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Regional Market Research of Food Security and Regional Resilience: Whole Community Preparedness through Local Food Production and Distribution in Washington State

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**RESILIENCE
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Regional Market Analysis of Food Security and Regional Resilience: Whole Community Preparedness through Local Food Production and Distribution in Washington State

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EXECUTIVE SUMMARY OF DELIVERABLES

1. Underprivileged populations overwhelmingly receive food assistance from national USDA suppliers and locally purchased manufactured food, not food from local producers or manufacturers.
2. Both Federal and State Food Assistance Programs are administered through WSDA via County specific Lead Agencies, which organize and administer food banks and pantries.
3. Approximately 20% of households rely on food provided via food programs.
4. Approximately 9% of total food provided by food pantries is fresh produce; local farms and gardens donate 8% with the remaining 1% being purchased by Lead Agencies and Food Banks.
5. Fresh produce is difficult to obtain (purchase or donation) from local farms due to cost of product and loss of profits to the farmer.
6. Long-term distribution scenarios are not in current emergency plans for food banks and pantries. Current scenarios focus on short term rationing and consolidated distribution for a few days until FEMA supplemental foodstuffs arrive.
7. Lead agencies, food banks and local farmers do not have any agreements in place to ensure locally-grown or produced food is distribution during a local or regional disaster. However, Lead agencies did not consider the lack of agreements with local farms to be a problem. In past short-term disasters, the public has increased donations to food banks and pantries and fresh products have been de-emphasized.
8. Maps provided indicate local staple crop growers, manufacturers, and warehouses of study counties – Grays Harbor, Snohomish, and Skagit Counties.
9. Regional research on urban household agriculture is sparse and primarily anecdotal. USDA estimates 10-20% of Americans grow some portion of their own food.
10. Urban agriculture, including home and community gardens as well as CSA participating farms do not produce significant yields for long term food relief during a disaster scenario.
11. Maps provided indicate the locations of urban gardens in study counties.
12. USDA Farm Offices, WSU Extension Services, and Farmers Market contact information and locations have been provided.
13. Maps with Lead Agency locations and food banks and pantries identified have been provided. Food pantry locations include a 5-mile driving and 1-mile walking radius, along with census data on poverty and household without vehicles.



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STUDY PURPOSE

This study draws upon the whole community approach to building local community resilience. A whole community approach ensures essential community services, such as food distribution, relies upon diverse funding, resources and/or information networks. A whole community approach also enables citizens and communities to take an active role in preparedness while living their life within social norms. Such a commitment to preparedness provides an intrinsic framework for communities to be prepared for an unexpected interruption in food supply. Identifying existing communities and systems, such as urban farming, gleaning operations, and organizations that deliver food to vulnerable populations -- all of which already provide key capital or service during, or immediately following a disaster -- leverages a potential solution in a crisis. Such organizations strengthen social infrastructure, networks, and assets thereby validating and further enabling local action. By doing so, the whole community approach offers ways to build more effective social paths to societal “preparedness” in terms of safety and resilience.

The degradation or disruption of regional food supply can be life threatening for some vulnerable populations.

The need for a resilient local food supply is important during disasters. In the short-term a regional disaster can severely disrupt or degrade transportation networks necessary for transporting food supplies and may also reduce a household’s ability to drive to local grocery stores and other food outlets. These events may also simultaneously damage businesses selling food products and displace households away from their existing food supplies at home.

The degradation or disruption of regional food supply can be life threatening for some vulnerable populations, even in the short term. Existing observations of survivors of famine and concentration camp and other extreme events indicate most healthy adults can survive without food for approximately 30 days without fatality and without water for 7 days (Packer 2002). However, negative health impacts are likely to occur much earlier for vulnerable populations, such as infants, the very old, and people with certain health conditions. A resilience regional food supply, supported by both regional and external resources, can potentially reduce immediate health impacts to these populations.

During longer-term recovery, the regional aspects of a resilient food supply may supplement, reinforce or diversify food resources for households and lower the likelihood of migration out of the effected region or state. Access to fresh and local dairy, produce and staples may further provide a sense of normalcy and bolster adaptive psychological responses to the stress of post-disaster recovery, both for vulnerable populations and the broader public.

The purpose of this study is to better understand two key relationships impacting the Puget Sound region's ability to distribute food to vulnerable populations during a regional disaster, especially a disaster that degrades or disrupt traditional retail food distribution through such outlets as grocers, discount warehouses, convenience stores and restaurants.

These two key relationships to regional food resilience are:

- local food production, specifically local farms, community supported agriculture, urban gardens, local food manufacturers and storage facilities, and
- local strategies for food distribution to vulnerable populations, particularly food banks and pantries, independent non-profits, and innovative farm-to-vulnerable population programs like gleaning.

Study Methods and Regional Scope

This study focuses on Grays Harbor, Skagit, and Snohomish Counties, as shown in Figure 1.

The study relies upon county and regional data, but draws upon national data where these local data are not available. Information was gathered using a four-tier approach focusing on interviewing program managers of government agencies, university extensions and food relief organizations; performing internet searches, completing an extensive literature review; and conducting site visits to obtain data and observe operations. Where interviews and



Figure 1. Case Study Counties

conversations occurred beyond the study counties, they are noted. Each is described below:

- **Interviews** – A significant part of this study is based on interviews with program managers with the Washington State Department of Agriculture, independent food relief organizations, Food Banks as well as University Extension Offices focusing on small farms and home gardening.
- **Internet** – Internet searches using multiple engines including Google, Google Scholar, Bing, Ask, and Duck Duck Go were used to locate information on farmers' markets, State and Federal Annual Reports covering food assistance programs, urban gardens, and independent organizations working on food relief in Washington. Search terms included variations of "food assistance," "vulnerable populations disaster," "urban and community gardens," "farmers markets," and "Washington Agriculture."
- **Literature Review** – An extensive literature review was conducted on urban and community gardens in Washington State using general Internet searches, Google Scholar, university thesis databases from Western Washington University (WWU), University of Washington (UW), and Washington State University (WSU). Other databases accessed through WWU's library were Academic Search Complete and JSTOR.
- **Site Visits** – Various urban gardens, food banks, and distributions centers were visited in Skagit and Snohomish Counties in order to visualize operations and understand the environment and access to locations.

These combined methods provide a more complete understanding of the current food distribution system's limitations during a regional disaster and potential strategies for reducing impacts on vulnerable populations.

Report Organization

This report is organized into five topics covering the primary variables contributing to food resilience in Washington:

- Overview of United States, Washington State and County Food Production



- Washington State Food Assistance Programs
- Emergency Food Distribution in a Regional Disaster
- Relationships between Farms, Gardens and Food Banks

Following these overviews is an analysis section covering the prospects and opportunities to build the within the whole community approach to resilience. Also included are appendices provide pertinent contact information for agencies, organizations, and businesses identified throughout the report as well as photograph exhibits and regional maps identifying key locations and vulnerabilities.

OVERVIEW: UNITED STATES FOOD PRODUCTION AND WASHINGTON STATE FOOD PRODUCTION

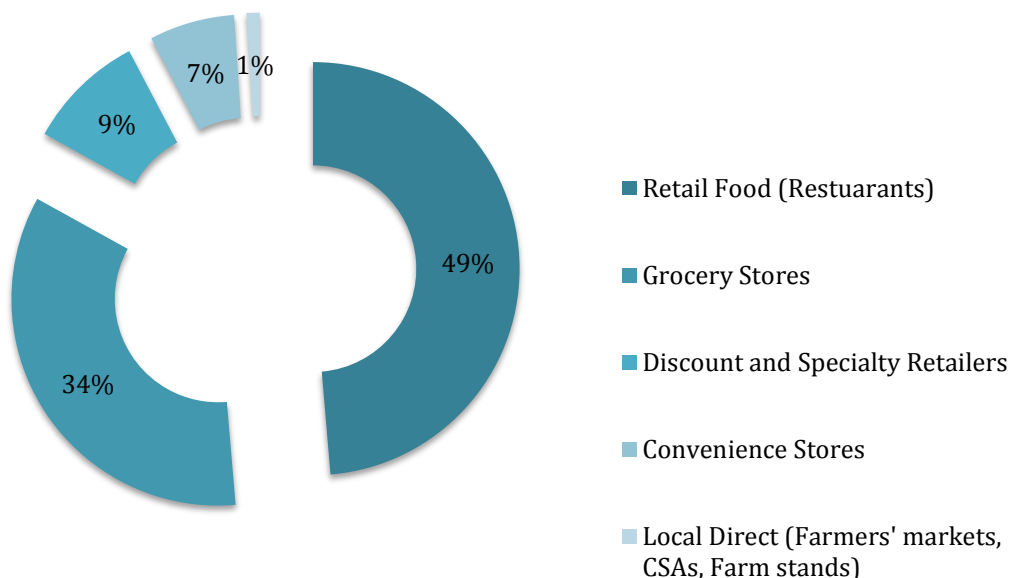
As it exists today, the domestic food industry is a competitive and developed industry, with little domestic growth. Most current growth comes from international expansion, which includes purchasing whole farm operations, contract crops, and companies abroad (IRS 2014). Increases in a company's market share usually come at the expense of a competitor's loss of market share, which had led to the consolidation of smaller farms and companies into larger conglomerates with centralized production and warehousing. According to the Internal Revenue Service (2014), this practice has become popular in order to take advantage of federal tax incentives, but consequently weakens community resilience by reducing the diversity of food supply sources. Localized production is recognized as a source of increased food security by reducing shocks to food price hikes, market distortions, and imported supplies (RUAF 2013).

Increasingly, households are relying upon more prepared and packaged meals. Fewer households may have adequate food staples and canned goods for use in emergencies.

At the consumer level, what and where households purchase food is shifting. Increasingly, households are moving away from relying on predominantly home-prepared meals to relying on eating out of the home and relying upon more prepared and packaged meals within the home (Guthrie et al. 2013). As such, fewer households may have adequate food staples and canned goods for use in emergencies.

In 2011, the U.S. Department of Agriculture's Economic Research Division reported total U.S. spending on food at 1.2 trillion dollars (Figure 2). About half of U.S. households spending, 49%, was on retail food purchases such as restaurants. The other 51% of household spending was on groceries for personal consumption from a variety of sources. Specifically, 67% of home food purchases were primarily made at traditional grocery stores including Safeway, Fred Meyers, Kroger, Cub Foods, and Vons. Another 18% came from non-traditional sources such as discount warehouses and specialty retailers including Costco, Whole foods, and Trader Joes. Another 13% was purchased from mass merchandisers, drug stores, and gas stations. U.S. household used only a tiny fraction, 1-2%, of their food budget to purchase food at farmers' markets, Community Supported Agriculture shares (CSA), or to make direct farm purchases.

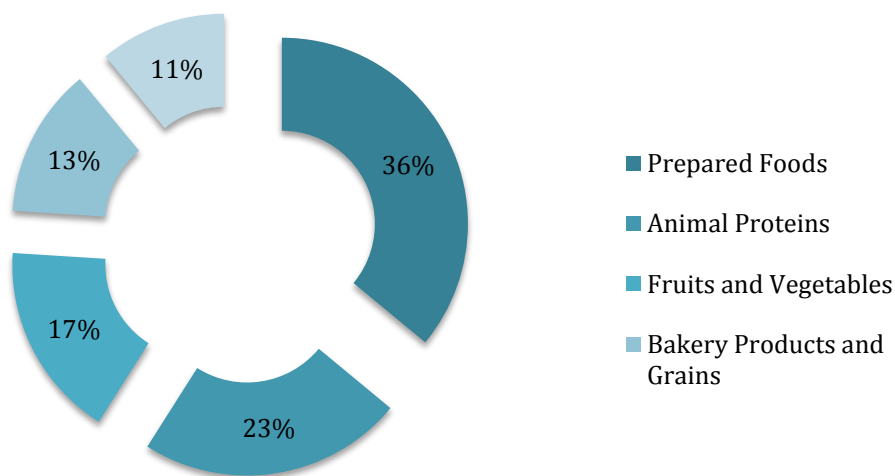
Figure 2. Breakdown of U.S. Food Purchases in 2011, \$1.2 Trillion



Another critical aspect affecting local produce and food availability is the increased demand of prepared food. Sales of convenience foods, such as prepared meals, meal replacement bars, and frozen food, are increasingly among dual-income households and consumers who are generally short on time, resulting a shift in commodity demand (Commerce 2008).

According to a 2006 Department of Commerce survey, over 36% of home food purchases and prepared meals and ready to eat products with only 17% constituting fruits and vegetables, as shown in Figure 3 (Commerce 2008). An aging population combined with rising per capita incomes may increase this trend and reduce demand for, and subsequently availability of, locally produced food.

Figure 3. Home Food Purchase Commodities, 2006



U.S. Food Production Today

With the passage of the North American Free Trade Agreement (NAFTA) and General Agreement on Tariffs and Trade (GATT), many domestic companies are entering into alliances with foreign entities (Commerce 2008). According the United States Food and Drug Administration (FDA), these shifts in business models have increased food imports into the United States from 4.4 million “lines”¹¹ in 2002 to 8.6 million import lines in 2010. Currently, an estimated 10% to 15% of all food consumed by U.S. households is imported, with the following commodity specific statistics:

- 50% of all fruits and vegetables are imported, and
- 80% of seafood is imported.

With produce in grocery stores traveling 4,200 miles on average (Weber 2008), and the FDA only inspecting an estimated 2% of all imported foods (FDA 2013), combined with an increasing numbers of suppliers and complex multinational supply chains, an increasing risk to supply and potential for disruption exists. Given the complexities of the

A regional disaster that interrupts the food supply chain – degrading or disrupting travel routes or ports of entry – poses a direct threat to local food security and community resilience.

¹ A line represents a data element provided by an import broker to the FDA to notify the agency of an imported shipment and can represent any quantity of food. Both 1 bag of coffee and 100,000 lbs. of coffee beans can represent 1 “line.”

domestic and imported food system, a regional disaster that interrupts the food supply chain – degrading or disrupting travel routes or ports of entry – poses a direct threat to local food security and community resilience.

