragmatic in the sense that there were specific deliverables for the clients (maps and data), in the end the broad and experimental nature of the project supplanted specificity.

The usefulness, availability, and quality of open-source data became the central research question. The team had neither the resources to purchase data nor the time to organize extensive primary data gathering or conduct significant ground-truthing. Open source data is inexpensive and relatively easy to obtain. How complete and accurate is it? Is it reliable? Does it need to be augmented? One particular parameter was of primary importance, that of data 'resolution.' The team wanted to visualize food insecurity at the local level, with as fine a geographic grain as possible. A second parameter was also

explored, that of how disparate data sets from different sources interacts and builds a story when brought together on the same map. Does this convergence of data increase understanding or not?

The question of the capacity and explanatory power of open-source data inputs to local food insecurity challenges combined with the generalized outcomes of the overall project forms the basis of this capstone paper. The project resulted in a preliminary platform for geographic analysis of local food access coupled to a series of educational posters and a data delivery package. The results of the research components are mixed but encouraging, pointing mostly towards further development of the platform and the need for specific rather than generalized questions to guide the work.

## *Background and Project Design*

History, Purpose, and Goals

**Project description**: A variety of public service agencies serving Cumberland County are interested in the nexus of food insecurity with public health and local food systems. But in the absence of easily accessible and consolidated data, it can be challenging to target agency efforts. Geographic Information Systems (GIS) provide a means to describe visually and to analyze data. This project developed a GIS-based framework using open-source data inputs to depict as accurately as possible multiple facets of food insecurity in Cumberland County. The impetus for the project came from a recommendation made by the 2010 Campaign to Promote Food Security (http://muskie.usm.maine.edu/cpfs/). The project was funded by the Good Shepherd Food-Bank and Healthy Lakes Communities Putting Prevention to Work, a health promotion program of the People's Regional Opportunity Program, and was housed at the Muskie School of Public Service.

**Purpose**: The purpose of the project was to cast a broad net for gathering food system related data, to place that data in geographic context by mapping it in multiple ways at the highest level of detail possible, and to make the data easily accessible. An important secondary outcome is the initial development of a platform for analysis and inquiry.

**Goals:**

1. Network existing efforts and encourage data-sharing and communication.
2. Build a localized model for capturing, mapping, distributing, and updating relevant data that is transparent, user-friendly, and replicable within the scope determined by the project team and the clients to be achievable. Verify specified data and develop base maps.
3. Ensure sustainability by locating a host agency and web-based distribution platform, convening an advisory board, and training all interested agencies in methods and analysis.

What is food security?

***Definitions used by the USDA*** (http://www.ers.usda.gov/Briefing/FoodSecurity/labels.htm)

**Food security** for a household means access by all members at all times to enough food for an active, healthy life. Food security includes at a minimum: (1) the ready availability of nutritionally adequate and safe foods, (2) and the assured ability to acquire acceptable foods in socially acceptable ways (that is, without resorting to emergency food supplies, scavenging, stealing, or other coping strategies).

**Food insecurity** is the limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways.

*An alternative **food security definition*** (http://whyhunger.org/programs/fslc.html)
Strong, sustainable, local and regional food systems that ensure access to affordable, nutritious, and culturally appropriate food for all people at all times.

*Another view: **Community food security*** (http://www.foodsecurity.org/views_cfs_faq.html)
A condition in which all community residents obtain a safe, culturally appropriate, nutritionally sound diet through an economically and environmentally sustainable food system that promotes community self-reliance and social justice.

Geography and Food Insecurity: Cumberland County[1]
The project team adopted the Cumberland County political geography to build on the work of the Campaign to Promote Food Security. Cumberland County contains the largest urban region in Maine (Portland) to the east and the rural Lakes Region to the west. It is possible to encapsulate a multitude of challenges in one small county. One client was particularly interested in the Lakes Region, so the team had the opportunity to simultaneously conduct a broad data gathering effort while thinking about how that data applied to a very specific rural place.

Maine's rate of 14.8% food insecure ranks 9th in the nation, and the rate of high food insecurity is 6.7%, 2nd in the nation. Feeding America data suggests that 1 in 5 children in Maine is food insecure. Many Maine people are going hungry, and in recent years this number has been rising significantly. From 2008-2010, the number of Cumberland County – Maine's most affluent and diverse county – residents aged 19-59 who received food supplements increased by 37%. A survey of food pantries in Cumberland County conducted by the Maine Hunger Initiative reported an average increase of 42% in the number of clients served over the previous year, and 21% of the food pantries reported that they experienced a more than 100% increase. Due to these recent increases, 82% of pantries have had to modify services, including decreasing quantities of distributed food and having to turn clients away.

According to Good Shepherd Food-Bank (GSFB) data, Cumberland County has the largest gap between food resource need and provision in the state. GSFB, the only statewide food bank, distributed about 1.3 million pounds of food in 2009 in Cumberland County. This was against an estimated need of more than 6.2 million pounds, leaving a gap of 4.9 million pounds of food, or 78% of demand, unmet.

Models
The two primary models for this project were the Center for Community GIS Greater Franklin County Community Health Status Maps project (http://www.community-gis.org/projects/gfcmaps.html) and the NYC Coalition Against Hunger Poverty and Food Access Project (http://www.nyccah.org/node/92). More mapping resources are listed in Appendix 5.

[1] Much of this section pulled from the Campaign to Promote Food Security in Cumberland County: Project Report 2010. http://muskie.usm.maine.edu/cpfs/. Accessed August 25, 2011.

### *Methodology: Overview*

A challenge with the food security metric is that it is an aggregate figure. It provides a generalized picture of the state as a whole, but does not yield much insight into Cumberland County, or a town in Cumberland County, or a neighborhood, a road, or a block. One of the primary objectives of Mapping Food Insecurity was to provide highly localized data in geographic context. Thus results are presented at US Census block level when possible (corresponding to Census geography, see Appendix 7 for more information). The project team was always searching for higher resolution, or finer 'grain,' data that would be relevant to a given locality. A second primary objective was to model a 'systems' approach, by pulling data together from different sources that rarely gets placed in the same space (i.e. agriculture data coupled to health and human services data).

Project staff consisted of a graduate student in the Community Planning and Development Master's Program at the Muskie School of Public Policy who served as Project Director, and a GIS certificate student of Geography at the University of Southern Maine who served as GIS Analyst. Both staff members were supported by their academic advisors. The project team was rounded out by the clients. (See Appendix 1 for a complete list.) A core belief, informed both by experience and the broader definitions of food security listed above, is that local food systems are an integral part of solving food insecurity. In terms of this project, the team believed that mapping the local food landscape could contribute to food insecurity solutions from both an emergency food and a public health perspective.

The standard methodology for a project like this is fairly straightforward:

1. Project development and design.
2. Gather, format, and geocode data.
3. Map.

(Data and mapping are described in detail in their own respective sections below.)

However, the process the project team undertook was somewhat 'messier,' because it was a collaborative learning process, exploratory in nature, and coupled to broad goals of outreach and transparency. Thus there were several additional steps:

1. *Learning about maps and map styles*: More on this in the mapping portion of the report. The team in the end chose to design the maps in three different ways to highlight the benefits of several different map styles.
2. *Deciding which software to use, especially proprietary versus open source*: Ultimately the team chose to use industry leader ESRI's ArcGIS software because the project was housed at an educational institution and the team had legal access to it. (ESRI offers a license to eligible non-profit organizations for $100; otherwise, the software is quite expensive.) However, all of the data sets were built and formatted in Excel, such that they can be directly imported into any software.
3. *Determining how to distribute project results, followed by website design*: The Muskie School of Public Service agreed to host the project website until further notice. The project team had

hoped to find a 'home' for the project such that it would be an ongoing and supported program, and thus an accessible resource for the community, but to date has not been successful.

4. *Extensive outreach – both during project and after*: The PD participated in more than a dozen meetings with individuals representing diverse organizations to discuss the project and learn about other similar efforts. In addition, the PD spoke to multiple groups, giving both informational briefs and more detailed presentations. Every effort was made to make people aware of the project, build on previous work, and contribute in any way possible to other projects. Outreach was extensive in comparison to the size and scope of the project. In addition, a lengthy stakeholder distribution list was developed to update interested parties on progress.
5. *Text development to enhance educational aspects*: This was ultimately rejected in favor of the extant poster design, though the team put a great deal of effort into it. The draft narratives are included in Appendix 6. The idea was to describe how the maps fit into the larger food security narrative. However, the team found it was coming to conclusions that were dependent on information not included on the maps, and thus were potentially misleading and substantially unsupported.

