

# Issues in Emergency Food Distribution for Whatcom County, WA

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## TABLE OF CONTENTS

1. PROJECT OVERVIEW	3
2. METHODOLOGY	7
3. CASE HISTORIES	9
3.1. Puget Sound Power Outage of 2006	9
3.2. Kobe Earthquake of 1995	10
4. FOOD AVAILABILITY IN WHATCOM COUNTY	10
4.1. Food Banks	11
4.2. Grocery Stores	12
4.3. Agriculture, Farming and Food in Storage	13
4.4. Household Food	15
5. VULNERABLE POPULATIONS	16
6. FOOD DISTRIBUTION	19
6.1. Emergency Food Distribution and EM Protocols	21
6.2. Locations for Food Distribution	22
7. ANALYSIS AND CONCLUSION	25
8. RECOMMENDATIONS AND FUTURE RESEARCH	26
8.1. Enhancing Gleaning Capabilities	27
8.2. Sustainable Agriculture	28
8.3. Map Your Neighborhood	29
9. APPENDIX	30
9.1. Interview Survey	30
9.2. Interview Data	33
10. BIBLIOGRAPHY	34

## EXECUTIVE SUMMARY

The Whatcom Coalition for Healthy Communities and Washington State University's Whatcom County Extension program invited our team, an group of undergraduate students in Western Washington University's course ESTU 497R: Practical Applications in Emergency Management Studio, to participate in a year-long Community Food Assessment Project. The Community Food Assessment Project seeks to ascertain food production and distribution in Whatcom County under "normal" conditions, those conditions happening on a day-to-day basis. We were asked to explore potential weaknesses that may arise during an emergency situation.

The research, described in this report, primarily focused on three main questions:

- What food sources exist during an emergency?
- Who is vulnerable to food insecurity during an emergency?
- Who takes care of ensuring proper distribution during emergencies?

Our team intentionally limited our scope to a hazardless disaster in order to assess Whatcom County's current food distribution systems. This allowed us to discover potential weaknesses that could occur during a number of different emergency situations. Our team understands that each hazard will affect a food distribution system differently. As such, our report can create a foundation for future work on emergency food distribution in Whatcom County that assesses hazard specific effects on the food supply system.

To examine the issues of emergency food availability, distribution, and social vulnerability, our team first examined local food retailers and distributors to understand the quantity and frequency of food entering Whatcom County. This helped our team establish the degree to which retailers and distributors could provide food to vulnerable populations on a mass scale and how long it would take to restock exhausted supplies. Local grocers indicated that they restocked shelves on an average of every three days, and thus had approximately 3 days to one week's supply of food for their customers at any given time. Based upon interviews with local food banks, we estimate that Bellingham Cold Storage stores, on average 75 to 80 million pounds of raw food, approximately 40 pounds per Whatcom resident. Our team also studied agriculture statistics in order to determine the amount of food grown in Whatcom County. The county is a major regional producer of dairy product and berries, with some production of eggs/poultry, potatoes, and meat. On an average daily basis, we estimate there is approximately 19 pounds of food, mostly powdered milk, per residents. As such, our research indicates there is significant food sources, measured in food pounds, throughout the non-profit, retail, and agricultural sectors in the county.

Secondly, our team defined vulnerable populations in Whatcom County as populations with an inconsistent stock pile of food in their homes and lack of easy access to food on a regular basis. Because food-insecure populations are not tracked by local or national statistics, we approximated vulnerable populations as individuals receiving social assistance. In Whatcom County, 33.1 percent of the population receives social services,

nearly 60,000 individuals. In addition, we estimated that there are 8,000 undocumented or migrant workers, just over 1000 homeless individuals. We also estimated an additional 500 individuals with specific vulnerabilities related to poor health, language barriers, cultural barriers, and financial difficulties. These nearly 70,000 individuals are a first-order estimate of individuals who may have limited food stockpiles, difficulty preparing for a forecasted emergency likely to result in food scarcity, or difficulty accessing food during a sudden onset event.

Finally, our research linked vulnerable populations to food distributors, considering both the current emergency plan and potential options outside of this plan. Our team interviewed local emergency response organizations, such as the Red Cross, the City of Bellingham Office of Emergency Management and local food banks that have experience in mass food distribution to gain a greater understanding of possible food distribution routes. The County Emergency Management Plan clearly indicates that the American Red Cross has the primary responsibility of providing food during an emergency, while food banks and their associates have been designated support agencies. During an emergency, the plan also dictates that local government will take control of food banks to use the space as emergency food distribution centers.

Based upon the current emergency plans and current sources of food and potentially vulnerable populations, our research shows that the food quantity through the Red Cross will be sufficient to feed approximately 1000 people a single meal. Our research also finds that local food banks will be able to provide approximately 325 families with food from their storage, without replenishment from local grocery stores and gleaning projects. As such, there appears to be emergency food for 4000 individuals through aid agencies and 1 to 3 days supply to grocery store customers. This is far less than the potentially 70,000 individuals who may be food insecure in a major emergency.

Based upon these findings, Whatcom County emergency food sources and distribution plans, as currently defined, may become insufficient in a prolonged or wide-spread disaster that cuts off replenishment of food banks, Red Cross stocks, and local grocery stores. An emergency that reduced outside replenishment via transportation links such as the Interstate 5 corridor, may result in bare grocery store shelves within 1-3 days and even quicker depletion of emergency food provisions for food insecure individuals that rely upon food bank or Red Cross provisions. After 3-7 days, local middle and upper income households would also likely exhaust their general food stock and would seek supplemental food through local emergency food suppliers. While Red Cross indicated that they could use helicopter and maritime transportation to bring in emergency food supplies, a regional disaster that significantly damaged local transportation infrastructure could reduce or delay such external support.

In a wide-spread or prolonged disaster, current emergency food distribution plans may also be insufficient. Additional food distribution sites may be necessary. We suggest that, in addition to the four county food banks currently indicated as emergency food distribution sites, the county could use public schools as distribution sites. Some

schools have on site kitchen facilities; furthermore, they are easily identified by the local community and are geographically distributed by population density.

Our research indicated that there are additional local supplies of food to help support vulnerable populations during a moderate and short-term emergency or a wider population during an extended emergency. Use of the 70 million pounds of food held by Bellingham Food Storage could supplement and extend existing emergency plans. Use of this food source would require that Bellingham Food Storage have an internal emergency plan (e.g. plans for electrical backups to keep food cold during a power outage), a protocol with local emergency management agencies, and a county plan for defrosting, cooking and distributing this food. Local farms are also a significant source of food, albeit a source with significant variation over the year and heavily concentrated in the dairy and fruit products. Our research suggests that the county produces over 1.5 pounds of food per day for each county resident. While this food source has significant variation over the year and is heavily concentrated in the dairy and fruit sector, development of new strategies or strengthening of existing farm to town strategies or development of new strategies to be implemented during emergencies may strengthen the emergency food security in the county.

## 1. PROJECT OVERVIEW

The Whatcom Coalition for Healthy Communities and Washington State University's Whatcom County Extension program invited our team to participate in their Community Food Assessment Project. The goal of the Community Food Assessment Project is to gather data from stakeholders from all the segments of the food system, such as farmers, food distributors, food retailers, emergency food suppliers, and nutrition experts in Whatcom County. Their objective is to ascertain food production and distribution in Whatcom County under "normal" conditions, those conditions happening on a day-to-day basis. We were asked to explore potential weaknesses that may arise during an emergency situation.

We primarily focused on three main questions:

- Who is vulnerable to food insecurity during an emergency?
- What food sources exist during an emergency?
- Who takes care of ensuring proper distribution during emergencies?

Firstly, our team defined vulnerable populations in Whatcom County as populations with an inconsistent stock pile of food in their homes and lack of easy access to food on a regular basis. We used dependency status to help identify these vulnerable populations.

Secondly, our team examined local food retailers and distributors to get a better understanding of the quantity and frequency of food entering Whatcom County. This helped our team establish the degree to which retailers and distributors could provide food to vulnerable populations on a mass scale and how long it would take to restock exhausted supplies. Our team also studied agriculture statistics in order to determine the amount of food grown in Whatcom County that emergency management personnel could utilize during an emergency feeding situation.

Finally, our research linked vulnerable populations to food distributors. Getting food to the community in a timely and effective manner requires significant coordination. Our team interviewed local emergency response organizations, such as the Red Cross, the City of Bellingham Office of Emergency Management and local food banks that have experience in mass food distribution to gain a greater understanding of possible food distribution routes.

Our team intentionally limited our scope to a hazardless disaster in order to assess Whatcom County's current food distribution systems. This allowed us to discover potential weaknesses that could occur during a number of different emergency situations. Our team understands that each hazard will affect a food distribution system differently. As such, our report can create a foundation for future work on emergency food distribution in Whatcom County that assesses hazard specific effects on the food supply system.

