The Ronald E. McNair Scholars Program at Portland State University (PSU) works with motivated and talented undergraduates who want to pursue PhDs. It introduces juniors and seniors who are first-generation and low-income, and/or members of under-represented groups to academic research and to effective strategies for getting into and graduating from PhD programs.

The McNair Scholars Program has academic-year activities and a full-time summer research internship. Scholars take academic and skills-building seminars and workshops during the year, and each scholar works closely with a faculty mentor on original research in the summer. Scholars present their research findings at the McNair Summer Symposium and at other conferences, and are encouraged to publish their papers in the McNair Journal and other scholarly publications.

The Ronald E. McNair Post-baccalaureate Achievement Program was established in 1986 by the U.S. Department of Education and named in honor of Challenger Space Shuttle astronaut
Dr. Ronald E. McNair. The program, which is in its seventh year on campus, is funded by a $924,000 grant from the U.S. Department of Education and institutional cost-share funds.

The McNair Scholars Program’s student-centered approach relies heavily on faculty and university commitment. Activities and opportunities provided by the program focus on building a positive academic community for the scholars while they are undergraduates at PSU.
Ronald E. McNair

Ronald Erwin McNair was born October 21, 1950 in Lake City, South Carolina. While in junior high school, Dr. McNair was inspired to work hard and persevere in his studies by his family and by a teacher who recognized his scientific potential and believed in him. Dr. McNair graduated as valedictorian from Carver High School in 1967. In 1971, he graduated magna cum laude and received a Bachelor of Science degree in Physics from North Carolina A&T State University (Greensboro). Dr. McNair then enrolled in the prestigious Massachusetts Institute of Technology. In 1976, at the age of 26, he earned his Ph.D. in laser physics. His dissertation was titled, “Energy Absorption and Vibrational Heating in Molecules Following Intense Laser Excitation.” Dr. McNair was presented an honorary doctorate of Laws from North Carolina A&T State University in 1978, an honorary doctorate of Science from Morris College in 1980, and an honorary doctorate of science from the University of South Carolina in 1984.

While working as a staff physicist with Hughes Research Laboratory, Dr. McNair soon became a recognized expert in laser physics. His many distinctions include being a Presidential Scholar (1971-74), a Ford Foundation Fellow (1971-74), a National Fellowship Fund Fellow (1974-75), and a NATO Fellow (1975). He was also a sixth degree black belt in karate and an accomplished saxophonist. Because of his many accomplishments, he was selected by NASA for the space shuttle program in 1978. His first space shuttle mission launched successfully from Kennedy Space Center on February 3, 1984. Dr. Ronald E. McNair was the second African American to fly in space. Two years later he was selected to serve as mission specialist aboard the ill-fated U.S. Challenger space shuttle. He was killed instantly when the Challenger exploded one minute, thirteen seconds after it was launched. Dr. McNair was posthumously awarded the
Congressional Space Medal of Honor. After his death in the Challenger Space Shuttle accident on January 28, 1986, members of Congress provided funding for the Ronald E. McNair Post-Baccalaureate Achievement Program. Their goal was to encourage low-income and first-generation college students, and students from historically underrepresented ethnic groups to expand their educational opportunities by enrolling in a Ph.D. program and ultimately pursue an academic career. This program is dedicated to the high standards of achievement inspired by Dr. McNair’s life.

Source: mcnairscholars.com
Table of Contents

Letter from the Program Director

The Portland State Scholars

Editorial Board

The Lents International Farmer’s Market: A Case and Comparative Study
Sarah Egan
Margaret Everett, Faculty Mentor

The effects of road culverts on the benthic macroinvertebrate community in a wadeable lotic ecosystems
Travis Peterson
Yangdong Pan, Faculty Mentor

Community Learning Garden Programs in the Portland Area: How do Learning Gardens help low-income families access fresh locally grown food?
Denissia Withers
Lisa Weasel, Faculty Mentor

Misguided Men: International Law and the Closing of Guantanamo Bay
Mike Tonn
David Kinsella, Faculty Mentor
Irene Alvarado

- Major: History
- Mentor: Dr. Friedrich Schuler
- Project Title: “Pushing without Borders: Smuggling Narcotics and Arms in Mexico during the 1930s”

Wes Anderson

- Major: Philosophy
- Mentor: Tom Seppalainen, PhD
- Project Title: “An Alternative Epistemology for Information-based Explanations in Cognitive Science”

Grayce Bentley

- Major: Liberal Studies
- Mentor: Dalton Miller-Jones, PhD
- Project Title: “Learning for Life: Identity and Achievement”
Rebecca X. Casanova
- Major: Community Health Education
- Mentor: Siobhan C. Maty, PhD
- Project Title: “Strength in Numbers? Wisdom about Health and Weight from Lesbians in Portland, Oregon”

Nathania Cha
- Major: Applied Linguistics
- Mentor: Martha Balshem, PhD
- Project Title: “Beyond Autonomy: Studying the Charter School-District Relationship in Portland, Oregon”

Ashley Cunningham
- Major: History
- Mentor: Chris Carey, PhD, JD
- Project Title: “The British Colonial Influence on the Commercial Sex Industry in Dar es Salaam, Tanzania from 1917-1961”

Valerie K. DePan
- Major: Community Development/Housing and Economic Development Graduate Certificate in Real Estate
- Mentor: Gerard C.S. Mildner, PhD
- Project Title: “Community Reinvestment Act of 1977: Revisited”

Cynthia Edison
- Major: Women’s Studies/Liberal Arts
- Mentor: Ann Mussey, PhD
- Project Title: “Lakota w ne heh ya pi” (Lakota women say)

Sarah Egan
- Majors: Sociology and Social Science
- Mentor: Margaret Everett, PhD
- Project Title: “The Lents International Farmers Market: A Case and Comparative Study”
Gene Estrada
- Major: Psychology
- Mentor: Gabriela Martorell, PhD
- Project Title: "The Alluring Altruist: Helping Behavior as a Costly Signal"

Stephanie Haas
- Major: Sociology/Women Studies
- Mentor: Peter Collier, PhD
- Project Title: “Exploring First-Generation College Students’ Usage of Student Support Services: Does Gender Matter?”

Jesse Iford
- Major: History
- Mentor: Richard Beyler, PhD
- Project Title: "The Rise of Professional Society in Relation to the Development of British Social Anthropology During the Era of ‘New’ Imperialism: from Gentlemanly Amateurs to Dedicated Specialists"

Emmalee McDonald
- Major: Community Development, Minor in International Studies.
- Mentor: Ellen Bassett, PhD
- Project Title: “Examining Women’s Land Rights in Rural Southwestern Uganda”

Sergey Ovchinnikov
- Major: Molecular Biology
- Mentor: Mark Fishbein, PhD
- Project Title: “Short Read Assembly Pipeline Using Scripted Filters, De Novo Assembly and Manual Extension of Terminated Contigs”

Travis Peterson
- Major: Environmental Studies
- Mentor: Yangdong Pan, PhD
- Project Title: “The Effects of a Road Culvert on the Benthic Macroinvertebrate Community in a Wadeable Lotic Ecosystem”
Melissa Shaquad Pirie
- Major: Geography
- Mentor: Hunter Shobe, PhD
- Project Title: “Portland’s Peri-Urban Rural Fringe: A Study of Farm production”

William Reynaga
- Major: Political Science
- Mentor: Richard Clucas, PhD
- Project Title: “Military Enlistments and the Correlation with the Recession”

Angela L. Robinson
- Majors: Business Management and Women’s Studies
- Mentor: Priya Kandaswamy, PhD
- Project Title: “LGBTQ Pacific Islanders Negotiating Multiple Identities”

Michael Razavi
- Major: Community Development
- Mentors: Eric Martin M.A.C; Jeff Morotta PhD
- Project Title: “Tobacco, Alcohol, and Gambling Youth Oriented Advertising in Retail Outlets: Results of a Citywide Survey in the Portland Metropolitan Area”

Javier Spyker
- Major: Geography
- Mentor: Thomas Harvey, PhD
- Project Title: “Sustainable Rural Landscapes in the Face of an Expanding Urban Growth Boundary (UGB): How does Farm Size and Proximity to the UGB Affect Sustainable Agricultural Practices in Washington County?”

