Defining the Agricultural Landscape of the Western Lake Superior Region:

Realities and potentials for a healthy local food system for healthy people

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Dept. of Food Science and Nutrition
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Specific aims of research and modifications

The goal of this research was to describe the agricultural landscape of a fourteen (amended to fifteen) county area in Northeast Minnesota and Northwest Wisconsin, including its capacity to provide food for the regional population. We proposed to compile and distribute results at a wide range of public events and media. There were four components to the research: geographic information system (GIS) analysis was used to describe the land-use of the region and its capacity for regional crops; in-depth ethnographic interviews with farmers documented their current practices and informed of challenges and potential for expanded production; the creation of a "regional pattern" diet and the capacity to produce it in comparison to the Standard American Diet (SAD), and finally, an economic analysis to describe the impact a local food system can have on the sustainability of the Western Lake Superior Region. These four components were completed; some minor modifications are discussed in methods and results below.

Study accomplishments and results

Geographic Information Systems Analysis

A fifteen county region was identified based on physical aspects of the region but the social and cultural nature and functions within this region. Iron County was added to our original fourteen county proposal after a suggestion from an agricultural extension agent with a good understanding of how that county's farmers identified their growing region. A 479,856 (2008 census) human population lives within this 18.6 million acre region. The economic value of the food consumed within this region totals over 1.26 billion dollars (2006 food dollars estimates) while the food production on-the- farm dollars total over 193 million dollars. The USDA 2007 census reveals that this farm value was produced from 5,602 farms averaging crop sales of $31,903 per farm with the average farm size equaling 216.5 acres. These are the data which we based our research on as we developed our methodology and work plan.

We identified and geocoded over 300 producers of consumable food in the region. Directories other than

publicly available sources (direct sale, organic grower directories) were difficult to obtain. An agricultural extension agent in Ashland provided data for a four county area in Wisconsin, farm location data for other counties was sparse in comparison.

To determine our agricultural land potential, we conducted a geographic information systems overlay process using variables representing suitable land available for food production. We eliminated land covered by lakes, rivers, or wetlands (35% of our region). We then eliminated all the land with a fifteen percent slope or steeper and developed land, removing another 9% area. Fourty-five percent of the land was left in MN (6,093,900 acres) and seventy percent of the area remained in WI (about 3,459,200 acres). We then used county digital soil surveys (SSURGO) with a crop productivity index to further restrict the land to soils with a better than average productivity (by county). Finally, areas were eliminated that were defined as "forest" (any type) by the GAP land use data. In Minnesota a total of 1.232 million acres remained meeting all "suitable" criteria, and in Wisconsin, the total "suitable" was 460 thousand acres. This amounts to about 9% of the total area in the fifteen counties. Table 1 lists the acres meeting all "suitable" criteria by county. Figure 1 illustrates the total of 1.692 acres, a conservative estimate of the amount of land that is available for future agricultural pursuits in building a regional food system.

The GIS data sources were narrowed somewhat from the proposed methods. Aerial photos were not used to identify agricultural areas, as this method proved unreliable. As the purpose of this geographic study was to estimate agricultural capacity, potential farm-ability in categories of "high, medium, and low" was not attempted. We discovered that labeling agricultural areas in this region would be inappropriate, given the complexity of crop needs and marginal conditions that farmers have already been farming in this region for decades. See Appendix A for GIS data sources.

Figure 1. Acres meeting "suitable" criteria are shown in brown.

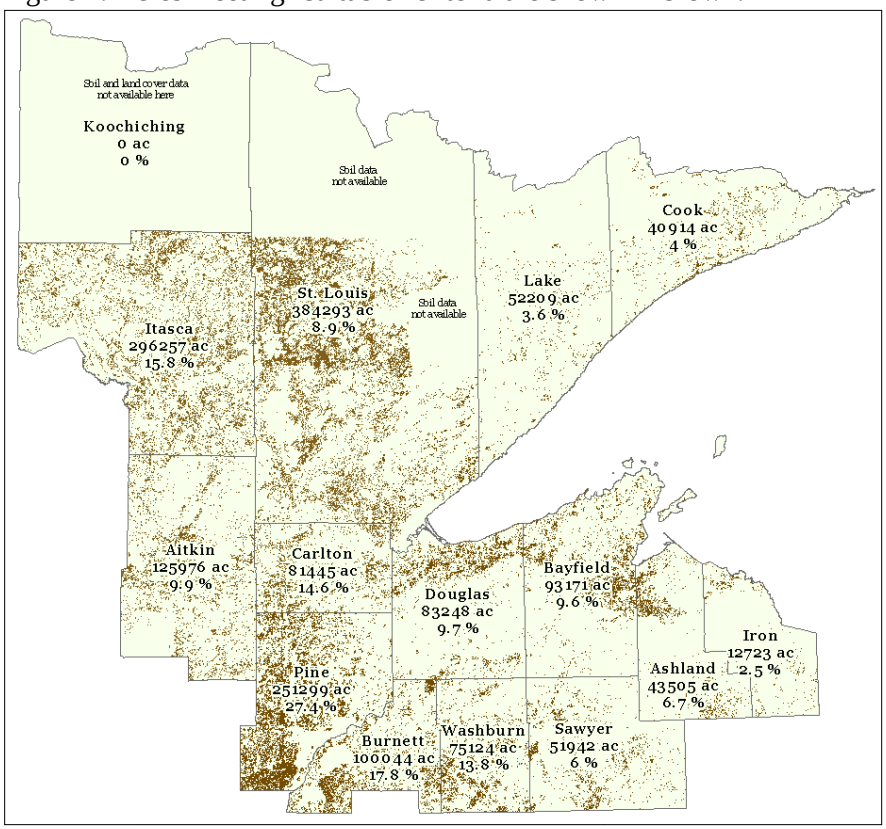


Table 1. Acres meeting "suitable" criteria by county.

county name		acres meeting criteria
Aitkin	MN	125976
Carlton	MN	81445
Cook	MN	40914
Itasca	MN	296257
Koochiching	MN	0
Lake	MN	52209
Pine	MN	251299
St. Louis	MN	384293
Ashland	WI	43505
Bayfield	WI	93171
Burnett	WI	100044
Douglas	WI	83248
Iron	WI	12723
Sawyer	WI	51942
Washburn	WI	75124
TOTAL		1692150

Qualitative Analysis: Ethnographic Interviews

In-depth ethnographic interviews with farmers will document their current practices and inform of challenges and potential for expanded production. We successfully interview 28 food producers in our region, representing a broad set of criteria for producers (see Table 2). Additional interviews (to reach our original goal of 40) were difficult to schedule, as we conducted this research during the peak of the production season, and a number of food producers who initially consented to interviews were unable to schedule time for us to meet with them. The extensive set of interview questions we developed (See Appendix B) and used were effective for soliciting grower knowledge of past and present practices related to food production, as well as insights to future possibilities and problems for expanding the regional food system.

We interviewed 26 farmers, 13 conventional farmers and 13 organic or certified organic producers of meat, dairy, fruit, grain, CSA vegetable, vegetable greenhouse production and wild harvests. The interviews revealed a wide range of perspectives and some common threads. All interviews were conducted with voice recorders and transcribed. Some threads of stories should revolve around historical, current production and lessons learned to shed light on future production and marketing ideas or models. Farmers were provided a $50 honorarium for their 2-3 hour time commitment.

Figure 2. Distribution of farmers located by geocoding addresses.
Starred farms were interviewed.

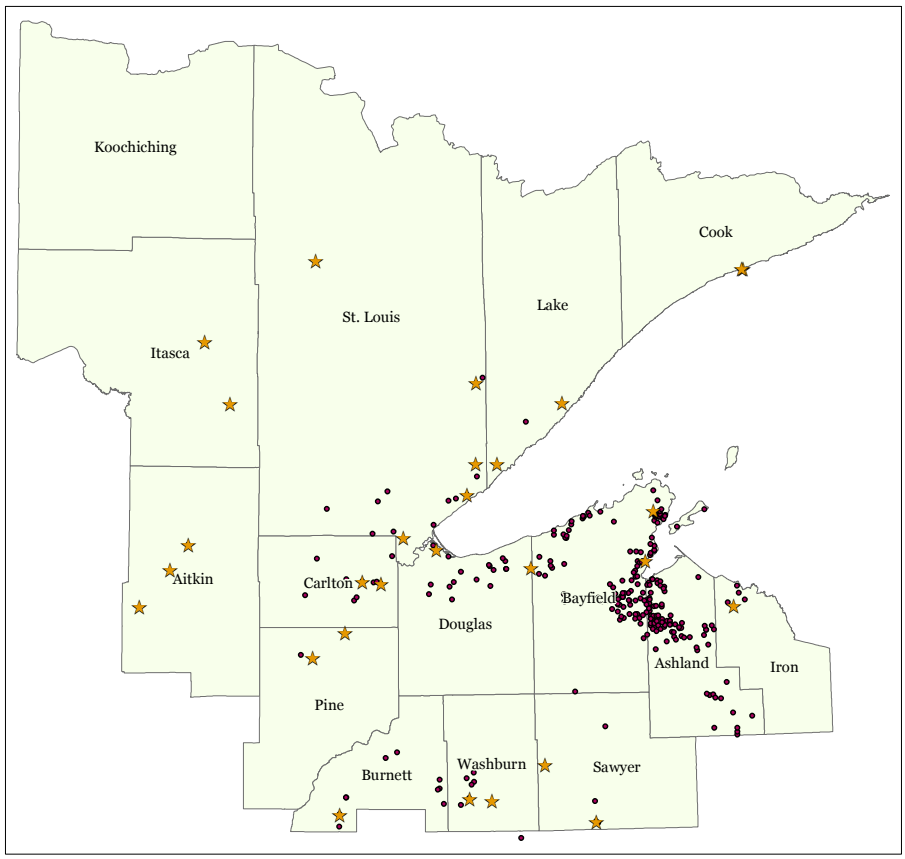


Table 2. Interviews by category

Product	Conventional	Organic	Organic Certified	Total
CSA		1	1	2
Dairy	1			1
Fruit	2	2	1	5
Grains	3	2		5
Meat	4			4
Vegetables	1		2	3
Wild		3		3
GH produce	2		1	3
	13	**8**	**5**	**26**

The qualitative data collected during this study reveals a local food production landscape that is active, healthy, operated by dedicated and knowledgeable growers, but which is limited by several constraining conditions. Strengths of the existing food production landscape in our region include:

1. Dedicated producers who have years of commitment and knowledge of their soils, customers and climate;

2. Independent and experimental producers who learn effectively both from trial and error and by using available educational resources (i.e. agricultural extension; publications; nonprofit agricultural groups, such as Sustainable Farming Association; fellow farmers, etc.);
3. Diverse lands, soils, and microclimates that lend themselves to a variety of crops, production scales and approaches;

Constraining conditions on the local/regional food system include:

1. Cool, short growing season and challenging soils;
2. Meager economic benefits of producing food under current commodity-market driven system;
3. Limited labor resources for intensive production (related to #2)
4. Minimal presence of infrastructure for processing and distributing foods;
5. Limited access to mass consumer markets (related to 4);
6. A population of producers without clear plans or fiscal means for their own retirement and/or succession for their operations.