For this project, our team considered Whatcom County an “island” that some unexplained hazard had cut off from incoming food supplies. Our team only looked within the county to quantify how long food supplies would last.

## 2. METHODOLOGY

We used three techniques for gathering information: interviews, GIS, and scholarly research. Our team conducted interviews with local food banks and grocery stores to determine the amount of food in Whatcom County at any given time. We also interviewed local emergency management personnel to better understand their potential response to a food crisis. We used the geographical information system software ArcGIS to digitize the locations of food banks, stores and u-pick farms. This data was added to a map with census data to locate food deserts. We also researched information about vulnerable populations and other factors affecting food distribution. This information generated ideas for future work.

We used interviewing as a primary means of gathering information for this report. We scheduled interviews with food distributors (food banks and local grocers) and mass care agencies (Red Cross and the Office of Emergency Management) in Bellingham. We used a variety of styles to interview, such as over the phone conversations and in-person tape recorded meetings. The process of developing interview questions for the various organizations, scheduling the interviews, and conducting the interviews took our team between five to six weeks.

We used our interviews to gain an understanding of how company processes affected the distribution of food in Whatcom County. We also ascertained how companies and organizations planned to respond in the event of a disaster or emergency situation. We obtained estimates of how much food is present at any given time in Whatcom County and more specifically in the Bellingham area. The interviews are referenced several times throughout the text.

We used GIS<sup>1</sup> as a second source of information in representing factors of emergency food distribution in Whatcom County. Our team used pre-existing GIS data layers to analyze aspects of roads, schools and Whatcom County boundaries for the project. The data was available through the following agencies: the GIS planning department for Whatcom County, United States Geologic Survey (USGS), and the City of Bellingham. Our team downloaded specific layers online pertaining to county roads and schools in order to visually analyze their use for our project.

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<sup>1</sup> A Geographic Information System (GIS) is defined as a system, which integrates hardware, software, and data to analyze, solve, and represent geographic information. This information is displayed in map form and used to represent different problems, solutions, and scenarios. Visual portrayal can improve comprehension of complex issues and provide a means to organize each issue in an appropriate manner. Analyzing data in a GIS program consists of creating data sets, which contain various layers. These layers are the specific features of a map and include county boundaries, locations of specific building types, roads, and many other forms of geographic information.

In order to analyze the other geographic aspects of Whatcom County's emergency food distribution, the team cartographer, Casey Desmond, constructed specific data layers. He compiled addresses for U-pick farms, food banks, and major grocery stores. He obtained these addresses online and with the help of surveys done by students in Western Washington University's Anthropology department. Separate spreadsheet files were then made for U-pick farms, food banks, and grocery stores that included the address and phone number of each location. Through the use of Google Earth, Desmond determined specific longitude and latitudes for each location and entered each into the spreadsheet. He imported this information into ArcGIS, created new data layers and plotted specific points according to the longitude and latitude data. Finally with the spreadsheet imports complete, Desmond was able to use the new data layers to further analyze and visually portray the information. These maps create a visual portrayal of food distribution and are useful for looking at solutions to a potential food crisis.

We used overlapping sources for our background and statistical information. This was necessary because some information did not exist in the form that we desired. For instance, when deriving figures relating to undocumented and transient members of the population, we used multiple data sources to extrapolate values that represent a reasoned conclusion. Lack of clear data in regards to vulnerable members of society is a documented problem in Whatcom County. The Whatcom County Point-in-Time 2006 study makes very clear that there are many ways in which persons in the county may not be enumerated (Roberts, 2006).

The US Department of Agriculture (USDA) has ceased keeping agricultural statistics by county, making accurate information difficult to locate at the county level. Our team used alternative sources to yield the required information.

We also conducted scholarly research on the impacts of food and emergency distribution related to hazard specific events, such as power outages, supplies chain breakage and earthquakes in order to generate a foundation for further research on hazard specific crises in regards to food distribution.

In addition to the above research methods, our team generated a plan to quantify food in a way that allowed our team to compare food measurements from different resources. Our team discovered that food is produced in pounds, transported in pounds and consumed in calories. This simple fact leads to a basic conundrum of equating a basic diet to pounds of food. In determining how much food might be required to support the population within Whatcom County, we utilized a method of combining information from U.S. Governmental sources to gain unique, but substantiated, results. Table 1 below shows the ratio between pounds and calories that we used. How this information was used will be explained in detail later.

**Table 1. Estimated Relationship between Food Weight and Caloric Need**

	<b>Average American consumption</b>	<b>Healthy consumption</b>	<b>Emergency ration</b>
<b>Caloric Intake</b>	2,757cal/day**	2000cal/day*	1,000cal/day
<b>Approx. Poundage Intake</b>	5.34lbs. food/day**	3.87lbs food/day	1.93lbs food/day

\* Source: U.S. Dept. Agriculture

\*\* 2000 cal/day defined as healthy consumption for average weight female

### 3. CASE HISTORIES

Our report starts with three case histories of emergencies or disasters where food availability and emergency food distribution were critical. Such cases illustrate the issues that may arise for Whatcom County in the case of a large scale disaster that interfered with transportation infrastructure and isolated the community.

#### 3.1. Puget Sound Power Outage of 2006

One case study that demonstrates the importance of food security is the December 2006 windstorms in the Seattle area, commonly known as the Hanukkah Eve Wind Storm. Shortly after the winds and heavy rain ceased, toppled trees, downed power poles and lines, and flood waters covered the roads causing traffic jams and cutting off neighborhoods from valuable resources, such as electricity, the ability to gather supplies at stores, and emergency workers. Traffic jams prevented utility crews from quickly reaching all the areas with power outages.

According to the Seattle Post-Intelligencer, a Whidbey Island, Washington corner store and service station was one of the few places on the island with a generator. The generator could operate for about three days, but it only powered the lights and the gas pump. This generator did not power refrigerators and the storeowner was not accepting any orders of perishable foods until utility crews restored electricity.

The large chain stores that had the resources ordered refrigerated trucks to keep perishable foods fresh until utility crews restored electricity. Such stores were Costco and Fred Meyer.

The Meals on Wheels program suffered during the outages. Meals on Wheels deliver two meals a day to senior citizens and others who cannot cook for themselves. This food is received two weeks in advance and stored at various locations until it is delivered to people who depend on it. During the storm, volunteers had to throw out much of the stored food because it wasn't able to stay cold during the power outage.

The Hanukkah Eve Storm is a good case study for the topic of food security. It demonstrates how vulnerable local road networks are to natural hazard events and how important they are for utility crews and food delivery trucks. This case study also reveals a distinction between companies that have the resources to protect their food and those that do not.

### **3.2. Kobe Earthquake of 1995**

Kobe, Japan is the first urban area to experience an earthquake more powerful than a magnitude 7. The results were devastating. Raging fires could not be extinguished because of broken water lines. Natural gas lines shattered creating explosive conditions. The city's transportation infrastructure was literally shutdown as bridges and viaducts collapsed. Heaved and buckled roads trapped motorists rendering surface streets impassable. The port facilities and the railroads were immobilized. Emergency responders were forced to work without ambulance transportation for the injured.

As the scope of the disaster grew through cascading effects of fire, transportation freeze, and homeless population the response system was overwhelmed. Food became critical as those with homes still standing shared what little they had with neighbors as well as strangers. Some shelters were forced to ration food to the extent of one rice ball per person a day. Reduced to foraging for food one survivor, Yoshio Oka told the media "The authorities haven't done anything. If we continue to rely on them we'll starve to death."

The Kobe earthquake occurred a year to the day after the powerful Northridge, California earthquake. Japanese officials were confident their early warning system and disaster preparedness would mitigate a similar event in Japan. Kobe fared far worse than California did. 50,000 buildings were destroyed and 310,000 people were left homeless.

One of the things that reduced the human impact in California was preparation; shelters were ready and **stocked with adequate food and water**. Responders were trained and equipped and, very importantly, responses were preplanned with multiple contingencies played out and practiced.