Many of these steps were concurrent and iterative, especially as the map design process unfolded. The project team met every 4-6 weeks. The team anticipated a six month timeline but faced several delays. Ultimately the project took nearly 10 months. Project staff was part-time at roughly 10 hours per week averaged over the entire period. The project had an official start in January 2011. The information presented in this report is accurate as of that date. (Since then, some numbers have changed, i.e. Maine's food insecurity data and rankings as reported by the USDA.) However, for mapping purposes, the project team did update several data sets from the decennial Census as they became available.

### *Methodology: Data*

The quality of the data is at the heart of the potential success of a project like this. GIS depend on robust data to be useful. The mapping is, in a sense, secondary, and brings in an artistic design component. The output is only as good as the input (or, as the common phrase goes, 'garbage in, garbage out'). Data gathering, formatting, and geocoding took a great deal of time and effort and comprised the bulk of the work. Once this is done, maps can be generated relatively quickly. That said the GIS analyst spent a great deal of time on finished products like the posters and the interactive PDF, and certainly any particular analysis would require an additional investment of time.

As described in the introduction, Mapping Food Insecurity relied upon open-source secondary data, so the project in turn became a test of the strength of that data. The zip file downloadable from the website (http://muskie.usm.maine.edu/mappingfood/) includes all of the raw data gathered and used for this project. Each data spreadsheet includes on a separate tab the source and any relevant disclaimers and notes (known as metadata, or data about the data). Data sources are a mix of websites, agencies, and individuals. Appendix 2 is a quick reference table of data and sources. Some data had multiple sources. Though the data was gathered from credible sources, all of it comes with limitations. This compels the project team to issue the standard disclaimer and urge caution when using or

interpreting any of the data. Finally, data collection was inherently collaborative. Acknowledgments are listed in Appendix 4.

The project team ultimately collected more than 30 data sets grouped into the following categories:

- **Locational or positional data** such as grocers and farmer's markets
- **Public health data** such as free or reduced school lunch eligibility
- **Demographic data** such as poverty, single parent households, or children under 18
- **Emergency food system data** such as SNAP and WIC rates and pantry locations
- **Related data** such as access to vehicles, public transit, and soils

The challenges to collecting and using such disparate data are numerous and merit further description:

- *Discovery*: Who has it? What is it called? Does it exist at all? For instance, most data sets collected by various state agencies are organized by license. In looking for commercial food processors, the team was directed to the Division of Quality Assurance and Regulation at the Maine Department of Agriculture. However, there are 15 food establishment licenses. It was necessary to determine which license was appropriate, and then learn what the license covered and how it was different from other licenses. A different challenge was presented by community gardens. No one agency collects or maintains a master list, so it was necessary to build a list through communication with multiple individual sources.
- *Access*: We relied exclusively on public data, thus the biggest hurdle was the time it took to gather. With state agencies, for instance, it was a three step process: (1) determine who can authorize the request, (2) communicate with the person who will actually put together the work order, (3) and then data extraction itself. In a few cases, it took multiple weeks to receive requested data. However, people were invariable willing and happy to help – it just took time.
- *Cost*: The project team did not buy any data, though it was necessary in one case to provide a thumb drive and postage for delivery of a data set.
- *Format and geocoding*: Once the data is in hand, it often needs to be manipulated to fit a format that the GIS software will understand. The team did all of its work in Excel and fit the data to a generic template: name, street, city, zip code, contact information. Where relevant, the 'attributes' of a given place were retained in separate columns on the spreadsheet. For instance, a food pantry listing might include hours of operation and whether any paperwork is required to be authorized to receive food. Then the data must be 'geocoded' to provide a latitude and longitude reference to locate it on a map. Geocoding in itself is a process and requires careful 'cleaning' of data by, for instance, verifying addresses. This can be done within ESRI's software. For a time, Google offered a website to enable quick geocoding, but that service has since been withdrawn. Finally, all the data is imported into the software.
- *Age*: How old is the data? How often is it updated? Much of the information in these data sets changes frequently. Any given data set marks a specific point in time. Data gathering for the project primarily occurred between January and June of 2011. During this time, the team impatiently awaited the release of 2010 census data because all of the demographics were more than 10 years old. Ultimately most of it was updated.

- *Choice*: There is a lot of data 'out there': how does one choose what to gather? This was a particular challenge because project goals were deliberately broad. The team considered close to 50 data possibilities. Some data was rejected for redundancy, some because the team did not sufficiently understand it, some because it was a poor fit, and some simply because it was too hard to collect. The scope of the project thus made it hard to choose what to include but also allowed some leeway in what to reject. Importantly, the project at this stage was not hampered by a lack of data.
- *Resolution and Privacy*: A primary objective of the project was to use the finest grain data possible, which essentially means data at the smallest geographic unit possible. In most cases, this meant census block groups. (While it did not become an issue for this project, privacy can become a concern with such local level data.) On the other hand, the team was very disappointed with the resolution of most public health data, which was only good at the county level. Much of it is collected by survey research, and a certain response rate is necessary to achieve statistical significance. This research largely did not exist for Cumberland County, though some agencies are working on it.
- *Anonymity*: Some locations – for a variety of reasons – do not want to appear on a public map. It is necessary to understand and accommodate these desires. However, this adds a layer of complexity to interpretation of the final maps. For instance, the map may reveal a 'gap' in some type of service that does not in fact exist simply because the agency does not wish to be included. Some data sets are suppressed entirely for security reasons, such as women's shelters.
- *Ground-Truthing*: Standard practice calls for ground-truthing the data. Essentially this means verifying the data 'on the ground' by some means such as driving around and visually double-checking that addresses are accurate. None of the data was verified as it would have taken a huge amount of time to ground-truth all of it. It is the sense of the team, further taken up in the conclusion, that the data is 'reasonably' accurate. That is to say, for the purposes of an exploratory demonstration project, the data is sufficiently robust as it has been collected either from credible public sources or through direct outreach by the project team itself. Ground-truthing would be highly recommended prior to drawing specific conclusions or running specialized analysis. Despite all best intentions, it is expected that some inaccuracies remain.

Finally, a few notes on specific data sources, definitions, and content are in order:

- Mapping Food Insecurity relied heavily on census data. The breadth and depth of census data is extraordinary, though accessing and the data can be a challenge: books have been written to guide the uninitiated. Much demographic information is based on the decennial census and thus is potentially 10 years old, though a number of estimates are created for intervening years. Appendix 7 goes into some depth as to the census data and definitions used for this project.
- Data definitions such as unemployment or school food eligibility taken from other sources are included in Appendix 8 and described on the posters except where the definition can reasonably be considered obvious. Time must be taken with many of the data sets to understand the nuances.

- The Healthy Maine Partnerships were particularly helpful for community level data such as community gardens. There are five that have at least some coverage in Cumberland County: Healthy Portland, Healthy Lakes, Healthy Rivers, Healthy Casco Bay, and Access Health. The Southern Maine Agency on Aging also provided input into senior centers and community meal sites; it is believed that the other Area Agencies on Aging would be similarly helpful in other parts of the state.