Jonette Swanson
- Major: Art History
- Mentor: Anne McClanan, PhD
- Project Title: “Teen Mentorship and Education Collaborations with Art Museums”
Jodi Lee Swartfager
- Major: Community Development
- Mentor: Barry Messer, PhD
- Project Title: “Rules of the Road: An Analysis of Road Users’ Perceptions about Urban Traffic Scenarios”

Alexis Thompson
- Major: Environmental Science
- Mentor: Richard White, PhD
- Project Title: “Perceived Benefits of an ICDNGO”

Michael Tonn
- Major: Political Science
- Mentor: David Kinsella, PhD
- Project Title: “Misguided Men: International Law and the Closing of Guantanamo”

Jason M. White
- Major: Psychology
- Mentor: Peter Collier, PhD
- Project Title: “Aiming High: Explorations into About-to-Graduate Undergraduates’ Understandings of the Graduate Student”

Denissia Withers
- Major: Liberal Studies
- Mentor: Lisa H. Weasel, PhD
Editorial Board

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Holly Hernandez, Graduate Assistant
The Lents International Farmer’s Market: A Case and Comparative Study

Sarah Egan

Dr. Margaret Everett

McNair Scholars Program

Portland State University

9/13/09
Abstract

The Lents neighborhood is a designated urban renewal area that has historically lacked access to ample grocery stores offering fresh produce. The Lents International Farmer’s Market enhances health and community by providing a community space to purchase fresh fruits and vegetables. Examining the Lents International Farmer’s Market is an invaluable opportunity to learn more about consumer shopping behavior and market expectations. This study also seeks to identify vendor opportunities and barriers when establishing themselves as retailers at Lents International Farmer’s Market. From both a business and consumer perspective, it is crucial for the market’s survival to gain a sense what is and is not working. Information obtained through customer surveys and structured vendor interviews could benefit the market and help secure its longevity in the Lents neighborhood. This market could also serve as a model to be replicated in other similar neighborhoods should it remain successful. Additionally, I will be comparing data from the Lents International Farmer’s Market to data collected from the more affluent Moreland Farmer’s Market, to compare information that comes from different demographic areas in Portland.

Research Questions

What are the opportunities and challenges facing vendors when establishing themselves at the Lents International Farmer’s Market and the Moreland Farmer’s Market? What are the buying habits and food values of the customers at these markets?
Introduction

Access to nutritious food should not be an issue for people residing in any neighborhood. However, many urban American communities do not have access to healthy food choices, either due to a scarcity of retail outlets or economic inability to purchase such foods. When Americans began to migrate out of urban areas into the suburbs, a number of supermarkets also relocated to the suburbs. Many urban centers were left without desirable and affordable places to purchase food. This type of urban transformation dotted the urban landscape with what are now called food deserts.

In the article “The Geography of Eating Well” author Joy Margheim (2007) stated, “In the mid 1990’s, British researchers coined the term food desert to describe neighborhoods with a combination of concentrated poverty, limited public transportation, and few or no retail stores” (2007, pg. 14). The absence of full service supermarkets has created ample opportunities for fast food restaurants and convenience stores, which can dominate low-income urban areas. Diets high in processed foods have been linked to chronic disease and obesity, which creates a great public health concern in communities that are abundant with unhealthy places to purchase food.

Literature compiled on food deserts provided different findings that were dependent on the geographical location of each individual study. It appears that America suffers from higher rates of inequitable food access than other industrialized nations. For example, studies conducted in Glasgow in 1999 and Montreal in 2007 found no significant difference in food access for those living in poor or more affluent neighborhoods. (Apparicio 2007; Cummins, 1999). However, an American study
published in the *American Journal of Preventive Medicine* in 2001 concluded that food access might not be equal depending on where one lives. (Moreland, 2001, pg. 28). Author of the book titled *Closing the Food Gap* Mark Winne (2008) stated the “lack of access to affordable supermarkets is rising to the top of the list of public health concerns” (pg. 92). According to the literature, it appears that food deserts are more prevalent in the American landscape than abroad, and that this continues to be an issue for people in the United States.

While safety and concern over profit may deter major supermarkets from opening new venues in so called “food deserts”, the placement of farmers’ markets in areas where access to food is a challenge can provide opportunities for residents to purchase seasonal, fresh foods directly from local farmers. Demand has become increasingly high for farmers’ markets, and according to the United States Department of Agriculture (USDA) website (2009) there were 1,755 farmers markets in operation, and in 2008, that number has increased to 4,685. These markets are a valuable way to promote nutritional health, enhance community, and support local agriculture and economies.

Farmer’s markets have existed in the United States for many years. These markets traditionally sell fruits and vegetables, but some markets sell dairy, meat, and specialty items too. The popularity of farmers’ markets has fluctuated over time. Changing attitudes regarding food and concern over food safety are just a couple of possible reasons that the markets are once again in high demand. With the wave of new farmer’s markets opening all over the country, technology has also made its way into the markets. Vendors now have the ability to accept WIC (Women, Infants and Children) coupons, food stamps, debit cards, and Senior Farmer’s Market Nutrition Program checks. Greater
variety in payment options allow customers multiple methods of purchasing food, which in turn can possibly increase customer traffic and diversify the customer base. Most farmers’ markets are open on the weekends during the main growing season, weekdays, evenings, and some operate year round.

**Why study the Lents International Farmer’s Market?**

The Lents neighborhood in southeast Portland has struggled with a lack of food access. As the atlas map shows (see Appendix 1), there are several full service grocery stores along the borders of the Lents community. Depending on where one lives, getting to one of these locations could be difficult, especially without a personal vehicle or reliance on public transportation. Also worth noting are the number of convenient stores and fast food restaurants. Given this context, the Lents International Farmer’s Market that was established in 2007 could prove quite beneficial to its residents. Since the market is still relatively new, a case study on the Lents International Farmer’s Market is needed as a way to check in with the customers and vendors. Its importance to the neighborhood should not be underestimated; therefore, anything that can be done to enhance or improve the market should be considered.

**Case Studies of Farmer’s Markets**

A number of case studies have been conducted on farmers’ markets. Some studies were focused on low-income farmer’s markets, while others looked at mixed-income markets. A vital theme in any farmer’s market study is community. Without support from the local residents, any farmer’s market is destined to have a shaky future. In particular,
in reviewing these studies, I sought information pertaining to successes, failures and
cultural relationships at the markets. Since the case study I am conducting is looking to
find what is working and what can be improved, reviewing what other scholars have
discovered about farmer’s market is a great asset to this study.