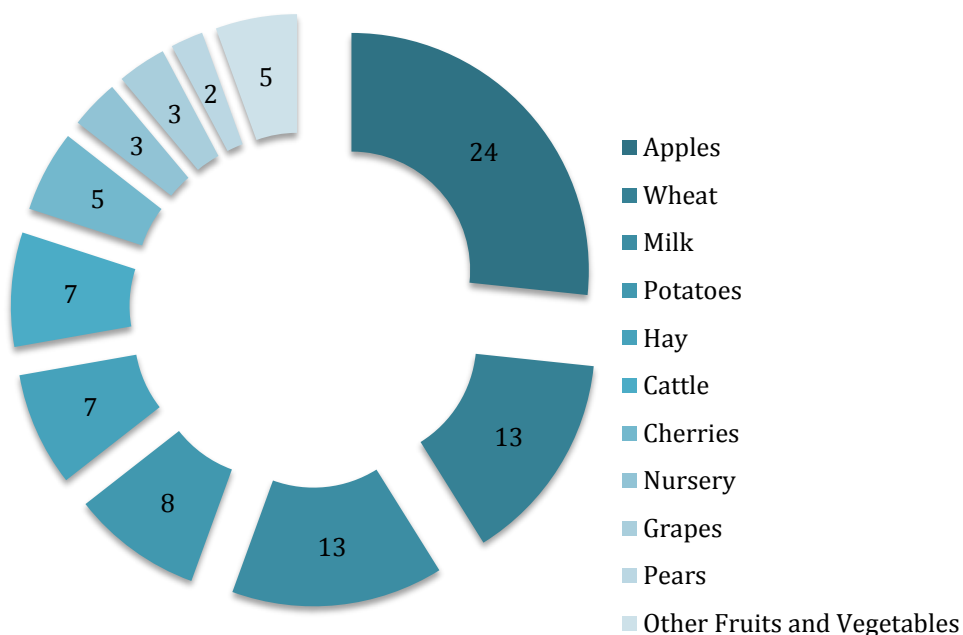
Small farms face heavy competition with large firms in pricing, crop yields, and profit margins. It is not uncommon for food manufacturers to spend more money advertising products than actually making the product (Commerce 2008). Furthermore, local growers or manufacturers without contracts with the grocery store or supplier usually have to pay a fee to get shelf space. These factors have led to an increase of contract growers, who plant specific crops based on market demand, and a decrease in direct sales to consumers or searching for a buyer for surplus crops at the time of harvest.

Increasingly grower plant crops on contract; they may have little or no crops available for direct purchase at time of harvest.

Washington State Food Production Today

Washington has approximately 40,000 farms with a total agricultural production of almost \$10 billion in 2012 according to the USDA's Pride of Washington report. The top five non-meat food commodities by value make up over 50% of the state's agricultural output and include apples, wheat, milk, potatoes, and cherries (Figure 4). Washington is also a major producer of hops, stone fruits, farm forest products, aquaculture fish, shellfish, onions and mint oils.

Figure 4. 2 Agricultural Commodities by Value, 2012, in billions of dollars



Washington State is also a major and rising exporter of food and agricultural products, both those grown in the state and in other states. According to the USDA, it is the third largest exporter of agricultural commodities in the nation, exporting \$9.3 billion in 2007 and \$16.5 billion in 2012 (USDA Value, 2013). The Farm Services Agency in Spokane stated that 99% of all wheat grown in Eastern Washington is exported through ports in Vancouver, WA or Portland, OR. The USDA reports approximately two-thirds of all farm exports are destined for Asia with approximately 15% headed to Canada. Since the signing of NAFTA, exports to Canada have doubled in size since 2002.



While Washington's farm exports are substantial, only a few farms (14%) directly sold to consumers, restaurants or retailers in Washington State in 2007, according to self-reported farm data collected by the U.S. Department of Agriculture's National Agricultural Statistics Service. Despite this low percent, Washington ranks seventh in the nation for having the most direct farm sales and second nationally for population size to dollars spent ratio. According to the USDA's Economic Research Service, across the nation direct-to-consumer sales accounted for only 0.4 percent of total agricultural sales in 2007, up from 0.3 percent in 1997. If non-edible products are excluded from total agricultural sales, direct-to-consumer sales accounted for 0.8 percent of agricultural sales in 2007.

Below is a table of major food crops produced in the state by season and their primary destination. Milk predominantly stays in the region, but wheat, potato and fruit/berry products primarily are destined for out of state.

Washington State ranks seventh in the nation for direct farm sales, yet farms selling directly to consumers, restaurants or retailers accounts for only 0.4% of total agricultural sales.

Table 1. Top Five Foods Produced in Washington by Pound, showing primary season and destination.

	Jan/Feb	Mar/Apr	May/Jun	Jul/ Aug	Sep/Oct	Nov/Dec	Total (lbs)	Destination
Southwest Washington								
Milk	X	X	X	X	X	X	300 million	
Wheat			X	X			250 million	90% Export
Potatoes	X	X	x	x	X	X	100 million	90% Interstate
Berries		x	X	X	X	x	25 million	75% Interstate
Puget Sound								
Milk	X	X	X	X	X	X	3 billion	
Wheat			X	X			50 million	90% Interstate
Potatoes	X	X	x	x	X	X	700 million	90% Interstate
Raspberries			x	X	x		65 million	90% Interstate
Eastern Washington								
Milk	X	X	X	X	X	X	3 billion	
Wheat			X	X			16.2 billion	99% Exported (Asia)
Potatoes	X	X	x	x	X	X	8.8 billion	90% Interstate
Apples				x	X	x	4 billion	60% Interstate 30% Exported

Estimates from 2013 USDA NASS, Commodity Commissions, and personal communications

Grays Harbor County

Grays Harbor produces five staple crops; sweet corn, yellow potatoes, peas as well as winter and spring wheat. Less than 10 out of 400 farms sell these goods directly to the public. According to the 2007 USDA Ag statistics, these farms cover over 120,000 acres in production. In 2012, local vegetable producers harvested nearly 1000 acres of cannery peas totaling 6 million pounds and 460 acres of sweet corn. The majority of the vegetable



crops are grown in the Brady Bottoms agricultural area under contract with National Frozen Foods in Chehalis and Symons in Centralia. In addition to vegetable crops, over 1000 acres of cereal grains were produced in the county in 2013 with the bulk comprised of spring and winter wheat.

Unique for this study, Grays Harbor County farmers have not created public farming cooperatives. Large farms are generally contract growers for manufacturers and rotate their crops to meet industry demand, while smaller growers focus more on agritourism. According to the County Farm Office, large farms are generally not interested in being contacted and do not maintain public contact information. To request information on crop subsidy or disaster payments these farms have received, a Freedom of Information Act (FOIA) request would be required – a request with an average processing time of over one year. Without specific farm and crop size information available, the farms listed on the Grays Harbor County Farm Fresh Guide, a County outreach document promoting local farms, were contacted by phone.

The three largest farms with publically accessible wholesale quantities were identified through phone conversations and have been identified on Figure 5. They are in rural areas of elevated poverty along Highways 12 and 109. These two highways are expected to have significant bridge damage in a major subduction zone earthquake, potentially decreasing the ease at which products from these farms could reach major cities like Aberdeen.

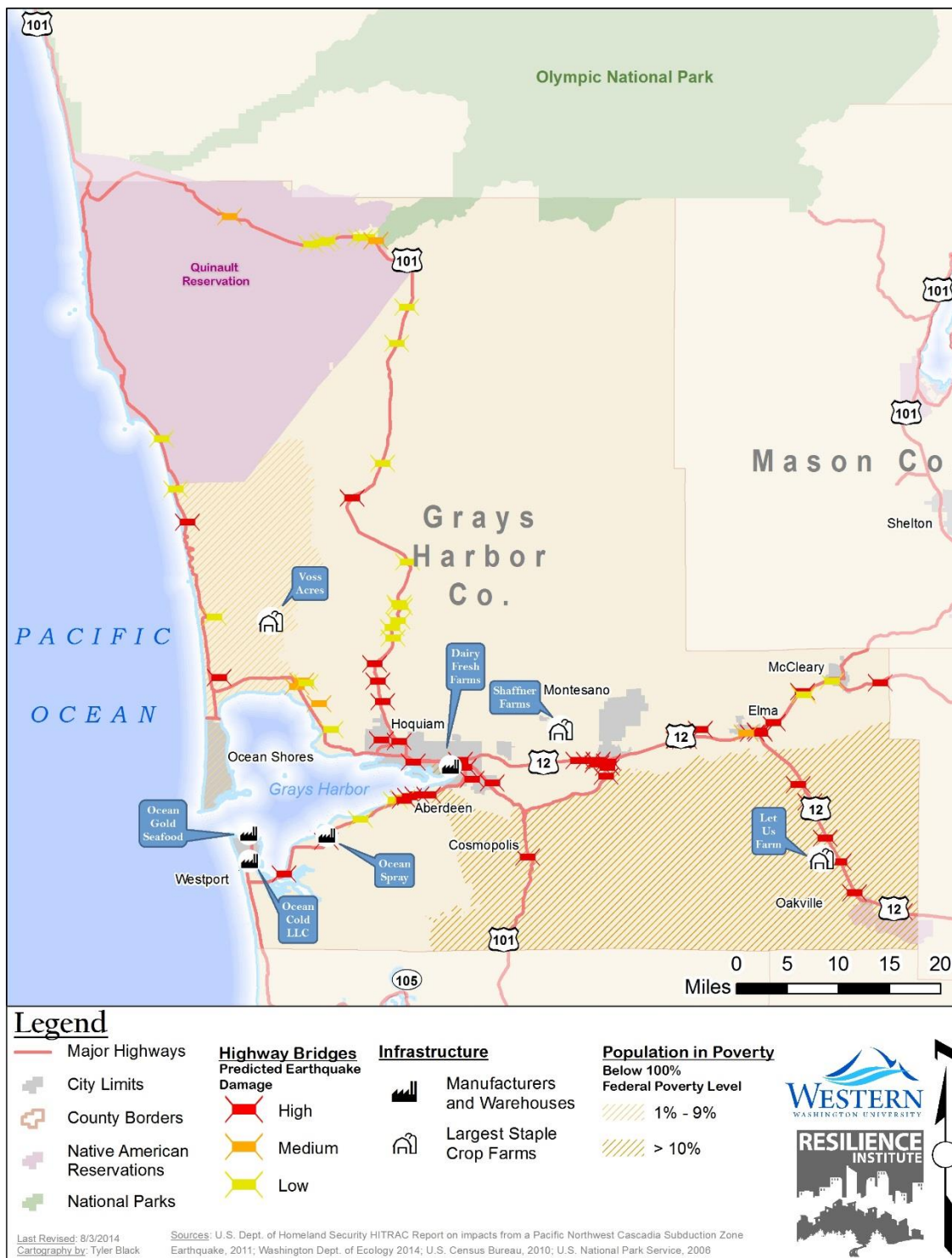


Figure 5. Largest stable crop producers and manufacturers, Grays Harbor County

From a manufacturing and food storage perspective, Grays Harbor County's largest firms specialize in seafood processing, seafood cold storage, and dried cranberries. Located on the Pacific Coast in West Port is Ocean Gold, one of the highest capacity seafood processors on the West Coast, and Ocean Cold, a cold storage for seafood and other agricultural commodities. These are separate businesses owned by the same Ocean Companies conglomerate.

The county also has significant cranberry production with approximately 1000 acres grown in the Grayland region along the Southwest area of the County. Thirty percent of the berries taken to the Ocean Spray Company in Markham are sold as fresh market berries with the remaining 70 percent being made into sweet dried cranberries and cranberry sauce with annual production of 20 million pounds and 1.2 million cases, respectively.

Snohomish County

In 2007, the USDA reported Snohomish County's primary crops as hay and silage to support the local dairy industry; this crop is not suitable for human consumption. Only approximately 25% of the total 28,000 acres of farmland are used to grow edible foodstuffs. Approximately 4,000 acres are used for general vegetable and berry agriculture with average sales of \$10,600 dollars annually; 3,000 of these acres are devoted to green peas, the only staple crop produced in the county. No other significant source of staple crops is available. Twin City Foods is the largest grower and processor of green peas, sweet corn, carrots, green beans, and baby lima beans in the County, processing locally grown private labeling goods. Identified on Figure 6 are Twin City Foods and four small farms with wholesale quantities of general produce varieties. Similar to Grays Harbor County, farmers in Snohomish County no longer have large cooperatives for packing and processing.

Snohomish County houses three large food distribution sites and cold storages that may be a significant source of calories during an incident. In Arlington and Stanwood are Twin City Foods cold storages as well as Northstar Cold Storage in Stanwood that focuses on Seafood storage and processing. According to one cold storage that did not want to be identified, the majority of their seafood is imported to the United States and arrives via the port of Seattle or is trucked from Vancouver, British Columbia in Canada. An estimated 30 million calories are housed in these locations at any given period. These locations are identified on Figure 6.