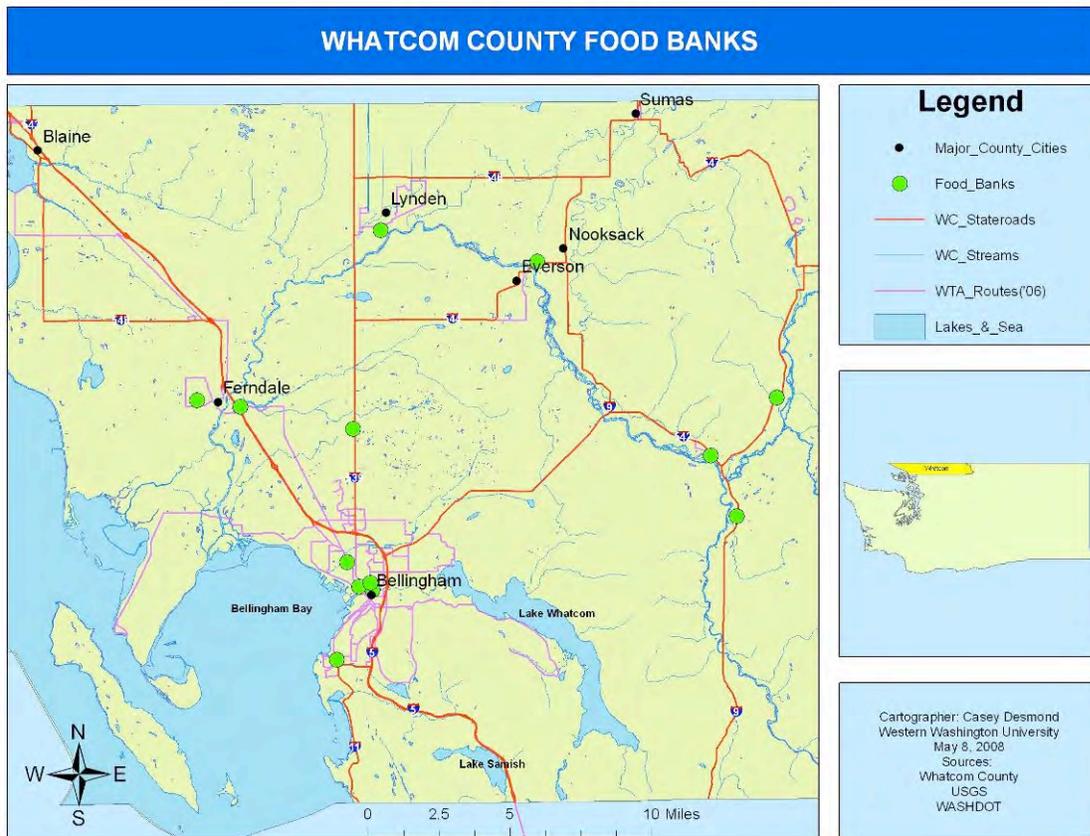
## **4. FOOD AVAILABILITY IN WHATCOM COUNTY**

We now turn to the issues of emergency food within Whatcom County. To assess this issue, we have broken our research into three major areas. We first discuss food availability by estimating food quantities available through a range of sources. We then consider local populations of who would be most likely to experience hunger in a county-wide event. Finally, we consider current methods and potential sites for emergency food distribution, considering what would be most appropriate for populations likely to be vulnerable.

When looking at all the possible sources of food in the Whatcom County area, our team narrowed this scope to three main sources comprised of food banks, grocery stores, and agricultural outputs. This narrowed scope was due to the amount of time allotted for this project.

#### 4.1. Food Banks

Our team identified three main food banks throughout Whatcom County as shown in Figure 4.1.



**Figure 4.1** shows all the Food Banks within Whatcom County and their relation to major cities, bus routes, and major state roads.

The distribution centers of the food banks are located in Bellingham, Blaine and Ferndale. All three are members of Americas Second Harvest, the national networking of food banks. The size of each distribution center and the number of people that they serve is dependent on location. The Bellingham Food Bank, located in a more populated region serves 250 families a day, the Ferndale Food Bank serves 50 families a day, and the Blaine Food Bank serves 20 families a day.

The three food banks in the area feed approximately 325 families, 3 times a week. This roughly equates to 3,000 individual people 3 times a week. Using the U.S. average

consumption of food in 2003 of 3.87 pounds, our team approximated that the Whatcom County area distributes around 3,870 pounds of food three times a week.

The quantity of food distribution by the food banks on a weekly basis requires careful planning and coordination of food stocks and supplies even in non-disaster times. Food banks receive food from a variety of locations, which include grocery stores that donate expired, but still usable food. The Bellingham Food Bank receives daily shipments of food from local grocery stores at 15 different locations. Combined with local food drives and gleaning projects the Bellingham Food Bank receives between 60 to 70 percent of its food from within Whatcom County.

## 4.2. Grocery Stores

Communities rely heavily on grocery stores as a main source of food as seen in Figure 4.2.



**Figure 4.2** shows all the major grocery stores within Whatcom County and their relation to major cities, bus routes, and major state roads. This list includes the stores, Albertsons, Haggens, Food Pavilion, Cost Cutter, Safeway, Fred Meyer, and the Community Co-op.

As a profitable company, grocery stores always maintain manageable stock on hand to feed its customers. Grocery stores have developed various techniques for storing and restocking food in an efficient and effective manner. As such, grocery stores are mass distributors of food and have a large affect on food distribution in the event of a disaster.

Through our team's interviews of local grocers in the area, our team was able to obtain information on estimates of food storage and restocking.<sup>2</sup>

According to our interviews, only a small percentage of the food that grocers place on their shelves was derived from inside Whatcom County. Around 25 percent or less of the food came from inside the county. Additionally we found that 25 percent or less of the food came from within Washington and Oregon. As such, it would require significant time to restock exhausted food supplies in the event of a supply disruption. The way that the majority of food is brought to Whatcom County also affects the time of delivery of food and supplies. The major highway I-5 provides most of the movement of these goods into the area up from Seattle and other places. "If this (I-5) were to fail, reliance on personal food stocks within the community would become depleted. If needed, an airlift of materials would be necessary." (Laura Fields, Red Cross).

Despite a heavy dependence on food from outside sources, food storage is adequate to meet the short term needs of the population that grocers serve. Grocery stores have one to three days worth of supplies on hand at any given time. These stocks include perishables. This seems to align with restocking practices in the stores, which required only one to three days to restock any type of food that our team listed on our survey of grocery stores, which can be found in Appendix 7.1. Typically high volume grocery stores have multiple deliveries in a week and are dependent on consistent restocking of food to keep up with the demand of their customers. Their ability to restock would be significantly altered if I-5 were to become unusable. The current restocking practices of the grocers would be disrupted and dependence on available food stocks would increase.

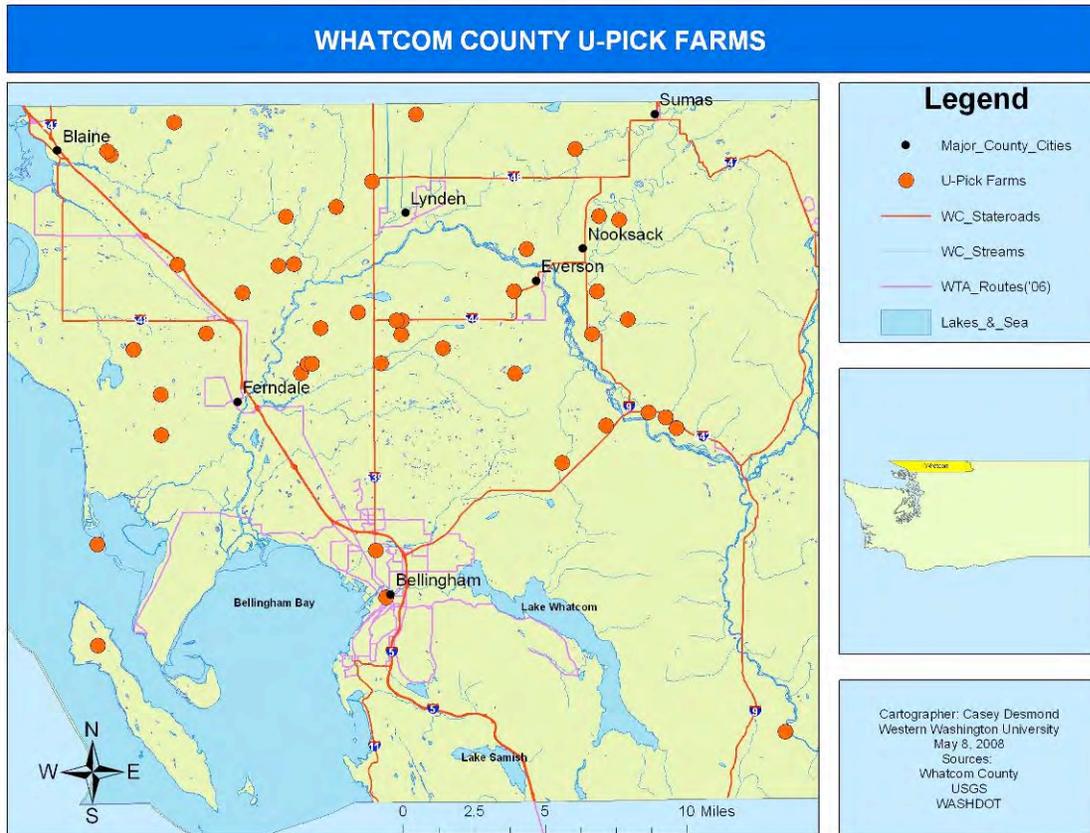
### **4.3. Agriculture, Farming and Food in Storage**

We compiled Table 2 below to show foods that might be available on a sustainable basis in Whatcom County. It should be noted that the meat is net pounds of meat after butchering. These agricultural foods represent a sustainable source of food for Whatcom County.