### *Methodology: Mapping*

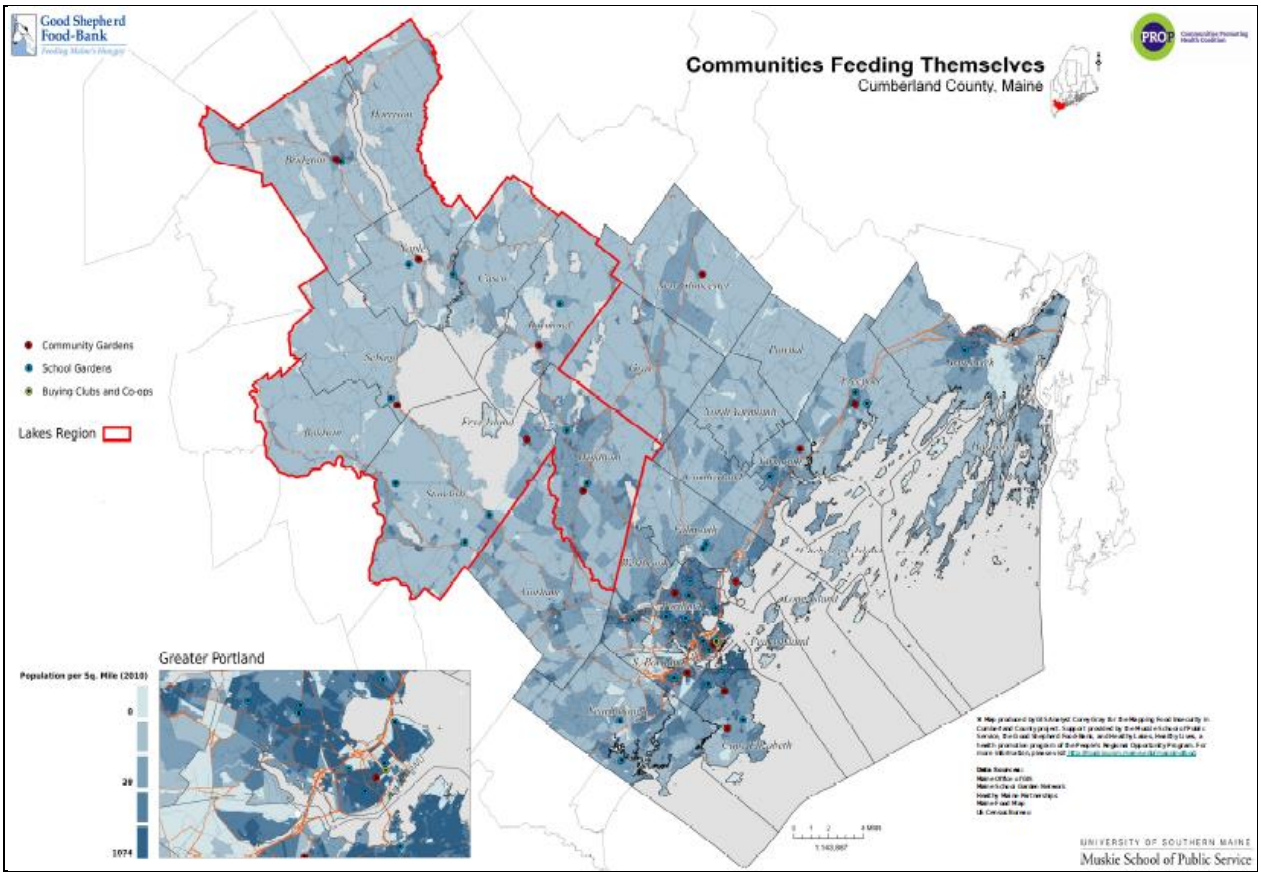
The project team designed the maps in three different ways because each method has pros and cons, and it was useful to provide samples of different methods best fit either to the datasets themselves or to the potential use of the data. Thus the maps themselves are intentionally diverse in order to be accessible, to suggest broad utility, and to demonstrate different ways of visualizing geographic data. Please see Appendix 3 for a list of maps generated for the project. All of the maps are downloadable from the project website (http://muskie.usm.maine.edu/mappingfood/).

Mapping within a GIS framework consists of layering data to build a composite structure. Each data set is a layer. A base map is developed and delineated in some way, generally by political boundaries such as towns. Often major water bodies and roadways are added and labeled. These layers together are easily recognizable as a specific place and it becomes possible to orient oneself in the 'map space.' Further iterations include additional 'layers' that are intended to convey particular information or to visually depict a particular scenario. Analysis of the data can be conducted based on the fact that all of the data is geo-referenced; it has a particular relationship in space and that relationship can be assessed.

The overarching idea with map design is to visualize positional data so that it is both understandable and in some way yields insight into a given inquiry. Maps are designed to uncover patterns, gaps, or trends. For instance, a common thread in Maine food systems discussions is a desire for increased processing capacity for local food. A map could suggest, by a confluence of soils, farms, transportation routes, and markets, where to locate a new facility.

Mapping Food Insecurity's primary product is a series of six static maps that depict some aspect of the food insecurity landscape in Cumberland County. They were conceived as storytelling maps taken at a particular moment in time. For instance the Communities Feeding Themselves map (Figure 1, next page) tells the story of how some communities are interested in growing their own food, which is one means to increase food security. It starts with the base map and adds population per square mile to give a sense of population density. The Lakes Region is outlined because it was of particular interest to one of the clients. Then, community gardens, school gardens, and buying club locations are added. The map is completed with a title, legend, and scale. The idea in this case is to suggest community resilience through active participation by individuals or groups of individuals in growing their own food. However, the sense of the map is that, while some activity is apparent, it is not at a significant scale.

Figure 1:




The project team also wanted to use the maps for education and outreach and there was a concern that the map alone was insufficient. In order to draw out the lessons and help people to understand the maps, the team developed informational posters by adding text to the maps. In this case, the text reads:

**Map description**

Many communities are taking steps to grow or procure their own food locally. This map portrays the locations of community and school gardens, as well as co-ops and buying clubs. This information is layered on a depiction of population per square mile. The Lakes Region is outlined to distinguish it from the rest of the county. The Portland peninsula is inset to enable a higher scale because the data points are generally denser.

**Tips on reading this map**

- There are a number of grow- or supply-your-own strategies at the household level that do not lend themselves to mapping, i.e. individual gardens or 'putting-by' for a later date (canning, freezing, etc.).
- Data in this area was particularly hard to find as there is no license or registry. These are community-level activities that impact a small number of individuals, and operate largely 'under the radar.'

**Quick facts**

- 23 community gardens, 36 school gardens, and two co-ops were identified for this project.

- In the Lakes Region, eight community gardens were established between the 2010 and 2011 growing seasons. In one year, the Windham Community Garden went from having one rented plot to 44. The Raymond Community Garden doubled in size in its second year.
- A food-based buying club is a group of people who come together to buy food in bulk, thus leveraging the purchasing power of the group to obtain discounts and/or to enable access to specific food distributors based on the size of the combined purchase.
- Gardens are often the result of a desire to 'cultivate community' and develop or retain skills in addition to producing food. Many residents of both rural and urban areas no longer know how to grow their own food; a community garden can provide a space for residents to pool and share knowledge.
- All of the current Lakes Region community gardens grow food for their local food pantries; some gardens grow food exclusively to help support food security in their communities.

This extra step makes the map more approachable, adds context, and bolsters the visual depiction with specific data. (At one point, the team struggled to add broad narrative to the maps - see Appendix 6 for draft text. This approach was ultimately rejected.)

Another similar approach was taken to use proxies such as poverty rates or Supplemental Nutrition Assistance Program (SNAP, formerly food stamps) rates to depict the potential for food insecurity within a given geography. Here are two samples:

Figure 2:

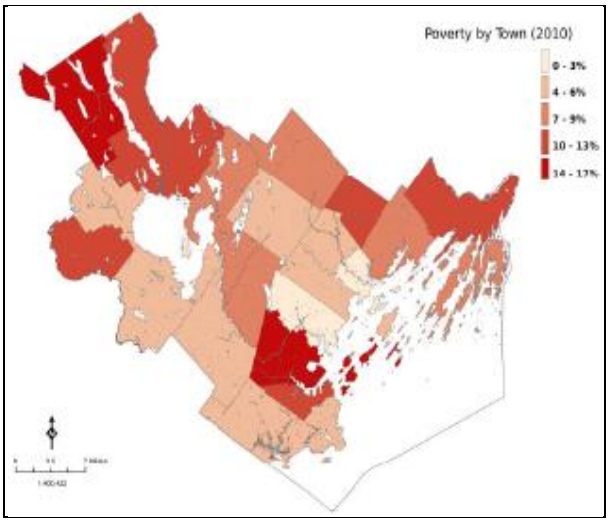
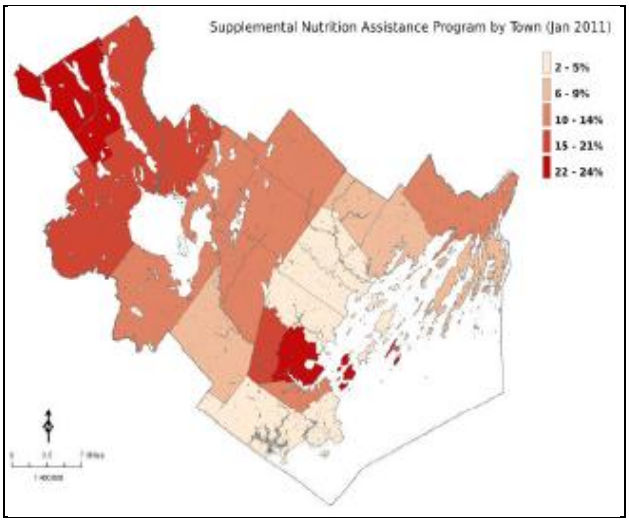