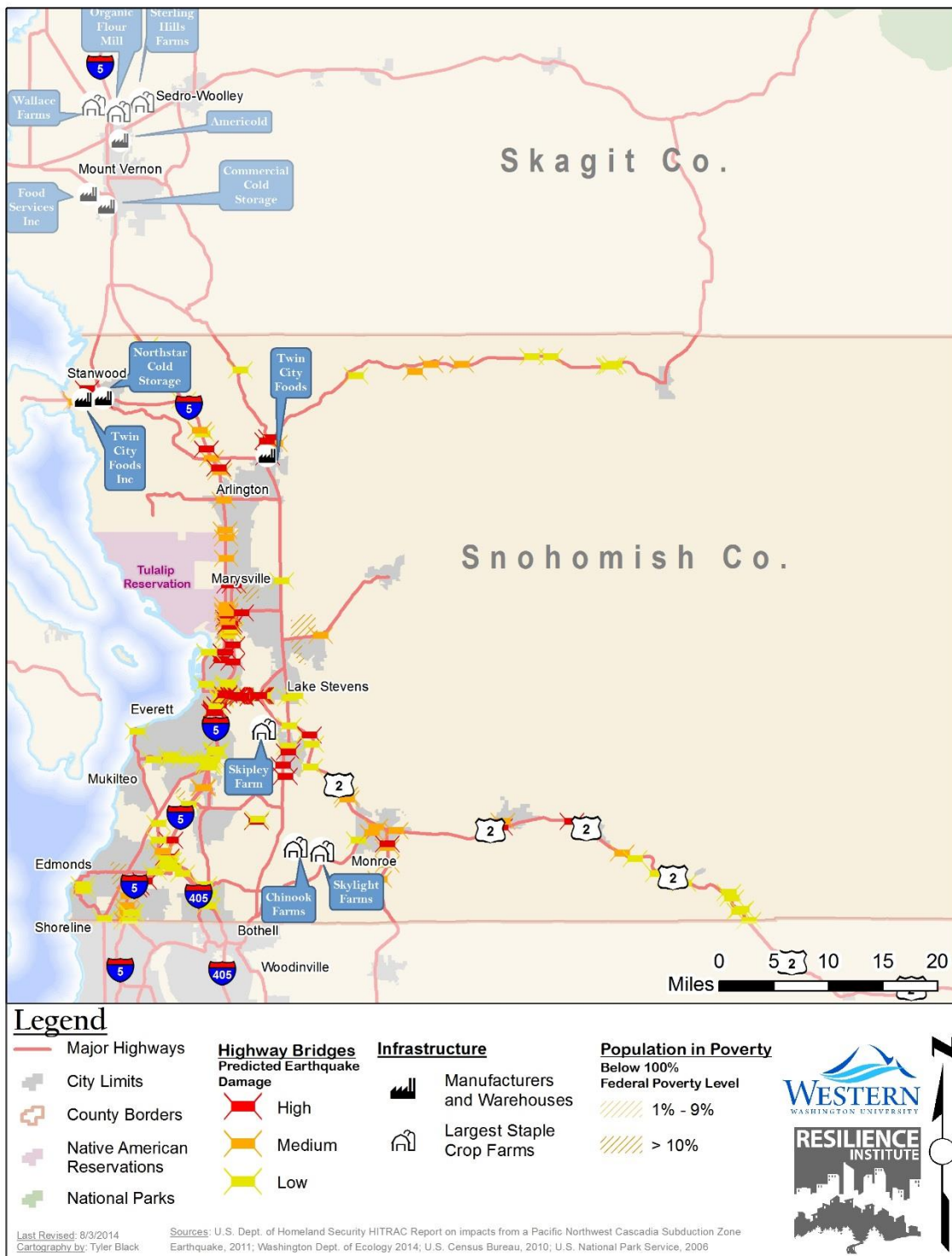


Figure 6. Largest stable crop producers and manufacturers, Snohomish County



Skagit County

Local farmers produce about \$300 million worth of crops, livestock, and dairy products on approximately 100,000 acres of land in Skagit County (WSU Skagit, 2012). Over 90 different crops are grown including blueberries, raspberries, strawberries, pickling cucumbers, potatoes, apples, green peas, and vegetable seed. The primary staple crop is multiple potato varieties, with an estimated 12,500 acres of production land totaling over \$35,000,000 in annual sales (WSU Skagit, 2012). There are also a limited number of local grains available.

Sterling Potato LLC, Wallace Farms, and Fairhaven Organic Flour Mill are Skagit County's three largest food producers. Sterling Potato LLC, the largest producer, is a cooperative of 3 potato farms that pack and distribute through a central location (Figure 7). Wallace Farms, the second largest independent farm is a centrally located grower and packer of potatoes. Combined, these two companies distribute over 45 truckloads of potatoes per week from September through May each year throughout the United States and to Canada. Fairhaven Organic Flour Mill is a centralized mill for grain growers including wheat, quinoa, cornmeal, rye, rice, buckwheat, spelt, millet, barley flours. Locations of these firms are designated on Figure 6. None of the three firms would share customer or shipping information over the phone, citing confidentiality, trade secrets, and privacy as their main concerns.

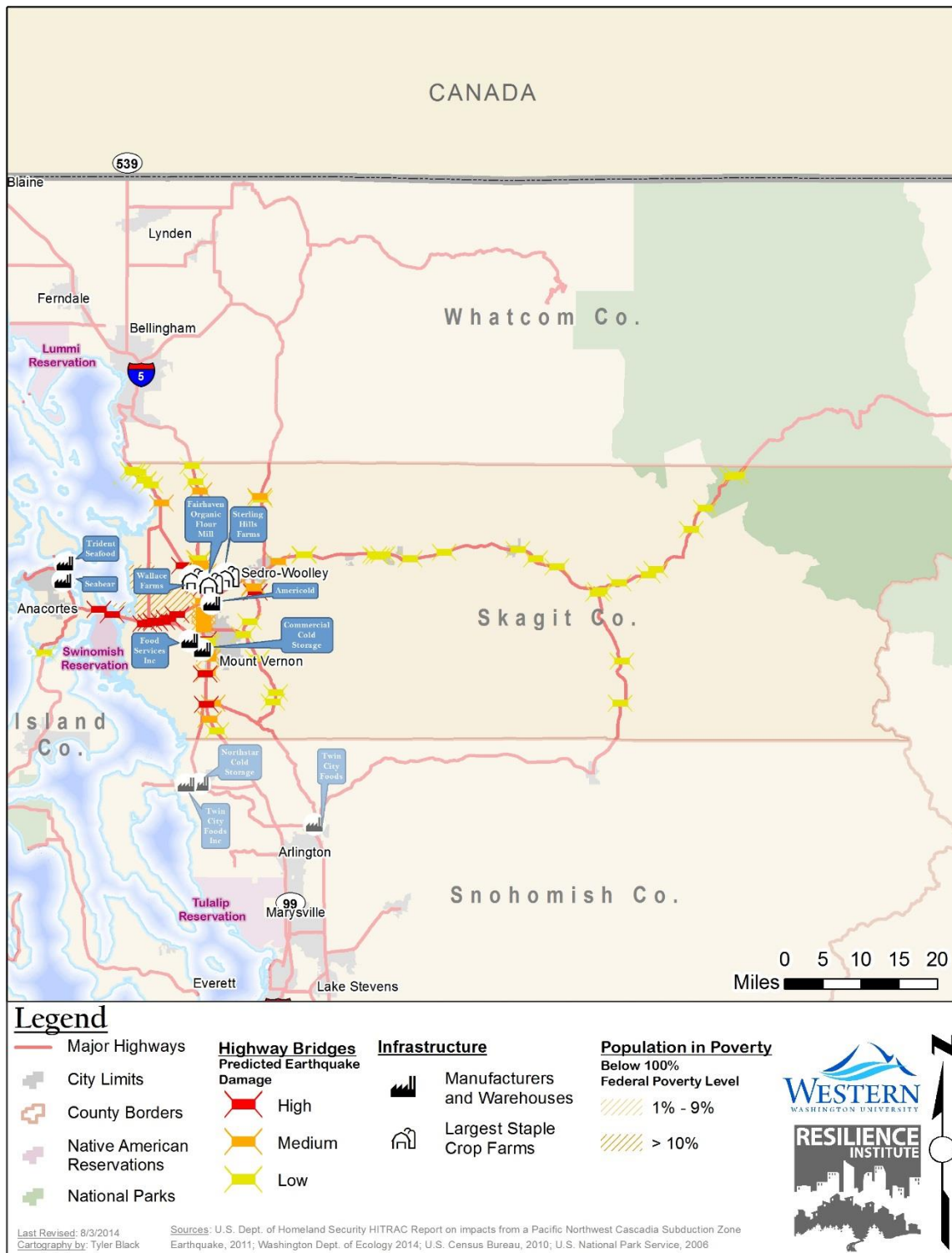


Figure 7. Largest stable crop producers and manufacturers, Skagit County



Five other potential sources of calories during an incident could be from three food storages and two seafood manufacturers. Specifically, Seabear and Trident Seafoods operate large seafood processors in Anacortes WA. More centrally located along I-5 corridor are the Americold and Commercial Cold Storages as well as food distributor Food Services Inc. These facilities hold an estimated 100 million calories combined at any given time. Similar to the farm operations above, these firms preferred not to share their food sources or their customer information citing privacy concerns. All of these firms are designated on Figure 7.

WASHINGTON STATE FOOD ASSISTANCE PROGRAMS

As reported by Food Lifeline, 1 in 6 Washington households, or 14.2%, was food insecure at some point in 2012. The USDA defines food security as access by all people at all times to enough food for an active, healthy life. This means that food insecure households were uncertain of having, or were unable to acquire, enough food to consistently meet the daily caloric needs of at least one person in the household.

Food Assistance Programs in Washington State provided over \$20.3 million in USDA food along with state and federal funding to lead contractors, which in turn helped over 500 food banks, food pantries and meal programs distribute 134.5 million pounds of food to low-income Washington families. A portion of these funds went to thirty-one tribes to issue food vouchers to tribal members and, in a few cases, to support their own food pantries. In 2013, one in five Washingtonians received food from food pantries supported with resources from Washington State Department of Agriculture (WSDA). On average, each client visited a food pantry 6.5 times last year resulting in over 8.35 million visits (WSDA Annual Report, 2014). For clarity, these statistics and programs are not associated with, nor do they include USDA's Supplemental Nutrition Assistance Program (SNAP), commonly referred to as food stamps.

In 2013, one in five Washingtonians received food from a food pantry supported with resources from the state Department of Agriculture, above and beyond any assistance they may receive through food stamps.

The average poundage of food distribution per client visit is between 15 and 16 pounds according to WSDA. Top commodities include canned beef stew, canned fruit, corn, rice, pasta and grain/corn based cereal. Value of the food is averaged at \$1.66 / lb. Each month, food banks receive and distribute over 554 truckloads of USDA food to over 126,000 families (WSDA Annual Report, 2014).

Distribution of Emergency Food to Vulnerable Populations

Providing adequate nutrition to vulnerable populations during a regional disaster serves two functions. It preventing individuals from declining into an emergency health situation and reduces the likelihood of mass migration out of the region. Mass migrations of individuals to a new area can compound a situation by placing new burdens on an area that does not have the infrastructure to handle the increased capacity, ultimately compounding

or creating a new problem. With approximately 20% of Washington households relying on emergency food assistance programs, the potential for health impacts or migration could be significant. By having local food resources available and an organized distribution method, regional disasters that involve supply chain disruption may have a reduced impact.

Washington State has a highly centralized network of food assistance primarily relying on federal aid programs to supply **emergency food –defined as food to food insecure individuals** -- and funding for vulnerable populations.

Four programs provide the majority of food² and infrastructure to vulnerable populations:

- **Washington State Emergency Food Assistance Program (EFAP) for Food Pantry Providers** – This state-funded program helps alleviate hunger for low income households by providing critical funding to food pantries, food banks, tribes and tribal organizations. Funding is flexible for providers; they may use their funding for the purchase of equipment or repairs, to purchase food and for operational costs. Washington State provides \$5 million in funding to this program annually. Approximately 60% of these funds are used to purchase food, with the remaining used to pay operational cost. An estimate of food weight is difficult since each county purchases separate food, but a rough conjecture of 4.5 million pounds annually should be appropriate.
- **Washington State Emergency Food Assistance Program (EFAP) for Tribal Providers** – This state-funded program helps alleviate hunger for low-income households by providing funding to Federally Recognized Tribes or Non-Federally Recognized Tribes that are nonprofit entities with a 501c3 designation. Tribes may also apply under another tribe or a nonprofit agency supporting tribes. Tribes receiving funding may use funds to help operate a food pantry or a tribal food voucher program. This program is similar to Food Pantry program but is specific for tribal entities.
- **U.S. The Emergency Food Assistance Program (TEFAP)** – This federal USDA program supports the diets of families by providing emergency food and nutrition assistance. TEFAP provides primarily USDA food and limited operational funding for

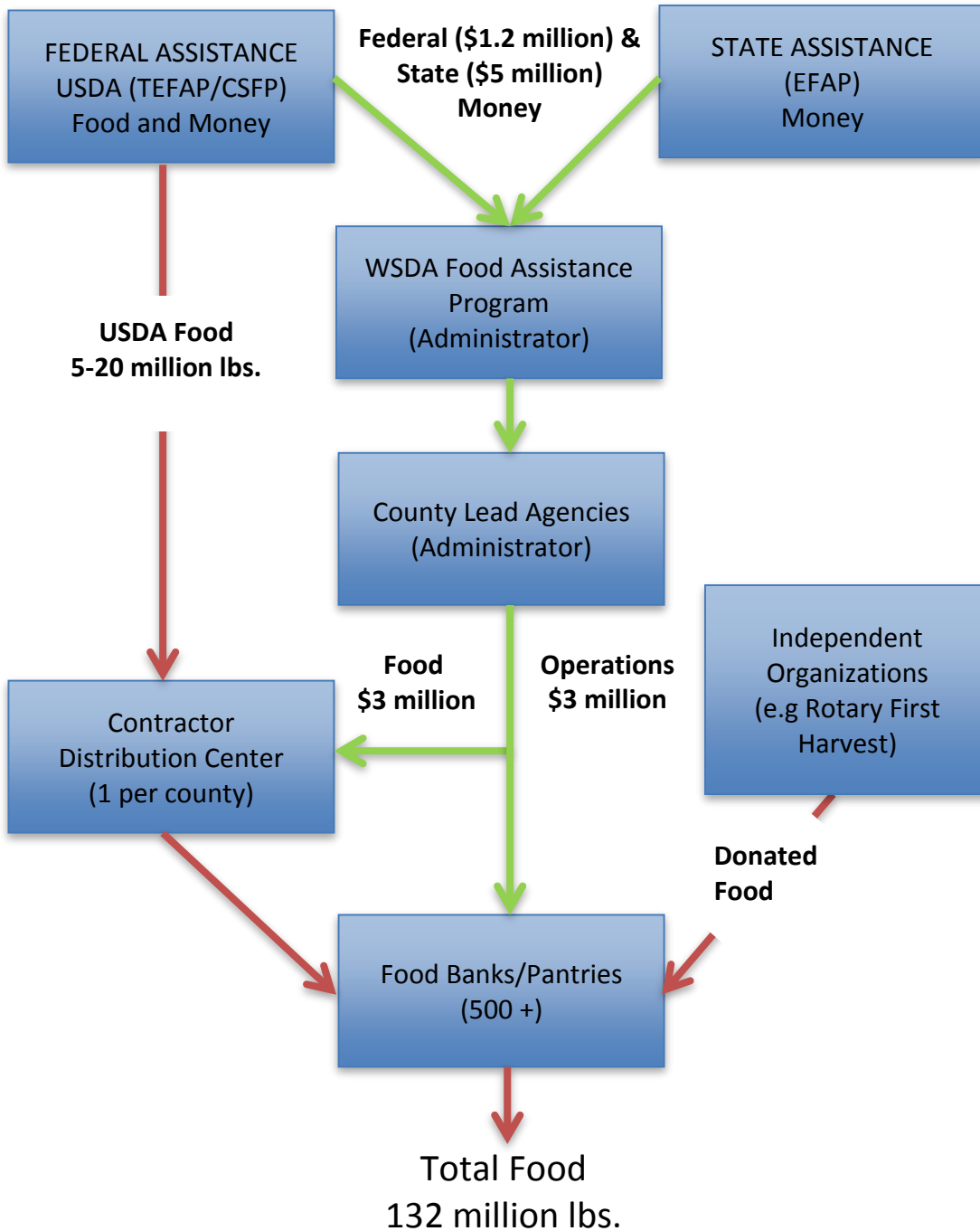
² According to the majority of food banks interviewed, private donations make up less than 1% of all food distributed

distribution to non-profit organizations such as community action councils, food banks, food pantries, shelters and meal programs that serve low-income Washingtonians. In 2012, Washington received \$1.5 million in TEFAP funds, with 89% being passed through to food banks. The TEFAP program trucks approximately 6-14 million pounds of food to Washington State each year. This amount includes federally allocated food and bonus foods, which varies from year to year and which USDA supplies outside of regular allocations.