Currently in Whatcom County there are 49 farms considered as U-pick farms as seen in Figure 4.3.

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<sup>2</sup> We assumed that the numbers of stock (1-3 days) were based on the average number of people served in a day



**Figure 4.3** shows the dispersal of U-Pick Farms throughout Whatcom County. It also includes major state roads and bus routes for 2006.

The main organization in place for gleaning around Whatcom County is known as the Small Potatoes Gleaning Project. In 2007 the Small Potatoes Gleaning Project gleaned 53,114 pounds of fresh produce. These produce were then distributed to more than 30 sites around the county, which included food banks, churches, and other low-income food distribution centers. Even though there is this potential for an increased emergency food supply using gleaned produce, constraints exist. The biggest constraint facing Whatcom County's agriculture is climate. Spring and summer seasons in Whatcom County are the highest for agricultural output and when individuals do much of the gleaning. On the other hand, during the winter and fall months the county does not produce many goods due to adverse weather conditions. Use of gleaning during the winter and fall seasons would produce few products for the county's emergency food supply. Other constraints include a limit to how much food gleaners are able to harvest, as well as storage space at distribution centers. Produce have a short shelf life and therefore would need to be stored at or near the distribution centers. Currently the centers storage is limited and may not be able to store the amount of produce needed to effectively process the increase in agricultural output products.

**Table 2. Whatcom County Agricultural Food Sources**

<b>Food Type</b>	<b>Annual Production</b>	<b>Avg. Daily Production</b>	<b>Avg. Daily Food/Person*</b>
<b>Meat-Beef 6000 per year</b>	284,050 lbs.	778 lbs.	0.004 lb. meat
<b>Potatoes, seed Available 7 Months of the year</b>	76,000,000 lbs.	208,000 lbs.	1 lb. potatoes
<b>Poultry – Eggs</b>	10,467,000 lbs.	29,000 lbs.	.16 lbs eggs and poultry
<b>Milk - Powdered</b>	1.2 billion lbs.	3,300,000 lbs.	18 lbs powdered milk
<b>TOTAL</b>			<b>~19 lbs. per person/day</b>

\*Estimated based upon Whatcom County population of 185,000  
Source: Whatcom County Farm Friends, 2002 census of agriculture

Our team also compiled Table 3, shown below, to illustrate quantities of food on hand at Bellingham Cold Storage. The Bellingham Food Bank stores around 100,000 pounds of raw meats and perishable products that they are able to draw upon at any given time. A representative from the Bellingham Cold Storage also noted that they store on average 75 to 80 million pounds of raw food at any given time and are capable of storing up to 120 million pounds. The food kept at Bellingham Cold Storage represents the largest emergency supply in Whatcom County.

**Table 3. Cold Storage Food Availability**

<b>Avg. Food in cold storage</b>	<b>Food/Person</b>
75,000,000 lbs.	40.0 lbs.

\*Estimated based upon Whatcom County population of 185,000  
Source: personal interview with Bellingham Cold Storage management

#### **4.4. Household Food**

Due to the limit of our team’s scope, we were unable to directly obtain information about individual home food stocks and how their dependency would change in the event of a

disaster. The quantity of household food is not well documented in articles or journals. Our team's primary source of information on household food stocks is from the Emergency Services Director of the Red Cross.

The Director of Emergency Services at the local Red Cross office told our team that generally people with lower incomes and lower socio-economic status tend to be more dependent on resources in disasters. These lower income populations have been identified in small pockets throughout Whatcom County. Based upon this, our team made the assumption that higher income households generally keep more food on hand in their homes. This means that they will have less dependency on emergency food supplies in an emergency. However, it should be noted that these individuals should not be forgotten in disaster planning tactics. In a crisis emergency workers must do all they can to meet the needs of any individual that requires help, this may include members of higher income households.

Due to the unpredictability of disasters and the impact that they can have on food distribution, the American and Canadian Red Cross highly recommended households and individuals to maintain a 72-hour supply of non-perishable food stocks on-hand. This equates to six cans of food per person, such as canned fruits, canned vegetables, canned meats and canned pastas.

## **5. VULNERABLE POPULATIONS**

In disaster preparedness, the terms "vulnerable" or "special needs" people or populations are used to define groups whose needs are not fully addressed by the traditional service providers. These terms also include groups that may feel they cannot comfortably or safely access and use the standard resources offered in disaster preparedness, response and recovery (CA Office of Emergency Services, 2000). Vulnerable members of society have been further identified as being physically and/or mentally disabled, non-English speaking, geographically isolated, medically or chemically dependent, homeless, elderly, and children. Poverty is often cited as root cause of vulnerability (Mileti, 1999).

In the instance of disaster, every person in our community is a member of our community (Wisner, 2002). As such, all people deserve the attention they need from emergency management personnel.

Figure 5.1 for Whatcom County and Figure 5.2 for Bellingham shows the population density per square mile. No map was directly created to visualize vulnerable populations. This map gives perspective of locations in the county where high density and vulnerable populations may exist.

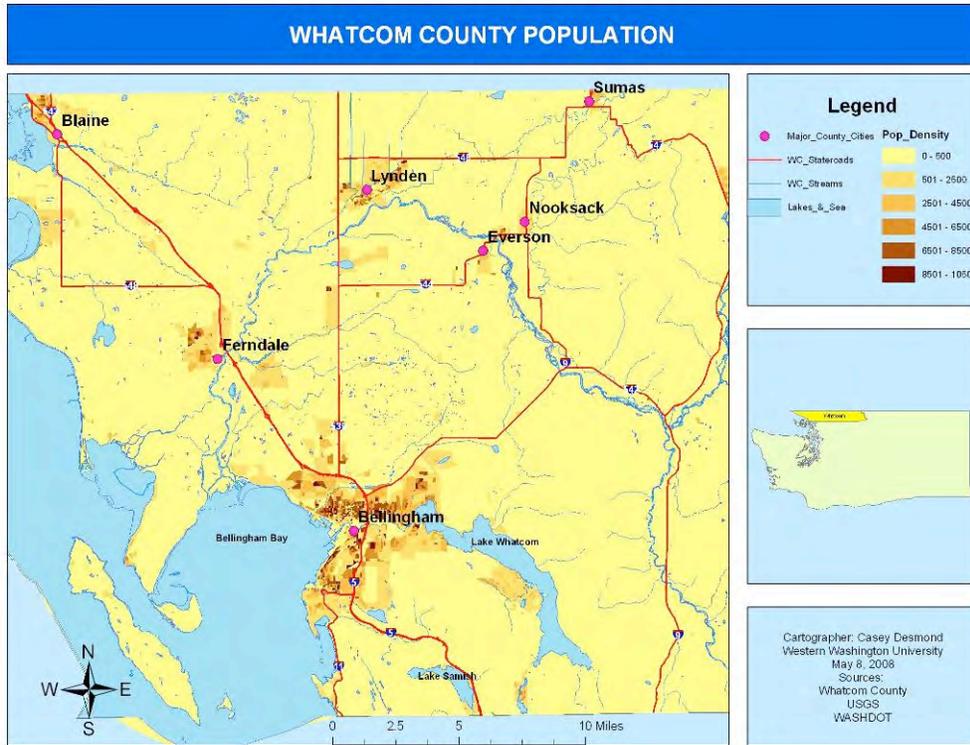


Figure 5.1 shows the population density of population per square mile of major cities throughout Whatcom County