The study “Managing Farms and Consumer Expectations: A study of a North
on the relationship and culture between farmers and consumers. The study aimed to
provide information regarding customer’s purchasing habits, and obtain information that
can be used to improve the market. Through interviews and focus groups with farmers
and personal interviews with consumers, the study concluded that farmers and vendors
could have complications with the market policies and rules, resulting in dissatisfaction.
The researchers generally found that reasons that the consumers shopped at the market
included “…an interest in fresh, locally grown produce, a desire to support local farmers
and local farm economy, an interest in cooking with seasonally available foods, and
enjoyment of the market atmosphere.” (2002, pg.175). This article served as a model for
my study, as I chose to conduct vendor interviews and consumer surveys in order to gain
a sense of how the Lents International Farmer’s Market is doing.

Lloyd, Nelson and Tilley (1987) describe the three stages in the development of
farmers’ markets. Stage one is a time of instability, when a market is trying to secure its
longevity, and like many businesses, spends a couple of years in this stage. Stage two
occurs when the market has obtained a variety of vendors, including farmers and
gardeners, and produce is the main product being sold. Finally, stage three happens when
the market has gained a base of regular shoppers, and the volume of produce that the
market sells has grown. (Lloyd, Nelson, and Tilley 1987, cited in Andreatta, 2002, pg. 169). This information is useful when looking at specific farmer’s markets because it can help one identify the characteristics of the markets and to figure out what stage it is currently in and help researchers better assess the market.

A lengthy case study titled “Hot Peppers and Parking Lot Peaches: Evaluating Farmers’ Markets in Low Income Communities” was published in 1999. This study looked at 8 case studies of farmer’s markets from California to the Bronx. The study first looked at four markets that had failed, and examined why they had failed. The successful cases were then reviewed, also describing why these markets were able to gain success in their communities.

One of the failed cases was in Van Nuys, California. This market existed for only 6 months. Part of the reason for its failure was that “unlike other successful low-income markets, the Van Nuys Market was unable to attract middle class Anglos from surrounding communities, which could have subsidized the market in its infancy” (Fisher, 1999, pg. 11). Other explanations were that there was already an inexpensive food store close by, high prices at the market, and that the direct community did not embrace the market enough. Issues of safety were also noted, as the neighborhood had been known to have gang activity.

Another case of a failed market was also in California, the Alvarado Certified Farmer’s Market in Los Angeles. Despite the good intentions of three people who tried to get this market going, the market was only open for 10 days in the spring of 1996! The reasons cited for this failure were that the community failed to show interest, poor location, and ineffective management.
It is also equally important to look at the successes of low-income farmers’ markets. “Hot Peppers and Parking Lot Peaches: Evaluating Farmers’ Markets in Low Income Communities” reported on some successful farmer’s market stories. At the Poe Park market in the Bronx, a market subsidized by the city, looked as if it was headed toward failure. However, this was not to be the case. Reasons for its success were that local residents worked as staff, and the added diversity of Spanish speakers and an African American farmer helped to draw in more residents. Although initially businesses were not thrilled about having the market nearby, they eventually realized that their sales were better on market days. A WIC Farmers Market Nutrition Program for women, infants, and children program was started, and now 70% of purchases at this market are made with these checks. (Fisher, 1999, pg. 24). Bringing in ample sales, these coupons remain a major reason for its continued success.

Finally, the San Francisco “Heart of the City” market did not look like it would initially be successful. Despite its tense relationship with area businesses and the city, and its less than desirable location, the market did survive. The primary reason for starting this market was to address the lack of food access in the community. (Fisher, 1999, pg. 31). Beginning in 1981, the market now has approximately 60 farmers in the summer and 30 farmers in the winter, and the market managers control the products that are sold there so that there is not too much of the same thing. A great variety of fresh produce is available there, including many Asian foods to serve the large Asian population in the area. Processed foods are not available at this market. The prices are also quite good, which has added to the success of the market.
A study titled “Working Toward a Just, Equitable Local Food System” was published in *Social Science Quarterly* in December of 2008. Author Thomas Macias examined three different systems of local agriculture: Community Supported Agriculture (CSA’s), organic local farms, and community gardens. With these three different agricultural methods, Macias studied how they affect the local population through three sociological principles: food equity, social integration, and natural human capital. Through a qualitative approach, the study was conducted with personal interviews, direct observation, and direct participation. The results of the study reflect that due to social class, the level of participation in local agriculture vary. The researcher suggests that more research in this field should be conducted in order to allow more equal access to local agriculture. (Macias, 2008, pg. 1099).

The findings regarding the organic market farms were interesting because Macias (2008) found that social integration was high at the farmers’ markets, low in human capital, and mixed in terms of food equity. (pg. 1097). I believe that this was due to the fact that organic farmers sell to high-end consumers as well as a diverse mix of people at the local markets. It was also mentioned that the farmer’s spent one day a week in a lower income neighborhood where much of their revenue came from “farm-to-family coupons.” While I believe that this group sought to include people of all incomes, this clearly represents the challenge of getting healthy, nutritious food into the hands of everyone. On a community-based level, much socialization occurred at the farmers’ markets bringing together the residents and achieving a cohesive community is vital in having a farmer’s market remain successful.
A local study conducted by Garry Stephenson and Larry Lev (2004) compared two close but different communities and measured their level of support for locally grown food. These researchers studied the towns of Albany and Corvallis, Oregon, and find that both communities are supportive of local agriculture. By mailing out surveys to both Albany and Corvallis residents, Stephenson and Lev were able to collect consumer data regarding local agriculture and shopping habits. While the demographics of each community vary, the study concluded that local agriculture was important to both communities. Garry Stephenson concluded, “The results indicate that there is potential for the development of more localized food systems in both communities” (2004, pg. 216). Given these results, both markets in Albany and Corvallis are likely to maintain success due to the community support of local agriculture.

In conclusion, the literature demonstrates the barriers and opportunities regarding farmers’ markets. Several themes have appeared as a result of examining the literature. First of all, community is truly one of the most important factors in maintaining a successful market. If people don’t shop there, the market will cease to exist. Location, price control, and having a diverse mix of farmers and customers have also seemed to work well for the markets that have succeeded. Socially and culturally, it is important to get fresh fruits and vegetables into the hands of the entire community, therefore some subsidizing and community outreach may also need to be taken into consideration. Establishing a relationship with the city and having the community greatly involved in market happenings also seems to create greater social integration and enhance the success of the markets. My study will compare two farmer’s markets that reside in different neighborhoods, Moreland, being more affluent and not lacking in food access, and Lents,
which has lacked food access and it is not as affluent. By analyzing consumer surveys and vendor interviews, this study will attempt to find out what people are saying about these markets, in regards to shopping behaviors, opportunities, and barriers. This will add to the literature on farmers’ markets in different demographic areas.

**Theory and Methodology**

During the month of July 2009, the height of the growing season, I used quantitative and qualitative research methods to study the Lents and Moreland Farmer’s Markets. I observed, took photographs, and generally described the settings of the both the Moreland Farmers market and the Lents International Farmer’s Markets. I confirmed approximately how many vendors are present at each market, what types of products were being sold, and also looked at parking and transit opportunities. Having these accurate descriptions of each market enhanced the study because introduced the audience to each market through imagery and description.