- **U.S. Commodity Supplemental Food Program (CSFP)** – This federal USDA program provides nutritious food "packages" designated specifically for elderly people of at least sixty years of age. This program has limited availability and is not available throughout the whole state. Eligible recipients received 27 lbs. of real food per month through this program. CSFP provides no direct funds to recipients. In 2013, there were 5,200 recipients receiving 30 lbs. per food each month totaling 1.6 million pounds.

All four programs are administered through the WSDA's Food Assistance Programs (FAP). A flow chart, Figure 8, shows how funds and food flow through each program. It is followed by a description of each actor's role.

Figure 8. Food Assistance Program Overview



In 2013, 1.3 million individuals, 126,000 families
8.5 million total visits (avg. of 6.5 visits per client)

The Washington **Food Assistance Program** staff develop and issue program contracts and funding; provides oversight of contracts; collaborates with state and national advisory committees and coalitions; provides food ordering, warehousing and shipping logistics services for USDA commodities; participates in emergency management responses; monitors for state and federal compliance; and develops strong partnerships in the emergency food provider system and the agricultural community.

County Lead Agencies, such as Coastal Community Action Program in Grays Harbor, Skagit Action Council in Skagit, and Volunteers of America in Snohomish, administer funds and coordinate food in their respective counties for food banks. Nontribal agencies, such as food banks and food sheds, apply through lead agencies in spring in odd years. Lead agencies submit an application packet in May for the food banks and distribution centers in their service areas. All perspective recipients must participate in a meeting with the lead agency, usually in April, prior to the application being submitted to make crucial decisions about how to use the funding.

Contractors, primarily food banks and pantries, but also community action programs, and tribes, serve as the distribution sites for both Federal and State Food Programs. Food banks are traditional storage facilities and warehouses for stockpiling foods while food pantries are usually distribution sites with one to three-days worth of food supply. This designation becomes muddled and often confusing, however, as many food pantries use the term “food bank” in their name. Contractors are the front line of food assistance, providing direct services and interaction with the public.

Food banks stockpile foods in a county or region; food pantries distribute food and only have one or two day's supply.

The WSDA Food Assistance Programs also partner with **independent organizations**

Independent assistance organizations specializing in bridge the gap between food banks, farms, and food manufacturers.

providing food and assistance including Washington Food Coalition, Anti-Hunger and Nutrition Coalition, Rotary First Harvest, and Northwest Harvest, and Food Lifeline. These organizations arrange for produce and meal donations to food banks. Their focus is working with local farms and manufacturers by identifying food waste situations -- nutritious food that would be otherwise discarded -- and arranging to have those calories redirected to food banks. These

organizations are key to identifying logistical and operational stress points since they directly work both inside and out of the government programs, allowing them more flexibility to negotiate and implement new methods. Three major independent organizations in Western Washington are:

- **Food Life Line** is an independent non-profit corporation that works with the food industry and its surpluses to redirect food goods from manufacturers, farmers, grocery stores and restaurants that might otherwise go to waste. Food Life Line provides approximately 82,000 meals per day to 267 local food assistance locations in Western Washington.
- **Northwest Harvest** is an independent food bank distributor and WSDA warehousing and shipping contract recipient. The distributor is currently researching methods to optimize Washington's distribution model and to discuss possible options with the state Food Assistance Program Advisory Committee and contractors.
- Seattle-based **Rotary First Harvest** is an independent non-profit corporation that primarily works with farmers, truckers, volunteers and others to bring valuable skills and resources into hunger relief efforts in communities across Washington State through surplus food, improving food distribution logistics, and developing solutions to increase hunger relief participation. Rotary First Harvest connects existing but underused resources within the agriculture, trucking and warehousing industries to collect and distribute millions of pounds of produce annually to food banks and hot meal programs across Washington State. They act as a non-profit produce broker, primarily by running gleaning programs but also by supporting plant-a-row operations.

Access to Food Banks and Pantries within Case Study Counties

Because food insecure populations rely upon food pantries, where these pantries are in relationship to food insecure populations is important. Census data does not collect information on food security, but the location of households at or below the federal poverty level suggests where food insecure households might be.

The following maps in Figure 9 - Figure 14, show the location of food distributions centers, which distribute federal and state food supplies to food pantries, and the food pantries themselves. Around each food pantry, the county-level maps show a 5-mile radius, indicating areas in relative close proximity to a food pantry. Also shown on these county maps are census demographics for the percentage of households at or below the poverty line, at the census tract level. Urban center maps for the largest cities in each county also urban pantries with a 1-mile walking radius, shown on top of census demographics of households without vehicles.

Grays Harbor County, shown in Figure 9, has 16 food pantries, places where food is regularly distributed to food insecure households. These pantries serve 600-1500 families each month. They have only three days reserve supply on hand. Towns and cities in Grays Harbor each have at least one pantry, with Aberdeen and Elma having multiple pantries. Smaller hamlets along highway 101 and 109 are also served by a few pantries, but rural food-insecure residents in along Highway 101 south of Aberdeen and in rural areas between 101 and 12 may have much longer distances to travel and may also become isolated in events that significantly impact the transportation network. Even some residents within the 5-mile radius of a food pantry may be impacted by bridge and roadway damage in a major earthquake.

Figure 10 shows food pantry locations in Aberdeen using a 1-mile walking radius. Notably, over 30% of household in downtown Aberdeen and between 11-20% of households to the west of Hoquiam do not own a vehicle. Many of these households may also be food insecure and regularly relying upon food pantries, or needing to rely upon them in a regional crisis due to low levels of stored food in their household. Households in central and west Hoquiam and in northeast Aberdeen live more than a mile from any food pantry. While they may live closer to minimarts and grocers, in a regional disaster that affects retail food, these households may have more difficulty reaching a food pantry.



Figure 9. Emergency Food Distribution Sites, Grays Harbor County. Food pantries serve 600-1500 families a month and have only three days reserve supply.

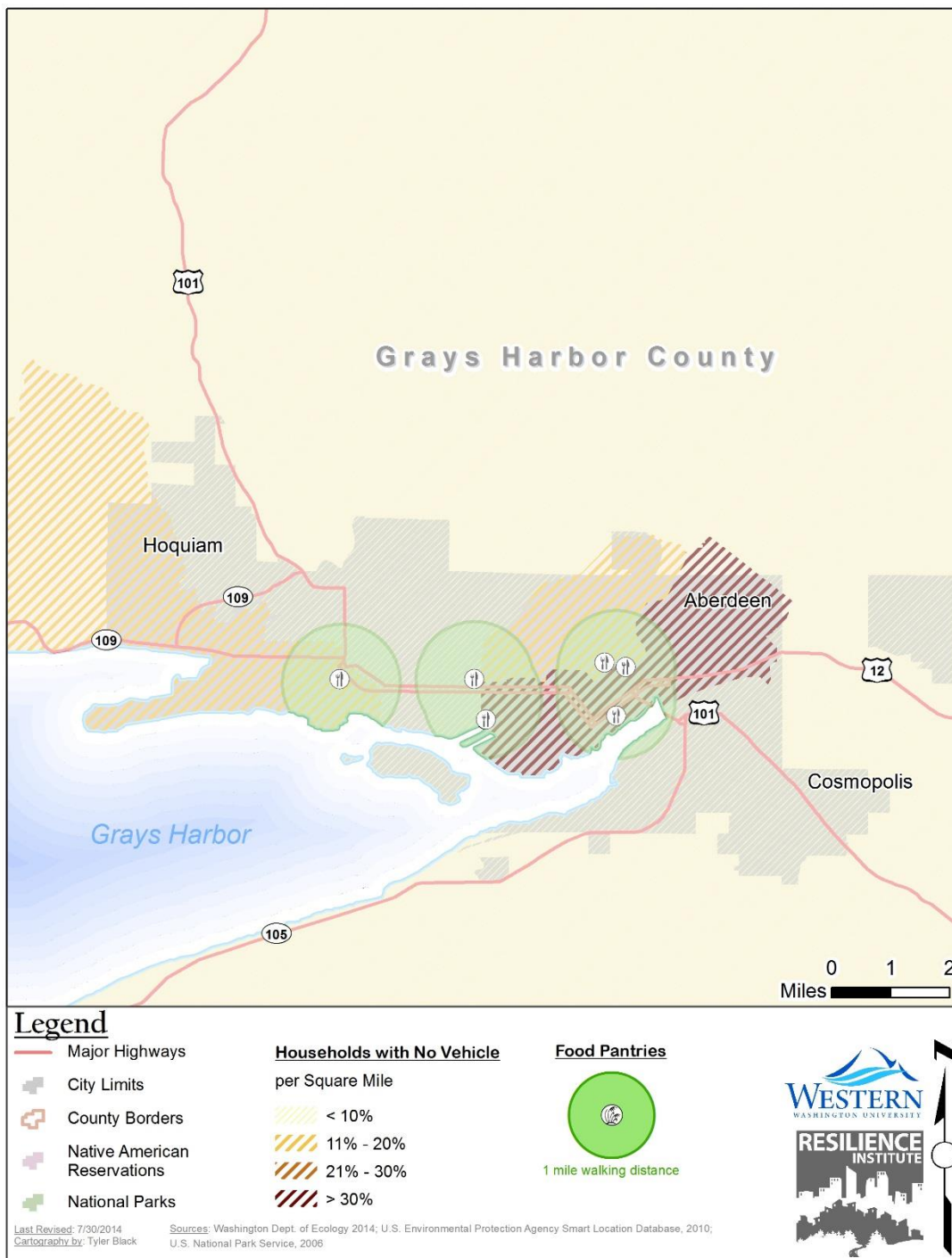


Figure 10. Food-Pantry Isolated Geographic Zones in Aberdeen-Hoquiam area, Grays Harbor County.



Snohomish County, shown in Figure 11, has 28 food pantries serving 8,000-14,000 families each month. They have only four days reserve supply on hand. Major towns and cities, such as Granite Falls, Arlington, Monroe and Sultan have at least one pantry, and residents within city limits are almost all within a 5-mile driving distance to a food pantry. Rural residents along Highways 2 and 503, such as in Gold Bar, Index and on the west side of the Tulalip Reservation, may have difficulty reaching food pantries if a major earthquake damages bridges along these routes. Figure 10 shows food pantry locations in the Everett metro region using a 1-mile walking radius. Over 30% of household in much of the Everett city limits, and between 11-20% of households in segments of Snohomish, Mukilteo, Marysville and Lake Stevens are more than a mile away from the nearest food pantry, though they may be closer to a neighborhood grocer or mini mart.

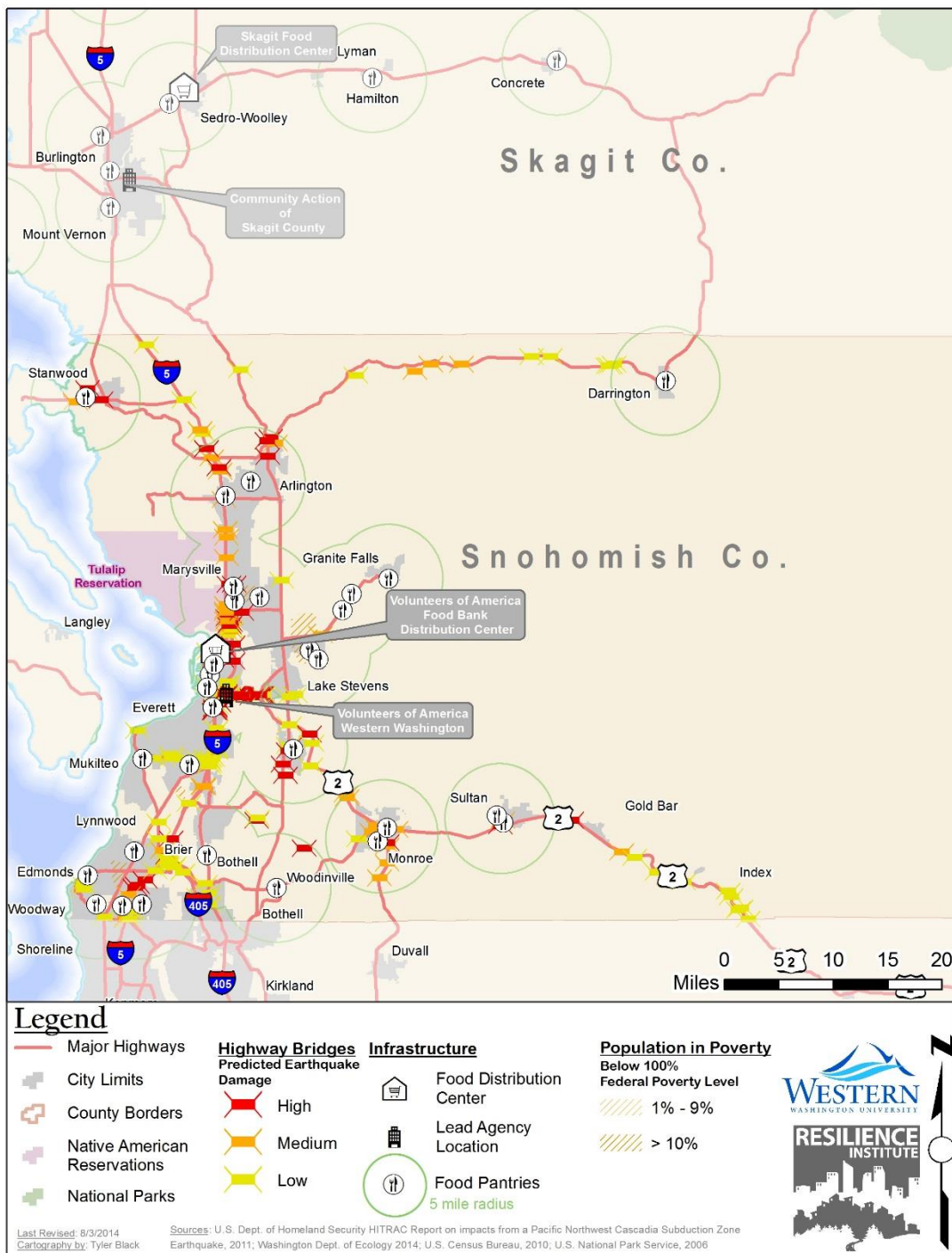


Figure 11. Emergency Food Distribution Snohomish County. Food pantries serve 8,000-14,000 families per month and have four days of reserve supply on hand.