Nutrition Research: Western Lake Superior Healthy Diet ("regional pattern") diet

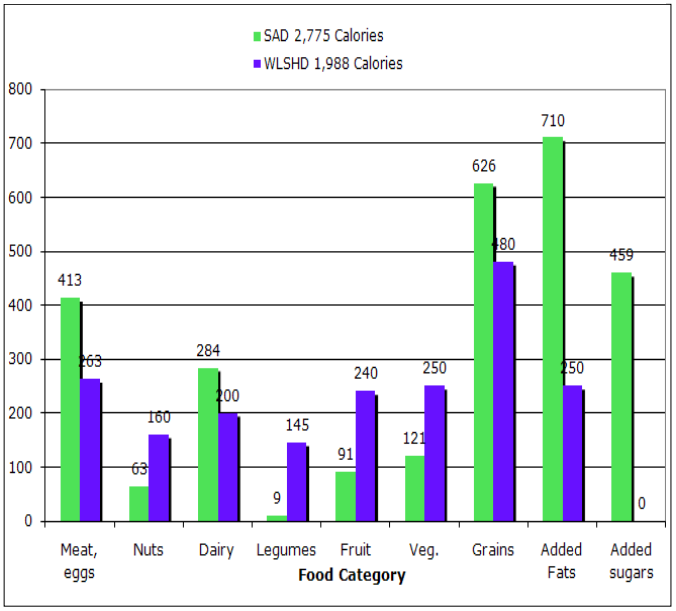
A group of individuals were identified and asked to participate in the development of a "Western Lake Superior Healthy Diet" (WLSHD) that would address growing, health and cultural issues. The group of doctors, nutritionist and dietitians along with expertise with Native American medical issues including diabetes and heart disease was formalized. The group was given the task to answer some broad questions that will likely lead to subsequent nutritional research on Western Lake Superior regional foods:

1. Quantify this region's food consumption based on the average Standard American Diet (SAD) pattern?
2. What would be an optimal diet pattern for WLSR that focuses as much as possible on local, seasonally available foods?
3. How would a regional diet particularly benefit people of the region in addressing health problems (e.g. diabetes) that particularly trouble indigenous populations?"

The individuals that dedicated their time and expertise to this process included: Peggy Heistad-Harri (Registered Dietition, MEd, LD, CDE), Gayle Nikolai (Nutritionist/Fond du Lac band member), Emily Onello (Physician), Nancy Sudak (Physician), and Sarah Nelson (Physician). The group was facilitated by co-PI David Abazs. Community volunteers were offered $250 for their approximate 20 hour time commitment.

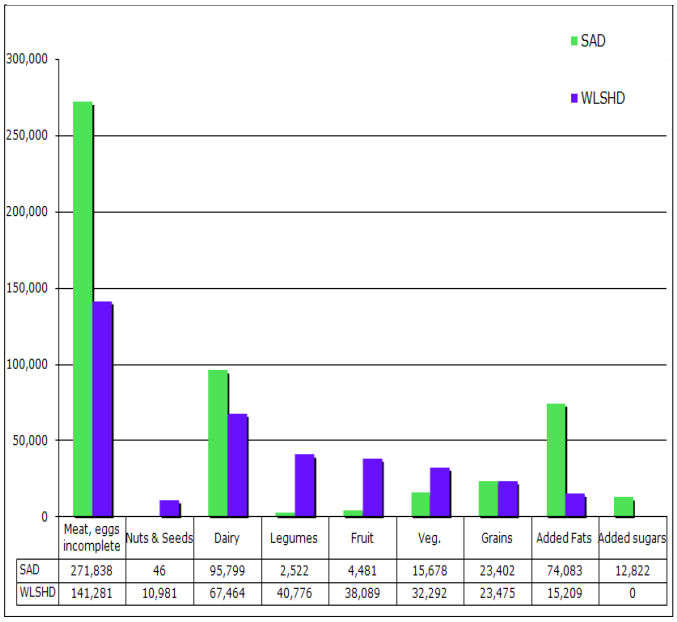
All task force members agreed that the most significant aspect of the WLS Healthy Diet is the total reduction of calories as compared to the Standard American Diet (SAD). This fact alone would provide many benefits for health. The other aspect of the new diet is that it contains no additional (added) calories of sugar. This recommendation as well, will help reduce suffering from health issues throughout our region. The group developed a healthy diet that can be 100% grown in our limited growing region (See Appendix C). This diet provides the basis of a statistical comparison of building a local food system using the Standard American Diet (SAD) and the new regional diet. A graph summarizing elements of this diet in comparison to the Standard American Diet is shown in Figure 3.

Figure 3. WLSHD vs. SAD diet comparison



Finally, Abazs developed methods to evaluate the amount of land that would be needed to meet the local portion of the Standard American Diet (SAD) and the new regional (WLSHD) diet. The final results show that a total of 500,671 regional acres, or 1.04 acres per person to provide the local portion (84 percent) of the Standard American Diet (SAD) are needed to grow the food for our current population. For the Western Lake Superior Healthy Diet, 369,567 regional acres, or 0.77 acres per person would be needed. The detailed results of acres needed based on consumption are found in Appendix D (References, Appendix E).

Figure 4. Acres needed for WLSHD vs. SAD diet



	Meat, eggs incomplete	Nuts & Seeds	Dairy	Legumes	Fruit	Veg.	Grains	Added Fats	Added sugars
SAD	271,838	46	95,799	2,522	4,481	15,678	23,402	74,083	12,822
WLSHD	141,281	10,981	67,464	40,776	38,089	32,292	23,475	15,209	0

Economic Analysis

The Bureau for Business and Economic Research and Dr. Mike Mageau were consulted to analyze the potential economic impact increased local food production could have on the regional economy. We attempted to analyze the economic impact of building a local food system by using the Bureau for Business and Economic Research IMPLAN model, a business tool that calculate direct, indirect, and induced impacts of increased local food production at the county level.

Unfortunately, the baseline farming numbers generated through the model could not be reconciled with other sources and local knowledge. For example, Lake County's agricultural baseline in IMPLAN amounted to $2,596,392 for the farming sectors needed in the food production analysis, including $1,777,686 of poultry and egg production. There are no significant poultry and egg production facilities in Lake County other than a few homesteads and farms that offer a few dozen eggs each week. This and other unsubstantiated numbers caused us to abandon the model. We have learned that the model has been customized successfully by the Leopold Center for Sustainable Agriculture at Iowa State University, so it may be possible to calibrate the model for this region in the future with their guidance.

Building a local food system would indeed have a significant economic impact for our region. Abazs developed economic scenarios using alternative, manual methods to determine that a 100% local diet would add thousands of additional jobs and additional revenues of over $952,559,068 per year. The non-farm portion of the food dollar and the health care impacts of embracing a 100% local food system is over 1 billion dollars per year for the Western Lake Superior Region. (See Economic calculations, Appendix F)

Significance of Findings Related to Qualitative Component & Brief Discussion

The qualitative data gathered is significant primarily for the ways that they point to a local food production system that is fragmentary and largely dependent on the efforts of people who have a commitment to food production that outweighs actual economic sustainability. Food producers in our region work long hours for economic returns usually not sufficient to support their households. Such

conditions do not result in an economic sector that draws new producers willing to expand the overall productivity of the regional food system.

Growers/producers who have been in business for more than a few years have carefully honed their production to focus on products that they know do well under their conditions, and for which they know they have a viable market. While certain crops (i.e. potatoes) have been historically grown at larger scales in parts of our region, current producers largely focus on higher value crops (i.e. greenhouse tomatoes, raspberries, smoked fish) that can be directly sold to consumers in order to maximize the return on their labor. Most of the producers interviewed report that they are at or near maximum productive capacity for their circumstances, and few report intentions to appreciably expand their operations. In fact, many regional food sectors have seen significant decline in the numbers of producers (i.e. the number of commercial fisherman on western Lake Superior has fallen from a reported early/mid-20th century peak of several hundred to less than 20, with only a few making close to a full-time living from fishing).

For the regional food system to grow, food production will need to become more economically viable (through consumer willingness to pay premiums for "local" food; through value added processing opportunities for producers; through enhanced labor resources, etc.) to motivate current and/or new producers to expand.

Despite these recognized challenges, this grant provided our region with enough information to begin to focus on the "right" questions. We now know that our region can produce enough food for the people that live in this region today and on into the future. We also have given birth to a new regional diet that can provide a local healthy diet choice as we move to more fully develop a regional food system. The vision for a new diet and having the beginning data needed to move forward, are the building blocks our region has needed to take the important steps forward in the right direction.

Unspent funds

Unspent funds will be used to create a 4 page report summarizing findings geared towards the general public. This report will be available at the Harvest Festival September 11 in Duluth, and will be mailed or emailed to all supporters and farmers that participated in the project. The GISL will continue to collect and update regional farmer addresses to build a more complete regional map. Student employees will be used to conduct these efforts this fall. The remaining ~$5,500 funds will be spent by December 31, 2010.

Training as a Result of this Project

Name / role	*Participation*	*Current Contact Information*
Jon Meiners Geography major	Undergraduate student GIS support	Position unknown Owatonna, MN
Brandon Keinath Biology major	Undergraduate student GIS support	Superior Water, Light & Power (GIS) Superior, WI
Deb Richards Geography major	Undergraduate student GIS support, graphics support	Geographic Information Sciences Lab, UMD Duluth, MN
Andrea Duca Environmental Ed major	Undergraduate student GIS support, graphics support	Geographic Information Sciences Lab, UMD Duluth, MN
Kelsey Gronberg Anthropology major	Undergraduate student Conducted, recorded and transcribed interviews	Position unknown St Paul, MN
Samantha Follis Geography major	Undergraduate student Conducted, recorded and transcribed interviews	Public Programs Specialist Fort Myers, FL

List full citations for all publications resulting from this project

N/A at this time.

List all events organized or presentations given that relate to this grant

Sept 12, 2009 – Lake Superior Harvest Fest and Energy Fair, Duluth
Poster and Presentation , *Life with LAFS (Locally Adapted Food System)* - David Abazs

Nov 14, 2009 – Lake Superior Food Summit, UMD
Presentation, *A Locally Adapted Food System Assessment*- David Abazs, David Syring, and Stacey Stark

Oct 23-25, 2009 MN GIS/LIS Consortium Annual Conference:
Poster, *Defining the Agricultural Landscape of the Western Lake Superior Region* - Stacey Stark

March 6, 2010 Lake Superior Farming Conference, Superior Wisconsin. Presentation, *Locally Adapted Food System for the Western Lake Superior Region* - Stacey Stark, David Abazs

March 15-16, 2010 Re-Localizing Our Foodshed: New Models and Methodologies for Planning Our Food Future, Symposium, University of Minnesota. Presentation - *Locally Adapted Food System for the Western Lake Superior Region* - Stacey Stark, David Abazs

July 13, 2010 Land Grant Administrators Conference, St. Paul Campus, Invited Presentation, *Project Report from Superior Region Foodshed Team*- Stacey Stark, David Abazs

August 10, 2010 Energy Efficient Ely Tuesday Series, Ely Grand Lodge, Presentation, *"~~Supersize It~~" no "Localize It!": Creating a Local Food System* – David Abazs

Duluth News Tribune - View Point, David Abazs

Sustainable Farming Association Winter Newsletter - article about the research, David Abazs

Radio interviews, David Abazs: WTIP Grand Marais; KAXE Grand Rapids, Northern Spirit Radio.

Radio interviews, David Syring: KUMD Duluth (Sept 6, 2010)

TV interview for CERTs about LAFS assessment, David Abazs

Interview with Extension agent about the research, David Abazs

Informal Presentations to 2 State Senators and 2 House members, David Abazs

Green Jobs interface, research discussed (Oct 2009 – Feb 2010 Green Jobs Duluth, invited participants (Abazs, Stark, Syring)

March 11, 2010 Classroom presentation: Field Techniques GEOG 5612, Stacey Stark, David Abazs

Grants that were submitted as a result of your being awarded this HFHL grant

Identification of strategies for implementation of a healthy local food system for healthy people in the Western Lake Superior Region, Stacey Stark, David Abazs, David Syring, Christian Peters. Submitted to Healthy Foods Healthy Lives Institute, UM (not funded)

Through transport and distribution mapping, consumer challenge activities, and community outreach actions; we will identify challenges and opportunities to consumer adoption of a regionally grown, healthy food diet.

Re-Localizing Our Foodshed: New Models and Methodologies for Planning Our Food Future, UMN Regional Sustainable Development Partnerships, Kathryn Draeger, PI (Stark and others). Funded by North Central Region Center for Rural Development $17,210 (2010)

The proposed symposium will convene faculty, staff and students from participating institutions with visiting experts and community partners to discuss novel models and methodologies to meet public needs associated with redesigning our food system, with a special focus on foodshed analysis and food systems planning.