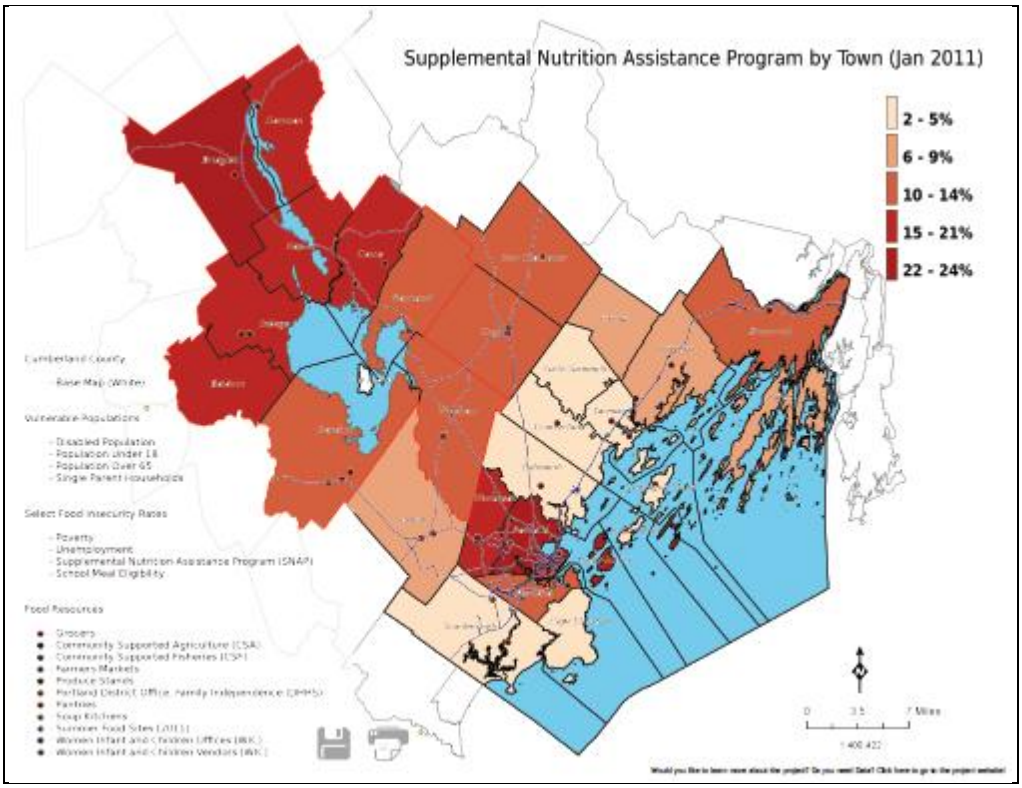

Figure 3:




These two maps correlate quite closely and suggest that poverty and SNAP usage are concentrated in the western Lakes Region and in greater Portland. Thus it can reasonably be concluded that food insecurity in these areas is of particular concern, and resources should be directed to these areas.

To develop this argument further, the team developed an interactive map (Figure 4, next page) so that users can build, save, and distribute their own maps based on their needs in an efficient and simple way. Not everyone has access to GIS software; the project team could not realistically design and distribute all of the possible maps that could be built with this data. Here pantries are layered on top of SNAP rates using the interactive map.

Figure 4:

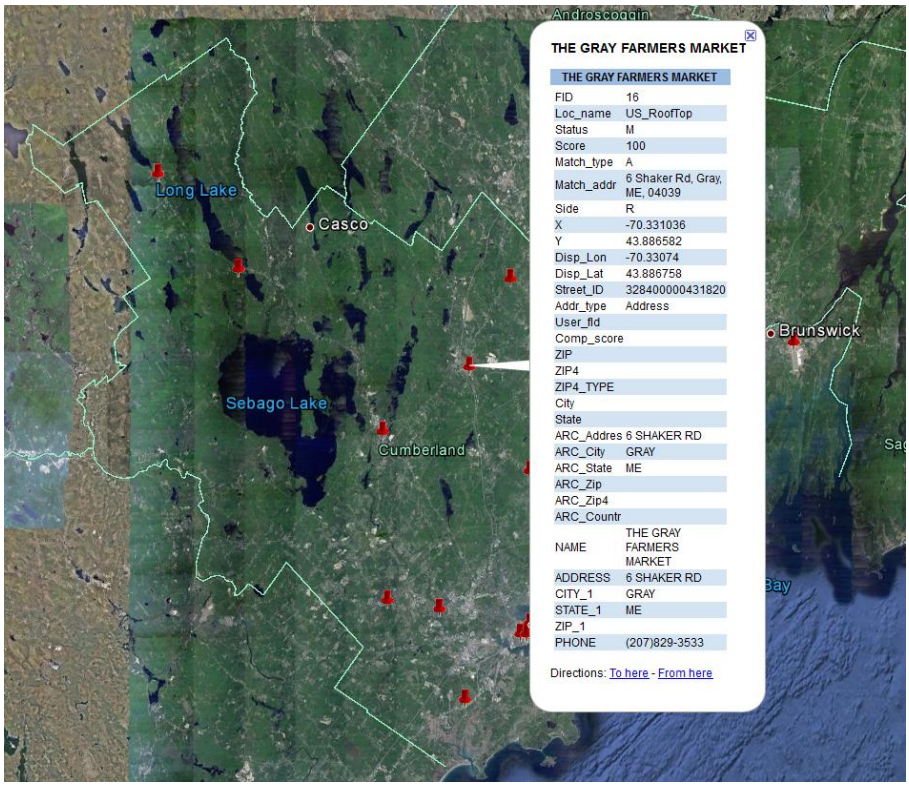



At this point, further analysis would need to be conducted as to whether existing resources are providing sufficient coverage to areas of need. The interactive map enables multiple 'cuts' at the scenario by changing out or layering up the data.

Finally, to be of use to users who might want to get directions to or learn about specific places, such as a pantry or a produce stand, several data sets are presented as KMLs. These maps use Google Earth to place locations in 'real space.' Some additional information – so-called 'attributes' – are connected to the locations and viewable when the user clicks on the pin marking the location. Unfortunately the team was unable to comprehensively build out the attribute tables. This would be a valuable next step.

Figure 5 on the next page is a sample showing Farmers Markets in Cumberland County. The Gray Farmers Market is opened to demonstrate the attribute table. Note at the bottom of the box the ability to get directions to and from that market.

Figure 5:




## *Conclusion*

Mapping Food Insecurity in Cumberland County was an exploratory project bringing together a public health agency, an emergency food distributor, and a graduate student in community planning to investigate how GIS might inform food systems and public health, how that research might be designed, and what the challenges might be. It had broad goals that, in sum, were to further and promote a collaborative effort to approach food systems challenges and to develop one particular tool: GIS. The project team developed maps that are best, in the end, for two purposes, outreach within the specific communities of Cumberland County and more broadly as engagement tools for parties with an interest in visualizing food systems. Ultimately, the project lays an intellectual groundwork upon which further efforts could be built while at the same time provides a starter 'Maine food systems database.'

The central research question revolved around the capacity and explanatory power of open-source data inputs as applied to the local food insecurity questions originally proposed by the Campaign to Promote Food Insecurity in Cumberland County. Here the results are mixed, but encouraging. We believe reviewing publically available open-source data is a necessary first-step to designing a robust research project. The data is inexpensive – usually free – and relatively accessible. The discovery and evaluation of available data 'sets the stage' and identifies gaps and needs for additional data. Thus, open-source data is a point of entry that focuses research efforts and helps to clarify next steps. Essentially, open source data is an inventory of existing resources.