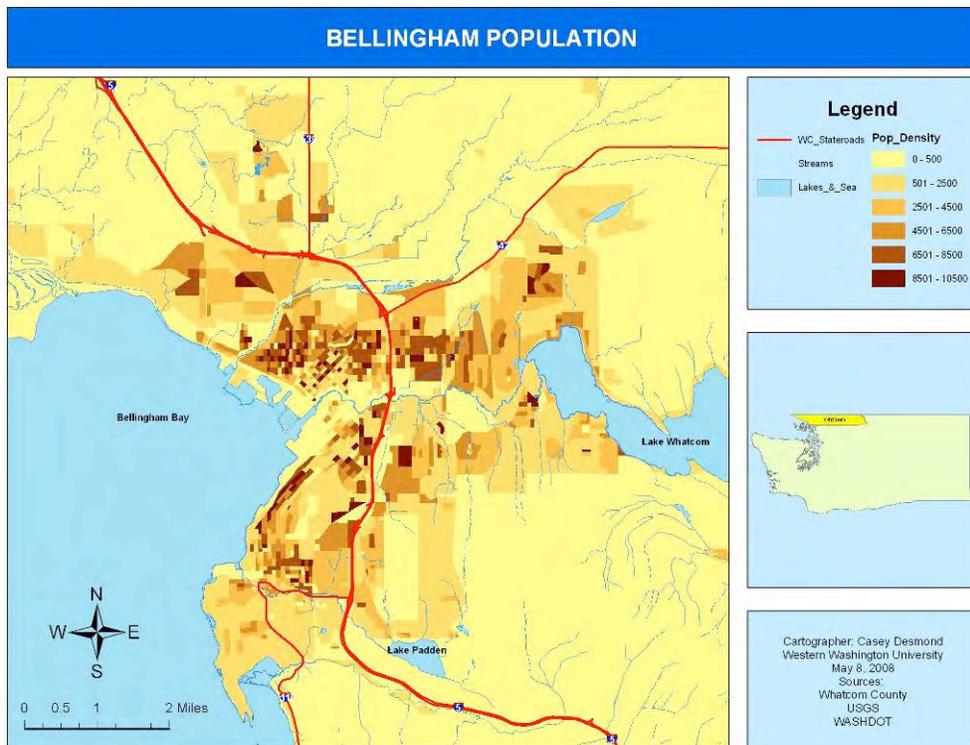


Figure 5.2 shows the population density of population per square mile throughout Bellingham.

In this study of Whatcom County and food availability in the presence of an isolating disaster event, there are many individuals who qualify as part of a vulnerable population. The numbers of individuals receiving social assistance are significant. In Whatcom County with a population of 180,800, 33.1 percent receive social services. This amounts to 59,919 individuals, according to Washington State Department of Social and Health Services (SFY 2005).

These categories contain specific categories of social service beneficiaries including the following significant service categories:

- Ageing and Adult services – 1,892 individuals or 1 percent of the population
- Alcohol and Substance Abuse services – 2,255 individuals or 1.2 percent of the population
- Children’s services – 5,919 individuals or 3.3 percent of the population
- Economic services – 39,555 individuals or 21.9 percent of the population

These individuals are not as vulnerable as they might seem because they are known to one or more social agencies and nongovernmental organizations. Through social agencies and nongovernmental organizations, it is likely that these individuals have a personal social network with access to communications and the ability to receive broadcast information.

Families and individuals not receiving governmental social services represent a potentially more vulnerable segment of Whatcom County’s population. These individuals may not be on any agencies lists of services. Further, they may not be familiar with Whatcom County and sources of information they might need in the presence of disaster or emergency conditions. These individuals and families are living outside of the social network, often unwilling to make their presence known to authority out of fear. The number of reclusive persons is hard to estimate. However, they need to be taken into account in food security planning. We have estimated this population to be 2 percent of Whatcom County’s population or **3,700 reclusive persons** for planning purposes.

A year 2000 report on migrant and seasonal worker enumeration lists, Whatcom County states having 4,904 farm workers and family members in seasonal residence. The 2006 US census indicates 11,529 residents describe themselves as of Hispanic or Latino origin. Neither of these figures represents a reasonable enumeration of migrant and undocumented workers. The 2000 report does not reflect the mass migrations experienced post NAFTA from Mexico and other Latin American countries (Pew 2006, US Dept. of Homeland Security 2007). The 2006 census of residents only reflects numbers of legal or documented individuals. Routine census procedures can only result in gross underestimations of the numbers of migrant and undocumented workers. The very act of being counted by US government representatives creates well-deserved fears of encountering immigration authorities in these individuals and families (J. Palerm, 2006).

Extrapolating from National and Washington State population statistics we derived a figure of **8,000 migrant or undocumented workers** residing in Whatcom County as migrant or undocumented workers (Pew 2006, WA. St. OFM 2007, Larson 2000).

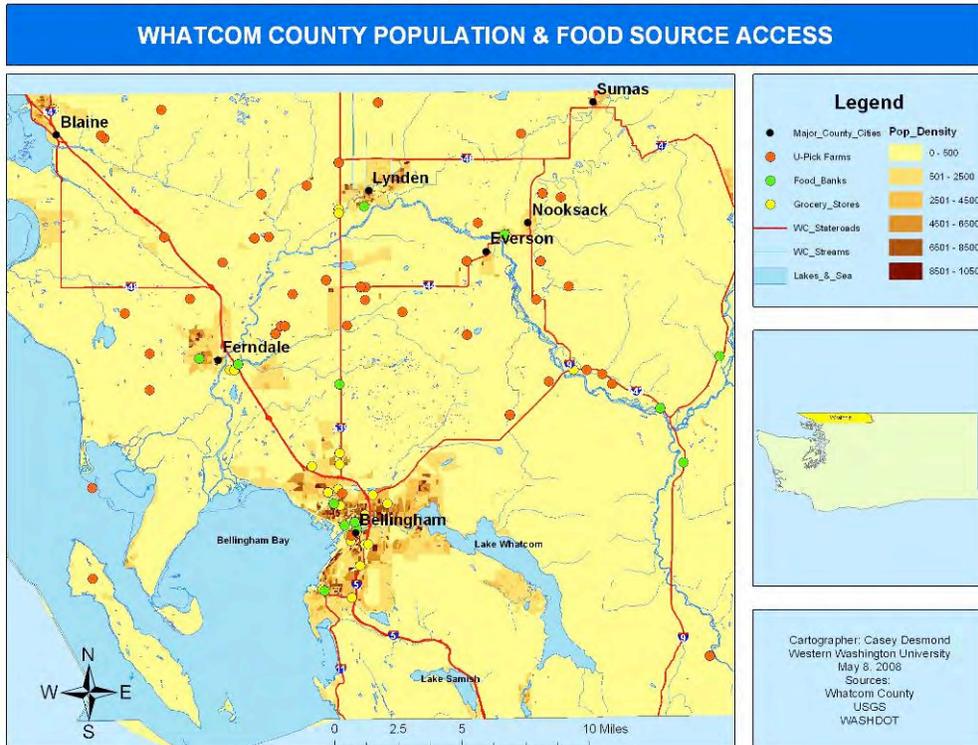
There are many facets of life that can lead to homelessness: poverty, domestic violence, drug and alcohol abuse, mental health, and other facets. The 2006 Whatcom County Point-In-Time Count of Homeless Persons reported **1,255 homeless individuals**. These members of our community may be so marginalized as to be completely uninformed in a time of disaster. A day to day existence deprives them of any opportunity to gather disaster provisions; they are living in an ongoing state of disaster.

These persons may have a number of specific vulnerabilities such as poor health, language barriers, cultural barriers, and lack of financial resources. They will need shelter, water, sanitary facilities, and information. Their food supply will most likely be nonexistent. They will be confused, frightened, and very vulnerable.

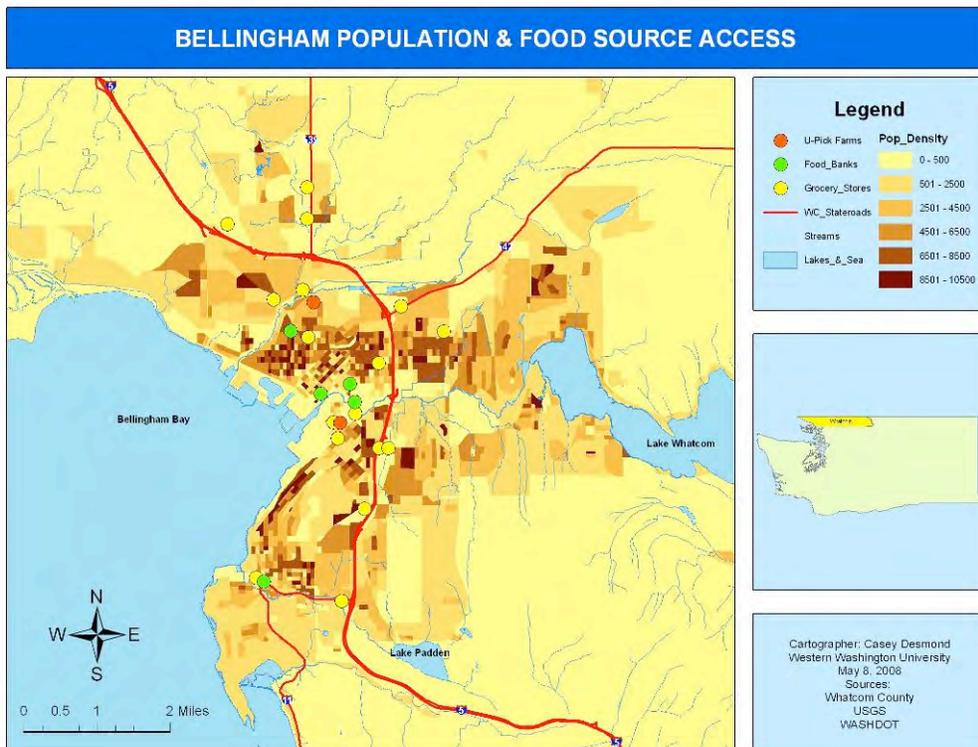
## **6. FOOD DISTRIBUTION**

Despite the wide variety and availability of food within Whatcom County, our research shows that the County has a sizable vulnerable population. This vulnerable population would need continued access to food in the event of a major disaster. Their needs would continue and it would be important to continue food distribution to these vulnerable members. In a prolonged disaster, where infrastructure linkages into and out of the county were degraded, restocking of grocery stores would be hampered. In this scenario, a wider segment of the population would need emergency food provisions. Moderate income households would likely deplete their household supplies; grocery stores would not be restocked. As such, it is important to consider methods for distributing emergency food to both vulnerable and other populations.