Food, Food Systems, and the New Regionalism, Faculty Seminar, Spring 2011, David Syring, Pat Farrell, Randel Hanson. Funded by Institute for Advanced Studies (University of Minnesota) approx $50,000 (2011)

In this seminar we seek to explore two main questions: what role can UMD play in this broad regional transformation making locally harvested food more abundant; and what does this new food regionalism mean to the scarcity of local food within UMD itself? Within the context of the Faculty Seminar, SAP will serve as a platform for managing interrelated activities around health, food, sustainability, and food systems.

Supporting Civic Engagement Teaching Related to the UMD Sustainable Agriculture Project and Regional Food Systems, David Syring. Funded by UMD Office of Civic Engagement, $2,000 (2011)

Civic engagement funding will be used to allow faculty to directly apply their learning in the faculty seminar on the revival of local food systems to courses taught in their disciplines.

Eating is an Agri-cultural Act: Understanding Food Systems from the Perspective of Citizens Who Eat and Exploring Policy Possibilities for Local Units of Government, David Syring
Funded by Center for Urban and Regional Affairs (CURA, University of Minnesota) $39,087 (2010-11)

This research focuses on creating an effective strategy for revitalizing regional civic agriculture by better understanding the needs and knowledge of eaters of food. In addition, the project will gather a comprehensive set of best and future practices by which local units of government can support the development of a robust local food economy to benefit community health and economic opportunities.

New partnerships that have developed as a result of this grant

Institute for Advanced Studies, University of Minnesota

Christian Peters, PhD; Assistant Professor, Friedman School of Nutrition Science and Policy, Tufts University

Randel Hanson; Coordinator, Superior Grown Food Summit

Nicole Wilde; Coordinator, Sustainable Farming Association

Angie Miller; Executive Director, Community Action Duluth

Mimi Stender; Executive Director, Fit City Duluth

Emily Onello**;** Family Physician M.D. Lake Superior Community Health

Sharon Murphy, General Manager, Duluth Whole Foods Co-op

Councilor Tony Cuneo, City of Duluth and Zeppa Foundation, Director of Policy and Planning

Deborah Shubat, Sole Proprietor, Shubat's Fruits

Kelly Smith (farmer); Carlton County Soil and Water Conservation District

Potential beneficiaries of the results of this project

There are many potential beneficiaries of this grant but we will highlight two concrete case studies currently in progress.

The data from this research were used to build a case for the development of this regional food production facility: the Silver Bay Fish/Food/Fuel Recirculating Aquaponics Systems Greenhouse project. The design team was able to determine the consumer and economic potential of building this facility using the research results, such as how much fish, lettuce, and tomatoes are consumed within this region? An initial grant of almost $300,000 was secured from the state and a additional $250,000 was obtained from e Iron Range Resources to design and build this cutting edge facility. The City of Silver Bay is looking at building this first unit in 2011.

Wolf Ridge Environmental Learning Center recently assessed their school's food consumption levels. Through the use of the production data derived through the grant, the center was able to determine the land needed to grow the food they need in their cafeteria. The Board and director are moving ahead to identify funds to build a farm on the campus to grow all of the vegetables, fish and eggs needed at the facility. Hopes are for the digging of ground the summer of 2011 if monies can be secured.

Describe future plans for your findings and reports

Manuscripts are being prepared to submit to *Culture & Agriculture* and possibly *Agriculture and Human Values* or *Journal of Agriculture and Environmental Ethics*

Our findings and reports will continue to be offered to the community through presentations to farmers and consumers, TV and radio interviews, and the data will continue to be used as the building blocks of

regional projects. The reports will also be available through a network of web sites, including the Superior Food Web, UMD Sustainable Agriculture Project, and GISL at UMD.

Describe how your outcomes /findings will help advance the work of HFHL and how you would like to contribute to HFHL activities in the future

This initial grant can be the foundation for an ongoing relationship between UMD, our regional communities and the HFHL work. We can continue to enhance our collaborators' work and help facilitate future projects and communication with a wider circle of academic and popular communities. We plan to attend most future HFHL symposia and continue to build our relationships in the University around this type of work.

Please add any other outcomes of your project, either direct or indirect, that may reflect the success of this HFHL grant program:

Along with the tangible outcomes listed above, this grant has connected UMD staff and professors in a mutually respectful and beneficial relationship with the wider community. Many non-believers, farmers and alike, gained a much greater appreciation for UMD and hope this type of networking and applied grants can become the norm rather than the exception. [per David Abazs]

Appendix A GIS data used in geographic analysis

Environmental Systems Research Institute (ESRI)

2008 ESRI Data and Maps 9.3 [polygon shapefile]. US Counties. 380 New York Street. Redlands, CA 92373-8100.

Minnesota Department of Natural Resources (MN DNR)

2002 BWCA boundary based on the 1978 legislation[polygon shapefiles]. St. Paul, MN: Department of Natural Resources. http://deli.dnr.state.mn.us [accessed May, 2009].

2003 Minnesota DNR 1:24:000 Lakes [polygon shapefiles]. St. Paul, MN: Department of Natural Resources. http://deli.dnr.state.mn.us [accessed May, 2009].

2003 Minnesota DNR 1:24:000 Streams [line shapefiles]. St. Paul, MN: Department of Natural Resources. http://deli.dnr.state.mn.us [accessed May, 2009].

2002 Minnesota GAP Land Cover - Tiled Raster [raster dataset]. St. Paul, MN: Department of Natural Resources. http://deli.dnr.state.mn.us [accessed May, 2009].

2003 Scientific and Natural Area Boundaries [polygon shapefiles]. St. Paul, MN: Department of Natural Resources. http://deli.dnr.state.mn.us [accessed May, 2009].

2002 State Park Statutory Boundaries. [polygon shapefiles]. St. Paul, MN: Department of Natural Resources. http://deli.dnr.state.mn.us [accessed May, 2009].

2006 State Wildlife Management Area Boundaries - Publicly Accessible[polygon shapefiles]. St. Paul, MN: Department of Natural Resources. http://deli.dnr.state.mn.us [accessed May, 2009].

Minnesota Land Management Information Center (LMIC)

2009 Farm Service Agency photos, http://www.lmic.state.mn.us/chouse/airphoto.html [accessed May, 2009].

Natural Resources Conservation Service (NRCS), United States Department of Agriculture.

2009 Soil Survey Geographic (SSURGO) Database for [county]. [geodatabases]. http://soildatamart.nrcs.usda.gov [accessed January, 2010].

United States Fish and Wildlife Service

1991-1994 National Wetland Inventory (NWI) [polygon shapefiles]. Minneapolis, MN: Department of Natural Resources. http://deli.dnr.state.mn.us [accessed May, 2009].

United States Geological Survey (USGS)

2004 National Elevation Dataset [raster dataset]. United States Geological Survey. http://seamless.usgs.gov/website/seamless/products/1arc.asp [accessed May, 2009].

Wisconsin Department of Natural Resources (WI DNR)

1998 WISCLAND Land Cover (WLCGW930)[raster dataset]. Madison, Wisconsin. Wisconsin Department of Natural Resources. http://dnr.wi.gov/maps/gis/datalandcover.html [accessed January, 2010].

2007 Wisconsin Rivers & Shorelines from 24K Sources Madison, Wisconsin. Wisconsin Department of Natural Resources.http://www.dnr.state.wi.us/maps/gis/datahydro.html. [accessed May, 2009].

2007 Wisconsin Open Water from 24K Sources [polygon shapefiles]. Madison, Wisconsin. Wisconsin Department of Natural Resources. http://www.dnr.state.wi.us/maps/gis/datahydro.html. [accessed May, 2009].

2005 USGS Wisconsin GAP Stewardship Data [polygon shapefiles]. Madison, Wisconsin. Wisconsin Department of Natural Resources. ftp://dnrftp01.wi.gov/geodata/. [accessed May, 2009].

2009 Wisconsin Wetland Inventory [polygon shapefiles]. Madison, Wisconsin. Wisconsin Department of Natural Resources. http://dnr.wi.gov/wetlands/inventory.html. [accessed May, 2009].

Appendix B. Interview Questions

Goals for the Interviews:

- Describe the unique character of farming in this specific region—including diversity within the region—assess whether the Western Lake Superior region has a distinct identity as a region, related to food production.
- Assess what people are currently producing, and whether producers are at optimal capacity.
- Collect growers/gatherers visions of potentials for the future of food production in our region.
- Assess what motivates growers/gatherers to produce food, including thoughts on future of food.
- Assess personal, financial, environmental and economic obstacles for maintaining or expanding food production.
- Provide a qualitative foundation for a future quantitative survey of growers in the region.

- Demographics
  - What size farm do you have?
  - How many acres/how much do you use for food production?
  - Age of grower/gatherer _____
  - Size of family/household _____
    - Are multiple family members involved in the food production business? How many? _____
  - Length of time you have been farming _____
  - How long has the property you are working operated as a farm (if known)? _____
  - What is (are) your primary products?

Meat ____ (if this is a yes, ask to identify specific meat)

- Beef ____
- Chicken ____
- Turkey or other poultry _____
- Pork ____
- Mutton/goat or other (identify specifics) _____

Vegetables ____

Grain/Pulses _____ (if this is a yes, please identify specific grain)

- Wheat ____
- Oats ____
- Barley _____
- Corn ____
- Soybean _____
- Other (identify specifics) _____

Milk or Milk Product ___ (if this is a yes, ask to identify specifics as indicated below)

- Cow Milk _____
- Goat Milk _____

- Cow's Milk Cheese _____
- Goat's Milk Cheese _____
- Sheep Milk _____
- Sheep Milk Cheese _____
- Other (identify specifics) _____

➢ What is/are the primary market(s) for your food production?
- Direct to Consumer ____
  - CSA _____
  - Farmer's Market _____
  - Pick Your Own _____
  - Farm Stand located on farm property _____
  - Other Direct Marketing Plan (identify specifics) _____
- Direct to food processor
  - Restaurant _____
  - Other institution (i.e. school, hospital, etc.—identify specifics) _____
  - Canner/Freezer/Other Food Processor _____
- Wholesale
  - Conventional Grocery store (i.e. Cub, SuperOne, Festival) _____
  - Whole Foods Coop _____

➢ Which of the following categories (these are derived from USDA Industry Classification Systems) best applies to your food production business:

- Cattle and calves _____
- Cattle Feed lot _____
- Hogs and Pigs _____
- Poultry and Eggs _____
- Sheep and Goats _____
- Milk _____
- Aquaculture and other animals _____ (identify other animal types): _____
- Grains and Oilseeds _____
- Hay and other crops _____
- Vegetables/herbs _____
- Nursery and Greenhouse _____
- Foraged Wild Foods _____ (identify types): _____

➢ USDA also classifies farms according to a typology that classifies farms by sales and operator's occupation. If we want to collect this data from our interviewees the categories are:

- Residential/lifestyle farms (produce less than $250,000 in sales of agricultural products and principal operators report something other than farming as their primary occupation). _____
- Retirement farms (produce less than $250,000 in sales and principal operators report that they are retired). _____
- Limited Resource (No criteria described in the document I found) _____

- Farming Occupation/Lower Sales (No criteria described in the document I found) _____
- Farming Occupation/Higher Sales (No criteria described in the document I found) _____
- Large Family (sales between $250,000 and $500,000)
- Very Large Family (sales over $500,000)
- Nonfamily (No criteria described in the document I found) _____

This concludes the basic demographic data collection.

Now we will move on to questions that seek to hear your story of what it is like to be a food producer in our region. Where the previous questions asked you for simple information that could be summarized with a yes or no, or a check mark on a list, the rest of the questions I will be asking you are designed to be open-ended.

I want to hear what you have to say in response to these questions—not so I can count things up and summarize them in a chart, but rather so people can hear your specific stories and examples and the thoughts that you have found as you have become a food producer in our area.

Please feel free to give examples, tell stories, and shape this conversation to talk about things you find interesting or important, and which you would like to share with others who produce and eat food in our area.

❖ **An Overall Opening Question**
- What impact has being a food grower/gatherer had on your household well-being?

❖ **Production**
- In previous questions you selected USDA categories for your food operation—can you explain how your operation fits in those categories, and/or ways that the categories may not apply to your operation?