However, the data is of variable quality and comes in many forms. Some data is missing altogether; some is incomplete. Most of it needs to be manipulated to achieve a consistent format. At times, it can take a few weeks to access. It comes at widely disparate levels of resolution. The greatest challenge was with public health data, which largely does not exist with sufficient statistical strength even within a county, let alone a town or neighborhood. Census data on the other hand, used as a proxy, can reach as deep as the block level, and begins to identify very specific areas of strong need. But census data is often old. Thus, the data is more robust in some areas and at some times than in others. Finally, layering data sets must be done to some specific purpose to achieve certain outcomes. The maps the project team built were not analytic but descriptive, and to this end the open source data proved largely sufficient.

Mapping Food Insecurity serves the greater community as a demonstration project. It is limited and inconclusive from a policy perspective, but reasonably successful at gathering disparate data and describing an environment at a relatively high level of resolution. The project team believes that with limited augmentation it could provide a base for analysis. Some of the strongest maps – those that depict vulnerable populations and select food insecurity rates – clearly indicate local level disparities that get lost in aggregate analysis. Building on the available data and focusing in on particular research questions would hone the platform and turn it from general to specific.

This project adds to a broader discussion taking place all around the country that seems to be validating the assertion that using a GIS framework is a valuable way to visualize food systems data. Maryland, Virginia and North Carolina all have statewide food systems mapping capacity and a variety of food systems mapping analysis – such as food desert delineation from the USDA and low supermarket access areas from PolicyMap and The Reinvestment Fund – has been published (see mapping resources in appendix 5). It is hoped that this effort will ultimately contribute to a broadly accessible tool to assist food-system related decision making on both a local and regional level within Maine and New England. Certainly it is hoped that lessons learned will enable improvements in project design and outcomes in the future. 'Phase 2' of this project would likely include the following in some configuration:

- Development of the analytical capacity of the GIS platform. As an example, during the timeframe of the initial project, the GIS Analyst developed a poster for the University of Southern Maine's Thinking Matters symposium that depicted a 'needs index' based on Traffic Analysis Zones.
- Increase in scale and scope; ideally to go statewide and to include additional data sets. Wherever and whenever possible, statewide data sets have already been gathered. In terms of scope, it would be useful to build out the attribute tables of specific locations (for instance a food pantry data point could have hours of operation connected to it).
- Expand upon synergies with other efforts. For instance, the Eat Local Foods Coalition (ELFC) is conducting a Food Assessment of Cumberland County which is a natural match for these maps. The Campaign to Promote Food Security in Cumberland County has become the Cumberland County Food Security Council, which might provide application for these maps. There is a nascent statewide food strategy discussion, which may at some point be interested in similar mapping. Finally, there has been a great deal of stakeholder interest from multiple sectors that could be developed as part of a mapping coalition.

- Determine a means to regularly update and support the project. This means a GIS analyst housed at some organization that holds responsibility for the database and has time allocated to respond to requests from interested parties.

Finally, to be truly useful, a comparison case must be developed. The data reveals information at a particular moment in time; more research could develop a series of maps that reveal trends in recent history. This work can and must inform planning, however it can also respond to proposed scenarios. What should the local food access landscape look like? If a robust vision was developed, than the current state of affairs could be compared to the vision, and specific action steps enumerated.

## *Appendices*

1. Project Team

Daniel Wallace, Project Director, daniel.wallace1@maine.edu
Corey Gray, GIS Analyst, corey.l.gray@maine.edu
Dr. Mark Lapping, Executive Director, Muskie School of Public Service
Dr. Matthew Bampton, Associate Professor of Geography, University of Southern Maine
Dr. Rick Small, President and CEO, Good Shepherd Food-Bank
Emily Wolff, MPH, CPPW Program Manager, People's Regional Opportunity Program (PROP)
Adam Burk, MA, CPPW Program Coordinator, PROP
Tracy Weber, MS, CPPW Program Coordinator, PROP
Bria White, CPPW Program Coordinator, PROP

2. Data and Sources

| Data | Source (s) |
|---|---|
| Access to water for fishers | http://www.islandinstitute.org/ |
| Adult education, senior, community, and recreation centers | *No single source identified, try:* |
| | http://www.healthymainepartnerships.org/ |
| | http://www.maine4a.org/ |
| Buying Clubs and Coops | http://www.eatmainefoods.org/page/maine-food-map |
| Commercial Food Processors | Maine Department of Agriculture, Division of Quality Assurance and Regulations |
| Community and School Gardens | *No single source identified, try:* |
| | http://www.msgn.org/ |
| | http://www.healthymainepartnerships.org/ |
| Community Meal Sites | *No single source identified, try:* |
| | http://www.healthymainepartnerships.org/ |
| | http://www.maine4a.org/ |
| CSAs and CSFs | http://www.mofga.net/Directories/tabid/279/Default.aspx |
| | http://www.eatmainefoods.org/page/maine-food-map |
| Daycare Facilities | http://gateway.maine.gov/childcare/ |
| Disability Status | http://factfinder2.census.gov/main.html |
| Farmers Markets | http://www.getrealmaine.com/ |
| | http://www.mofga.net/Directories/tabid/279/Default.aspx |
| Farms | Maine Department of Agriculture, Food, and Rural Resources |
| Food Pantries | http://www.preblestreet.org/mainehungerinitiative.php |
| Grocers | Maine Department of Agriculture, Food, and Rural Resources |
| Hospitals | http://www.maine.gov/megis/catalog/ |
| Income (poverty) | http://factfinder2.census.gov/main.html |
| Overweight and Obese | http://www.cdc.gov/brfss/index.htm |
| | http://www.maine.gov/youthhealthsurvey/fact_sheets.shtml |
| Population over 65 | http://factfinder2.census.gov/main.html |

| | |
|---|---|
| Population under 18 | http://factfinder2.census.gov/main.html |
| Produce Stands | Maine Department of Agriculture, Food, and Rural Resources |
| | http://www.eatmainefoods.org/page/maine-food-map |
| Public Transportation | http://www.gpcog.org/home/index.php |
| School Breakfast & Lunch Eligibility | https://portal.maine.gov/sfsr/sfsrdev.ED534.ED534_report |
| Senior FarmShare Farms | http://www.getrealmaine.com/ |
| Single Parent Households | http://factfinder2.census.gov/main.html |
| SNAP at Farmers Markets & Produce Stands | USDA Food and Nutrition Service, Maine Field Office, Augusta |
| SNAP Individuals & Rates | http://www.maine.gov/dhhs/OIAS/reports/2011/index.html#gdpb |
| SNAP Offices | http://www.maine.gov/dhhs/ofi/offices/index.html |
| Soils | New England Plant, Soil and Water Laboratory; University of Maine, Orono |
| | http://soildatamart.nrcs.usda.gov/Default.aspx |
| Soup Kitchens | http://gsfb.org/ |
| Summer Camps | http://mainecamps.org/ |
| Summer Food Service Sites | https://portal.maine.gov/sfsr/sfsrdev.sponsor_county_report.select_date |
| Unemployment | http://www.maine.gov/labor/lmis/laus.html |
| Vehicles Available | http://factfinder2.census.gov/main.html |
| WIC Offices, Clinics, and Vendors | http://www.maine.gov/dhhs/wic/locator-cumberland.shtml |

3. Map list

***Static Maps and Posters***

The Emergency Food System: This map shows the locations of emergency food services.
Vulnerable Populations and Select Food Insecurity Indicator Rates: This compilation of micro-maps depicts various proxies often used for the food insecure: geographic concentration of particular populations such as the elderly or single-parent households and rates (percents) of certain indicators such as poverty or school food eligibility.
Production Resources and Farms: Access to the water (ocean) and appropriate soils is necessary for production in Cumberland County. This map is a starting point for visualizing existing resources.
Access to Fresh Food: This map shows the locations where a consumer can go to purchase fresh food. It says nothing about the quality or cost of the food at the location. Further, without a car, many of these locations are inaccessible. Public transportation is limited to the greater Portland area. Therefore, the apparent density of locations in some part of the county does not necessarily imply convenience.
Processing and Institutional Procurement: Institutions represent a large potential market for farmers. However, institutions cannot generally purchase raw product. Thus processing infrastructure is necessary to enable local purchasing.
Communities Feeding Themselves: Many communities are taking steps to grow or procure their own food locally. This map portrays the locations of community and school gardens as well as coops and buying clubs.