In Figure 6.1 for Whatcom County and Figure 6.2 for Bellingham, we overlaid the three main food sources with population density. These maps show where access to food resources is for high and low density areas. Several trends and observations can be made from these two maps, including the number of grocery stores in relation to population density, food deserts, access distance, and the ratio of food sources to others.



**Figure 6.1** shows food sources (u-pick farms, grocery stores, and food banks) overlaid with population density for all major cities and outlying areas throughout Whatcom County.



**Figure 6.2** shows food sources (u-pick farms, grocery stores, and food banks) overlaid with population density for Bellingham.

## 6.1. Emergency Food Distribution and EM Protocols

One of the functions of the Red Cross is to deliver care at the mass level in the event of a disaster. They operate according to FEMA protocols and standards and are a part of their Emergency Framework. The Red Cross has primary oversight of Emergency Framework No. 6, addressing the issues of mass care. Within this function the Red Cross is responsible for “the coordination of non-medical mass care services to include sheltering of victims, organizing feeding operations, providing emergency first aid at designated sites, collecting and providing information on victims to family members, and coordinating bulk distribution of emergency relief item” (FEMA, 2008).

The Red Cross maintains enough food on hand to feed around 1,000 people in the form of meals ready to eat. This food does not require cooking or heating. When on-hand resources are exhausted, the Red Cross is dependent on other chapters for support and local food suppliers in the area like Costco and Wal-Mart. From these combined resources the Red Cross states that they are not only able to feed individuals for 72 hours, but can sustain a population however long it is necessary for recovery. However, in the event of Whatcom County being isolated these contingency plans may no longer be viable. To meet all of the criteria laid forth in the Emergency Framework the Red Cross has developed working mutual aid agreements at the local, state, and national levels. This is to ensure a timely response to a disaster, while at the same time meeting all the needs of the affected population.

Our team conducted an interview with Bellingham Office of Emergency Management’s Assistant Fire Chief and Emergency Management Specialist. During this interview the Assistant Fire Chief stated that the city would utilize NIMS<sup>3</sup> or incorporate parts of the Whatcom County Pandemic Influenza Task Force Community Preparedness Plan in dealing with emergency food distribution. There are no separate specific plans for dealing with a food emergency in Whatcom County. Conceptually, they know what their department would do, but no plans have ever really been practiced.

Within the County Emergency Management Plan (CEMP) emergency support functions (ESF) clearly predestinate parties responsible for each of the critical support roles. In the case of a widespread food shortage in Whatcom County the American Red Cross has the primary responsibility as defined in ESF No. 6. Under ESF No. 6, food banks and their associates have been designated support agencies.

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<sup>3</sup> National Incident Management System (NIMS) is a set of flexible and consistent guidelines for a wide range of groups, both public government organizations and private businesses. Its purpose is to assist mandated responders and emergent responders in maintaining control in an emergency situation in order to best assist people affected. It is also intended to assist in the coordination of working relationship between public and private during prevention preparedness, recovery, and mitigation. NIMS is coordinated from community level, to city, county, state, regional and federal level. As stated in the FEMA document *NIMS and the Incident Command System* “Homeland Security recognizes that the overwhelming majority of emergency incidents are handled on a daily basis by a single jurisdiction at the local level. However, the challenges we face as a nation are far greater than the capabilities of any one community or state, but no greater than the sum of all of us working together” (FEMA, 2008). Utilization of necessary resources, including personnel, from many organizations in an efficient manner is the key to NIMS’s success.

During an emergency, local governments will take control of food banks to use as distribution centers. If need be, government agencies could order to have food shipped to the Port of Bellingham or delivered by helicopter. The lead agency in Whatcom County is the Whatcom County division of Emergency Management. Although Bellingham has its own Office of Emergency Management, during an emergency the County Division will take command of the resources found in all its municipalities, including Bellingham, Ferndale, Blaine, Everson, Nooksack and Sumas. The CEMP as required by Washington State law governs these relationships.<sup>4</sup>

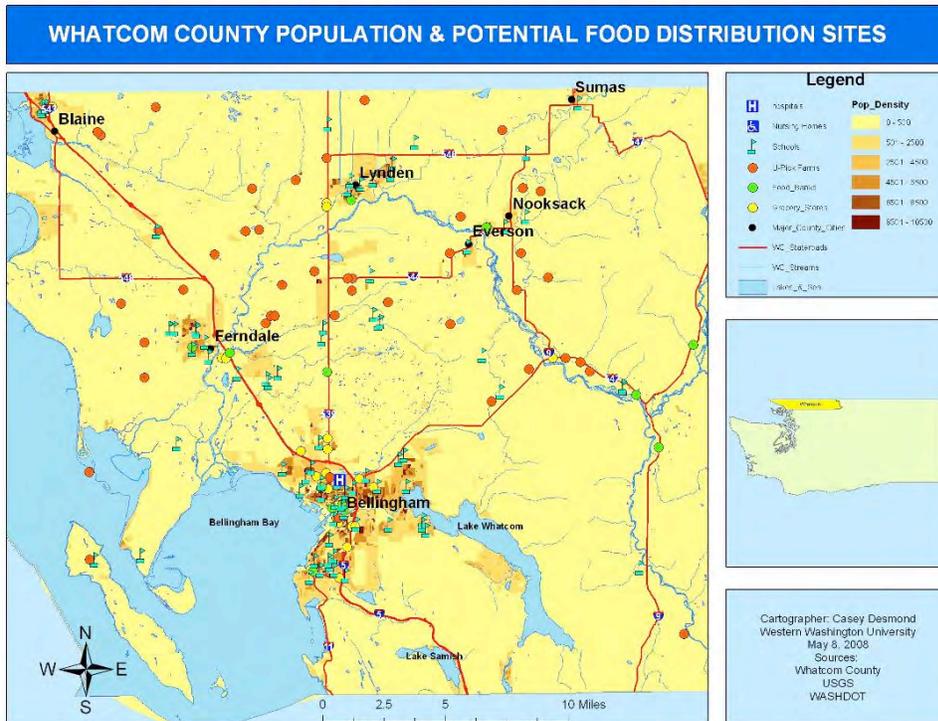
As an emergency develops, the Incident Commander (IC) has the ultimate authority to make decisions until such time as the emergency is eliminated or the incident is supported by a broader IC, supplanting the IC. This would be the case if a Whatcom County food shortage were to be managed on a State or Federal level.