- What foods do you grow/produce/gather/hunt?
  - What foods do you grow/produce/gather/hunt for self consumption?
    - How much of your own food do you produce?
    - Where else do you get your food?
  - What foods do you grow/produce/gather/hunt for gift/exchange?
  - What foods do you grow/produce/gather/hunt for market?

- What do you see as the environmental limits to what you can grow/produce/gather/hunt?
  - Have you tried some crops that have not been successful, given our regional climate, soils, etc.?

- If interviewee has self-identified as a wild food gatherer, ask the following (If not a gatherer, skip this box):

- Which edible products do you gather / forage?
- Do you gift (Y/N), exchange (Y/N), or sell gathered edibles or products made of them?
- Do you hunt and consume the meat?
- Do you gather / forage other (in-edible products)?
- Do you gift (Y/N), exchange (Y/N), or sell (Y/N) gathered in-edibles or products made of them?
- What would you say is the single biggest obstacle to gathering / foraging?
- Is there someone that you consider a teacher or mentor with respect to your gathering knowledge?
- Is that person a relative? Y/N
- Where do you go for information about gathering and harvesting (list major sources)?
- Have you ever taken a class or workshop or been "formally" trained on sustainable gathering or harvesting of wild plants?

- What inputs are required for the things that you grow/produce/gather/hunt?
  - Where do these inputs come from?

- How have you learned to be a food grower/producer/gatherer/hunter?
  - Who do you look to for ideas, knowledge and information about food production, processing and distributing of food in our area?
  - Has any individual or organization been particularly important for you as a source of knowledge about food production?
  - What additional kinds of informational/learning support do you think would be useful for you?
  - Who do you think should be solving the problems you see in the growing, gathering, processing, and distributing of food in our area?

❖ **Distribution/Marketing**

- ***How*** do you market your foods?
  - How much direct retail? (examples: CSA, Farmer's Markets, Pick-Your-Own)
  - How much wholesale? (examples: cooperative, Organic Valley, AMPI, grocery store, restaurant, schools, hospitals)
  - Do you do any value-added work with your products? (Example: Enhanced value by adding additional labor to a basic product—i.e. making sauerkraut from cabbage) Explain what you do and how you sell it.

- ***Where*** do you market your food (in local town, in county, in region, outside the region)? Please explain specifics.

- Do you think it is important for food producers to know their customers?
  - How well do you know the wants/needs of your customers?
  - Do you think it would be helpful for you to know more about your customers?
  - What kind of information about your customers would you find useful?

❖ **Developing Markets**

- Is the way you currently market what you grow/produce/gather/hunt sufficient to your current production? (That is, are you able to sell all of what you grow/produce/gather/hunt for a price that brings you enough to pay for your effort?)
  - Is this the way you *want* to market your production?
  - Are you interested in changing/expanding the market for your food?

- How do you identify potential markets to produce for? Where do you get information/advice for developing potential markets?

- Are there certain products you'd like to grow/produce/gather/hunt, but don't because of obstacles to finding a market?

- What kinds of assistance would you find helpful to overcome those obstacles?

❖ **Historical Practices**

- Do you think there is a strong history of farming/gathering food in the region? What makes you think there is or is not?
  - Are there positive legacies of farming/gathering food in this region?
  - Are there negative legacies of farming/gathering food in this region?

- Do you know of examples of positive/successful collaboration in the past among farmers or gatherers to better their situations in the region?
  - What were they?
  - Why were they successful?
- Do you know of examples of negative/unsuccessful collaboration in the past among farmers or gatherers to better their situations in the region?
  - What were they?
  - Why were they *not* successful?

- Do you remember processing & distributing infrastructures for food growing/gathering and distributing in this region? What happened to them?

❖ **Present Practices**

- What are the *most positive* aspects of being a farmer/gatherer in this region today?

- What are the *most challenging* aspects of being a farmer/gatherer in this region today?

- What kinds of collaboration would you want to see among farmers/gatherers and others in the region?

- What would help you become a better farmer/gatherer?
  - Who could help you do so?

- Do you believe you currently have the assistance that you need to accomplish what you set out to do?

❖ **Economic Realities**

- Can you describe how you arrived at your current level of food production, in terms of the initial economic arrangements that made it possible for you to begin producing food?

- What is your total household income, including food production and other sources of income?
  - What is your gross income from food production?
  - What is your net income from food production?
  - Does anyone in the household have an off-farm job?
    - If so, how many hours?
    - Is this an arrangement that you want to have?

- Do you employ others beside yourself on the farm? If so, how many hours of labor?

- What economic obstacles do you see impeding your success as a food producer?

❖ **Visions for Future of Individual Producers**

- What is your vision for the future of your own production of food?
  - Short-term (1-3 years)
  - Mid-term (5-7 years)
  - Long-term (7+ years)
    - What are your plans for passing on your food production business when you no longer want to continue doing it yourself?

❖ **Visions for Overall Food System Future**

- What would you like to see in terms of farming/agriculture over the next couple decades?

- Are you optimistic/pessimistic about farming in this region over the next few years?

- What would allow farmers in the region to produce more of the food that is eaten here?

❖ **Obstacles to Success/Limits to Growth**

- In your opinion, what are the obstacles that are keeping you from farming/producing/distributing food in the ways that you would like to? (Do we need a list of suggested topics for Kelsey & Samantha to offer as prompts after individuals have offered their thoughts?

❖ **Policy Ideas for Supporting Local Food**

- What policies and regulations exist that help you get your products sold?

- What policies exist that hinder you from selling your products?

- What policy changes would you like to see you help you in your efforts to sell your products?

❖ **Concluding Open-ended Question**
- Is there anything else that you would like to tell about your experience farming/gathering food?

Reserve/Afterthought questions that might need to be asked if topics don't come up in interview:

Lack of access to Healthcare—is this an obstacle?

What other reserve questions should we have?

Appendix C. Diet Basics for 2000 Calorie Western Lake Superior Healthy Diet

FOOD GROUP

Grains - 6 ounce equivalents

1 ounce equivalent equal to 1 slice bread, 1/2 cup cooked rice, pasta or other grain, and 1 cup dry cereal

Vegetables - 2 1/2 cups

1 cup for most vegetables, 2 cups lettuce and leafy greens equals 1 cup.

Fruits - 2 cups

1 cup for most fruits and juice, 1/2 cup of dried fruit

Meat/Fish/Poultry/Egg - 3 1/2 ounce equivalents

1 ounce equivalent equal to 1 ounce of meat, fish, poultry(lean cuts and without skin) or 1 large egg

Legumes - 2 ounce equivalent

1 ounce equivalent equal to 1/4 cup cooked beans, lentils or peas. 2 tablespoons hummus

Nuts and Seeds - 2 ounce equivalent

1 ounce equivalent equal to 1/2 ounce of seeds or nuts. 1 tablespoon of nut or seed butter

Fats and Oils - 6 teaspoons

Dairy - 2 cup equivalents

1 cup equivalent equal to 1 cup milk or yogurt, 2 cups cottage cheese, 1/2 cup ricotta cheese, 1 ½ ounces hard cheese, 1/3 cup shredded cheese.

Discretionary calories - None

Appendix D. Food Consumption Estimates

The following tables detail the results of the food consumption analysis for the Standard American Diet and the Western Lake Superior Healthy Diet.

Source: U.S. Department of Agriculture, Economic Research Service,
Food Consumption, Prices, and Expenditures,
Food Availability(Per Capita) Data System;
\<http://www.ers.usda.gov/data/foodconsumption/\>

Standard American Diet (SAD) 413cal/263cal ratio				**Western Lake Superior Healthy Diet**		
Consumption	**#/per.**	**#/region[58]**	**%**	**#/per.**	**#/region[58]**	**%**
Meat Total	**242.9**	**116,544,100.5**	**100.0%**	**155.0**	**74,377,680.0**	**100.0%**
Red meat, total (boneless, trimmed weight)	109.9					
Beef	**62.7**	**30,109,952.3**	**25.8%**	**27.9**	**13,387,982.4**	**18.0%**
Veal	**0.4**	**170,307.6**	**0.1%**	**0.2**	**111,566.5**	**0.2%**
Lamb and mutton	**0.8**	**374,618.6**	**0.3%**	**1.6**	**743,776.8**	**1.0%**
Pork	**46.0**	**22,077,062.1**	**18.9%**	**27.9**	**13,387,982.4**	**18.0%**
Poultry, total (boneless, trimmed weight)	74.7					
Chicken	**61.3**	**29,438,026.8**	**25.3%**	**30.2**	**14,503,647.6**	**19.5%**
Turkey	**13.3**	**6,395,465.4**	**5.5%**	**7.8**	**3,718,884.0**	**5.0%**
Fish and shellfish, total(boneless, trimme	**16.5**	**7,920,686.9**	**6.8%**	**15.5**	**7,437,768.0**	**10.0%**
Eggs Ave. 260 eggs or 34.4# eggs year[41]	**41.8**	**20,057,980.8**	**17.2%**	**23.3**	**11,156,652.0**	**15.0%**
Shell	29.5					
Processed	12.1					
Rabbit	**x**	**x**	**x**	**7.4**	**3,570,128.6**	**4.8%**
Venison	**x**	**x**	**x**	**13.2**	**6,322,102.8**	**8.5%**
Total Meat Acres		**271,837.53 acres**			**141,281.03 acres**	

2% was added to the total to account for seed production for the crops consumed to produce the meat

Western Lake Superior Healthy Diet was determined by a "task force" of doctors, dietitians, & nutritionist. LAFS Assessment of WLS, HFHLI Grant, Fall 2009

Beef Cow	**Standard American Diet (SAD)**	**Western Lake Superior Healthy Diet**
Protein Vit Min. #315.4[7]		
Complete Ration #366.7[7]		
Corn (bu.) Bu. 2.4[7]		
Corn Silage #3,777.4[7]		
Hay, Alfalfa #1,891.9[7]		
Haylage, Alfalfa #3,786.2[7]		
Pasture (aum) #8.5[7]		
Other feed stuff #1,500.4[6]		
Straw Bedding[6]		
Cow cons., yield & replacement per beef cow[6]	3.45 acres	3.45 acres
Per Beef Cow[6]	540.0 #meat[6]	540.0 #meat
Regional Needs	56,075 #cows	24,999 #cows
No. Farms Needed	561 #farms[7]	250 #farms
Land Needed	**193,457.22 acres**	**86,247.12 acres**

Note 1- These animal consumption numbers are from an averaging of 119 farms.
Note 2- Feed production pounds/acre consumption and total acres estimate are from Troy Salzer, Extension
Note 3 - These estimates are for the more productive managed farms and much of the land would require more land.
Note 4 - This per/cow acreage includes a 15% factor for fuller acre accounting of the meat system i.e.replacement
Note 5 - The WLSHD assumes a grass-fed based operation which might increase the acres needed.
Final Note - The 2008 Census Estimate of 479,856 was used as our population calculator.

Lamb & mutton	**Standard American Diet (SAD)**	**Western Lake Superior Healthy Diet**
Protein Suppliment[44] #184.5	0.07 acres[6]	0.07 acres[6]
Grain (= parts corn,wheat,oats)[44] #1346.5	0.30 acres[7]	0.30 acres[7]
Corn Silage[44] #3,717.0	0.14 acres[7]	0.14 acres[7]
Haylage[44] #4398.5	0.22 acres[7]	0.22 acres[7]
Hay[44] #1343.9	0.33 acres[7]	0.33 acres[7]
Straw Bedding		
Per Ewe Combo (2 lambs + 1 ewe)	1.1 acres	1.1 acres
Per Ewe Combo (2 lambs + 1 ewe)	153.0 #meat[43]	153.0 #meat[43]
Regional Needs	2,448 #ewe+	4,861 #ewe+
No. Farms Needed	49 #farms	97 #farms
Land Needed	**2,605 acres**	5,171 acres

Note 1 - 2 lambs, 1 ewe (5 yr life), 1/30th ram were totaled and averaged to get the annual meat and feed data
Note 2 - These animal consumption numbers are from NDSU
Note 3 - The WLSHD assumes a grass-fed based operation which might increase the acres needed.