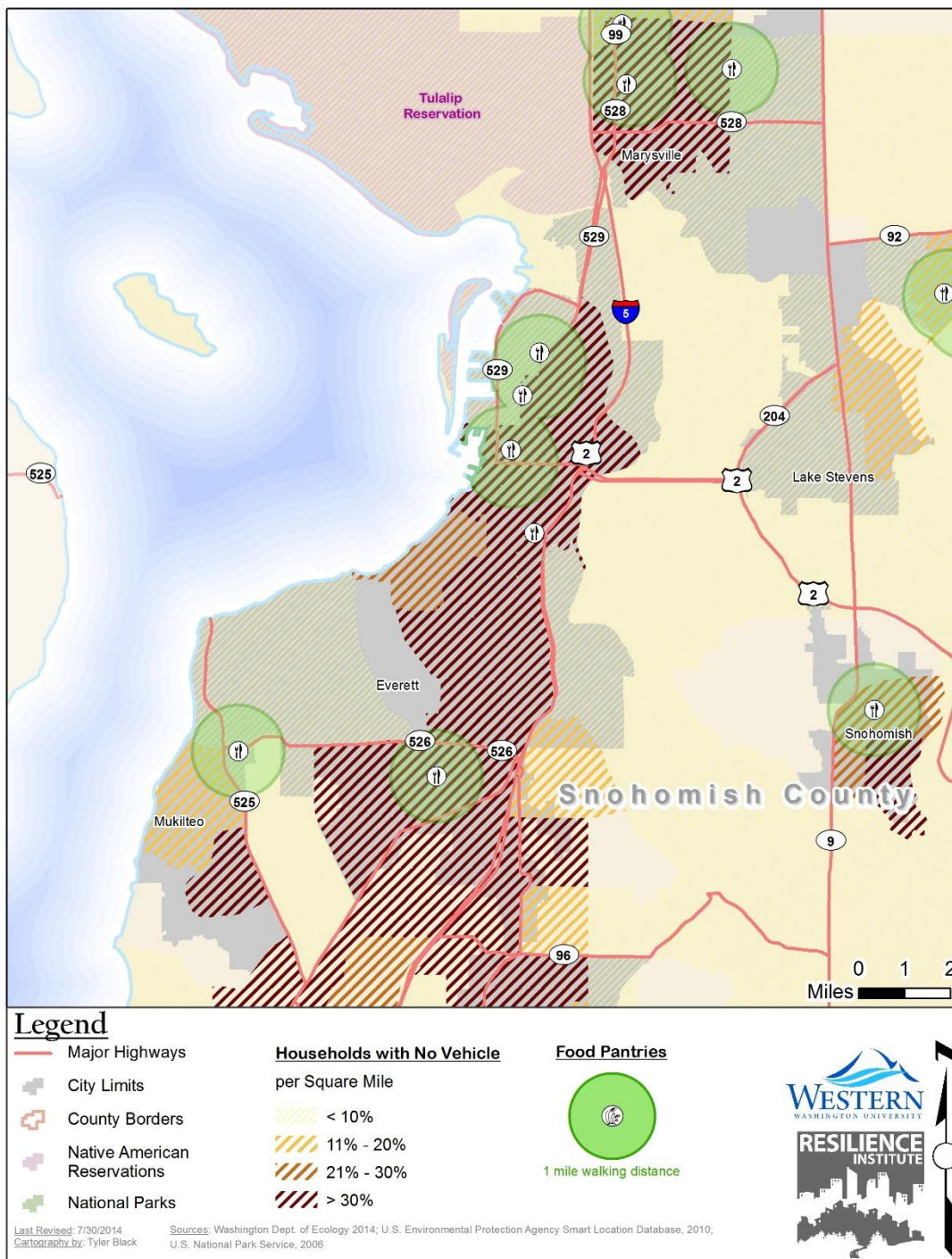


Figure 12. Food-Pantry Isolated Geographic Zones in the Everett metro area, Snohomish County.



Skagit County, shown in Figure 11, has 11 food pantries serving 1,600-2,500 families each month. They have only four days reserve supply on hand. Major towns and cities such as Lyman, Concrete, Burlington, La Conner and Anacortes have at least one pantry and residents within city limits are almost all within a 5-mile driving distance to a food pantry. Rural residents in unincorporated areas west of Mt. Vernon, which census data indicate have over 10% of households at or below the federal poverty line, are further than 5 miles from a food pantry.

Figure 10 shows food pantry locations in the Mt Vernon using a 1-mile walking radius. Over 30% of household in a census track east of downtown are without vehicles and outside a 1-mile walking radius to the nearest food pantry. Other locations in Mt. Vernon's southeast also have high percentages of households without vehicles and far from a food pantry location.



Figure 13. Emergency Food Distribution Sites, Skagit County. Food pantries serve 1,600-2,500 families per month and have four days of reserve supply on hand.

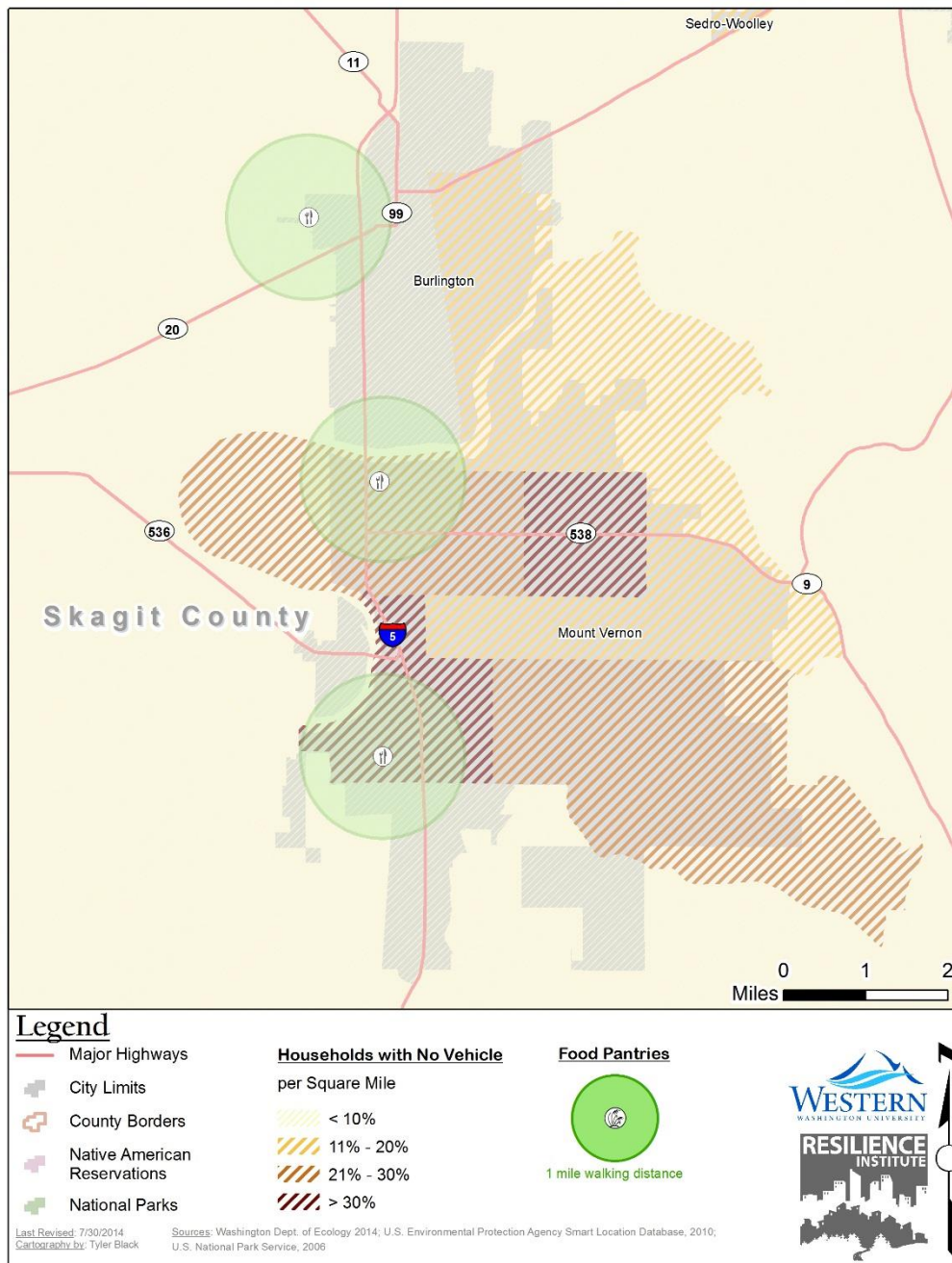


Figure 14. Food-Pantry Isolated Geographic Zones in and around Mt. Vernon, Skagit County.

EMERGENCY FOOD DISTRIBUTION IN A REGIONAL DISASTER

Annually, over 500 truckloads of USDA-supplied commodities arrive in Washington as part of the federal TEFAP support to the state. Approximately half of these trucks are taken to Northwest Harvest's facility in Kent, WA where the food is offloaded, consolidated and then delivered to county distribution centers throughout the state. These shipments are usually for the smaller population counties that would not receive a full truckload on a regular basis. The other half of the trucks are driven directly to the County distribution centers by USDA contracted drivers.

The actual routes and frequency of particular routes were not readily known or available from the WSDA or the USDA, with a USDA representative stating that information would most likely not be available even through Freedom of Information Request, citing both terrorist and security concerns. However, with the two main interstates leading to Kent, WA being I-90 and I-5, these routes would be of most concern during a transportation disruption.

The percentage of local and federally supplied food to food banks is drastically different throughout the State, with rural counties generally relying more heavily on federal assistance. For Grays Harbor County, approximately 80% of the food distributed is derived from the federal TEFAP program or purchased using EFAP funds, whereas Skagit County is approximately 60%. Urban counties rely less on USDA food supplies and state EFAP funds, picking up the slack with independent organizations that work to divert urban food waste (e.g. products near expiration, restaurant excesses, seconds, farm gleanings) to food distribution sites. In Snohomish County, 40% of the food supplied to food banks is from the federal and state TEFAP/EFAP programs; King County is as low as 10% according to a WSDA representative. A supply chain disruption in rural counties has the potential to compound two problems by reducing food available to existing vulnerable populations as well as people affected by the disaster.

Existing Agreements with Distributors to Vulnerable Populations

According to WSDA and the lead agencies for Snohomish, Skagit, and Grays Harbor Counties, there are no formal agreements or contracts to ensure continuity of fresh produce deliveries during disaster situations or in case of a major supply chain disruption. When queried about a supply chain disruption, WSDA stated these scenarios have been analyzed by their Emergency Preparedness group and although delivery time would be reduced, there are both land and sea routes to deliver products within a few days to most of the state. Lead agency managers in Skagit and Snohomish Counties said this subject has

broached at a recent conference and at the local level due to a recent distribution blackout in Seattle, but no strategies have been implemented in response to that incident.

Of the six food bank managers interviewed, the general consensus is that during a complete supply chain disruption, food would be consolidated at pre-determined distribution locations with driveways or drive through pickup available. Food would also be pre-packed, as opposed to allowing people to shop and select goods, in order to reduce the amount of time required at the site. There was also agreement amongst the managers that fresh produce would not be a top priority during an incident. All three representatives of lead agencies also mentioned their reserve supplies would allow them to hold out for two or three days until FEMA supplied food trucks arrived, which is their expectation.

Food Bank representatives in the Grays Harbor, Snohomish and Skagit Counties expect to pre-package food, reduce or eliminate fresh produce and rely upon reserves during a regional disaster. They assume FEMA-supplied food delivery will refill stocks within two or three days.

Not all parties in the food assistance program supply chain appear to be completely integrated in the emergency response planning, however, at least at the regional level. A representative from a state contractor responsible for managing food distribution divulged that the local and state emergency responders have little knowledge of the food assistance programs, the logistics involved, the location or food storage capabilities and supply at food banks. Further dismay was expressed after being directly questioned as to the validity of their attendance at an emergency response conference in 2012. Additional frustrations were voiced regarding not being included in local fire departments and police stations training on how to operate their facility during a crisis, given that their facilities are a significant and critical source of emergency calories in their region.

A state contractor responsible for managing food distribution stated that the local and state emergency responders have little knowledge of the food assistance programs, the logistics involved, the location or food storage capabilities and supply at food banks.

Of note, WSDA representatives stated that distribution of USDA-provided food and expenditures of Federal monies are prohibited without explicit WSDA and USDA consent during a local, state, or federally declared incident. This means neither the food nor monies may be repurposed for disaster-related assistance during an incident and would remain

USDA-provided food and federal funds to food banks cannot be repurposed for general disaster relief without explicit WSDA and USDA consent.

intact at the food bank or distribution center until authorized. The Washington State Emergency Operations Center would be responsible for making this decision and communicating to the county lead agencies to issue for general aid, and then the state would be reimbursed at a later date.

WSDA also has the ability to issue emergency food stamps under the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)

program. This program does guarantee fresh produce deliveries to food assistance programs, but does allow access to existing food in grocery stores or warehouses to people affected monetarily and has reportedly been successful in regional disaster situations including the Grays Harbor County flooding in 2013.

Flooding Impacts on Grays Harbor County Food Pantries

The Lead Agency for Grays Harbor County described a situation where flooding had cut off roads to many rural areas and people were not able to reach typical food distribution sites to pick up their food. Households also had increased need for additional emergency food since many people were isolated and unable to work, reducing their usual income.

As such, the need for emergency food assistance increased in a very short period of time. The temporary solution was to issue emergency food stamps, but logical and cellular issues prevented employees from being able to sign up new clients for the program. Even when successful, however, food stamps were used to purchase existing food at grocery stores, a situation that is not necessarily viable in a regional disaster that degrades the traditional retail food sector.