## **6.2. Locations for Food Distribution**

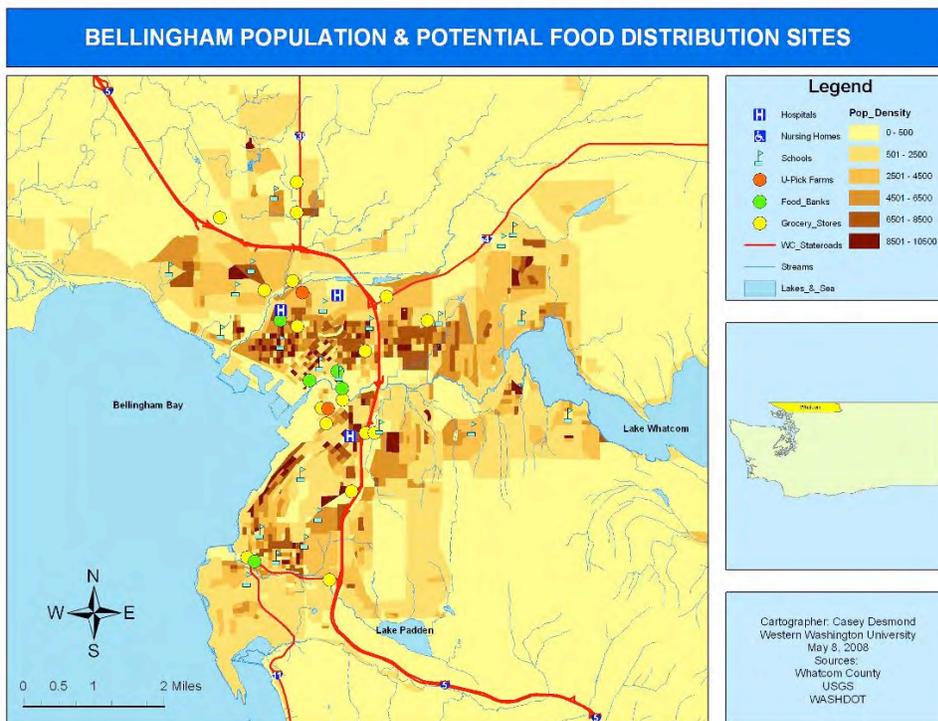
We identified four possible types of locations for food distribution in Whatcom County. These are schools, food banks, hospitals and nursing homes, and Western Washington University dining services. All of these food distribution sites are shown in Figure 6.3 for Whatcom County and Figure 6.4 for Bellingham. The strengths and weaknesses of these locations are discussed below.

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<sup>4</sup> The purpose of the CEMP is to ensure a coordinated response to any emergency condition affecting Whatcom County. The municipal plans are written and formatted to fit into the CEMP with consistency and without controversy.



**Figure 6.3** shows potential food distribution sites (schools, hospitals, nursing homes, grocery stores, food banks, and u-pick farms) overlaid with population density for all major cities and outlying areas throughout Whatcom County.



**Figure 6.4** shows potential food distribution sites (schools, hospitals, nursing homes, grocery, food banks, and u-pick farms) overlaid with population density for Bellingham.

Schools are locations that are well known to community groups and have the role of serving a student population within a specific geographic area. Thinking in reverse, every student already knows where the school they attend is located, as do their parents and most likely the community members within that school's district. Most schools are also equipped to prepare foods and serve meals in a sanitary, healthful fashion. School kitchens, sanitary facilities, shelter, and opportunity for personal hygiene are all factors favoring selecting schools as central points of food distribution.

Another advantage of designating a school as a distribution site is the availability of school busses that cover the schools boundaries on a daily basis. This represents an already functioning means of transit for community members without transportation, including the members of the community recognized as vulnerable in Section 4.2.1 of this report.

Food banks and sites of other humanitarian aid may be good choices for emergency food distribution. Community members already receiving food assistance know where these organizations are located throughout Whatcom County. Therefore, these locations might be more accessible to them. In the same respect, other food distribution sites, such as the Lighthouse Mission, are familiar to some of our most vulnerable citizens.

We believe that hospitals and nursing homes are poor locations for emergency food distribution. These facilities should not be used for food distribution in that the residents are most likely to be already under the stressors of age, poor health, and emergency medical care.

Western Washington University Dining Services will be an obvious emergency food distribution site for university students and on-campus faculty and staff. During an interview, the director for University Dining Services at Western Washington University explained Western's current emergency feeding procedures and food quantities. At any given time, University Dining Services has three days worth of inventory. On any given day, students purchase 9,000 meals in markets and dining halls. As such, Western's three days worth of food is approximately 27,000 meals. The director stated that much of this food is fresh or frozen and that little of it is in cans. Western Washington University gets food delivered three times a week from Seattle.

If trucks were not able to deliver food on a regular basis, Dining Services would consolidate all its food to one location, the Viking Commons, the largest dining area on campus. Fairhaven Commons and Ridgeway Commons would send all students to Viking Commons. At Viking Commons, food preparers and servers would ration food out to students to make it last as long as possible. This location also has generators to run lights and to heat food. However, if there was a power outage, the university does not have generators to run its refrigerators and freezers. Dining Services may use refrigerated trucks for a short period of time if necessary, but they would be powered by fossil fuels and this strategy is costly.

## 7. ANALYSIS AND CONCLUSION

According to our interviews with companies and organizations in Whatcom County the general consensus is that there is a one to three day food supply. However, the definition of a three-day stock is represented differently by the organizations and companies interviewed.

In an interview with the Red Cross, the Emergency Services Director stated that the local Red Cross has working agreements with local food distributors and other Red Cross chapters, which allows them to tap into a large pool of resources. The Red Cross also has the capability and means of transporting necessary supplies. Established working agreements with State Emergency Management officials and the Coast Guard allows provisions to be distributed anywhere in Whatcom County without road access via helicopter.

Unlike the Red Cross and the city of Bellingham Office of Emergency Management, grocers in the area have less flexibility in restocking exhausted food supplies. Interviews with local stores revealed that access to ground transportation and unhampered delivery are very crucial to the functioning of these stores. Most of the food stocked on the shelves is derived from sources outside of Whatcom County. If transportation were to become interrupted, local grocers would be limited to the food that they have on hand. This is likely to be only one to three days worth of food.

Regardless of food stocks provided by local grocers, Red Cross and Emergency Management officials, the amount of food that individual household members have at any given time plays a crucial role in a food security assessment. The relatively scarce data on this topic gave way to the assumption (confirmed in our interview with Emergency Services Director of the Red Cross) that higher income populations had more food available than lower income populations. This ultimately effects the distribution of resources. How the Red Cross responds to a disaster is solely dependent on need regardless of income. With this in mind, higher-income households with more food on hand would be able to sustain themselves longer than those without. Thus, income indirectly effects the distribution of resources by the Red Cross.

The Red Cross has been able to identify areas within Whatcom County that would be more susceptible to food issues in the event of a disaster. These areas of vulnerable populations include but are not limited to: Marietta, Paradise Valley, Point Roberts and spots scattered throughout eastern Whatcom County.

In Table 4 below, we have estimated vulnerable population totals in Whatcom County.

**Table 4. Estimated Vulnerable Population of Whatcom County**

Reclusive	3,700
Undocumented	8,000
Homeless	1,255
<hr/>	
<b>TOTAL</b>	<b>12,955</b>

We believe this is a reasoned number of individuals at 7 percent of Whatcom County population, based upon a county population estimate of 185,000. The Red Cross of Whatcom County indicated they plan on providing food for 1,000 persons for 72 hours in the event of disaster. According to our estimates, feeding 1,000 persons may be an underestimation of what a true number will be within the 72 hour time frame.

According to MACC’s estimates emergency workers may need to implement pre-existing plans for utilization and distribution of food held in Bellingham Cold Storage within 48 hours. It should be noted that the agricultural food sources detailed in Table 2 above will take some measure of time to be organized and brought into distribution. Much of this food would need to be thawed and cooked, unlike the food that Red Cross has on hand.

## **8. RECOMMENDATIONS AND FUTURE RESEARCH**

This report is the first assessment of emergency food sources and distribution in Whatcom County. As such, we have had to make many simplifying assumptions that now warrant further investigation.

It is clear that a major source of emergency food is located in the private enterprise, Bellingham Cold Storage, yet there is little known about the types of food available there, the potential for use in a major disaster, or even the company’s own emergency preparedness plans. This should be investigated further. An exploratory meeting between Bellingham Cold Storage, local emergency management, Red Cross, and local food banks is also recommended as a first step in assessing the potential for Bellingham Cold Storage to serve as a local resource during a major emergency that overwhelms Red Cross and food bank stockpiles.

We also had to make assumptions about the quantity of food available at food banks in the county. While we estimated the food quantity based upon the known number families served, average family size, and average food poundage intake per person, this calculation assumes that food bank patrons rely upon this source of food exclusively. This assumption likely over estimates the quantity of food at the food bank. Further

study, including direct measurement of food bank outflow would improve this calculation.

Do to time constraints, we were also unable to assess average household food stockpiles. We recommend a random sampling of Whatcom County households to learn how often they shop for food and their food stockpiles. This survey should be carried out in a way that adequately captures variation across income levels, urban vs. rural and county vs. tribal geographies, and significant subpopulations such as university students, households with children, elderly households, and ethnic and language minorities.

Finally, we made a first order estimate of vulnerable populations in the county. While we considered reclusive, migrant, and homeless populations to be the most in need, there is likely considerable variation. Migrant and undocumented workers may be socially marginalized, but some may have sufficient food stockpiles for emergencies or significant social networks on which to rely in emergencies. Other populations, such as those on food stamps and households that rely heavily upon food banks for their caloric needs, may have lower household stockpiles and be particularly vulnerable during an emergency that causes food shortages. Further research should be conducted to better assess food shortage vulnerability to improve upon our first order estimate.