***KMLs***

These maps use Google Earth (download at http://www.google.com/earth/index.html) to place physical locations in real space. This enables the ability to get directions to and from these locations. In addition, attributes such as hours of operation can be displayed.

Produce stands, farmers markets, CSAs and CSFs
WIC clinics and offices; SNAP offices; WIC vendors and SNAP at produce stands and farmers markets
Pantries, soup kitchens, community meal sites, and summer food service sites
Community and school gardens
Recreation and fitness centers; Adult education, community and senior centers
Processing facilities

***Interactive map***

The clickable PDF allows users to interact with certain data sets. Layers in the map can be turned on and off, and thus create a customized map. The map can then be saved, exported, and emailed or printed.

## 4. Acknowledgements

Many, many people, organizations and agencies contributed in some way to the development of this project. We hope to have captured them all in the list below, and sincerely regret any oversight.

Project Team
Members of the Campaign to Promote Food Security in Cumberland County

Individuals
Sherri DeFauw
David Wilkinson
Andrew Files
Aaron Hoshide
Wayne Munroe
Courtney Kennedy
Anne Tricomi
Joan Ingram
Jennifer Thibodeau
Amy Witt
Richard Rudolph
Alida Payson
Ellen Libby
Chanda Turner
Tim Fuller
Richard Foisy
Ernie Boda
Heidi Jo Lupardo
Cheryl Jalbert
Nicole Nadeau
Patrick Colley
Brian Conklin-Powers
Janet Casey
Vinton Valentine
Kyle Radke
Lisa Fernandes
John Harker
Robin Beck
Sonya Theriault
Andrew Plant
Toho Soma
Ron Adams
Craig Lapine
Theresa Hubley
Michele Lamm
Kip Neale
Donna Tippett
Larry Harwood
Annie Brown
Hope Rowan
Barbara Ives
Elizabeth Trice
Elizabeth Banwell
Shelly Doak
Sara Trafton
Ted Trainer
Larry Gross
Jeremy Bloom

Agencies and Organizations
Maine Office of GIS (MEGIS)
Natural Resources Conservation Service
Maine Sustainable Agriculture Society
University of Maine
University of Southern Maine
USDA ARS: New England Plant, Soil and Water Laboratory
Feeding America
Healthy Maine Partnerships
Good Shepherd Food Bank
People's Regional Opportunity Program
Island Institute
Maine Department of Agriculture
Cooperative Extension
Cultivating Community
Portland Public Schools
City of Portland
Preble Street
Southern Maine Agency on Aging
Maine Women, Infants, and Children Program
Office of Integrated Access and Support
Maine Center for Disease Control
Maine Department of Health and Human Services
Maine Bureau of Labor
Regional Transportation Program
Maine Association of Grocers
Greater Portland Council of Governments

5. Mapping Resource List

***Maine***

Maine Food Map: http://www.eatmainefoods.org/page/maine-food-map

Island Institute, Mapping Maine's Working Waterfront: http://www.islandinstitute.org/publications/Mapping-Maines-Working-Waterfront/12270/

Center for Community GIS Greater Franklin County Community Health Status Maps project: http://www.community-gis.org/projects/gfcmaps.html

***National***

Feeding America: http://feedingamerica.org/hunger-in-america/hunger-studies/map-the-meal-gap.aspx

USDA ERS Food Environment Atlas: http://maps.ers.usda.gov/FoodAtlas/

USDA ERS Food Desert Locator: http://www.ers.usda.gov/data/fooddesert/fooddesert.html

USDA ERS Supplemental Nutritional Assistance Program (SNAP) Data System: http://www.ers.usda.gov/Data/SNAP/

The Reinvestment Fund Low Access Area Mapping: http://www.trfund.com/TRF-LAA-widget.html

Tufts GIS Resources, Food Access and Food Security: https://wikis.uit.tufts.edu/confluence/display/GIS/Food+Access,+Food+Security+Analysis,+Food+Waste+Recycling

Cornell University Library Guide, scroll down for Spatial Analysis and Mapping of Food Systems: http://guides.library.cornell.edu/content.php?pid=84833&sid=639443#5792402

***A few specific programs or projects***

Community Food System Explorer, Virginia Cooperative Extension: http://www.cv.ext.vt.edu/topics/ComFoodSystems/com_food_explorer/index.html

New York City Coalition Against Hunger Poverty and Food Access Interactive Map: http://www.nyccah.org/files/interactive_map.pdf

The Maryland Food System Mapping Resource, Johns Hopkins Center for a Livable Future: http://www.jhsph.edu/clf/programs/food_mapping/

Vermont Energy Atlas http://www.vtenergyatlas.com/# (Model for a food atlas to be developed by Vermont Sustainable Jobs Fund)

UNH, Food Solutions New England, Food System Scenario Tool: http://www.foodsolutionsne.org/

Carsey Institute, Finding and Affording Healthy Foods in New Hampshire Communities: http://carseyinstitute.unh.edu/publications/IB_Stracuzzi-Ward_Healthy_Food.pdf

Seattle-King County FPC, Mapping Food Insecurity and Access: http://king.wsu.edu/foodandfarms/documents/AFPCFoodAccessIssuePaperNo.4_000.pdf

Baltimarket: The Virtual Supermarket Project and Community Food Availability Map: http://www.baltimorehealth.org/virtualsupermarket.html

6. WORK-IN-PROGRESS: Using the Maps to Jumpstart Community Conversations

The project team struggled to add descriptive content to the maps, and settled in the end on the approach presented in the body of this report and on the website. However, several narratives were tested for the maps and are reproduced here. The project team does promote or support this draft text. It is presented here as a possible means to help develop talking points and thus promote conversation on food system issues.

**POSSIBLE narrative for Maps 1 and 2 (The Emergency Food System; Vulnerable Populations and Select Food Insecurity Indicator Rates):**

Food security is a metric used by the USDA to describe access and availability by households to sufficient nutritious and safe food for an active and healthy life. It is best interpreted as a spectrum of vulnerability to hunger. Maine's current rate of 14.8% food insecure ranks 9$^{th}$ in the nation, and the rate of very low food security (or high insecurity) is 6.7%, 2$^{nd}$ in the nation. Feeding America data suggest that 1 in 5 children in Maine is food insecure. Many Maine people are going hungry, and this number is rising significantly. From 2008-2010, the number of Cumberland County – Maine's most affluent county – residents aged 19-59 who received food supplements increased by 47%. A survey of food pantries in Cumberland County conducted by the Maine Hunger Initiative reported an average increase of 42% in the number of clients served over the previous year, and 21% of the food pantries reported that they experienced a more than 100% increase.

Certain populations tend to be more "at risk" than others. These populations include the poor, the disabled, and the young and the elderly, among others. These populations are often used as proxies for food insecurity: an individual who is poor is not necessarily food insecure, but the likelihood is greater. A broad network exists to help alleviate hunger, from public services like the Supplemental Nutrition Access Program (SNAP, formerly food stamps) or National School Lunch Program to the extensive private emergency food distribution system, epitomized by food pantries and soup kitchens. These services, though often provided through selfless and heroic effort, represent a short-term solution: they keep people from starving, but they do not solve the problem.

In addition to the nutritional value and price of food implicit in the food security metric, there is a third important factor: geographic proximity (or access to food). This raises the issue of transportation, whether on foot (walkable access) or by vehicle (bike, car, bus, etc.). Despite the urban hub of Portland, Cumberland County is predominantly rural and highly car dependent. Overall, only 1.4% of residents use public transit to get to work while 5% walk. 7.6% of county residents do not own a vehicle. In the Lakes Region, where poverty rates are among the highest in the county, 100% of residents working outside of the home commute to work in a vehicle. Only 3.2% of households do not own a vehicle, and public transit is severely limited.