RELATIONSHIPS BETWEEN FARMS, GARDENS AND FOOD BANKS

Under the current system of food assistance to needy households, lead agencies, contractors and food banks have limited means to purchase locally supplied food. Of the six food banks interviewed, none of them purchase fresh produce directly from local farms, although they stated they receive occasional donations from farms and gardens. Monetary funds provided through Federal and State programs (TEFAP and EFAP) are primarily used to pay for the vast majority of operational costs. TEFAP funds cannot be used to purchase food and approximately only 60% of EFAP funds are used for actual food purchases. When these purchases are made, it is usually through local grocery stores or warehouses that can provide reduced pricing for bulk orders. In Skagit and Snohomish Counties, for example, most of state EFAP funds are used to purchase shelf stable products from local grocery stores such as Haggen Food, discount warehouses such as Costco, or wholesale food suppliers such as Food Services of America.

Under the current system, food banks have limited means to purchase locally supplied food.

During this study, lead agency and independent organization representatives stated farmers rarely contact them directly with food donations. Usually, a lead agency or independent organization contacts the growers directly and solicits goods for purchase or donation. Farm offices are versed in USDA tax write-off programs and counsel farmers in the benefits of food donations, but the actual value in these benefits does not appear to support high farm-to-food bank donations. Donations comprise less than 10% of total food provided to the food banks and pantries. A breakdown of local fresh produce purchases and donations is shown in Table 2.

Table 2. Fresh and Local Produce Purchased by or Donated to Lead Agencies (Food Banks) in Case Study Counties, 2013

	Purchase of fresh, local produce (lbs)	Donations from growers and private and urban gardens (lbs)	Volunteer gleaning operations on local farms (lbs)	Total Food Distributed (lbs)
Grays Harbor	1,000	2,000	0	3,700,000
Snohomish	40,000	115,000	60,000	11,300,000
Skagit	27,000	170,000	30,000	4,300,000

Estimated and Reported data from Lead Agency and WSDA representatives

In 2013, Americorp*VISTA hosted The Grower Round Table series, “an effort by the Washington State Department of Agriculture, the Washington Food Coalition, and Rotary First Harvest to sponsor gatherings across Washington State to better understand and support growers’ relationships with their community, state and the wider hunger-relief network” (Rotary First, 2013). A summary of the findings, which included farmers from Skagit and Snohomish Counties, found that farmers were unlikely to participate in local hunger relief efforts for the following reasons:

- 1) Many farmers are hard-pressed to give away product that they might be able to sell, even at a reduced rate. Profit margins are too slim to lose a sale on even small quantities of produce on a farm operating on less than 25 acres.
- 2) If farmers didn’t grow their own food, they may be in the food bank line too.
- 3) Farmers can use excess food for other purposes like compost to return fertility to their soil, feeding their animals, or finding a seconds market that will pay them.
- 4) Most farmers surveyed reported that they do not know any small farmers making more than \$30k a year, but they are asked repeatedly to make donations or lower their prices. A general sense that the larger farms should be shouldering more of the burden was discussed. Farmers are willing to allow gleaning, some plant-a-row, or other means of donating since they feel like they are contributing healthy food to the community.
- 5) Many farmers cited factors including time, transportation and money as being prohibitive. Some farmers stated that if the infrastructure were pre-existing, they would be more likely to participate.

A 2013 Grower Round Table series found that farmers were unlikely to participate in local hunger relief efforts due to low profit margins, produce repurposing, and the time and transportation costs of doing so, among other reasons.

Farm to Food Bank: Direct Agreements in Whatcom County

Statewide, few lead agencies have contracts in place for local farms or growers to provide food directly to food banks, with no contracts existing in the three study counties. An exception is the Bellingham Food Bank in Whatcom County that has entered into farm to food bank agreements through Food Bank Fresh, a non-profit organization based in Whatcom County.

Food Bank Fresh is a traditional pay-for-services contract that ensures a certain amount of produce is provided to the food bank. For 2013, contract growers included Boxx Berry Farm, Osprey Hill Farm, Moon Dance Farm, Cedarville Farm, Terra Verde Farm, Rabbit Fields Farm, and Hopewell Farm, all in Whatcom County. While the details of pricing are not disclosed, the program appears favorable with comments from Osprey Hill's Owner including:

- "I'd be a very happy farmer if more of our production was by contract. It's a piece of cake...literally enjoyable...to know your crops have a home before they even go in the ground. It fits seamlessly into our current production and we're able to maintain our crop diversity and continue to grow our wholesale and Community Supported Agriculture program at the same time." (Morange, 2013)

A WSDA Food Assistance Program representative stated this model is being expanded through a pilot program to include four or five more areas in order to gauge the success and value of this type of agreement. The program is in its earliest planning stages and results should be available in 2015. Further, Americorp*VISTA in Washington is currently conducting a study on how to write, structure, execute, and evaluate contracts with local farms to supply produce to food banks.

Local Farm Advertising and Direct Sales

USDA's 2010 Local Food System Report identified direct marketing as a key component of community food security programs, with the goal of reducing community food insecurity by strengthening traditional ties between farmers and urban consumers. In particular, farmer's markets have been associated with food security programs because they are increasingly capable of accepting benefits from Federal and State food and nutrition programs.

Local food markets typically involve small farmers, heterogeneous products, and short supply chains in which farmers also perform marketing functions, including storage, packaging, transportation, distribution, and advertising. According to the 2007 U.S. Census of Agriculture, most farms that sell directly to consumers are small farms with less than \$50,000 in total farm sales.

Small produce farms and those engaged in non-traditional farm operations tend lead direct-to-consumer sales and marketing. In 2007, direct-to-consumer sales accounted for a larger share of sales for small farms (total sales less than \$50,000) than for medium-sized farms (total farm sales of \$50,000 to \$499,999) and large farms (total farm sales of \$500,000 or more). Produce farms engaging in local marketing comprised 56 percent of total agricultural direct sales to consumers; these produce farms accounted for 26 percent of all farms engaged in direct-to-consumer marketing. Direct-to-consumer sales are also higher for the farms engaged in other entrepreneurial activities, such as organic production and tourism (USDA Local Food Systems, 2010).

In Washington, a myriad of programs and outlets work to lower barriers and increase local food consumption with the intention of both strengthening the local economy and building community resilience. Yet, farms face barriers to expanding their direct-to-consumer market and new farms face barriers to entry, including:

- capacity constraints for small farms and lack of distribution systems for moving local food into mainstream markets;
- limited research, education, and training for marketing local food; and
- uncertainties related to regulations that may affect local food production, such as food safety requirements.

Organizations such as the Northwest Agricultural Business Center, located in Mt. Vernon, provides Northwest Washington farmers with the skills and the resources required to profitably and efficiently supply their products to consumers, retailers, wholesalers, foodservice operators and food manufacturers. Specifically, they host marketing and outreach classes as well as business strategy seminars. This organization primarily serves Island, King, San Juan, Skagit, Snohomish, and Whatcom Counties.

Skagit County farms also have a variety of options available for advertising to local clientele including a Skagit Food Co-op, the Puget Sound Food Hub, annual Festival of Family Farms, farmer's markets, and grower's cooperatives.



Snohomish County has Sno-Isle Natural Foods, farmer's markets, Snohomish Valley Growers Alliance, an organization comprised of 22 vegetable farms with the mission of sustaining a permanent farmers market, and Snohomish Valley Farm Bureau.

The primary method of advertising for local farms in Grays Harbor County is through social media (Facebook), company websites, and the local farmer's markets. The WSU Extension also provides the "Farm Fresh Guide to Grays Harbor County," an online and print map with all 29 growers in the County that sell directly to the public. This guide is found at stores throughout the County, on the Chamber of Commerce website as well as the WSU Extension website.

At the state, regional and national levels, a variety of organizations help farmers advertise or promote their products, some of which bolster direct farm-to-consumer marketing. See Appendix II for more detail.

Urban Household Food Producers

Urban agriculture is loosely defined as the practice of cultivating, processing, and distributing food in or around a town or city. The three primary forms of urban agriculture that take place in the United States are home gardens, community supported agriculture (CSA), and community gardens. In the context of resiliency, most research frameworks hypothesize that vulnerable populations are more food secure when nutritious food is consistently available, accessible, and reasonably priced. The ideology is that locally grown food will substitute for purchased food, and ultimately provide a wider variety of nutritious foods to the community, especially poor households. An abundance of policy guidelines, frameworks, advocacy groups, and independent organizations promote urban agriculture, but scarce research demonstrating the effectiveness during a disaster or post-disaster recovery in the U.S. or similar countries.

Urban Homesteading / Personal Gardens

Ideally, every home would have some form of garden to provide produce year round, providing some form of food security, even if minimal, in terms of nutrition and calories. These gardens would be a more secure and reliable form of food during a disaster than relying on typical food distribution means. Very little information can be derived from the limited research on home gardens. A summary of the known regional or national data is:

- US - 43 million US homes had gardens in 2009 (National Gardening Association 2011)
- US – 80 million homeowners gardened in 2012 (Scarborough 2012)



- US – Median garden size is 96 sq. ft., with an average of 600 sq. ft. (National Gardening Association 2011)
- Regional – 86 percent of gardens in Washington grow tomatoes (National Gardening Association 2011)
- Regional – Seattle – 63 percent of homeowners gardened in 2012 (Scarborough 2012)

The primary demographic information, as provided by 2012 Scarborough survey, and supported by the 2011 National Gardening Association work are:

- Gardening Homeowners are 10 percent more likely than all homeowners to be Baby Boomers (ages 50 to 70)
- 33 percent have at least a college degree
- 47 percent of gardening homeowners hold full-time employment
- 26 percent have an annual household income of \$100K or more
- 22 percent of Gardening Homeowners are retired

With the sparse data above comprising the majority of available research, many of the critical unknowns remain, including; how many people have the ability and knowledge to garden, the number of existing gardens, percentage of edible food, grown, and whether the garden is maintained year round. Each of these variables could drastically change any estimate of how well gardeners could provide for themselves or others in a disaster. From the limited data that does exist, it is fairly clear that homeowners have the space, means, and interest to provide some of their own food supply, but face some barrier to participating. Without more information available including locations and production, home gardens should be largely disregarded in terms of caloric supply or source of nutrition during a disaster scenario.

Community Supported Agriculture

Community Supported Agriculture (CSA) is a program offered by some farmers where shares of their farm are available for a purchase during a summer or winter growing season. A typical CSA then provides the shareholder with regular boxes of fresh produce and other commodities throughout the growing season. Usually, the CSA boxes are picked up at the farm but other options including drop-off locations or direct delivery. The intent of the program is to increase community resiliency by reducing the financial burden and risk to the farmer since payment is made before the growing season; the system also provides fresh and local produce to the consumer. In short, the farmer and the local CSA shareholder share the inherent risk of farming. This arrangement allows the farmer to



focus on ensuring quality and less time marketing their product.

To collect regional data in Washington, both phone and email surveys were attempted at approximately twenty CSA participating farms in Skagit and Snohomish Counties to determine customer extent of sales coverage, demographic of customers, number of clients participating in food assistance programs, number of people that could be supported by the farm during a disaster and willingness to engage into a contract or sale of their produce to a relief organization of government agency during a disaster. Of these surveys only two farms were willing to participate or acknowledged the survey, and had similar answers to most questions.

Providing food to vulnerable populations is one of the key elements to building a resilient community that can withstand a long-term disaster scenario. Interestingly, not all CSA's qualify to participate in food assistance programs and subsequently cannot accept WIC payments. Since small and medium size farms are the most likely to provide local produce, an unfortunate situation occurs when they cannot accept payments from the population they are intended to help.

When asked about customer demographics, most farms were hesitant to provided details but the general consensus was upper middle class and upper class families with descriptions including "upwardly mobile, mostly families" and "upper middle class Caucasians."

Regarding whether a farm was willing to enter into an agreement or contract to sell their produce directly to a relief agency or government agency such as FEMA, both farms stated they would have to assess the situation, ensure their neighbors are taken care of, and then determine the best scenario to provide for their community. Neither was opposed to the idea, but were hesitant of entering into a contract, especially with the government, without first evaluating their options.

When asked about how many people could be sustained by their farms, of which both are approximately 40 acres, both farmers said it would vary drastically by the season, but should be able to support between 200 and 300 people. In particular, both had concerns regarding winter disaster scenarios and missing the August planting window, which is usually based on economical decisions, not production based on achieving the highest caloric yield.

CSA In Snohomish County

Case Study – Klesick Family Farm, a 37-acre homestead in Stanwood, WA provides a CSA box and produce delivery service to over 1,000 accounts in Skagit, Snohomish, and Island Counties. The delivery zone is separated into four regional areas and a delivery is made once per week. The farm raises a variety of crops including potatoes, spinach, carrots, lettuce, onions, beets, winter squash, green beans, cucumbers, cabbage, sugar snap peas, fresh herbs, and a few other vegetables and fruits. They also raise all natural grass-fed beef and grow hay.

The CSA box offered is more progressive than the typical one size fits all offerings in the regions by coming in multiple sizes and allowing a certain level of customization from the consumer via their webpage. Not all of the food are grown on their farm, but are sourced as locally as possible. To add variety, they also import certain commodities such as kiwis from New Zealand and avocados from Mexico.

A farm representative explained the limitations and flexibility of a 40 acre farm when provided with a disaster scenario that damaged transportation routes to Snohomish County:

If a disaster occurred during the summer, isolating all transportation into the County, how many people could be supported by your farm and for how long? A few hundred, but we could plant more and have more food in 45 – 60 days.

Same for a winter disaster? Depends when the disaster happens, a winter garden needs to be planted and planned in August for winter greens, potatoes and winter squash. [Our farm] could feed several hundred people for a few months.

Community Gardens

A specific type of urban agriculture gaining popularity in the recent decade is community gardens. There are many varieties but are generally either produce gardens, often referred to as victory gardens, or flower gardens. The general consensus amongst researchers is that community gardens provide fresh produce, well as building community and environmental ties through shared labor.

The Washington State Nutrition and Physical Activity Plan developed by the Washington Department of Health, lists developing community gardens as a way to improve nutrition in the community as a whole (2008). One of the plan's objectives is increasing access to healthy foods through increasing the availability of and access to local community gardens.

The Municipal Research and Service Center (MRSC) has compiled a list on their website of the locations of community garden by local governments or independent organizations including Anacortes, Bellevue Community Gardens and Farms, Bellingham, Bonney Lake, Bremerton, Clark County Community Gardens, Coupeville, Davenport, Duvall, Langley, Kittitas County Food Access Coalition, Mukilteo, Puyallup, Sammamish, Redmond, Tacoma, Thurston County Community Gardens, and Westport.