To learn consumer values and opinions of the consumers, I used convenience sampling to survey customers while they were at the market. Convenience sampling was used in order to find customers to take the survey, as well as to obtain vendor interviewees. According to Anthropology professor H. Russell Bernard (2006) “Convenience sampling is a glorified term for grabbing whoever will stand still long enough to answer your questions” (2006, pg. 191). However, my study paid a bit more attention to detail. Stationed inside of both the Lents and Moreland Farmer’s Markets, I was able to target a specific population of farmer’s market shoppers. Customers that I
sought to survey were those who appeared over the age of 18 who had visibly made a purchase at the market.

The survey instrument (see Appendix 2) was one page front and back, and did not take more than 5 minutes for anyone to complete. The majority of the questions were check box questions, with only several allowing space for comments. I chose to do this for easier analysis and ease of completing the survey promptly at the busy market. As an incentive for completing the survey, I held a raffle each day I was at the market for all customers that took the survey, with a prize of $10 in farmer’s market tokens that could be redeemed at the participating farmer’s market. I surpassed my goal of obtaining at least 30 surveys from each market.

In order to obtain vendors available for interviews, I first asked the market managers of both the Lents and Moreland Farmer’s Markets for recommendations. I wanted to be sure to obtain an established vendor (of more than 1 season) and a new vendor (first season at the market). I interviewed 3 vendors for the study. Two interviews have been conducted with vendors from the Moreland Farmer’s Market, and one vendor interview from Lents. These were semi-structured personal interviews that did not take more than one hour to conduct.

Community Demographics

The following tables will describe the different physical and demographic characteristics of the Lents and Moreland neighborhoods. This information is from the 2000 U.S. Census, the most current data available at this time. Having this data available is helpful when comparing survey results of the two markets.
### Physical Area (in acres)

<table>
<thead>
<tr>
<th></th>
<th>Lents</th>
<th>Moreland</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1,943</td>
<td>1,157</td>
</tr>
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### Population (in thousands)

<table>
<thead>
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<th></th>
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<th>Moreland</th>
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<tbody>
<tr>
<td></td>
<td>15,570</td>
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### High School Graduates (in thousands)

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<th>Moreland</th>
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<tr>
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<td>3,142</td>
<td>1,313</td>
</tr>
<tr>
<td></td>
<td>28%*</td>
<td>15%*</td>
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### Population with a 4 year College Degree

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<td>751</td>
<td>2233</td>
</tr>
<tr>
<td></td>
<td>6%*</td>
<td>26%*</td>
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</table>

### % Of Population below Poverty Line

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<tr>
<th></th>
<th>Lents</th>
<th>Moreland</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>15.49%</td>
<td>10.22%</td>
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</table>

### Housing Demographics

<table>
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<th>Med. Home Value</th>
<th>Occupied Units</th>
<th>Vacant Units</th>
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<tr>
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<td>5,576</td>
<td>438</td>
</tr>
<tr>
<td>Moreland</td>
<td>$171,636</td>
<td>5,159</td>
<td>229</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th></th>
<th>Owner</th>
<th>Renter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lents</td>
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<td>2,564</td>
</tr>
<tr>
<td>Moreland</td>
<td>2,682</td>
<td>2,471</td>
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</tbody>
</table>

Source: 2000 U.S. Census
Portland by Neighborhood Census 2000: Median Household Income

<table>
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<th>Community</th>
<th>Median Household Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lents</td>
<td>$17105-37, 574</td>
</tr>
<tr>
<td>Moreland</td>
<td>$37, 575-$44, 285</td>
</tr>
</tbody>
</table>

Source: Getting to Know Lents
*For map, please see Appendix 3

Percent of Population Earning $125K or More

<table>
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<th>Community</th>
<th>Percent</th>
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<tbody>
<tr>
<td>Lents</td>
<td>1.80%</td>
</tr>
<tr>
<td>Moreland</td>
<td>5.30%</td>
</tr>
</tbody>
</table>

Source: Regional Equity Atlas


*Percentages of High School and College Graduates were calculated by only using the number of residents in each neighborhood that reported being 18 years or older.

As these demographics show, there are slight differences in these communities, particularly in poverty levels and educational attainment.

Market Descriptions

Lents International Farmer’s Market

The Lents International Farmer’s Market is located in southeast Portland, on SE 92nd Ave. and Foster Rd. The market is currently in its third season, and now has approximately 15-20 vendors. As this is not a year round market, there is no covered area, just an open, grassy space. Market hours are Sundays from 9-2 from mid-May-October. Approximately 10-15 tents are set up at each Sunday, and usually one or two are
a rotating community member that provides information about a specific topic. For example, one week that I was present at the market there was someone providing information about not using pesticides, while another week there was a representative from the Community Cycling Center. The topic varies from week to week.

Food tents are usually produce, however there is one bakery, as well as several prepared food tents as well. Beautiful plants and flowers for sale are in abundance at the Lents International Farmer’s Market. Demonstrations are a theme at each market as well, cooking or urban farming are popular topics. Musical acts are normally booked in the afternoon, adding variety to the normal hum of the market.

The information booth is the place to visit if one wants to sign up to volunteer, snag up flyers for upcoming events, or to purchase farmer’s market currency with either a debit card or the Oregon Trail food stamp card. WIC vouchers and Senior Farmer’s Market Nutrition vouchers can be used if the vendor has been through an application process and been granted approval. One other great feature that I discovered that Lents offers is a free rides program. If people express a need or desire to be picked up and brought to the market, the Lents International Farmer’s Market has obtained a bus that can transport people to and from the market if the customer lives within a certain boundary.

**Moreland Farmer’s Market**

The Moreland Farmers Market is located in a bustling little area in inner southeast Portland. This market is in a parking lot on SE 14\textsuperscript{th} and Bybee. It is slightly larger than the Lents market, and has ample parking for customers, utilizing a parking lot of a nearby funeral home. This market commences every Wednesday from 3:30 to 7:30, from mid-
May through September. At last count, there were approximately 30 vendors selling at this market. The product mix is slightly more diverse at this market. While the majority of the market booths sell fruits and vegetables, there are several vendors who have diversified. For example, one vendor sells treats specifically for dogs, while another performs massage, and another sharpens knives!

Results

Part 1: Quantitative Analysis

To complete the data collection process, I have collected 35 customer surveys from the Moreland Farmer’s Market, and 38 customer surveys from the Lents International Farmer’s Market. On the survey instrument (see Appendix 2), 17 questions were asked, and an area for consumer comments was provided. In examining the quantitative data, some interesting results have been discovered.

To begin, one theme that was very apparent is that the majority of survey takers were women. In fact, at the Moreland Farmer’s Market, only 8 respondents were male (23%). At the Lents International Farmer’s Market, 10 of the respondents were male (26%), leaving 28 of the survey takers female (74%). Was it that more women frequent the market than men? Is it because I am female so women were more inclined to approach and speak to me? Unfortunately, these are research questions that I did not account for in the study. However, they are interesting results.