The following are three long-term strategies the County should consider to strengthen both its overall local food supply and its short term emergency food capacity.

### **8.1. Enhancing Gleaning Capabilities**

Enhancing gleaning capabilities is one option to increase Whatcom County's emergency food supply. The University of Arizona conducted a study and claims that up to 50 percent of the nation's harvest never reaches a dinner table. For this number to decrease counties with high agriculture output, such as Whatcom County, need to harness their gleaning capabilities. Currently gleaning already provides the low-income population of Whatcom County with fresh produce and we believe it can be used in the event of emergencies.

Even taking into account the fact that an emergency could occur during the fall or winter when gleaning is not productive, Whatcom County's agriculture has the potential to help increase our food security. A system is already in place between gleaning projects, distribution centers, cities, and the county that would make an increase in incoming food easier. Distribution centers, such as food banks, are already in place to distribute the food during an emergency in accordance with Bellingham's emergency management plan.

Present guidelines and protocols would also not have to be altered extensively. With the fast onset of disasters and emergencies and the little forecasting that can be done the more food that is constantly on hand the better.

## 8.2. Sustainable Agriculture

Whatcom County is also vulnerable to food shortages because much of the food in the county is transported in from along Interstate-5. Whatcom County has plenty of agricultural lands, but very little food for people to eat. If Whatcom County diversified its crops, then much of the county could be self-sufficient at least for a few months after harvesting. Whatcom County could also benefit from a stronger economy where much of people's income stayed in the community instead of spending money on food that comes from far away.

Sustainable agriculture and agro-biodiversity can be defined as growing diverse crops just outside of urban areas to create a closer connection between food producer and consumer.

*“A more sustainable food system would involve closer connections between producer and consumer, meaning more direct marketing of foods to local consumers (through farmers markets, community-supported agriculture farms, farmer cooperatives, etc.). These localized marketing strategies mean shorter distances from the farm to the dinner plate, and therefore less energy from the farm to the dinner plate, and therefore less energy use for food transport”* (Horrigan, et al. 2002).

Most fruits and vegetables travel 2,500 to 4,000 km from farm to market (Halwell 2002). Sustainable agriculture can improve food freshness by reducing distance and time from farm to table. Sustainable agriculture would be fresher because farmers would harvest the produce at the peak of freshness and transportation would be minimal compared to most other foods that are sent to processors and sold in grocery stores.

According to *Home Grown: The Case for Local Food in a Global Market*, money spent on local foods stays in the local economy, going from individual to individual to create jobs and raise incomes. “There is strong evidence that local food often costs less than the equivalent food bought on the international market or from a supermarket, because transportation costs are lower and there are fewer middlemen.”

Whatcom County should consider some of its farming practices. Currently the agricultural industry is dominated by a few cash crops. Whatcom County's dependence on raspberries and dairy as its predominant type of agriculture make it vulnerable to a disease outbreak or even climate variations. “The homogenization of species and of farming systems increases vulnerability to insect pests and diseases. Purely monoculture systems are highly susceptible to attack, which can devastate a uniform crop” (Thrupp 2000).

One way to promote agriculture in Whatcom County is to expand subscription farming, also known as community supported agricultural agreements. Subscription farming is when people pay for a share of the farm's output before the growing season and then receive regular deliveries of fresh foods during and after harvest. Some farms in Whatcom County already participate in programs such as these, but one way to

increase food security is to make these programs available to lower-income people by a sliding scale rate.

Another way to make Whatcom County more resilient in food supplies is to encourage small community farms to develop. Neighborhoods could create small gardens to supplement some of the food they purchase at stores.

### **8.3. Map Your Neighborhood**

Map Your Neighborhood would be one way for communities to feel more empowered during planning for a potential food shortage. The Map Your Neighborhood program is designed to strengthen disaster readiness among neighbors and assessing the community for individuals that could be most vulnerable during emergency situations. To revamp the current Map Your Neighborhood program, our team proposes that communities identify average household food supplies when assessing food quantities. While assessing neighborhood food distribution, communities would be able to identify households that might potentially have insufficient food supplies on hand at any given time. This would mean that a fifth team would be added to the current Map Your Neighborhood program. Team 5 would coordinate a central feeding station to gather food supplies and cooking equipment, run a shared generator to keep foods fresh and distribute food to their neighbors.

## 9. APPENDIX

### 9.1. Interview Survey

#### Grocery Stores

Organization/Company:

Name:

Position Title:

Date:

This questionnaire is a part of a research project being conducted by Western Washington University students on food security and distribution in the Whatcom County Area. The concern with food security is how it may change in the event of a disaster and we are interested in those changes. In our study we want to identify major distributors of food in Whatcom County to gain a better understanding of how they handle a food crisis.

Please answer the following questions to the best of your knowledge. If certain questions do not pertain to you, please leave them blank. All answers will be kept confidential and will be used for research purposes only!

#### 1. How many full time equivalent employees do you have?

- a. 1-5    b. 5-9    c. 10-25    d. 25-50    e. 50+

#### 2. About how many people do you serve/help in an average day?

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#### 3. What percentage of your food comes from *inside* of Whatcom County?

Fruits and Vegetables

- a. 0-25%    b. 25-50%    c. 50-75%    d. 75-100%

Meats

- a. 0-25%    b. 25-50%    c. 50-75%    d. 75-100%

Breads

- a. 0-25%    b. 25-50%    c. 50-75%    d. 75-100%

Non-perishables

- a. 0-25%    b. 25-50%    c. 50-75%    d. 75-100%

**4. What percentage of your food comes from *inside* Washington and Oregon?**

Fruits and Vegetables

- a. 0-25%      b. 25-50%      c. 50-75%      d. 75-100%

Meats

- a. 0-25%      b. 25-50%      c. 50-75%      d. 75-100%

Breads

- a. 0-25%      b. 25-50%      c. 50-75%      d. 75-100%

Non-perishables

- a. 0-25%      b. 25-50%      c. 50-75%      d. 75-100%

**5. How often do you purchase locally grown seasonal items:**

Summer

- a. Never      b. Rarely      c. Sometimes      d. Often      e. Always

Fall

- a. Never      b. Rarely      c. Sometimes      d. Often      e. Always

Winter

- a. Never      b. Rarely      c. Sometimes      d. Often      e. Always

Spring

- a. Never      b. Rarely      c. Sometimes      d. Often      e. Always

**6. How many days of inventory do you stock:**

Fruits and Vegetables

- a. Less than 1 day      b. 1-3 days      c. 3-7 days      d. 7+ days

Meats

- a. Less than 1 day      b. 1-3 days      c. 3-7 days      d. 7+ days

Breads

- a. Less than 1 day      b. 1-3 days      c. 3-7 days      d. 7+ days

Non-Perishables

- a. Less than 1 day      b. 1-3 days      c. 3-7 days      d. 7+ days

**7. How long would it take to restock the majority of your food?**

Fruits and Vegetables

- a. Less than 1 day      b. 1-3 days      c. 3-7 days      d. 7+ days

Meats

- a. Less than 1 day      b. 1-3 days      c. 3-7 days      d. 7+ days

Breads

- a. Less than 1 day      b. 1-3 days      c. 3-7 days      d. 7+ days

Non-Perishables

- a. Less than 1 day      b. 1-3 days      c. 3-7 days      d. 7+ days

Comments:

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**8. What are your normal store hours of operation?**

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**9. How long are you able to operate without external electrical power? With what source? How might it impact your services?**

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**10. If there was no water and waste water supply how would it impact your services?**

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**11. Do you have any agreements with local community aid establishments to supply food goods in the event of an emergency? (e.g. Red Cross, Food Banks, Churches, City Emergency Management)**

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## 9.2. Interview Data

<b>Community Co-Op</b>				
Percentage of food in Whatcom County	Fruits and Vegetables	Meats	Breads	Non-Perishables
0-25	x	x		x
25-50			x	
50-75				
75-100				
Inventory on Hand	Fruits and Vegetables	Meats	Breads	Non-Perishables
Less than 1 day				
1-3 days	x		x	
3-7 days		x		
7+ days				x
Restocking	Fruits and Vegetables	Meats	Breads	Non-Perishables
Less than 1 day			x	
1-3 days	x	x		x
3-7 days				
7+ days				
<b>Haggen</b>				
Percentage of food in Whatcom County	Fruits and Vegetables	Meats	Breads	Non-Perishables
0-25	x	x	x	x
25-50				
50-75				
75-100				
Inventory on Hand	Fruits and Vegetables	Meats	Breads	Non-Perishables
Less than 1 day				
1-3 days	x	x	x	
3-7 days				x
7+ days				
Restocking	Fruits and Vegetables	Meats	Breads	Non-Perishables
Less than 1 day				
1-3 days	x	x	x	x
3-7 days				
7+ days				

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