Food insecurity – the spectrum of vulnerability to hunger – is far easier to report in aggregate than on the individual level. The risk factors for any given individual are likely to be different from any other given individual. Assuming the desire to eradicate food insecurity, this complexity may suggest two strategies. In the short-term, an array of diverse, creative, and targeted solutions must continue. But in

the long-term, in the face of large increases in the food insecure and the challenges of peak oil and climate change, a consistent community-wide approach may be more productive. Ultimately, the idea that we are all food insecure may drive broad structural changes to the ways in which we produce and deliver food.

*Sources and links:*

Nord, Mark, et. al., 2010. Household Food Security in the United States, 2009 (Washington, DC.: Economic Research Service, USDA, Rpt. No. 108).

Feeding America Report "Child Food Insecurity in the United States: 2006-2008." http://feedingamerica.org/our-network/the-studies/child-food-insecurity.aspx

Food Desert Locator: http://www.ers.usda.gov/data/fooddesert/

**POSSIBLE narrative for Map 3 (Production Resources and Farms):**

Local food is seen as a potential solution, in sum or in part, to a wide variety of challenges, including food insecurity, the obesity epidemic, and rural economic development. Two of the initial questions that arise are these: what do the farms in our given locality – Cumberland County – currently produce and what is the land use framework – zoning – in which they operate? Maine farms are known both for their diversity of crops and small size. The number of Maine farms is on the increase after many decades of decline. Many farms are selling more of their product directly to the consumer than they did in the past, often through burgeoning farmer's markets or through newer models like Community Supported Agriculture.

In 2007, 630 farms operated in Cumberland County. These farms have a total of 51,727 acres in production which represents just 4% of Cumberland County's total acreage. Only 2,862 of those acres are in the Lakes Region, which might suggest growth potential. Forage crops such as silage and hay make up the largest portion of crop acreage. Vegetable crops come in second, with 76 farms cultivating vegetables on 660 acres. The total sales of vegetables in the county in 2007 came to $2,133,000. Fruit and berry sales in 2007 were $1,434,000. Beef and laying hens are the top two livestock raised in Cumberland County. Sales from this group came to $8,724,000 in 2007.

In Maine, zoning is the responsibility of each municipality; therefore, zoning patterns are often different in every town, and some towns have no zoning at all. Zoning, based on the vision outlined in a town's comprehensive plan and coupled with the land use ordinances that describe it, outlines the place-based rules that govern what happens where. Often, these rules are neither well understood nor easily changed. Zoning is not "agriculture friendly" in Cumberland County. Though the comprehensive plans of many towns are supportive of agriculture in print, agriculture is generally forced to compete with housing. This is a losing battle as land for housing is more valuable than land for agriculture. However, two towns – Cumberland and Cape Elizabeth – have in recent years amended their local rules. These towns recognize that existing regulation is not supportive of the agricultural base of the community and have moved to change this situation. They provide models for the kind of change that may need to happen in other Maine towns.

Fisheries are often neglected as a food source, despite their prime importance to the productive capacity of a region with a long coastline. The regulatory environment is complicated and frequently changes. Access to the water is increasingly crowded out by high-end residential development. Stewardship of our ocean resources must be placed on equal footing with our land resources.

**POSSIBLE narrative for Map 4 (Access to Fresh Food):**

Looking at this map it is tempting to dismiss the issue of access altogether: look at all of the places where food can be purchased! While aspects of the map are encouraging, such as the increasing numbers of farmer's markets and CSAs, it is not that simple. What kinds of food are available? How much do they cost? What transportation is required to arrive at the store? How much time is available to purchase and prepare food? It is because of these complicating factors, among others, that food insecurity remains a challenge.

A case in point is the obesity epidemic. It seems commonsensical that if people are eating enough to become overweight, access to food is clearly sufficient. But in reality it is not so simple. Obesity often correlates with the type and quality of ingested calories, and in this case to heavily processed, inexpensive, calorie dense, convenience foods. In the Lakes Region, almost 70% of community members are considered overweight or obese – a rate 10% higher than the state average. Obesity, diet and physical inactivity combined together are among the leading causes of preventable death.

Research suggests that children from poor families, especially those from food insecure households, are at a greater risk of becoming overweight or obese. This can put youth on a path to a less healthy life. Maine has the highest rates of obesity in New England. In Cumberland County, 6 out of 10 community members 18 and older are considered overweight or obese. In the state of Maine, 1 in 3 kindergartners and 1 in 4 middle/high school students are overweight or obese.

| | Overweight or Obese, 2009 | Geography | Source |
|---|---|---|---|
| Adults | 59.6% | Cumberland County | BRFSS |
| High School Youth | 21.2% | Cumberland County | MIYHS |
| 8th Grade | 27.3% | State of Maine | MIYHS |
| 7th Grade | 25.7% | State of Maine | MIYHS |
| 6th Grade | 28.2% | State of Maine | MIYHS |
| 5th Grade | 34.8% | State of Maine | MIYHS |
| 3rd Grade | 36.3% | State of Maine | MIYHS |
| Kindergarten | 28.4% | State of Maine | MIYHS |

Further complicating the picture, Maine's long cold winters make many people think that local food is available only a few months out of the year. In reality, Maine farmers can grow greens, like kale and spinach, from March into November and tomatoes are being grown in greenhouses year round. Other products, such as apples, honey, maple syrup, meats, and dairy, are available year round.

*Season extension and indoor growing techniques; Maine Local 20; Putting Food By (freezing, pickling, root cellars, jams, etc.); winter markets*

*Links:*
Seasonal produce: http://www.mofga.org/Publications/SeasonalFoodGuides/tabid/1903/Default.aspx
Maine Local 20:
http://www.mofga.org/Publications/MaineOrganicFarmerGardener/Summer2008/MaineLocalTwenty/tabid/970/Default.aspx
2009 Behavioral Risk Factor Surveillance System (BRFSS)
Maine Integrated Youth Health Survey
Maine Food Map
Ag and Food Trader

**POSSIBLE narrative for Map 5 (Processing and Institutional Procurement):**

Food production does not occur in a vacuum, but rather as part of a system that 'starts' with farm inputs, moves through production, processing, wholesale and retail distribution, and consumption, then 'ends' with waste and nutrient management. Ideally, this system is circular, feeding back into itself, building soil structure, creating jobs, and keeping money in local economies. A robust local food system must contain some significant portion of all of these pieces in order to function efficiently. The benefits of such a system could include improved economic viability for farmers and at the same time greater affordability for consumers.

One major opportunity is that hospitals, restaurants, nursing homes, school districts, and summer camps have the potential to be major economic engines behind developing a robust local food system in Cumberland County. The two school districts operating in the Lakes Region alone have a food purchasing power of almost $750,000.00. There are 30 summer camps in the Lakes Region, with an estimated combined food budget of more than $3 million. These could provide a level of "demand" that local producers could…

Challenges: While interest to purchase more locally grown food is high in the region a barrier is a lack of capacity to **process** raw vegetables or livestock into products easy to use or **store**. This is a common problem in Maine as we lack the infrastructure necessary to process foods for potential customers and to freeze produce for winter consumption.

Maine does currently lack enough of the facilities needed to process the local meats, vegetables, fruits, and grains that are in demand and to freeze produce for winter consumption. However, that is changing as more and more people are creating businesses in this sector.

A current issue and opportunity for local economic development is that demand for local foods currently exceeds the farms' capacity to produce. 45% of the farms in Cumberland County are very small, earning less than $2,500.00 annually. Only 18% earn more than $25,000.00. Thus, it is possible to conclude that current production falls short of potential demand.

**POSSIBLE narrative for Map 6 (Communities Feeding Themselves):**

*Community Resiliency- what can be done by individuals, neighborhoods, and communities*

Nationally, "grow your own" efforts have seen a strong resurgence in the last several years. In Maine's rural Lakes Region, eight community gardens were established between the 2010 and 2011 growing seasons. In one year, the Windham Community Garden went from having one rented plot to forty-four. The Raymond Community Garden doubled in size in its second year. All of the current Lakes Region community gardens grow food for their local food pantries; some gardens grow food exclusively to help support food security in their communities. It is often questioned why individuals living in rural communities would take interest in establishing a community garden space when land is often readily available to them. Consistently, the answer to that question has been a desire to cultivate community as well as food and for growers to learn from one another. As is often the case in urban communities, many residents in rural communities also no longer know how to grow their own food; a community garden can provide a space for residents to share knowledge and skills. Local schools have followed the lead by planting their own gardens, often inspiring parents and students to participate in community gardens with their families. Currently, there are _____established school gardens in the Lakes Region, impacting _____students. Many of the schools incorporate the foods grown in their gardens into the cafeteria's menu.