When asked whether or not this was their first time at either of the farmer’s markets, many reported that it was not their first time, indicating that there are many repeat customers at both markets. At the Lents International Farmer’s Market, 9 people
were first time customers at the market (24%), and 29 consumers had previously attended the market (76%).

At Moreland, the story is similar. Only 5 customers recorded that it was their first time at the market (14%), while the remaining 30 had visited the market previously (79%). To get a sense of how many times customers had previously shopped at the market, I asked a contingency question on the questionnaire. At Moreland, 7 reported having visited between 1-5 times (20%), 9 people reported that they had been at the market 5-10 times before (26%), and 13 respondents stated they had been there more than 10 times (29%). The data regarding this matter is relatively evenly distributed, representing a good mix of people, from newcomers to seasoned shoppers.

I was interested in finding out how far customers were traveling to get to the market. At the Lents International Farmer’s Market, the number of respondents stating they traveled 5 miles or less was a bit higher at 33 people (87%). Only one person reported traveling between 5-10 miles (3%), and 4 people stated that they had come more than ten miles to get to the market (11%). At the Moreland Farmer’s Market, a smaller community, 28 respondents reported traveling 5 miles or less to shop at the market (80%). 6 customers traveled between 5-10 miles (17%), and just one person traveled more than 10 miles to get to the market (3%). This data shows that both of these markets are clearly serving their local communities, as the majority of respondents didn’t have to travel a long distance to come to the market.

Interestingly enough, although many respondents reported not traveling a long distance, many people reported that they drove their cars to get to the market. Out of 38 people surveyed at Lents, 24 of those arrived at the market via personal automobile
(63%), while 10 walked or bicycled (26%), 2 took public transportation (5%), and 2 obtained “other” methods of arriving to the market (5%). At Moreland, 20 consumers drove personal vehicles (57%), 13 walked or bicycled (37%), 1 person took public transportation (3%), and one person arrived with “other” means (3%). Over 50% of people at both markets drove personal vehicles. The results demonstrate that both of these markets seem to be well attended by those residing in the neighborhood, although the main method of getting to and from the market is the personal automobile.

Another element of the farmer’s market study that I thought would greatly assist the market managers is to find out why people attend the markets. On the survey, I allowed for customers to check all that apply, so the total number of selections is more than the 38 customers that took the survey. At the Lents International Farmer’s Market, there were 8 selections for atmosphere (22%), 32 selections for purchasing food (52%), 4 selections for meeting friends (7%), and 10 selections for educational/entertainment purposes (17%). In addition, there were 2 selections of other (2%). At the Moreland Farmer’s Market, there were 13 selections for atmosphere (28%), 25 selections for purchasing food (53%), 6 selections for meeting friends (13%), and 3 selections for education/entertainment (6%). The data suggests that purchasing food is the main reason that people come to the farmer’s markets; however there were a number of selections for the other categories, suggesting that entertainment, atmosphere, and socializing are other reasons that people come to enjoy the markets. For charts, please see Appendix 4, Figures 1 and 2.

Consumers were also asked what type of stores they tend to conduct most of their food shopping. At the Lents International Farmer’s Market, 25 respondents reported that
they do the majority of their grocery shopping at large grocery stores, such as Winco or Fred Meyer (66%), and 8 reported that they shop at mid-size stores such as QFC or New Seasons (215%). 3 reported “other” (8%) and 2 respondents did not answer the question (8%). At the Moreland Farmer’s Market, only 12 respondents stated that they shop at large grocery stores (34%), while 23 consumers shop at mid-size stores (66%). 2 people reported that they shop at “other” locations (6%).

The question of whether or not the hours of these farmer’s markets are convenient for the shoppers, 34 of the consumers at Lents stated “yes” (89%), 1 said “no” (3%) and 3 did not answer the question (8%). At Moreland, 33 consumers said that the hours were convenient (94%), while 2 people said “no” (6%).

Additionally, a contingency question was presented for those who stated that the hours were inconvenient. 3 consumers at Lents reported that weekdays would be preferable, 3 consumers also reported that Saturdays would be good, and 2 marked other. At Moreland, 1 consumer reported that weekends would be preferable, and 1 consumer marked “other” on the survey.

One of the most intriguing questions that I was curious about was whether or not people preferred to purchase food from local producers, and if so, would they be willing to pay more for it. At the Lents International Farmer’s Market, I found that 3 people did not have a preference for locally produced food (8%), 30 people responded “yes” (79%) and 5 wrote in that it depends (13%). When asked if they would be willing to pay more for locally produced food, 36 respondents said “yes” (95%) while only 2 respondents stated that it “depends” (5%). See Appendix 4, Figure 3.
At the Moreland Farmer’s Market, the same questions were presented. All 35 respondents stated that they prefer to purchase local food, and when asked whether or not they would be willing to pay more for locally produced food, 31 stated “yes” (89%) while 4 people simply said “no” (11%) See Appendix 4, Figure 4.

In order to gain a sense of how many people were shopping with WIC or food stamps, I presented a question on the survey. At the Lents International Farmer’s Market, only three people reported that they had made a purchase with WIC or food stamps (8%). 31 respondents stated “no” (81%) and 4 respondents did not answer the question (11%). A similar story occurred at the Moreland Farmer’s Market. 4 people reported paying for products with WIC or food stamps (11%), while 29 respondents reported not using them (83%). 2 people did not answer the question (6%). From the data, it appears that the majority of shoppers at the markets do not utilize the WIC and food stamp payment options. See Appendix 4, Figures 5 and 6.

A very important question about the farmer’s markets that was on the survey was what consumers would like to see improved at each market. At the Lents International Farmer’s Market, 8 consumers reported that longer hours would be an improvement (21%). 14 consumers want greater food variety (36%), 1 consumer preferred more convenient parking (3%), 2 respondents stated that cost of food needed improvement (i.e. cheaper) (5%) and 4 people reported that more social events would be an improvement (11%). For chart, see Appendix 4, Figure 7.

At the Moreland Farmer’s Market, only 4 people stated that they would prefer longer market operating hours (11%), 1 consumer reported that convenient parking would be an improvement (3%), 4 respondents stated that cost of food needed improvement
(11%), 6 people would like greater food variety (17%), and just one consumer preferred more social events (3%). For chart, see Appendix 4, Figure 8.

Finally, the survey asked for consumers to rank their overall satisfaction of the market. At the Lents International Farmer’s Market, 19 consumers were “very satisfied” with the market (50%), 16 were “satisfied” (42%) and 3 consumers did not answer the question (8%). At the Moreland Farmer’s Market, 27 consumers reported that they were “very satisfied” with the market (77%), and 7 consumers reported that they were “satisfied” (20%). 1 consumer did not answer the question (3%). We can assume from these results that the majority of visitors to these markets seem to be quite satisfied with their respective market, given that not one respondent rated the markets as unsatisfactory.

Results Continued

Part 2: Qualitative Analysis

Three vendor interviews were conducted for this project. Two of the vendors sell at the Moreland Farmer’s Market, and one sells at the Lents International Farmer’s Market. In the original research proposal, I had hoped to interview another vendor from Lents, but unfortunately, the vendor I arranged to speak with canceled (at the last minute). With such a small sample size, there were several commonalities, but no general themes emerged from the research.