Source: U.S. Department of Agriculture, Economic Research Service,
Food Consumption, Prices, and Expenditures,
Food Availability(Per Capita) Data System;
\<http://www.ers.usda.gov/data/foodconsumption/\>

Note 4 - The meat total includes 2 lambs at 60lbs meat and 1 ewe at 75lbs meat divided by 5
Note 5 - The number of Ewe Combo's/per farm was taken out of a hat. Economics of sheep are sketchy
Final Note - The 2008 Census Estimate of 479,856 was used as our population calculator.

Pork Pig	**Standard American Diet (SAD)**	**Western Lake Superior Healthy Diet**
Protein Vit Min. #48.1[6]	0.0406931 acres[6/70]	0.0406931 acres[6/70]
Complete Ration #105.14[6]	0.0154508 acres[7/70]	0.0154508 acres[7/70]
Corn(56#Bu * 2.92 = 163.52#) Bu. 2.92[7]	0.0614510 acres[7/70]	0.0614510 acres[7/70]
Soybeans (60#Bu * .01 = .6#) Bu. 0.01[7]	0.0007500 acres[7/70]	0.0007500 acres[7/70]
Other feed stuff #2.32[6]	0.0004823 acres[7/70]	0.0004823 acres[7/70]
Total 319.68# (per 100# gain)		
Per Pig 38# - 266#	0.1188272 acres	0.1188272 acres
Per Pig 0# - 38# (ration .01666666)	0.0019805 acres	0.0019805 acres
Total Per Pig Acres	**0.1208077 acres**	0.1208077 acres
Sow Accounting[N1] (acres multiplier 6.2562562)	0.0354007 acres[70]	0.0354007 acres[70]
Boar Accounting[N2] (acres multiplier 6.2562562)	0.0017700 acres[70]	0.0017700 acres[70]
Total Per Pig Full Accounting[N1/N2]	**0.1579784 acres**	0.1579784 acres
Per Pig Full Accounting[N3]	**206.3 #meat[7]**	206.3 #meat[7]
Regional Needs	107,004 #pigs	64,889 #pigs
No. Farms Needed	535 #farms[8]	324 #farms[8]
Land Needed	**16,904.32 acres**	10,251.12 acres

Note 1 - Full Accounting Acres (FAA) - 2000# Sow feed[70] per year = .7434137 acres/21 piglets = .0354006~ acres
Note 2 - Full Accounting Acres (FAA) - 2000# Boar feed[70]/(20 Sow * 21 piglets) = .0017700 acres
Note 3 - Full Accounting Meat (FAM) includes 100% Sow meat (450# *.55 dressed weight = 247.5#)/divided by (21 piglets * 2.5 years = 52.5 piglets)= 4.71# Sow meat per pig
Plus 100% Boar meat (750 *.68% = 510.0#)/divided by (20 Sow bred per year * 21 piglets * 2 years = 840 piglets) = .61# Boar meat per pig
Note 3- The pig feed consumption numbers are from an averaging of 119 farms.
Note 4- The pigs came in at 38#, sold at 266# and dressed out at 201#[7]
Note 5 - Piglet 0 - 38# assumed 90% growth from Sows milk 10% from grain nibbling (calculations not shown on graph)
Note 6 - The WLSHD assumes a grazing operation which would increase the meat quality and the acres needed.
Final Note - The 2008 Census Estimate of 479,856 was used as our population calculator.

Chicken		**Standard American Diet (SAD)**	**Western Lake Superior Healthy Diet**
Protein Vit Min. #1.00[63]		0.0003711 acres[6]	0.0003711 acres[6]
Corn #6.00[63]		0.0009890 acres[7]	0.0009890 acres[7]
Soybean Meal #3.00[63]		0.0015385 acres[6]	0.0015385 acres[6]
Chicken Breeders (Divided by 150)	Protein Vit Min. #12[63]	0.0000297 acres[6]	0.0000297 acres[6]
	Corn #78[63]	0.0000857 acres[7]	0.0000857 acres[7]
	Soybeans #30[63]	0.0001026 acres[7]	0.0001026 acres[7]
Per Broiler		0.0028985 acres	0.0028985 acres
Broiler Breeder %		0.0002180 acres	0.0002180 acres
Per Broiler Full Accounting		0.0031164 acres	0.0031164 acres
Per Broiler (5#)		3.0 #birds	3.0 #birds
Regional Needs		9,812,676 #birds	4,834,549 #birds
No. Farms Needed		9,813 #farms	4,835 #farms
Land Needed		**28,441.80 acres**	14,012.82 acres

Note 1 - Full Accounting Acres (FAA) broiler breeders = 120 lbs feed/150 chicks[63]
- broilers breeders 78# corn, 30# Soybeans, 12# Protein Min.

Source: U.S. Department of Agriculture, Economic Research Service,
Food Consumption, Prices, and Expenditures,
Food Availability(Per Capita) Data System;
\<http://www.ers.usda.gov/data/foodconsumption/\>

- Corn and soybean meal amounts would be about 65 and 25% of the feed, respectively[63]

Note 2 - Full Accounting Meat (FAM) is a very minor contributor of the total pounds of meat

Note 3- These consumption numbers are from Dr. Sally L. Noll

Note 4 - The WLSHD assumes a grass-fed based operation which might increase the acres needed.

Note 5 - Number of farms is based on 1000 birds per farm, the current limit for on-farm direct sales

Final Note - The 2008 Census Estimate of 479,856 was used as our population calculator.

Turkey			**Standard American Diet (SAD)**	**Western Lake Superior Healthy Diet**
Protein Vit Min.	#12[63]		0.0044527 acres[6]	0.0044527 acres[6]
Corn	#44[63]		0.0072523 acres[7]	0.0072523 acres[7]
Soybeans	#24[63]		0.0123077 acres[7]	0.0123077 acres[7]
Turkey Breeders	Protein Vit Min.	#25.0[63]	0.0000976 acres[6]	0.0000976 acres[6]
(Divided by 95)	Corn	#162.5[63]	0.0002819 acres[7]	0.0002819 acres[7]
	Soybeans	#62.5[63]	0.0003374 acres[7]	0.0003374 acres[7]
		Per Turkey	0.0240127 acres	0.0240127 acres
		Turkey Breeder %	0.0007170 acres	0.0007170 acres
		Per Turkey Full Accounting	0.0247297 acres	0.0247297 acres
		Per Turkey (28#)	22.0 #meat	22.0 #meat
		Regional Needs	290,703 #turkey	169,040 #turkey
		No. Farms Needed	581 #farms	338 #farms
		Land Needed	**7,189.00 acres**	**4,180.31** acres

Note 1 - Full Accounting Acres (FAA) turkey breeders figure about 250 lbs feed to produce 95 poults[63]

- turkeys breeders 162.5# corn, 62.5# Soybeans, 25# Protein Min

- Corn and soybean meal amounts would be about 65 and 25% of the feed, respectively[63]

Note 2 - Full Accounting Meat (FAM) is a very minor contributor of the total pounds of meat

Note 3- These consumption numbers are from Dr. Sally L. Noll

Note 4 - The WLSHD assumes a grass-fed based operation which might increase the acres needed.

Note 5 - Number of farms is based on 500 birds per farm, the current limit for on-farm direct sales

Final Note - The 2008 Census Estimate of 479,856 was used as our population calculator.

Fish & Shellfish 7,437,768.0	**Standard American Diet (SAD)**	**Western Lake Superior Healthy Diet**
	Wild Harvest 0 acres	Wild Harvest 0 acres
Lake Superior WI Catch 2009[80]		1,337,317 pounds
Lake Superior Red Cliff Nation Catch 2008[80]		722,663 pounds
Lake Superior Bad River Nation Catch 2009[80]		307,857 pounds
Lake Superior MN Catch 2008-2009[71]		428,270 pounds
Fish Pounds Needed to Farm		4,641,661 pounds
Soybean Meal (57%) or pounds per cwt[66]		0.0292308 acre/50#fish[6]
Corn Grain (30.3%)[66]		0.0049942 acre/50#fish[7]
Wheat Middlings (10%)[66]		0.0030340 acre/50#fish[7]
Dicalcium Phosphate (1%)[66]		
Vitamine & Mineral Mix[66]		
Fat/oil (1.5%)[66]		0.0015339 acre/50#fish[22]
This all equals 1 unit		
	Acres per unit (31.3# meat)	0.0388503 acres/31#meat
	Total Fish Units Needed	5,761 #fish units
	Regional Acres Needed	223.83 acres

Note 1 - This data is based on catfish production in Recirculating Aquiculture Systems (Rainbow Trout is another option

Note 2 - 100# will produce 50# fish meat[64]

Source: U.S. Department of Agriculture, Economic Research Service,
Food Consumption, Prices, and Expenditures,
Food Availability(Per Capita) Data System;
\<http://www.ers.usda.gov/data/foodconsumption/\>

Note 3 - Canola oil produces 127 gallons and each gallon weights 7.7# = 977.9# divided by 1.5# needed per cwt

Note 4 - RASystem provides 100,000#/5,000 square feer or 20# live fish per square foot of space[65]

Note 5 - If a outdoor pond system were used, you would need 20 acres to produce 100,000# of live fish meat[65]

Note 6 - Dressed weight of catfish averages 62.5% of live weight or 31.3# per 50# live fish per 100# feed[64 & 67]

Note 7 - Wild Harvest are all dressed except for MN where dressed weight is unknown

Note 8 - Wild Harvest sustainability levels of harvests are unknown.

Note 9 - WI state numbers may include some areas just outside of the official region

Final Note - The 2008 Census Estimate of 479,856 was used as our population calculator.

Eggs per 100 wt/ (90lbs per hen per/year)		**Standard American Diet (SAD)**		**Western Lake Superior Healthy Diet**
Protein Vit Min.	#18[43]	0.0060 acres[6]		0.0060 acres[6]
Alfalfa pellets	#8[43]	0.0027 acres[6]		0.0027 acres[6]
Corn	#30[43]	0.0045 acres[7]		0.0045 acres[7]
Peas	#24[43]	0.0116 acres[29]		0.0116 acres[29]
Wheat	#12[43]	0.0031 acres[7]		0.0031 acres[7]
Barley	#8[43]	0.0028 acres[23/24]		0.0028 acres[23/24]
	Per Hen	0.0307 acres		0.0307 acres
	Per Hen	34.4 #eggs[41]		34.4 #eggs[41]
	Regional Needs	583,081 #hens		324,321 #hens
	No. Farms Needed	292 #farms		162 #farms
	Land Needed	**17,910.43 acres**		9,962.14 acres

Note 1 - Virginia Teck data include 3.8# feed is needed for 1 dozen eggs. At

260 eggs the ave. hen consumes 82.33 lbs yr. 90lbs cold climate number is used

Note 2 - 30% reduction of feed can be realized by pasturing laying hens

Note 3 - Protein Vit min provides the acre data for this aspect of the feed

Note 4 - The ratio of the Protein Vit Min was used for the Alfalfa pellets

Note 5 - The WLSHD assumes a grass-fed based dairy operation which would increase the acres needed.

Note 6 - 2000 hens per farm was chosen for determining the number of farms

Final Note - The 2008 Census Estimate of 479,856 was used as our population calculator.

Rabbit		**Standard American Diet (SAD)**			**Western Lake Superior Healthy Diet**
Protein Vit Min.	#1.00	x	x	x	0.0003711 acres[6]
Corn	#16.00	x	x	x	0.0026372 acres[7]
Soybean Meal	#8.00	x	x	x	0.0041026 acres[6]
	Per Fryer Rabbit				0.0071108 acres
	Per Fryer Rabbit Full Accounting				0.0075640 acres
	Live Weight Per Fryer (4.5#)				3.0 #meat
	Regional Needs				1,190,043 #rabbit
	No. Farms Needed				595 #farms
	Land Needed		0.00 acres		8,462.20 acres

Note 1 - Full Accounting Acres (FAA) includes 100% Doe feed per year /divided by 30 fryers = .0089864 acres
+ 100% Buck feed/year divided by (20 Does * 30 fryers or .0004493 acres) = .0094357 acres
we take this number and add it onto the total acres needed per one fryer for market

Note 2 - Full Accounting Meat (FAM) includes 100% Sow meat (450# *.55 dressed weight = 247.5#)/divided by
(21 piglets * 2.5 years or reproduction = 52.5 piglets)= 4.71# Sow meat
Plus 100% Bore meat (750 *.68% = 510.0#)/divided by (20 Sow bred per year * 21 piglets * 2 years =
840 piglets) = .61# Bore meat

Note 3- Rabbits have a 4:1 or a 5:1 feed to gain ratio by pound[68]

Note 4- Finished meat is about 55% of live weight animal[69]

Note 2 - The WLSHD assumes a grass-fed based dairy operation which would increase the acres needed.