Permaculture: More and more people are turning to permaculture as an effective means to produce food. Based on ecological and biological principles, permaculture design maximizes efficiency through thoughtful organization inhabited land where the "wastes" of one aspect feeds the needs of another. Once in place, permaculture design requires less work than caring for a lawn and provides impressive amounts of diverse food.

*Talk about organizing for community and school gardens, buying clubs and coops.*

*Links:*
Portland Permaculture
Urban Farm Fermentory

7. Census Geography and Definitions

**Census Geography**

US Census Bureau, Census 2000 Geographic Definitions
http://www.census.gov/geo/www/geo_defn.html
Accessed and excerpted on November 25, 2011.

In decennial census data products, geographic entities usually are presented in a hierarchical arrangement or as an inventory listing.

A hierarchical geographic presentation shows the geographic entities in a superior/subordinate structure. This structure is derived from the legal, administrative, or areal relationships of the entities. An example of hierarchical presentation is the "standard census geographic hierarchy": census block, within block group, within census tract, within place, within county subdivision, within county, within state, within division, within region, within the United States. Graphically, this is shown as:

United States: Region: Division: State: County: County subdivision: Place (or part): Census tract (or part): Block group (or part): Census block

Census Tract
Census tracts are small, relatively permanent statistical subdivisions of a county delineated by local participants as part of the U.S. Census Bureau's Participant Statistical Areas Program. The primary purpose of census tracts is to provide a stable set of geographic units for the presentation of decennial census data.

Census tracts generally have between 1,500 and 8,000 people, with an optimum size of 4,000 people. (Counties with fewer people have a single census tract.) When first delineated, census tracts are designed to be homogeneous with respect to population characteristics, economic status, and living conditions. The spatial size of census tracts varies widely depending on the density of settlement. Census tract boundaries are delineated with the intention of being maintained over many decades so that statistical comparisons can be made from decennial census to decennial census. However, physical changes in street patterns caused by highway construction, new developments, and so forth, may require occasional boundary revisions. In addition, census tracts occasionally are split due to population growth or combined as a result of substantial population decline.

Block Group (BG)
A block group (BG) is a cluster of census blocks having the same first digit of their four-digit identifying numbers within a census tract. For example, block group 3 (BG 3) within a census tract includes all blocks numbered from 3000 to 3999. BGs generally contain between 600 and 3,000 people, with an optimum size of 1,500 people. Most BGs were delineated by local participants as part of the U.S. Census Bureau's Participant Statistical Areas Program.

Census Block

Census blocks are areas bounded on all sides by visible features, such as streets, roads, streams, and railroad tracks, and by invisible boundaries, such as city, town, township, and county limits, property lines, and short, imaginary extensions of streets and roads. Generally, census blocks are small in area; for example, a block bounded by city streets. However, census blocks in remote areas may be large and irregular and contain many square miles.

**Census Definitions**

US Census Bureau, Appendix B: Definitions of Subject Characteristics
http://www.census.gov/main/www/glossary.html
Accessed and excerpted on November 25, 2011

Single Parent Households
Subject Characteristic: Family Type and Subfamilies
Definition: Household

A household includes all of the people who occupy a housing unit. A housing unit is a house, an apartment, a mobile home, a group of rooms, or a single room occupied (or if vacant, intended for occupancy) as separate living quarters. Separate living quarters are those in which the occupants live separately from any other people in the building and that have direct access from the outside of the building or through a common hall. The occupants may be a single family, one person living alone, two or more families living together, or any other group of related or unrelated people who share living quarters.

Definition: Family Type

A family includes a householder and one or more other people living in the same household who are related to the householder by birth, marriage, or adoption. Families are classified by type as either a "married-couple family" or an "other family" according to the presence of a spouse. "Other family" is further broken out according to the sex of the householder. The data on family type are based on answers to questions on sex and relationship that were asked on a 100-percent basis.

Definition: Other family

*Male householder, no wife present.* A family with a male householder and no spouse of the householder present.

*Female householder, no husband present.* A family with a female householder and no spouse of the householder present.

Disability Status

The data on disability status were derived from answers to long-form questionnaire Items 16 and 17. Item 16 was a two-part question that asked about the existence of the following long-lasting conditions: (a) blindness, deafness, or a severe vision or hearing impairment (sensory disability) and (b) a condition that substantially limits one or more basic physical activities, such as walking, climbing stairs, reaching, lifting, or carrying (physical disability). Item 16 was asked of a sample of the population 5 years old and over.

Item 17 was a four-part question that asked if the individual had a physical, mental, or emotional condition lasting 6 months or more that made it difficult to perform certain activities. The four activity categories were: (a) learning, remembering, or concentrating (mental disability); (b) dressing, bathing, or getting around inside the home (self-care disability); (c) going outside the home alone to shop or visit a doctor's office (going outside the home disability); and (d) working at a job or business (employment disability). Categories 17a and 17b were asked of a sample of the population 5 years old and over; 17c and 17d were asked of a sample of the population 16 years old and over.

For data products that use the items individually, the following terms are used: sensory disability for 16a, physical disability for 16b, mental disability for 17a, self-care disability for 17b, going outside the home disability for 17c, and employment disability for 17d.

For data products that use a disability status indicator, individuals were classified as having a disability if any of the following three conditions were true: (1) they were 5 years old and over and had a response of "yes" to a sensory, physical, mental or self-care disability; (2) they were 16 years old and over and had a response of "yes" to going outside the home disability; or (3) they were 16 to 64 years old and had a response of "yes" to employment disability.

Poverty Status

The Census Bureau uses the federal government's official poverty definition. The "absolute poverty line" is the threshold below which families or individuals are considered to be lacking the resources to meet the basic needs for healthy living; having insufficient income to provide the food, shelter and clothing needed to preserve health. The most common measure of poverty in the United States is the "poverty threshold." This measure recognizes poverty as a lack of those goods and services commonly taken for granted by members of mainstream society. The official threshold is adjusted for inflation using the consumer price index. (More information at: http://aspe.hhs.gov/poverty/11poverty.shtml.)

*How Poverty Status is Determined:* The poverty status of families and unrelated individuals in 1999 was determined using 48 thresholds (income cutoffs) arranged in a two dimensional matrix. The matrix consists of family size (from 1 person to 9 or more people) cross-classified by presence and number of family members under 18 years old (from no children present to 8 or more children present). Unrelated individuals and 2-person families were further differentiated by the age of the reference person (RP) (under 65 years old and 65 years old and over).

To determine a person's poverty status, one compares the person's total family income with the poverty threshold appropriate for that person's family size and composition (see table below). If the total income of that person's family is less than the threshold appropriate for that family, then the person is considered poor, together with every member of his or her family. If a person is not living with anyone related by birth, marriage, or adoption, then the person's own income is compared with his or her poverty threshold.

Vehicles Available

The data on vehicles available were obtained from answers to long-form questionnaire Item 43, which was asked on a sample basis at occupied housing units. These data show the number of passenger cars,

vans, and pickup or panel trucks of 1-ton capacity or less kept at home and available for the use of household members. Vehicles rented or leased for 1 month or more, company vehicles, and police and government vehicles are included if kept at home and used for non-business purposes. Dismantled or immobile vehicles are excluded. Vehicles kept at home but used only for business purposes also are excluded.

*Vehicles per household (mean vehicles available):* Vehicles per household is computed by dividing aggregate vehicles available by the number of occupied housing units. Vehicles per household is rounded to the nearest tenth.

*Limitation of the data:* The statistics do not measure the number of vehicles privately owned or the number of households owning vehicles.

8. Glossary of terms

Unemployment
Supplemental Nutritional Access Program (SNAP)
Women, Infants, and Children Program (WIC)
School Food Eligibility
Grocers
Produce Stands
Farmers Markets
Community Supported Agriculture (Fisheries)
Senior FarmShare
Emergency Food System (Providers; Distribution)
Food Pantries
Soup Kitchens
Farm
Public Waterfront Access
Prime Farmland
Farmland of Statewide Importance
Community Garden
School Garden
Buying Club (Cooperatives)
Commercial Processors