To briefly introduce the vendors, I will begin with John, who sells at the Lents International Farmer’s Market. He sells oyster mushrooms, which he grows at his home in the Lents neighborhood. John has been cultivating them for about a year, and he is solely behind the operation. During the day, he operates a food cart in downtown
Portland. This is his first season at the Lents market, and the only market that he currently participates in.

Meg, a vendor at the Moreland Farmer’s Market, sells sheep cheese. She began this venture when she realized her son had a dairy allergy. Although she said he eventually outgrew the allergy, she and her husband decided to keep on producing sheep cheese. This is not her only source of employment. Formally trained as a nurse, she teaches clinical coursework during the winter. She lives in Washington, yet makes the trip down to Portland to sell at the Moreland market, as well as several other markets here in the metropolitan region.

Another vendor from the Moreland Farmer’s Market is Charles, and he has been farming for over 30 years. Unlike the other two vendors, he cultivates a variety of fresh produce to sell at the 5 farmer’s markets that he participates in. His farm is approximately 120 acres, and he employs three full time employees to help out on the farm. This is his main form of income.

One common theme that all three vendors demonstrated is their work ethic. In addition to the niche products that two of the three vendors sell at the farmer’s markets, they also have other jobs. The third farmer has 120 acres with crops that are quite diversified and farming is the only job he maintains. Two of the three vendors also sell at more than one market. Their work entails much more than the shoppers see. Growing, producing, setting up and taking down the booths and merchandise, these vendors are hard at work much of the year.

When I asked all three vendors what they liked most about their markets, the people were the general consensus. John, the oyster mushroom vendor, enjoyed that
people in the community recognized him and that he gets to see the regular customers from week to week. Meg, a sheep cheese producer who sells at the Moreland Farmer’s Market also said that the people were her favorite part of the market. Charles from the Moreland Farmer’s Market also agreed that it was the people were his favorite part of the market. To directly quote Charles, he stated, “It’s the people. They’re friendly. It’s just a slice of Americana there” (Charles Stevens, personal communication, July 27th, 2009).

While there may be other motivating factors for selling at the farmer’s markets, the community and the people were definitely important to all three vendors.

When the vendors were asked about opportunities that they have had from selling at the market, Meg from Black Sheep Creamery and John who sells oyster mushrooms at Lents, both commented that they have gained exposure from selling at their markets. John sells to several restaurants now, and Meg is able to sell her cheese to retailers New Seasons and Steve’s Cheese. Charles, on the other hand, primarily grows produce to sell at farmer’s markets. He does not currently have any outside opportunities that he mentioned in the personal interview, although he may be too busy to take on any other outside opportunities. However, Charles does grow a large amount of wheat that exports rather than selling at the market.

Another question that I asked the interviewees was in regards to challenges and barriers. The responses to this question all vary. John, a mushroom vendor from Lents has had challenges with the WIC process. Although his product qualifies as a WIC purchasable item, the application process was not easily accessible to someone who already has a Monday-Friday 9-5 job. So John does cannot currently accept WIC checks for purchases.
Meg from Black Sheep Creamery has had challenges that are specific to her product. Her product is seasonal; as the sheep do not lactate year round. So during the market season, she frequently runs out of cheese. Some of the cheeses are not ready until the markets have nearly closed for the season, so finding cheese buyers in the winter has been challenging. Though as previously mentioned, New Seasons and Steve’s Cheese are selling her product. Barriers for Meg are not specifically related to the farmer’s market itself, rather just the seasonality of the product.

Charles, from Stevens Farm, states that his biggest challenge has been competition. Prices and too much of the same type of product can cause farmers to compete for business, all the while competing with large grocery chains. For many markets, the managers strive to ensure that there is not too much of the same product at the market. Each vendor has mentioned unique barriers and challenges to selling at the market.

When I asked the vendors if they felt that anything could be improved at the markets they sold at, all three seemed quite pleased with the way the market functions already, and had very little to comment on. One vendor thinks that eventually the Moreland Farmer’s Market might want to consider being a year round market, while another vendor wishes that the market would open a couple of weeks earlier. Other than those comments, all three vendors are really quite happy about their markets, and didn’t see much room for improvement.
Discussion

After examining the data collected from the Lents International Farmer’s Market and the Moreland Farmer’s Market, several conclusions can be made. Since the overall sample size is quite small, these results cannot be representative of the general population. However, referring back to the literature review, the preliminary results from this study remain interesting.

Examining this study to the model study, I did not find that any of the vendors took issue with market policies as the model study found, but I did find that people come to both the Lents International Farmer’s Market and the Moreland Farmer’s Market to support local agriculture rather than to save money. In looking at the stages of farmers’ markets, described in the model study, the data collected at Lents seems to show that this market is still in stage one, This means that it is still relatively unstable and volatile. While some of the vendors have been there for more than one season, some are new to market, and the market itself is definitely still developing. Moreland, on the other hand, seems to be in stage 3, meaning that it is well established and the market have a substantial amount of produce, and that many people shop there weekly. While many results of these markets were similar, this was one difference that really stood out.

Garry Stephenson and Larry Lev (2004) compared two demographically different communities and found that both generally supported local agriculture. My study found similar results when customers were asked if they preferred to purchase food locally. Even though the demographics and food access options differed in these two neighborhoods, both neighborhoods reported a high rate of support for local agriculture.
When referring back to “Hot Peppers and Parking Lot Peaches: Evaluating Farmers’ Markets in Low-Income Communities”, the multi market case study, I did not find any of the reasons for these market failures present in the markets that I studied, which is a positive sign for the longevity of the Lents International Farmer’s Market and the Moreland Farmer’s Market. The communities are interested and involved in the markets, and the management seems effective and efficient. Safety did not come up as an issue for customers, though some did comment on the fact that dogs are allowed at both of these markets.

Some of the reasons for success of the market studies in “Hot Peppers and Parking Lot Peaches: Evaluating Farmers’ Markets in Low-Income Communities.” included local residents getting involved, community support, the implementation of programs such as WIC, and good pricing. For the “Heart of the City” market in San Francisco, having a variety of international foods for the city’s diverse population has proved successful. In terms of what I found at the Lents and Moreland Farmer’s Markets, there was great resident and community support at both markets. Moreland is more established market, so it has a bit more of a homely and cohesive feel to it. Both markets participate in WIC and Food Stamp programs, which can help bring in more shoppers. The markets prices seemed average; overall, I found Lents to be slightly cheaper during the weeks that I was collecting data (and purchasing food) from the markets. Lents is an “international” farmer’s market, so it has a great international flair to it. The shoppers are extremely diverse, and the products sold there are too.

The study conducted by Thomas Macias (2008), “Working Toward a Just, Equitable Food System” suggested that social integration was high at the farmers’
markets. My results suggest the same. All three of the vendor interviewees stated that the people were the main reason they participate in the market.

A recent article published in the “Oregonian” newspaper titled “Farmers’ Markets Work to Draw People on a Budget” (2009) suggests that farmer’s markets are working on trying to get more people on a food budget to attend and purchase produce at the market. Data results suggest that this is a good area to work in, as the majority of customers who took part in the study did not make purchases with WIC or Food Stamps.

**Conclusion and Implications for Further Research**

This pilot study attempted to find out about consumer values and expectations of two farmer’s markets. It also sought to discover vendor opportunities and barriers. Overall, this research has found that consumers are generally satisfied with the markets, and that there is a strong support for locally produced food, even to the point of being willing to pay more money for it. Vendors are happy with the customer and market setup at both markets, and also seem quite content with the product mix and hours of operation. Even though food access varies between these two neighborhoods, both markets appear well attended and ranked satisfactory by those who attend and shop the market.