Note 3 - The # meat & estimate of beef cows per farm (100) is from Tauna Powell, Masters Ranch

Source: U.S. Department of Agriculture, Economic Research Service,
Food Consumption, Prices, and Expenditures,
Food Availability(Per Capita) Data System;
\<http://www.ers.usda.gov/data/foodconsumption/\>

Final Note - The 2008 Census Estimate of 479,856 was used as our population calculator.

Venison	**Standard American Diet (SAD)**			**Western Lake Superior Healthy Diet**
Minnesota Deer Harvest Low Estimate 66,617 in 2009				4,196,871.0 #meat
Minnesota Deer Harvest Low Estimate 33,562 in 2009				2,114,406.0 #meat
				6,311,277.0 #meat
Wild Harvested/Farm Land Needed?	x	x	x	0.00 acres

Note 1 - 2009 Deer Harves Report for Permit Area 104,167,197,172,242,247,154,157,159,225,183,156,182,199,174,170, 168,107,115,175,178,181,180,122,127,116,126 with missing data from 242,247 & 199. The Total harvested firearm archery, muzzle loader and part management permits in 2009, (low estimat) is 66,617 Deer MN[73]

Note 2 - Minnesota yield is 145# Doe and 170# for a buck[74]

Note 3 - Wisconsin 7 County Totals, Bucks (15,136) Does (18,259) Unknown (167) TOTAL = 33,562 Deer Harvested[75]

Note 3 - Minnesota/Wisconsin meat yield average is 157.5# * .40 dressed weight = 63# meat per deer harvested[74]

Note 2 - If current management practices continue, similar yields are possible into the future

Final Note - The 2008 Census Estimate of 479,856 was used as our population calculator.

Source: U.S. Department of Agriculture, Economic Research Service,
Food Consumption, Prices, and Expenditures,
Food Availability(Per Capita) Data System;
\<http://www.ers.usda.gov/data/foodconsumption/\>

Standard American Diet (SAD)	63cal/160cal ratio			Western Lake Superior Healthy Diet			
Consumption	#/per.	#/region[58]	%	#/per.	#/region[58]	%	
Nuts	10.4	4,990,502.4	100.0%	25.1	12,044,385.6	100.0%	
Peanuts	7	3,123,862.6	62.6%				
Almonds	1.0	484,654.6	9.7%				
Walnuts	0.5	254,323.7	5.1%				
Coconuts	0.6	287,913.6	5.8%				
Pecans	0.4	211,136.6	4.2%				
Pistachios	0.1	62,381.3	1.3%				
Macadamia	0.1	62,381.3	1.3%				
Filberts/Hazelnuts	0.1	38,388.5	0.8%	10.0	4,817,754.2	40.0%	
Others	1.0	465,460.3	9.3%				
Sunflower Seeds	x	x	x	7.5	3,613,315.7	30.0%	
Pumpkin/Sauash Seeds	x	x	x	5.0	2,408,877.1	20.0%	
Flax Seeds	x	x	x	2.5	1,204,438.6	10.0%	
Production/acreage							
Hazel Nut(1,000lbs/acre)[17]		38.4 acres			4,817.8 acres		
Sunflower Seeds(1,646lbs/acre)[7]-25% shell[21]					2,926.9 acres		
Pumpkin Seeds(1150 lbs acre)+6 Ton pulp[20]					2,094.7 acres		
Flax Seed(1,300lbs/acre)[18]					926.5 acres		
		46.1 acres			10,981.2 acres		

Western Lake Superior Healthy Diet was determined by a "task force" of doctors, dietitions, & nutritionist. LAFS Assessment of WLS, HFHLI Grant, Fall 2009

Note 1 - The amount of nuts that we consume that can currently be grown hear is close to zero

Note 2 - A significant effort to find recipes to best use the grains and seeds we can grow is needed.

Note 3 - % column doesn't always equal 100 due to rounding

Note 4 - I altered the nut total, from 9.9 to 10.4 to equal the actual individual sum of the nuts

Note 5 - 2% was added to the total to account for the acres needed to seed/plant

Final Note - The 2008 Census Estimate of 479,856 was used as our population calculator.

Source: U.S. Department of Agriculture, Economic Research Service,
Food Consumption, Prices, and Expenditures,
Food Availability(Per Capita) Data System;
\<http://www.ers.usda.gov/data/foodconsumption/\>

Standard American Diet (SAD) 284cal/200cal ratio				**Western Lake Superior Healthy Diet**		
Consumption	**#/per.**	**#/region[58]**	**%**	**#/per.**	**#/region[58]**	**%**
Dairy products, total \3	**606.3**	**290,918,017.9**	100.0%	**426.9**	**204,871,843.0**	**100.0%**
Fluid milk products \4	22.3	10,711,247.1	10.6%	15.7	7,543,131.8	10.6%
Beverage milks						
Plain whole milk	6.4	3,092,841.2	3.1%	4.5	2,178,057.2	3.1%
Plain reduced fat mi	6.9	3,312,688.2	3.3%	4.9	2,332,879.0	3.3%
Reduced fat milk (1%	5.8	2,774,645.1	2.7%	4.1	1,953,975.4	2.7%
Flavored whole milk	0.3	134,284.6	0.1%	0.2	94,566.6	0.1%
Flavored milks other	1.4	692,180.7	0.7%	1.0	487,451.2	0.7%
Buttermilk	0.2	93,477.8	0.1%	0.1	65,829.4	0.1%
Yogurt (excluding froz	20.4	9,778,072.6	9.7%	14.4	6,885,966.6	9.7%
Fluid cream products \5						
Cream \6	15.4	7,399,738.8	7.3%	10.9	5,211,083.6	7.3%
Sour cream and dips	7.9	3,794,377.4	3.8%	5.6	2,672,096.8	3.8%
Condensed and evaporated milks						
Whole milk	2.2	1,055,683.2	1.0%	1.5	743,438.9	1.0%
Skim milk	4.2	2,015,395.2	2.0%	3.0	1,419,292.4	2.0%
Cheese \7 (lbs)	32.5	15,595,320.0	15.5%	22.9	10,982,619.7	15.5%
American \8	13.1	6,286,113.6	6.2%	9.2	4,426,840.6	6.2%
Cheddar	10.4	4,990,502.4	4.9%	7.3	3,514,438.3	4.9%
Italian \8	13.8	6,622,012.8	6.6%	9.7	4,663,389.3	6.6%
Mozzarella	10.5	5,038,488.0	5.0%	7.4	3,548,231.0	5.0%
Other \8	5.0	2,399,280.0	2.4%	3.5	1,689,633.8	2.4%
Swiss	1.3	623,812.8	0.6%	0.9	439,304.8	0.6%
Cream and Neufchatel	2.5	1,199,640.0	1.2%	1.8	844,816.9	1.2%
Cottage cheese, total	2.6	1,247,625.6	1.2%	1.8	878,609.6	1.2%
Lowfat	1.4	671,798.4	0.7%	1.0	473,097.5	0.7%
Frozen dairy products						
Ice cream	14.4	6,909,926.4	6.8%	10.1	4,866,145.3	6.8%
Lowfat ice cream	6.8	3,263,020.8	3.2%	4.8	2,297,902.0	3.2%
Sherbet	1.1	527,841.6	0.5%	0.8	371,719.4	0.5%
Frozen yogurt	1.4	671,798.4	0.7%	1.0	473,097.5	0.7%
	210.28	Ratio Multiplier	.70422535	148.08		

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Protein Vit Min. #4,042.10[6]	1.5 acres		1.5 acres
Complete Ration #34,752.50[6]	2.2 acres		2.2 acres
Corn (bu.) 63.30[7]	0.6 acres		0.6 acres
Corn Silage #19,968.20[7]	0.8 acres		0.8 acres
Hay, Alfalfa #3,581.10[7]	0.6 acres		0.6 acres
Haylage, Alfalfa #5,992.00[6]	0.3 acres		0.3 acres
Other feed stuff #3,290.10[6]	0.3 acres		0.3 acres
Straw Bedding[6]	0.5 acres		0.5 acres
Per Dairy Cow	6.8 acres		6.8 acres
Per Dairy Cow	20,946.0 #milk[7]		20,946.0 #milk
Regional Needs	13,889 #cows		9,781 #cows
No. Farms Needed	92 #farms[7]		65 #farms
Land Needed	95,798.50 acres		67,463.74 acres

Note 1 - These numbers are from an averaging of 351 farms and includes cow replacement inputs.
Note 2 - The milk and 7 resource numbers is a five year average from 2004 - 2008
Note 3 - Organic per cow annual yields run 67% of conventional operations
Note 4 - Number of farms needed is based on the average of 151 cows per/farm in the 2008 study
Note 5 - The WLSHD assumes a grass-fed based dairy operation which would increase the acres needed.
Note 6 - 2% was added to the total to account for the acres needed to seed these crops
Final Note - The 2008 Census Estimate of 479,856 was used as our population calculator.

Source: U.S. Department of Agriculture, Economic Research Service,
Food Consumption, Prices, and Expenditures,
Food Availability(Per Capita) Data System;
\<http://www.ers.usda.gov/data/foodconsumption/\>

Standard American Diet (SAD)	9cal/**145cal** ratio			**Western Lake Superior Healthy Diet**			
Crop Consumption	**#/per.**	**#/region**[58]	**%**	**#/per.**	**#/region**[58]	**%**	
Legumes	**8.5**	**4,078,776.0**	99.76%	**136.9**	**65,713,612.9**	**100.0%**	Western Lake Superior Healthy Diet was determined by a "task force" of doctors, dietitians, & nutritionist. LAFS Assessment of WLS, HFHLI Grant, Fall 2009
Dry Beans Total	***4.5***	**2,159,352.0**	52.94%	**72.6**	**34,828,214.8**	**53.0%**	
Pinto	2.7	**1,305,208.3**					
Navy	0.9	**422,273.3**					
Great Northern	0.3	**143,956.8**					
Red Kidney	0.5	**239,928.0**					
Lima	0.1	**47,985.6**					
Lentils	***2.1***	**1,007,697.6**	24.71%	**34.2**	**16,428,403.2**	**25.0%**	
Others	***1.9***	**902,129.3**	22.12%				
Dry Peas		Ratio Multiplier	16.1111	**30.1**	**14,456,994.8**	**22.0%**	
Dry Beans(1851# acre)[28]		1,166.6 acres			**18,815.9 acres**		
Lentils(1229# acre)[29]		819.9 acres			**13,367.3 acres**		
Other/**Dry Peas**(1855#acre)[29]		486.3 acres			**7,793.5 acres**		
		2,522.3 acres			**40,776.2 acres**		

Note 1 - Pounds available, not necessarily consumed due to waste and spoilage
Note 2 - % column doesn't always equal 100 due to rounding
Note 3 - The Region consists of MN 8 northeastern counties and WI's 7 northwestern counties
Note 4 - Total legume pounds in SAD diet was changed to equal the sum total of beans below.
Note 5 - Legume yields were determined by the average of the 5 years of production (ERS source)
Note 6 - 2% was added to the total to account for the acres needed to produce se
Final Note - The 2008 Census Estimate of 479,856 was used as our population calculator.