In Washington, a typical community garden consists of a plot of land where individuals rent space for an annual fee. The American Community Gardening Association surveyed community gardens across the United States in 2010 and found no standard community garden plot size. Individual plot sizes vary widely depending on many factors including location, land availability, demand, physical and time limitations of the gardeners, among others. As a general rule, Washington plots are 6' x 12' (72 square feet) and cost between \$25 and \$100 per year.

The production potential of community gardens vary according to region. According to the Master Gardener Coordinator in Oregon State University Extension, a 100 sq. ft. plot can produce between 25 and 100 lbs. of produce from April to September if a mix of tomatoes, bell peppers, lettuce, basil and zucchini are planted. Using a market value obtained by dividing the costs of these items between three grocery stores in Bellingham, WA, the retail value may be between \$80 and \$120.

Grays Harbor County Community Gardens

A survey of Grays Harbor County revealed only one community garden located in Westport at the tip of a peninsula right on the Pacific Ocean. Locating this garden was a challenge as three home and garden stores, the Cities of Aberdeen and Montesano, as well as a local farmer all stated that they did not think any existed in the county. This garden was identified through an Internet search after an employee of the Coastal Community Action Program mentioned there may be one in Westport. She also stated a few gardens had started over the years, but usually ended shortly after since most homeowners probably have their own gardens and that one person usually ends up doing most of the work.

The Westport Community Garden is administered by the City of Westport and costs \$10 for an approximately 16 sq. ft. plot in the garden. When queried the city representative said that at this time, fees were not reduced based on income or need. This garden appears typical for the average with approximately 20 small plots growing a variety of flowers, herbs, and vegetables. See Appendix XIV for visual description.

Snohomish County Community Gardens

As expected due to a higher population, Snohomish County has a larger number of community gardens -- 25 in total. The majorities of gardens are located in Everett, Lynnwood, and Snohomish, but are not representative proportionately to the population of these cities. Similar to Skagit County, gardens are a mix of the standard rent-a-plot, neighborhood, church, and organization run gardens.

The Mukilteo Community Garden is a non-profit run site run by volunteers with the goal of providing fresh produce to area food banks and to provide space and education for community members to successfully grow their own food. Since 2010, this garden has donated between 1100 and 1800 lbs. annually to local food banks, with the amount increasing each year. A weekday site visit in June showed little activity, but there were two senior citizens working on plots. See Appendix XVI for visual description.

Maps of the community garden locations and their relationship to populations at or below the 100% federal poverty line are below in Figure 15, Figure 16, and Figure 17.

Skagit County Community Gardens

An electronic and phone survey of Skagit County revealed there are approximately twelve community gardens located primarily in Anacortes towards the west side of the county and Mt. Vernon, centrally located along the I-5 corridor. The gardens are a mix of city-administered, neighborhood specific, open-access community areas, and organization-owned and administered locations. Some of these gardens have specific purposes, such as the Kid's Garden in Anacortes, which is used to educate children about gardening and supply underprivileged children with fresh produce. Others, such as various church gardens in Mt. Vernon primarily grow food for donation to local food banks. Other, more traditional gardens, such as the Anacortes Community Garden are city-administered and use the rent-a-plot model.

Some church gardens in Mt. Vernon primarily grow food for donation to local food banks.

The Anacortes Community Garden on 29th St is city-administered and used the common rent-a-plot model. A city employee stated that while no specific demographics are known, the garden is a combination of master gardeners, working families, children, and senior citizens. During a site visit on a Saturday in May at approximately 9:00am, five senior citizens, three middle-aged couples, and two women with children were observed at the



garden. The plot sizes are slightly larger, averaging 10 ft. x 24 ft. (240 sq. ft.) with crops being planted directly in the soil, not in elevated buckets or beds. See Appendix XV for visual description.



Figure 15. A single community garden in Grays Harbor County.

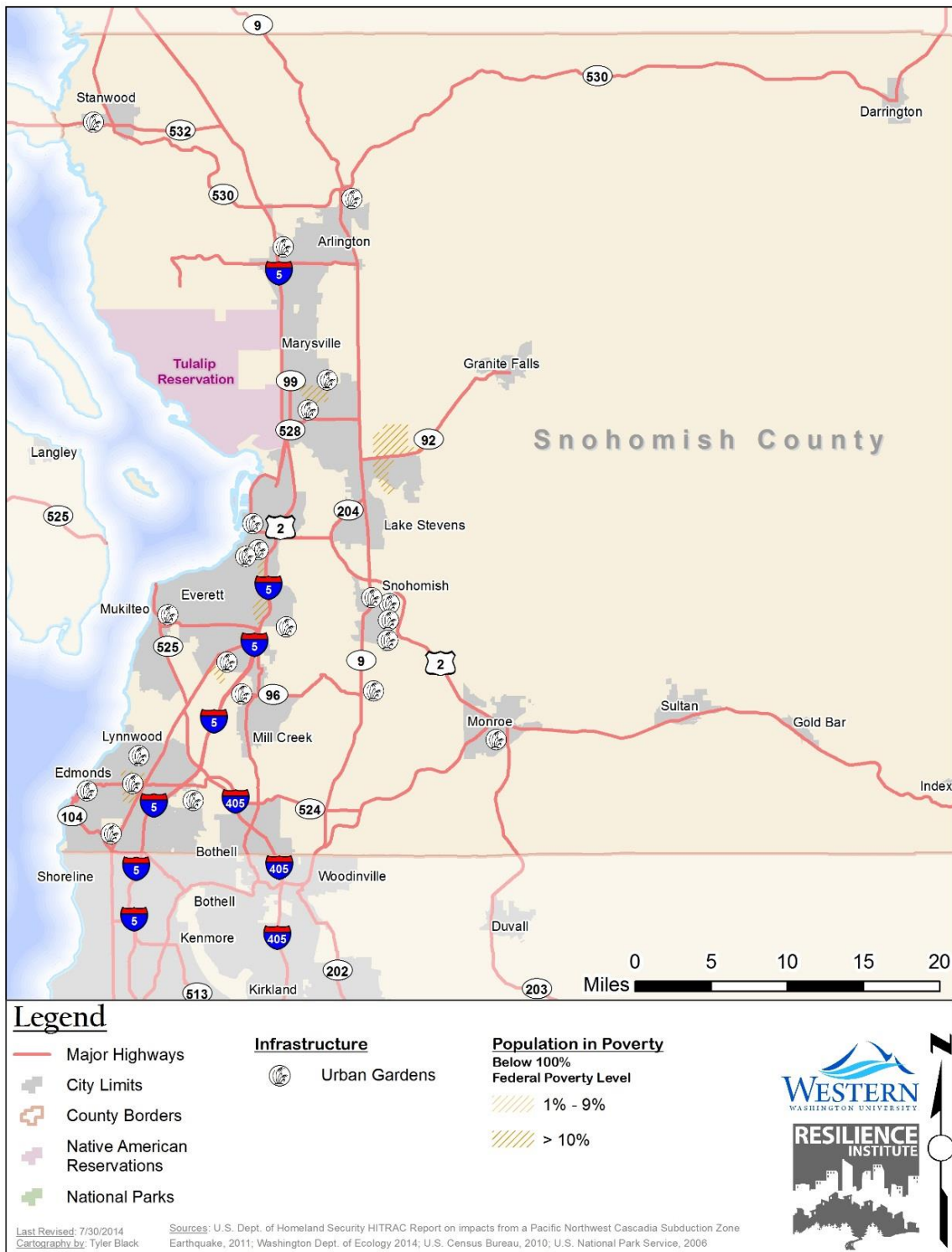


Figure 16. Community gardens in Snohomish County.



Figure 17. Community gardens in Skagit County.



PROSPECTS FOR WHOLE COMMUNITY APPROACH TO REGIONAL FOOD PRODUCTION IN CRISES

Multiple and diverse food sources and distribution channels are important for resilient regional food systems and their ability to support vulnerable populations in a regional disaster. Local, diverse agriculture and food production is part of this answer. Yet, in order for local foods to support vulnerable populations in a crisis, we must have a robust and regionally-appropriate food security strategy – a strategy that re-balances our increased dependence on imported and national foods and decreased reliance on local food sources and home-based food preparation. A regional food security strategy will be strengthened by diversification in agricultural fields. It will also be supported by greater public awareness and policy in support of healthier diets, based on better decisions about the types and quantity of food consumed.

Diet and Food Trends – Increasing Transportation Risk

The current trend of manufactured, ready to eat foods, and increasing food imports places a profound importance on the transportation infrastructure throughout Washington. With approximately 50% of all produce and increasing amounts of manufactured food arriving through the ports of Blaine, Seattle, and Tacoma, regional isolation could have severe effects on food supplies. Any scenario that degrades transportation networks would do more than reduce food on grocery store shelves. Degraded transportation would also cripple emergency food assistance programs that rely overwhelmingly on USDA-supplied and other manufactured food originating outside the region. The additional stress placed on already vulnerable populations could lead to life-threatening situations.

Of most concern is a winter disaster, which has greater potential to disrupt dietary social norms since imports increase with seasonal fruits and vegetables from equatorial and southern hemisphere countries. Since changing dietary norms would require a drastic education effort or rework of current food system, focus should be placed on expanding the capability of emergency food distribution. A proactive approach and emergency plan could be developed and integrated into current emergency response teams for Region X agencies to minimize a supply chain disruption. Steps may include:

1. Enter into agreement or develop emergency contact framework for farms, manufacturers, and warehouses capable of providing significant calories and flexible enough to redirect or change their operations.

2. Develop contacts or interagency agreements with appropriate agencies such as the US Food & Drug Administration and Washington State Department of Agriculture to facilitate contacting and negotiating contracts with existing firms.
3. Identify and develop grant programs with USDA for increasing support to small and medium sized farms, increasing both production and providing marketing services for their products.

These methods could help fortify the existing system, and provide a framework that could be easily integrated into an emergency response structure, as opposed to starting from the ground out during an incident.

Limitations of Federal and State Emergency Food Assistance

The overwhelming share of the operational and logistical funds used to feed vulnerable populations in Washington are funded through federal and state programs. Neither of these programs and their funding levels is solely capable of supporting the food distribution network. A disruption in either could severely limit the ability of food banks to distribute food. Moreover, the federal funds are reliant on the passage of the Federal Farm Bill and the appropriation of state funds, which has seen continual cuts in recent years despite the increased demand of food assistance.

Although a recent policy change in state funds has dictated that healthier, more nutritious food should be provided, it also costs more and may leave food banks short on food when client bases expand. This change has forced lead agencies and contractors to initiate new programs to solicit more fresh produce from local farms, but the reduction in operating funds leaves these groups without a reliable work staff.

Untapped Potential of Local Farms – Framework and Relationships

As of 2013, grains and apples constitute the majority of crops in Washington and are grown by large farms, with the vast majority being exported or shipped in interstate commerce. The companies and individuals that own these farms operate in highly complex business structures and their contact information is not readily available or easily obtainable if a crop purchase or negotiation was sought during an incident. Further, even if wheat and other field crops could be redirected, the majority of the public has become unaccustomed to producing edible and nutritious meals from base ingredients.

With the limited number of small and medium-sized farms surrounding urban areas, local farms will unlikely be able to solely support a long-term disaster due to diverse diet needs and nutrition requirements in communities. Since large farm products and imported

produce dominate the winter diets, there is little economic gain for farmers to focus on high production of these commodities, leaving the community vulnerable in rapid onset disasters. Vegetables require up to 2 months planning during the summer, which further complicates the situation along with a critical fall planting window for winter crops that cannot be missed, also reducing the immediate capabilities of these farms in the short term.

There is untapped potential, however, for local farms to contribute a significant amount of food security if the appropriate frameworks and infrastructure were implemented. Specifically:

- Profits – Collaborations with farmers are likely to succeed if reasonable prices are negotiated and contracted. Uncertainty is the largest concern for a farmer, and contract help reduce this unknown since the crops already have a buyer.
- Cost-Benefit – Donations and food bank cooperation needs to require less work from the farm, which already operates on slim margins and are generally understaffed. Ideas for some of the commonly identified problems include organizations and food banks picking up directly from the farm instead of requiring delivery. Federal and state tax breaks also should be easier to claim and worthwhile, and gleaning operations should require less training and effort by the farmer. This topic requires a multi-disciplinary and dynamic approach that requires building an infrastructure of individuals trained in areas from food safety to tax codes.

Under the current model of emergency food assistance, independent non-profits are critical in developing a new framework since they are more flexible to make arrangements with growers, who may be hesitant to work with government agencies. These independent non-profits generally have fewer policies restricting cooperation, and less bureaucracy such that they can achieve more timely results.

Prospects for Community Gardens in Regional Disaster

After surveying and observing community gardens throughout the study counties, four factors stand out as potentially affecting the use of community gardens as a method to serve underprivileged populations during a disaster:

- Public awareness – Surveyed individuals from each county appeared unaware of community gardens and their availability. This included individuals with gardens in their neighborhoods, city employees in areas with city administered gardens, and private businesses selling garden supplies.



- Production and use – During the winter months, the gardens appear largely unused with few plots per site producing winter vegetables. During the summer months, approximately 1/3 of the plots are producing flowers and other non-edible plants.
- Demographics – Using public photo galleries from six websites, combined with a site visit to five gardens in Skagit and Whatcom Counties, the general demographic of these gardens appears to be white, retired woman and mid-thirties white couples.
- Security – During an incident, food in these gardens would not be well secured if looting or desperation for food became an issue. There are generally 5 ft. fences and a gate with a number type padlock securing them. The long term production and intended use of the produce may be unexpectedly affected by unforeseen foraging.

These anecdotal examples support the USDA's hesitancy to conclude that community gardens are a robust component of local food systems and effectively improving access to healthy foods in underserved communities (USDA Local Food Systems, 2010). The Small Gardens Report also cites a lack of research and gaps in data when showing whether improved access translates into improved health and diet-related outcomes. Currently, community gardens appear to be in their infancy, and not capable of supporting any significant population for more than a few days during a regional disaster.

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APPENDIX I: CONTACT INFORMATION FARM OFFICES AND FARMERS MARKETS

The Farm Service Agency (FSA) of the United States Department of Agriculture (USDA) administers farm commodity, crop insurance, credit, environmental, conservation, and emergency assistance programs for farmers and ranchers. Almost all farms in the United States are on file in some capacity with the FSA due to subsidies and insurance payments. Most information covering farm locations, names, crop yields, and contact information collected by FSA requires a Freedom of Information Act (FOIA) request to obtain.