This study provided just a tiny glimpse of the Lents International Farmer’s Market and the Moreland Farmer’s Market. A longer, more in depth study would be beneficial to existing research on farmer’s markets. Interviewing more vendors from each location would be good to gain a greater sense of opportunities and barriers that vendors face at the markets would be valuable. Surveying more customers over an entire growing season could possibly present different data. Printing surveys in multiple languages and possibly
conducting a mail survey could also help to grasp a greater sense of neighborhood values and expectations of the farmer’s market.

Overall, a study that is conducted over a longer period of time with a larger sample size could produce results that could be representative of a population. In addition, new data suggests that other areas in the Portland metropolitan area may be in greater need of improved food access. The study titled “Finding Food Deserts: Methodology and Measurement of Food Access in Portland Oregon” (2009) identified a handful of neighborhoods that could be identified as food deserts. Therefore, studies that focus in other neighborhoods may be useful to farmer’s market research.
References


Appendix 1
Lents Access to Food Sources

Existing Food Options
Although there are several full-service grocery stores at the northern boundary of the Lents neighborhood, it is clear from this map that they are relatively inaccessible to community members without access to a car. On the other hand, convenience stores are well distributed. In addition, there is a large number of fast food restaurants close to Marshall High School. Unhealthy food options tend to promote diets low in nutrients and high in fat and calories.

The Lents neighborhood has taken steps to promote healthier eating by initiating changes in its food environment. The addition of the Lents International Farmer’s Market and the push by community members for a new grocery store are two examples.
Appendix 2:
Survey Instrument

The Lents/Moreland Farmer’s Market Consumer Survey

1. What is your gender?
   ❑ Male      ❑ Female

2. How far did you travel today to get to the farmer’s market?
   ❑ Less than 5 miles      ❑ 5-10 miles      ❑ More than 10 miles

3. How did you get to the farmer’s market today?
   ❑ Personal automobile      ❑ Public transportation      ❑ Walk or bicycle
   ❑ Other: ________________

4. What brought you to the market today? Please check all that apply:
   ❑ Atmosphere      ❑ Purchase Food      ❑ Meet Friends      ❑ Entertainment

5. Is this your first time at the Lents/Moreland Farmer’s Market?
   ❑ Yes      ❑ No

6. If you answered no to number 5, how many times have you visited the Lents/Moreland
   Farmer’s Market?
   ❑ 1-5      ❑ 5-10      ❑ More than 10

7. How did you find out about the Lents/Moreland Farmer’s Market?
   ❑ Friends/Family      ❑ Local Media      ❑ Other: __________

8. What types of products do you normally purchase at the market?
   ❑ Vegetables and Fruits      ❑ Bread      ❑ Prepared Foods
   ❑ Meats and Cheeses      ❑ Flowers      ❑ Other

9. Do you prefer to purchase food from local farmers rather than at a large grocery store?
   ❑ Yes      ❑ No      ❑ No preference

10. If you answered yes to question 8, are you willing to spend more money on food that
    is locally grown and produced?
    ❑ Yes      ❑ No

11. Where do you tend to shop for your groceries the most?
    ❑ Large grocery stores (Fred Meyer, Winco etc)      ❑ Mid-size grocery stores (New
                                                        Seasons, Wild Oats, QFC, etc.)
    ❑ Small convenience stores      ❑ Other: ___________________
12. Are the hours of the Lents International Farmers Market convenient for you?
   ☐ Yes   ☐ No

13. If you answered no to question 11, when would you prefer to the market to be open?
   ☐ Weekdays    ☐ Saturdays    ☐ Other: ______________________

14. Is there anything about the market that you would like to see improved? Please check all that apply.
   ☐ Longer hours    ☐ Convenient parking area    ☐ Lower cost of food
   ☐ Greater food variety    ☐ More Social Events

15. If you made a purchase today, did you use WIC or Food Stamp Vouchers?
   ☐ Yes   ☐ No

16. Please rank your overall satisfaction with the Lents International Farmers market:
   ☐ Very satisfied    ☐ Satisfied    ☐ Neutral    ☐ Dissatisfied    ☐ Very dissatisfied

17. Please add any additional comments below:

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

Thank you for taking the time to complete this survey! Your input is very valuable to this study.
Appendix #3

Portland By Neighborhood Census 2000: Median Income


Getting to Know Lents

A Thematic Atlas of Healthy Eating and Active Living
Appendix 4
Customer Survey Results

Figure 1

Why Do People Attend the Lents International Farmer’s Market?

- Atmosphere: 22%
- Purchase Food: 52%
- Meet Friends: 17%
- Entertainment/Educational: 7%
- Other: 2%

Other
Figure 2

**Why Do People Attend the Moreland Farmer's Market?**

- Atmosphere: 28%
- Purchase Food: 53%
- Meet Friends: 6%
- Entertainment/Educational: 0%
- Other: 13%

Figure 3

**Are Lents International Farmer's Market Customers Willing to Spend More on Locally Produced Food?**

- Yes: 95%
- Other: 0%
- 5%
Figure 4

Are Moreland Farmer’s Market Customers Willing to Spend More on Locally Produced Food?

- Yes: 89%
- No: 11%

Figure 5

WIC or Food Stamp Purchases Made at Lents

- Yes: 11%
- No: 8%
- No Answer: 81%
Figure 6

![Pie Chart: WIC or Food Stamp Purchases at Moreland](image)

- Yes: 11%
- No: 6%
- No Answer: 83%

Figure 7

![Bar Chart: Customer Recommendations for the Lents International Farmer’s Market](image)

- Longer Hours: 7
- Greater Food Variety: 15
- Convenient Parking: 1
- Cost of Food: 2
- More Social Events: 4

**Improvement Categories**

**Number of Customers**
Figure 8

Customer Recommendations for the Moreland Farmer’s Market

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<th>Number of Customers</th>
</tr>
</thead>
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<tr>
<td>Greater Food Variety</td>
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<tr>
<td>Convenient Parking</td>
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<td>Cost of Food</td>
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<td>More Social Events</td>
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The effect of road culverts on the benthic macroinvertebrate community in wadeable lotic ecosystems

Travis Peterson
Yangdong Pan, Faculty Mentor

Abstract

Roads and lotic ecosystems intersect as their paths unfold across the landscape. At their intersections lotic ecosystems are often routed underneath a road through a culvert. Road culverts allow the transportation system and lotic ecosystem to coexist, but their presence can introduce physical stress on the local ecology. The purpose of this study was to investigate the effects of road culverts on the benthic macroinvertebrate community. I collected physical habitat, water quality, and benthic macroinvertebrate data from three sample units near the culverted sections of two lotic ecosystems. Sample units were positioned in a longitudinal configuration with a reference sample unit located above the road culvert, a study sample unit below the outlet, and a recovery sample unit further downstream. Non-metric Multi-Dimensional Scaling and Bray-Curtis distance showed an alteration of the benthic macroinvertebrate community at the study sample units when compared to reference conditions. In the study sample units, the benthic macroinvertebrate community was composed of a greater proportion of stressor-tolerant taxa, as assessed by the presence of Ephemeroptera, Plecoptera, and Trichoptera taxa. There was also an alteration of dominant feeding groups in the study sample units. This study shows a fundamental shift of the local lotic ecology below road culverts.
Introduction

Lotic ecosystems are characterized by the interactions of biotic and abiotic constituents in an area of flowing water over a period of time. They are open systems, characterized by their spatial and temporal heterogeneity, which can be translated into spatial and temporal dimensionality. Included in the spatial dimensions of a lotic ecosystem are: longitudinal (upstream downstream interactions), lateral (interactions through the flood plain), and vertical (interactions of the lotic system and the contiguous groundwater) dimensions. The three spatial dimensions are structured by the fourth dimension, which is time. These four dimensions and their interactions can elucidate patterns and processes within a lotic ecosystem and detect alterations from perceived normal conditions (Ward 1989).