Source: U.S. Department of Agriculture, Economic Research Service,
Food Consumption, Prices, and Expenditures,
Food Availability(Per Capita) Data System;
\<http://www.ers.usda.gov/data/foodconsumption/\>

Standard American Diet (SAD) 91cal/240cal ratio				**Western Lake Superior Healthy Diet**			
Crop Consumption	#/per.	#/region[58]	%	#/per.	#/region[58]	%	Western Lake Superior Healthy Diet was determined by a "task force" of doctors, dietitians, & nutritionist. LAFS Assessment of WLS, HFHLI Grant, Fall 2009
Fruits, total	265.0	127,160,533.0	*99.85%*	698.9	335,368,433.8	100.0%	
Apples	19.4	9,313,742.4	7.32%	174.72	83,842,108.5	25.0%	
Bananas	*20.8*	9,966,463.7	7.84%				
Cantaloupes	*5.8*	2,783,164.8	2.19%				
Grapes	4.0	1,926,056.6	1.51%	13.98	6,707,368.7	2.0%	
Peaches and nectari	*7.1*	3,396,286.7	2.67%				
Pears	2.6	1,260,821.6	0.99%	69.89	33,536,843.4	10.0%	
Pineapples	*1.5*	713,275.0	0.56%				
Plums and prunes	1.5	733,293.0	0.58%	20.97	10,061,053.0	3.0%	
Strawberries	2.0	942,970.6	0.74%	34.94	16,768,421.7	5.0%	
Watermelons	10.7	5,134,459.2	4.04%				
Other	5.1	2,439,910.5	1.92%				
Blueberries				13.98	6,707,368.7	2.0%	
Pie Cherries				6.99	3,353,684.3	1.0%	
Rasperries				6.99	3,353,684.3	1.5%	
June Berries				3.49	1,676,842.2	0.5%	
Oranges citrus	*14.3*	6,853,432.5	5.39%				
Grapefruit citrus	*7.3*	3,501,615.3	2.75%				
Other citrus	*4.5*	2,145,647.2	1.69%				
Processed Frozen\A	3.3	1,590,694.0	1.25%	13.98	6,707,368.7	2.0%	
Processed Dried\B	11.2	5,372,226.7	4.22%	55.91	26,829,474.7	8.0%	
Processed Canned\C	24.5	11,780,117.6	9.26%	34.94	16,768,421.7	5.0%	
Processed Fruit\D	119.0	57,118,355.8	44.92%	244.61	117,378,951.8	35.0%	
		Ratio Multiplier	2.6373626	349.4	167,684,216.9	50.00%	
Apples(18,586# acre)[30]		1,252.8 acres			9,022.1 acres		
Grapes (10,228# acre)[30]		470.8 acres			1,311.6 acres		
Pears(12,736#acre)[30]		247.5 acres			5,266.5 acres		
Plums & Prunes(3,640#acre)[35]		503.6 acres			4,146.0 acres		
Strawberries(4,080#acre)[30]		231.1 acres			8,219.8 acres		
Blueberries(2,124#acre)[30]		0.0 acres			4,736.8 acres		
Cherry Sweet(3,838#acre)[30]		0.0 acres			1,310.7 acres		
Raspberries(5,000#acre)[34]		0.0 acres			1,341.5 acres		
June Berries(3,500#acre)[37]		0.0 acres			718.6 acres		
Other (3,616#acre)[30&31&36&38/39]		1,686.9 acres					
Cranberries(10,400#acre)[31]		0.0 acres			460.4 acres		
Cherry Tart(6321#acre)[30]		0.0 acres			378.8 acres		
Currents/Goos(8,350#acre)[38 & 39]		0.0 acres			286.7 acres		
Choke Cherry(15,000#acre)[36]		0.0 acres			142.7 acres		
		4,480.6 acres			38,089.1 acres		

Note 1- The "Other" category was determined by averaging the 4 other crops listed for the new diet
Note 2 - This is pounds available, not necessarily pounds consumed due to waste and spoilage
Note 3 - Percent column doesn't always equal 100 due to rounding
Note 4 - The Region consists of MN 8 northeastern counties and WI's 7 northwestern counties
Note 5 - 2% was added to the total to account for the acres needed to produce seeds & pl
SAD DIET ASSUMPTIONS - A/B/C/D - Processing represents 60% of the SAD fruit consumed
A/B/C/D - The SAD percents suggested we use a 2.5 multiplyer to determine acres needed
WLS HEALTHY DIET ASSUMPTIONS - A/B/C/D - Processing represents 50% of the WLSHD fruit consumed
A/B/C/D - The WLSHD percents suggested we use a 2.0 multiplyer to determine acres needed
A/B/C/D - 10# Cranberries, 5# Currents, 5# Tart Cherries,4.47# Choke Cherry replaced half (48.93#)
of the Juneberries, Blueberries, Plums, & Sweet Cherry for processing
Final Note - The 2008 Census Estimate of 479,856 was used as our population calculator.

Source: U.S. Department of Agriculture, Economic Research Service,
Food Consumption, Prices, and Expenditures,
Food Availability(Per Capita) Data System;
\<http://www.ers.usda.gov/data/foodconsumption/\>

Standard American Diet (SAD) 121cal/250cal ratio				**Western Lake Superior Healthy Diet**			
Consumption	**#/per.**	**#/region[58]**	**%**	**#/per.**	**#/region[58]**	**%**	Western Lake Superior Healthy Diet was determined by a "task force" of doctors, dietitians, & nutritionist. LAFS Assessment of WLS, HFHLI Grant, Fall 2009
Vegetables, total	**338.6**	**162,470,701.4**	**100.0%**	699.55	335,683,267.0	100.0%	
Fresh vegetables	**151.6**	**72,743,980.3**	**44.8%**	313.21	150,297,479.7	44.8%	
Asparagus (all uses)	0.3	141,057.8	0.1%	0.61	291,441.7	0.1%	
Broccoli	1.4	672,258.0	0.4%	2.89	1,388,962.8	0.4%	
Cabbage	8.0	3,837,517.7	2.4%	16.52	7,928,755.5	2.4%	
Carrots	6.2	2,951,504.4	1.8%	12.71	6,098,149.7	1.8%	
Cauliflower	1.1	544,299.6	0.3%	2.34	1,124,586.0	0.3%	
Celery (all uses)	7.4	3,537,278.7	2.2%	15.23	7,308,427.1	2.2%	
Corn	6.5	3,118,242.2	1.9%	13.43	6,442,649.2	1.9%	
Cucumbers	3.9	1,853,275.9	1.1%	7.98	3,829,082.5	1.1%	
Head lettuce	25.6	12,299,296.0	7.6%	52.96	25,411,768.5	7.6%	
Mushrooms	1.2	576,766.4	0.4%	2.48	1,191,666.0	0.4%	
Onions	11.4	5,461,780.4	3.4%	23.52	11,284,670.3	3.4%	
Snap beans	1.3	630,845.7	0.9%	2.72	1,303,400.1	0.9%	
Bell peppers (all use	2.9	1,384,499.7	0.9%	5.96	2,860,536.6	0.9%	
Potatoes	51.1	24,530,999.2	15.1%	105.62	50,683,882.5	15.1%	
Sweet potatoes (all u	*4.4*		1.3%	9.06	4,349,148.7	1.3%	
Tomatoes	12.8	6,156,212.2	3.8%	26.51	12,719,446.7	3.8%	
Other fresh vegetable	6.0	2,860,979.1	1.8%	12.32	5,911,113.8	1.8%	
Processed vegetables	**187.0**	**89,726,721.2**	**55.2%**	386.34	185,385,787.3	55.2%	
Vegetables for freezi	51.5	24,733,077.6	15.2%	106.49	51,101,399.9	15.2%	
Vegetables for cannin	102.5	49,189,904.0	30.3%	211.80	101,632,032.9	30.3%	
Vegetables for dehydr	10.5	5,061,552.6	3.1%	21.79	10,457,753.2	3.1%	
Potatoes for chips	16.5	7,911,375.1	4.9%	34.06	16,345,816.3	4.9%	
Pulses	5.9	2,830,812.0	1.7%	12.19	5,848,785.1	1.7%	
		Ratio Multiplier	2.0661157				
Fresh vegetables							
Asparagus (#4,400/acre)[15]		32.1	acres		66.2	acres	
Broccoli (#7,300/acre)[15]		92.1	acres		190.3	acres	
Cabbage(#13,700/acre)[15]		280.1	acres		578.7	acres	
Carrots(#19,400/acre)[15]		152.1	acres		314.3	acres	
Cauliflower(#10,800/acre)[15]		50.4	acres		104.1	acres	
Celery (#32,000)[15]		110.5	acres		228.4	acres	
Corn (#6200)[15]		502.9	acres		1,039.1	acres	
Cucumbers (#8400)[15]		220.6	acres		455.8	acres	
Head lettuce (#9100)[15]		1,351.6	acres		2,792.5	acres	
Mushrooms (#650)[52]		887.3	acres		1,833.3	acres	
Onions (#19,800)[15]		275.8	acres		569.9	acres	
Snap beans (#4600)[15]		137.1	acres		283.3	acres	
Bell peppers (#6900)[15]		200.7	acres		414.6	acres	
Potatoes (#15,200)[15]		1,613.9	acres		3,334.5	acres	
Sweet potatoes (all uses)		x	x		x	x	
Tomatoes (#11,000)[15]		559.7	acres		1,156.3	acres	
Other fresh vegetables(#10,840)		263.9	acres		545.3	acres	
Processed vegetables							
Vegetables/freezing(#10,840)[15]		2,281.6	acres		4,714.2	acres	
Vegetables/canning(#10,840)[15]		4,537.8	acres		9,375.6	acres	
Vegetables/dehydrating(#10,840)		466.9	acres		964.7	acres	
Potatoes for chips (#15,200)[15]		520.5	acres		1,075.4	acres	
Pulses (#3,400)[15] average beans &		832.6	acres		1,720.2	acres	
		15,677.8	**acres**		32,392.1	acres	

Note 1 - For other, freezing, canning and dehydrating the average vegetable yield of 10,840 lbs/acre was used
Note 2 - Vegetable yields per/acre are above and below these numbers. Difinitive numbers is debatable
Note 3 - Sweet Potato is a marginal crop for this northern climate and it has been removed from the totals
Note 4 - There are some "other" crops that are very productive per acre that could reduce the overall acerage
Note 5 - 2% was added to the total to account for the acres needed to produce seeds & plants for farming.
Final Note - The 2008 Census Estimate of 479,856 was used as our population calculator.

Source: U.S. Department of Agriculture, Economic Research Service,
Food Consumption, Prices, and Expenditures,
Food Availability(Per Capita) Data System;
\<http://www.ers.usda.gov/data/foodconsumption/\>

Standard American Diet (SAD)	626cal/**480cal** ratio		**Western Lake Superior Healthy Diet**		
Crop Consumption	#/per.	#/region[58] %	#/per.	#/region[58]	%
Flour and cereal produc	192.8	92,537,327.9 99.40%	147.9	70,955,139.3	100.0%
Wheat flour	134.5	64,533,433.3 69.74%	94.6	45,411,289.1	64.0%
Rye flour	0.0	0.0 0.00%	3.0	1,419,102.8	2.0%
Rice, milled	20.7	9,925,053.2 10.73%	x	x	x
Corn products	31.9	15,307,406.4 16.54%	22.2	10,643,270.9	15.0%
Oat products	4.6	2,216,347.7 2.40%	7.4	3,547,757.0	5.0%
Barley products	0.0	0.0 0.00%	13.3	6,385,962.5	9.0%
Wild Rice			5.2	2,483,429.9	3.5%
Quinoa			1.5	709,551.4	1.0%
Amaranth		Ratio Multiplier .766773	0.7	354,775.7	0.5%
Wheat(54.93Bx60=3296# acre)[7]		19,579.3 acres		13,777.7	acres
Rye (34Bx56=1904# acre)[25]		0.0 acres		745.3	acres
Corn(121.57x56=6808#acre)[7]		2,248.4 acres		1,563.3	acres
Oat (62.11Bx32=1987# acre)[7]		1,115.4 acres		1,785.5	acres
Barley(59.42x48=2852# acre)[7]		0.0 acres		2,239.1	acres
Wild Rice (296# acre)[53]			¼ growr	2,097.5	acres
Quinoa(1572# acre)[26]		0.0 acres		451.4	acres
Amaranth(1000# acre)[27]		0.0 acres		354.8	acres
		23,402.1 acres		23,474.9	acres

Western Lake Superior Healthy Diet was determined by a "task force" of doctors, dietitians, & nutritionist. LAFS Assessment of WLS, HFHLI Grant, Fall 2009

Note 1 - Pounds available, not necessarily consumed due to waste and spoilage
Note 2 - % column doesn't always equal 100 due to rounding
Note 3 - The Region consists of MN 8 northeastern counties and WI's 7 northwestern counties
Note 4 - This is grain directly consumed by people, not the grain that is grown for livestock.
Note 5 - Wheat, Oats, Barley, Corn figures from The mtg.org Report
Note 6 - Spring/Summer wheat and corn were averaged from 3 data points from The 2008 NE Report
Note 7 - Whole Grains Rice levels are realized equally with Amaranth, Quinoa, Wild Rice and Barley
Note 8 - Wild Rice natural production should be preserved and protected for their huge food benefi
Note 9 - The Wild Rice grown should not be genetically modified so as to preserve the native speci
Note 10 - 2% was added to the total to account for the acres needed to produce see
Final Note - The 2008 Census Estimate of 479,856 was used as our population calculator.