Washington State University Extension offices are located in most counties and serve to engage people, organizations and communities to advance knowledge, economic wellbeing and quality of life by fostering inquiry, learning, and the application of research. Each county has an office that collects information from willing farm participants to display their crop variety and location on the extension's website.

The Washington State Farmers Market Association (WSFMA) is a non-profit organization membership organization dedicated to supporting vibrant and sustainable farmers markets in Washington State through member services, education and advocacy. Primary services include education, information sharing, and discussion topics regarding farmers markets, farming, as well as food access, food security, and food system policy at the local, state, and federal levels. Most farmers' markets in Washington State are members of the association. The Association can provide current contact information for member farmers' markets.

Washington State Farmers Market Association

Pike Street, Suite 316

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206.706.5198

info@wfarmersmarkets.com

Karen Kinney, Executive Director, execdiretor@wafarmersmarkets.com

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Daniel Teuteberg, Interim County Director, 360.482.2934, dan.teuteberg@wsu.edu

<http://ext100.wsu.edu/graysharbor/>

<http://cahnrsdb.wsu.edu/newdirectory/departments.aspx?locationID=61>

Grays Harbor Public Market / Grays Harbor Farmers Market

1956 Riverside Ave

Hoquiam, WA 98550

Barbara Parsons, Market Manager, 360.538.9747

info@ghpublicmarket.com

www.ghpublicmarket.com

Aberdeen Farmers Market

Broadway between Market and Wishkah

Hoquiam, WA 98550

Guy Koehler, 360.987.0088

Ocean Shore Farmers Market

Far West End of the Skateboard Park

Ocean Shores, WA 98569

Linda Swalley, Marketing Director

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Anacortes Farmers Market

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Anacortes, Washington 98221

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Bow Little Market

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Mount Vernon Farmers Market

Across from Library and at the Hopital

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<http://cahnrsdb.wsu.edu/newdirectory/departments.aspx?locationID=78>

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Bothell, WA 98021

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info@countryvillagebothell.com

Edmonds Farmers Market

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Edmonds, WA 98020

Margaret Wilcox, 425-776-7201

http://www.historicedmonds.org/Summer_Market.html



The Everett Farmers Market

1600 West Marine Drive

Everett, WA 98201

Karen Erickson or Gary Purves, 425.422-5656

<http://everettfarmersmarket.net>

everettfarmersmarket@gmail.com

Lynwood Farmers Market

Wilcox Park, 5215 196th St SW

Lynnwood, WA 98036

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Michelle Harrington, Coordinator, 425.670.5532, mharrington@ci.lynnwood.wa.us

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Mukilteo Farmers Market

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Snohomish, WA

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APPENDIX II: STATE, REGIONAL AND NATIONAL FARM MARKETING

At the state, regional and national levels a variety of organizations help farmers advertise or promote their products, some of which bolter direct farm-to-consumer marketing:

- Gorge Grown Food Network serves counties in southern Washington and Oregon along the Columbia River gorge. www.gorgegrown.com/gorge-markets.cfm.
- Know Your Farmer, Know Your Food (KYF2) is a USDA-wide effort to strengthen local and regional food systems. Their resources and tools include a Food Compass map where you locate resources in your community. <http://www.usda.gov/wps/portal/usda/usdahome?navid=KNOWYOURFARMER>
- Pacific Northwest Vegetable Association represents vegetable growers from Idaho, Oregon, and Washington, including specialty crop farmers and large corporate farms. Their member directory provides a searchable database by crop and state. www.pnva.org.
- Puget Sound Fresh Guide is available online and in print. Managed by Cascade Harvest Coalition, the guide includes a list of farmers and marketing outlets around the Puget Sound. www.pugetsoundfresh.org,
- Puget Sound Fresh provides consumers with resources and tools to help them identify and make informed choices on how to find and purchase seasonal and locally grown, raised or harvested foods. They have directory of farms and farmers markets for the following counties in northwest Washington: Clallam, Island, Jefferson, King, Kitsap, Mason, Pierce, San Juan, Snohomish, and Whatcom. www.pugetsoundfresh.org.
- Tilth Producers of Washington promotes ecologically sound, economically viable, and socially equitable farming practices. Their Member Directory includes Washington's organic and sustainable growers, food and farm suppliers, and resources that are searchable by county. www.tilthproducers.org.
- USDA National Farmers Market Directory is maintained by AMS Marketing Services and is designed to provide members of the public with convenient access to information about U.S. farmers market locations, directions, operating times, product offerings, and accepted forms of payment. Market information included in the directory is voluntary and self-reported to AMS by market managers, representatives from state farmers market agencies and associations, and other key market personnel. <http://search.ams.usda.gov/farmersmarkets/>
- Washington State Department of Agriculture provides resources, technical assistance, and information on the state's farming sector. www.agr.wa.gov
- Washington State Farmers Market Association (WSFMA) supports and promotes



vibrant and sustainable farmers markets in Washington State. Their online directory provides locations and contact info for the 125 farmers market members throughout the state. www.wafarmersmarkets.com.

- Washington State has at least 20 commissions representing commodities throughout the state. The commissions have various programming in research, crop promotion and marketing, and consumer education. A list of Washington State commissions can be found at <http://access.wa.gov/agency>.
- WSU Small Farm Team provides research-based information and educational programs for farmers, consumers, decision-makers, and others involved in local food systems. Their website includes a farm finder directory for counties in Eastern and Southwest Washington. With over 40 county extensions and partners, they will be able to offer guidance on where to find farmers in your region. www.smallfarms.wsu.edu.

APPENDIX III: CROP AVAILABILITY SOUTHWEST WASHINGTON

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Apples								X	X	X	X	
Blackberries							X	X				
Blueberries							X	X	X			
Boysenberries							X	X				
Cherries, Sweet						X	X					
Currants, Black						X	X	X				
Currants, Red						X	X	X				
Filberts										X	X	X
Gooseberries							X	X				
Kiwi									X			
Loganberries							X	X				
Marionberries							X					
Melons								X	X	X		
Nuts									X	X		
Pears								X	X	X		
Pears, Asian									X			
Plums								X	X	X		
Prunes									X	X		
Quince										X		
Raspberries						X	X	X				
Raspberries, Fall								X	X	X		
Rhubarb				X	X	X						
Strawberries						X	X					
Strawb, Everbearing						X	X	X	X			
Tayberries							X					
Walnuts										X	X	X
Artichokes					X	X			X	X		
Bamboo Shoots				X	X	X						
Beans, Green							X	X	X			
Beans, Dry							X	X	X			
Beans, Shell								X	X	X		
Beans, Wax							X	X	X			
Beets	X					X	X	X	X	X	X	X
Broccoli						X	X	X	X			
Brussels Sprouts	X								X	X	X	X
Cabbage	X	X				X	X	X	X	X	X	X
Carrots	X					X	X	X	X	X	X	X



Cauliflower							X	X	X			
Celery								X	X	X	X	
Chinese Vegetables	X	X	X	X	X	X	X	X	X	X	X	X
Corn, Sweet								X	X	X		
Cucumbers, Pickling							X	X	X	X		
Cucumbers, Slicing							X	X	X	X		
Daikon						X	X	X	X	X	X	
Eggplant								X	X	X		
Garlic								X	X	X	X	X
Garlic, Elephant								X	X	X	X	X
Greens	X	X	X	X	X	X	X	X	X	X	X	X
Kohlrabi								X	X			
Leeks	X	X	X	X	X				X	X	X	X
Lettuce					X	X	X	X	X	X	X	
Onions						X	X	X	X	X		
Parsnips	X	X							X	X	X	X
Peas, Chinese						X	X					
Peas, Shell						X	X					
Peas, Sugar Snap						X	X					
Peppers, Hot								X	X	X		
Peppers, Sweet								X	X	X		
Potatoes	X	X	X	X	X	X	X	X	X	X	X	X
Pumpkins										X	X	
Radishes					X	X	X	X	X	X	X	
Shallots									X	X	X	X
Spinach	X	X	X	X	X	X	X	X	X	X	X	X
Squash, Summer						X	X	X	X	X		
Squash, Winter	X	X							X	X	X	X
Tea Leaves					X	X						
Tomatoes	X	X	X	X	X	X	X	X	X	X	X	X
Turnips	X					X	X	X	X	X	X	X
Zucchini						X	X	X	X	X		

APPENDIX IV: CROP AVAILABILITY PUGET SOUND WASHINGTON

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Apples								X	X	X	X	
Blackberries								X	X			
Blueberries							X	X	X			
Boysenberries							X	X				
Cherries, Pie							X	X				
Cherries, Sweet						X	X					
Currants, Black						X	X	X				
Currants, Red						X	X	X				
Gooseberries							X	X				
Loganberries							X	X				
Marionberries							X	X				
Melons								X	X	X		
Nuts									X	X		
Quince										X		
Raspberries						X	X	X				
Raspberries, Fall								X	X	X		
Rhubarb				X	X	X						
Strawberries						X	X					
Strawb, Everbearing						X	X	X	X			
Artichokes					X	X			X	X		
Beans, Green							X	X	X			
Beans, Dry									X	X		
Beans, Shell									X	X		
Beans, Wax							X	X	X			
Beets	X					X	X	X	X	X	X	X
Broccoli						X	X	X	X			
Brussels Sprouts	X								X	X	X	X
Cabbage	X	X				X	X	X	X	X	X	X
Carrots	X					X	X	X	X	X	X	X
Cauliflower							X	X	X			
Celery								X	X	X	X	
Chinese Vegetables					X	X	X	X	X	X		
Corn, Sweet								X	X	X		
Cucumbers, Pickling							X	X	X	X		
Cucumbers, Slicing							X	X	X	X		
Daikon						X	X	X	X	X	X	
Eggplant								X	X	X		



Garlic								X	X	X	X	X
Garlic, Elephant								X	X	X	X	X
Greens	X	X			X	X	X	X	X	X	X	X
Leeks	X	X	X						X	X	X	X
Lettuce					X	X	X	X	X	X	X	
Onions							X	X	X	X		
Parsnips	X	X							X	X	X	X
Peas, Chinese							X	X				
Peas, Shell							X	X				
Peas, Sugar Snap							X	X				
Peppers, Hot								X	X	X		
Peppers, Sweet								X	X	X		
Potatoes	X	X	X	X	X	X	X	X	X	X	X	X
Pumpkins										X	X	
Radishes					X	X	X	X	X	X	X	
Shallots									X	X	X	X
Spinach					X	X	X	X	X	X	X	X
Squash, Summer							X	X	X	X		
Squash, Winter	X	X							X	X	X	X
Tomatoes							X	X	X	X		
Turnips	X						X	X	X	X	X	X
Zucchini							X	X	X	X		

APPENDIX V: CROP AVAILABILITY EASTERN WASHINGTON

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Apples								X	X	X	X	
Apricots							X	X				
Blackberries								X	X			
Blueberries							X	X	X			
Boysenberries							X	X				
Cherries, Pie							X	X				
Cherries, Sweet						X	X					
Currants, Black						X	X	X				
Currants, Red						X	X	X				
Grapes							X	X	X	X		
Loganberries							X	X				
Marionberries							X	X				
Melons								X	X	X		
Nectarines								X	X			
Nuts									X	X		
Peaches							X	X				
Pears								X	X			
Raspberries						X	X	X				
Raspberries, Fall								X	X	X		
Rhubarb				X	X	X						
Strawberries						X	X					
Strawb, Everbearing						X	X	X	X			
Tayberries						X	X					
Artichokes					X	X			X	X		
Asparagus				X	X	X	X					
Beans, Green							X	X	X			
Beans, Dry									X	X		
Beans, Shell									X	X		
Beans, Wax							X	X	X			
Beets	X					X	X	X	X	X	X	X
Broccoli						X	X	X	X			
Brussels Sprouts	X								X	X	X	X
Cabbage	X	X				X	X	X	X	X	X	X
Carrots	X					X	X	X	X	X	X	X
Cauliflower							X	X	X			
Celery								X	X	X	X	
Chinese Vegetables					X	X	X	X	X	X		



Corn, Sweet								X	X	X		
Cucumbers, Pickling							X	X	X	X		
Cucumbers, Slicing							X	X	X	X		
Eggplant								X	X	X		
Garlic								X	X	X	X	X
Garlic, Elephant								X	X	X	X	X
Greens	X	X			X	X	X	X	X	X	X	X
Leeks	X	X	X						X	X	X	X
Lettuce					X	X	X	X	X	X	X	
Onions						X	X	X	X	X		
Parsnips	X	X							X	X	X	X
Peas, Chinese						X	X					
Peas, Shell						X	X					
Peas, Sugar Snap						X	X					
Peppers, Hot								X	X	X		
Peppers, Sweet								X	X	X		
Potatoes	X	X	X	X	X	X	X	X	X	X	X	X
Pumpkins										X	X	
Radishes					X	X	X	X	X	X	X	
Shallots									X	X	X	X
Spinach					X	X	X	X	X	X	X	X
Squash, Summer						X	X	X	X	X		
Squash, Winter	X	X							X	X	X	X
Tomatoes							X	X	X	X		
Turnips	X					X	X	X	X	X	X	X
Zucchini						X	X	X	X	X		

APPENDIX VI. COMMUNITY GARDEN PHOTOS



Westport Community Garden, Grays Harbor County

Pictures sourced from www.facebook.com/Westport-Community-Garden

Top - Empty boxes (plots) available to rent for \$10. Mix of smaller 3ft. x 3ft. and larger 4ft. x4ft. totes available at same cost. Typical Community Garden in size surrounded with 5 ft. fence for security.

Right – Any noninvasive plant can be grown.

Left – Smaller totes with vegetable plants and herbs.

Anacortes Community Garden – Anacortes, WA – Skagit County

Pictures sourced from anacortescommunitygardens.org



Left – Combination of ground level and raised plots. Plot size is 10ft. x 24.ft. with two dedicate food bank plots, ADA accessible plots, and a children’s garden.

Right – Community shed to store tools, equipment, and notes. Typical community garden with 3½ ft. high fence for security and to keep out nuisance animals.



Below – Ground level mixed garden of flowers and vegetables.



Mukilteo Community Garden – Mukilteo, WA – Snohomish County

Pictures sourced from www.mukilteogarden.org



Typical elevated box plots with various herbs and vegetables. Minimal fencing primarily to keep dogs out of garden.



Vertical gardening (squash on lattice) along with traditional ground plants to maximize production in limited space.