Source: U.S. Department of Agriculture, Economic Research Service,
Food Consumption, Prices, and Expenditures,
Food Availability(Per Capita) Data System;
\<http://www.ers.usda.gov/data/foodconsumption/\>

Standard American Diet (SAD) 710cal/250cal ratio				**Western Lake Superior Healthy Diet**		
Consumption	**#/per.**	**#/region**	**%**	**#/per.**	**#/region**	**%**
Total, fat content only	**84.5**	**40,550,967.3**	99.7%	29.76	14,278,506.5	99.7%
Butter (product weight)	4.7	2,263,186.3	5.6%	1.66	796,896.4	5.6%
Margarine (product weight)	4.6	2,192,491.1	5.4%	1.61	772,003.7	5.4%
Lard (direct use)	1.7	800,524.0	2.0%	0.59	281,874.6	2.0%
Edible beef tallow (dire	3.9	1,861,396.8	4.6%	1.37	655,421.3	4.6%
Shortening	24.9	11,924,800.9	29.4%	8.75	4,198,872.6	29.4%
Salad and cooking oils	44.5	21,370,553.4	52.7%	15.68	7,524,841.1	52.7%
		Ratio Multiplier	0.3521126			
Butter (product weight)		Acres in Dairy Data			Acres in Dairy Data	
Lard (direct use)		Acres in Dairy Data			Acres in Dairy Data	
Edible beef tallow (direct use)		Acres in Dairy Data			Acres in Dairy Data	
Total, vegetable oil pound	**9.6**	gallons (74#/7.7)		3.4	gallons (26#/7.7)	
Margarine, shortening, salad & cooking oil by priority below						
Soybean Oil (48 gal/acre)[22]	55.61%	53,427.3 acres		x	x	x
Canola Oil (127 gal/acre)[22]	11.16%	4,052.4 acres		80.00%	10,206.6 acres	
Flax Seed Oil (51 gal/acre)[22]	x	x	x	8.00%	2,541.6 acres	
Hemp Seed Oil (39 gal/acre)[22]	x	x	x	1.00%	415.5 acres	
Sunflower Seed Oil(102 g/a)[2]	1.72%	777.6 acres		11.00%	1,747.4 acres	
Corn (18 g/a)[22]	5.61%	14,372.8 acres		x	x	x
Olive Oil (129 gal/acre)[22]	1.95%	x	x	x	x	x
Coconut	3.59%	x	x	x	x	x
Cottonseed	2.26%	x	x	x	x	x
Lard	2.59%	x	x	x	x	x
Palm	7.50%	x	x	x	x	x
Palm kernel	2.24%	x	x	x	x	x
Peanut 2/	0.85%	x	x	x	x	x
Safflower	0.34%	x	x	x	x	x
Sesame	0.08%	x	x	x	x	x
Tallow, edible	4.50%	x	x	x	x	x
%Oil/Plant Type - USDA[62]	100.00%			100.00%		
Total Regional Acres Needed		**74,082.8 acres**			15,209.3 acres	

Western Lake Superior Healthy Diet was determined by a "task force" of doctors, dietitians, & nutritionist. LAFS Assessment of WLS, HFHLI Grant, Fall 2009

Note 1- Calculations example… Soybeens .5561*9.6 gal = 5.33856 gal/48 gal acre = .11122 acres per person
Now take this .11122 acres per/person x 479,856 (regional population) = 53,427.3

Note 2 - The % totals do not always equal 100 due to rounding issues

Note 3 - Some of the oil by-product includes a mash that is used as a livestock suppliment

Note 4 - The oil selections for the new diet address both health issues and the crops ability to grow here.

Note 5 - The Butter, Lard and Edible beef tallow's direct use is included in the dairy and meat data sets.

Note 6 - These numbers include loss and waste reducing the total average actually consumed

Note 7 - A conversion rate of 7.7# per gallon was used to connect consumption to production numbers

Note 8 - The SAD acreage includes 74.1% of the oil used and the WLSHD inludes 100% of the oil needed

Note 9 - 2% was added to the total to account for the acres needed to produce seeds & plants

Final Note - The 2008 Census Estimate of 479,856 was used as our population calculator.

Source: U.S. Department of Agriculture, Economic Research Service,
Food Consumption, Prices, and Expenditures,
Food Availability(Per Capita) Data System;
\<http://www.ers.usda.gov/data/foodconsumption/\>

Standard American Diet (SAD) 459cal/0cal ratio				**Western Lake Superior Healthy Diet**			
Consumption	**#/per.**	**#/region**[58]	**%**	**#/per.**	**#/region**	**%**	Western Lake Superior Healthy Diet was determined by a "task force" of doctors, dietitions, & nutritionist. LAFS Assessment of WLS, HFHLI Grant, Fall 2009
Caloric sweeteners, total	138.9	66,644,025.8	98.9%				
Sugar, refined cane and beet	62.3	29,907,828.5	44.9%				
Corn sweeteners	75.0	35,989,536.2	54.0%				
High fructose corn syrup	58.2	27,916,310.1					
Maple Syrup	x	x	x				
Honey	x	x	x				
Production/acreage							
Sugar (cane 45% cannot grow in MN)[45]		x	x				
Sugar (Beet 55% 46,720 x .17 #/acre)[45 & 50]		2,071.1 acres					
Corn Sweeteners Total		10,499.7 acres					
Corn Syrup (1.77 #Corn/1.0 #HFCS)[45 & 47]							
Maple Syrup (0.18 lbs/person)[45 & 48]		x	x				
Honey (1.42lbs/person)[45 & 48]		x	x				
		12,822.2 acres			0.0 acres		

Note 1 - WLSHD does not include added sugars in this diet

Note 2 - The "Healthy Diet Task Force" did recognize that sugars may be desired and offered Maple Syrup and Honey as options

Note 3 - % column doesn't always equal 100 due to rounding

Note 4 - The "Healthy Diet Task Force" did recognize that sugars may be the last part of the diet to localize

Note 5 - 95% of beets grown in the US are now genetically modified plantings

Note 6 - % beet vrs cane sugar consumption is based on US production levels (What we actually consumes may be different

Note 7 - Corn/HFCS ratio was taken from Table 30 of USDA divided into Induatrial Use of Corn, (HFCS) numbers

Note 8 - Total Corn Sweeteners used Corn/HFCS calculation to determine acres needed

Note 9 - State production of Maple Syrup & Honey divided by the population resulted in these numbers

Note 10 - 17% sugar content was used for the beet to sugar conversion calculations

Note 11 - 2% was added to the total to account for the acres needed to produce seeds & plants for planting.

Final Note - The 2008 Census Estimate of 479,856 was used as our population calculator.

Appendix E.

Food Consumption and Economic References

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Appendix F. Economic Calculations

Total amount of money spent on food in our region each year ~ $1,268,259,400
2006 Food Cost (CU) = $6,608/ 2.5 people per (CU) = $2,643 per capita * 479,856 population or our region (2008 Census)

The farmers share of this food dollar ~ $240,969,290
USDA estimates that 19 cents of every food dollar spent goes to the farmer. If we take the total food dollar spent each year at $1,268,259,400 and * .19 we obtain the value of $240,969,290 for the farmers share.

The farmers current local share of locally grown and consumed foods ~ $13,531,980
The 2007 Agricultural Census calculated our regions farm product sales at $193,314,000. Through our study, our best estimate for the percent of food that was both locally grown and consumed is about 7%. Most areas around the country suggest 5% locally grown and consumed to be a typical value due to research that came out of the Leopold Center, IA. After an interview with the APPI Dairy Coop, it was determined that 7% is the most likely amount, by weight, that is both grown and consumed locally. The remaining farm products grown in our regions must either leave the regions or be for non-human consumed products i.e. hay, horses, wool, biomass etc. The resulting calculation took the census number of $193,314,000 * .07 (7%) = $13,351,980

The farmers potential local share of this regions annual food dollar ~ $227,437,310
Take the total of the farmers share of the regions food dollars $240,969,290 – (subtract) the estimated current farmer value of locally grown and consumed foods $13,531,980 and we arrive at the remaining potential additional farmer share of the local foods dollar.

Additional farms needed to produce 100% of our food locally ~ 7,129 – 7,424
It is likely that some of the locally grown products would come from existing farms but if all of the current farms maintained their current production and patterns of sales, we would need these additional farms. To estimate that we would need to add 7,129 new farms, I simply divided the total remaining food value of $227,437,310 by the average farms income in the 2007 census of $31,903. The estimate of 7,424 new farms, I used prominent and successful crop and livestock farms as models to help size the farms more appropriately to our region. As example, 100 acres was used for the production of meat animals, 10 acres for a vegetable operation and 40 acres for fruit nuts and seed farming. These numbers were divided into the total acres needed for each product and the resulting number emerged. These two completely separate methods resulted in similar numbers.

The non-farms share of this food dollar ~ $1,027,290,110
Total food dollar spent in this region is $1,268,259,400 – (subtract) the 19 cents on the dollar or farmers share of $240,969,290 and you end up with the non-farmer portion of the food dollar at $1,027,290,110. Some of this food dollar is currently in our region i.e. restaurants, groceries, corner store, owners, workers and buildings. These facilities would shift from imported foods to local foods but the total food dollar value of these operations is accounted for. Other parts of the food dollar are processing, distributing, energy and the labor involved in all of these food system needs is currently outside of our region and could be captured within the regions with a 100% locally grown and consumed food system.

Percent of Food Dollar	
Farm value	19.0
Labor	38.5
Packaging	8.0
Transportation	4.0

Energy	3.5
Profits	4.5
Advertising	4.0
Depreciation	3.5
Rent	4.0
Interest	2.5
Repairs	1.5
Business taxes	3.5
Other costs	3.5
Total	100

Total direct economic impact of a 100% Local Food System ~ $952,559,068
The potential farm income from local products sold for local consumption to meet 100% of the food needs is $227,437,310 + (Add) half of the remaining food dollar (1,027,290,110/2) $513,645,060 for processing, distribution & labor = $741,082,370. According to the Rodale Institute Report, $930 needs to be added to every $1,000 increase in net farm income, our farm income impact would need to increase by $211,516,698. We need to add this amount to the $741,082,370 and we have an economic impact in our region of $952,599,068

Total indirect economic impact of a 100% Local Food System ~ $? MORE
An additional indirect multiplier affect would occure with the processing and distribution industries developed locally. For every job directly needed for the processing of food, .5 additional jobs would be created according to the Rodale Institute Report.

Finally, the economic health cost savings for a WLS Healthy Diet ~ $154,333,640
Our population of about 500,000 people represents 1/600th of this country's 300,000,000 population or a 0.00166667 multiplier. Multiply this number by the 2002 figures of expected health care costs of $92,600,000,000 associated with obesity and this = $154,333,640