Lotic ecosystems are long linear systems that are vulnerable to anthropogenic stressors along their longitudinal dimension, often times by the transportation network. The transportation network can cross a lotic ecosystem in a number of ways, including bridges, fords, and road culverts. As lotic ecosystems meander across the landscape, roads commonly intersect them, and the flowing water is directed under the road through a culvert. On the lands in Oregon and Washington managed by Bureau of Land Management and Forest Service, there are at least 10,000 culverts in fish-bearing lotic ecosystems. This estimate was based on road culverts that affect the upstream movement of certain fish species. The number of culverts in all lotic ecosystems is not officially known (United States General Accounting Office 2001). Depending on the type of crossing, there can be a range from relatively little to drastic impacts on the lotic ecosystem (Jackson 2003).

Road culverts can detrimentally affect a lotic ecosystem. The physical environment is altered from its pre-culverted state when a lotic ecosystem is directed through a road culvert.
Road culverts can affect the longitudinal movement of substrate and large woody debris (Jackson 2003). The velocity of the lotic system is locally increased during spates due to a constriction of the channel, which can lead to lateral, longitudinal, and/or vertical erosion below the road culvert outlet and deposition further downstream (Abt and Thompson 1996; Foreman et. al. 2003) or a scour pool formation directly below the road culvert outlet (Abt and Thompson 1996). The overall affect of a road culvert along a flowing section of water is the alteration of the lotic ecosystem (Foreman et. al. 2003; Jackson 2003).

The alteration of the lotic ecosystem leads to several negative effects on biota. Upstream migration and instream movement of fish species is blocked or altered (Warren and Pardew 1998; Jackson 2003). Road culverts similarly affect the non-insect macroinvertebrate community in that their ability to disperse upstream and within the stream is negatively affected (Resh 2004; Vaughn 2002). In addition to disturbing migration and instream movement, culverts can also affect the composition of the benthic macroinvertebrate community. Kahn and Colbo (2008) found that the abundance of some benthic macroinvertebrates decrease below the road culvert outlet compared to reference conditions.

Benthic macroinvertebrates are found in all lotic ecosystems. These organisms have evolved a habitat-specific physiology and morphology, and distinct communities form along environmental gradients. The structure and function of these communities are shaped by both the physical and chemical stressors of their environment (Hauer and Resh 2006). The relationship of the benthic macroinvertebrate community to its environment is an intimate one, which allows these organisms to serve as indicators of environmental stress. The ecological
affects of stressors can be identified by relating the autecologies of these organisms to the perceived environmental stressors (Carter et al. 2006).

This study investigates the effects of a road culvert on the benthic macroinvertebrate community of a lotic ecosystem. Identified changes to the benthic macroinvertebrate community will aid in the understanding of the ecological impacts from a road culvert. The specific aims of this study are to identify whether there is an alteration of community composition, sensitive taxa, and/or functional feeding groups and what characteristics may control the structure of the benthic macroinvertebrate community when a lotic ecosystem is routed through a road culvert.

Materials and Methods

Study Area

This study was conducted in the 34,398-hectare Scappoose Bay Watershed (SBW). The SBW is located in Columbia County, Oregon and drains to Scappoose Bay and the Columbia River through a rural landscape characterized by coastal hills, stream valleys, and lowland wetlands (David Evans and Associates, Inc. 2000). Data were collected from two stream reaches within the watershed (Figure 1), one located on Alder Creek (lat: 45°50’21.1"N, long: 122°57’31.9"W) and one located on Cedar Creek (lat: 45°50’23.4"N, long: 122°58’35.9"W), both
of which are third-order perennial lotic systems. Data were collected from the Alder Creek stream reach on May 9, 2009, and from the Cedar Creek stream reach on May 31, 2009.

**Study Design**

Sample units were the basic unit in which, physical habitat, water quality, and benthic macroinvertebrate data were collected. They were positioned (Figure 2) in a longitudinal configuration with a reference sample unit above the culvert, a study sample unit immediately below the road culvert outlet, and a recovery sample unit further downstream. The reference sample unit represented normal conditions. The study sample unit represented conditions that may be experiencing stress from the road culvert. The recovery sample unit represented conditions that may have returned to normal conditions. Sample units were sized according to the length of the scour pool.

A 30-m measuring tape was used to measure the distance parallel to the stream channel from the road culvert outlet to a point where the scour pool was no longer evident. This measurement established the size of the sample units for that particular stream reach.

The sample units in this study were composed of highly variable instream habitat from two distinct Channel Geomorphic Units (CGUs): riffles and scour pools. In order to collect benthic macroinvertebrates representative of the CGUs, I used methods derived from Barbour et. al. (1999), which were necessary to collect benthic macroinvertebrates representative of the

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*Figure 2. Configuration of sample units within stream reaches, also showing transect locations along sample units.*
The proportion of major instream microhabitat was estimated by counting habitat occurrence, at certain positions, across the width of the channel from set distances on a transect laid out parallel to the stream channel within each sample unit. This method provided a standardized estimation of major instream microhabitat within a sample unit. The observer moved along the transect from one end of the sample unit to the other while scanning across the channel, recording each major habitat within the stream on the left, one-third, center, two-thirds, and right channel areas. The observer then shifted approximately 0.5m along the transect, repeating the observation process until the end of the transect. The count of each major instream microhabitat was divided by the total habitat count to calculate percentage of each major instream microhabitat. For the purposes of this study, major instream microhabitats (Barbour et al 1999) included cobble, snags, vegetated banks, submerged macrophytes, as well as sands and other fines. An additional category, bare, was included in order to accommodate those spots that were more like exposed bedrock (Table 1).

<table>
<thead>
<tr>
<th>Microhabitat</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobble</td>
<td>Rocks larger than 2mm in diameter</td>
</tr>
<tr>
<td>Snags</td>
<td>Submerged woody debris</td>
</tr>
<tr>
<td>Vegetated Banks</td>
<td>Exposed roots, emergent plants, submerged terrestrial plants</td>
</tr>
<tr>
<td>Submerged Macrophytes</td>
<td>Aquatic plants</td>
</tr>
<tr>
<td>Sands and Other Fines</td>
<td>Sand, clay, and other rocks &lt;2mm in diameter</td>
</tr>
<tr>
<td>Bare</td>
<td>Exposed bedrock</td>
</tr>
</tbody>
</table>

Substrate was characterized with methods derived from Wolman (1954). From the downstream edge of the sample unit, the observer walked the width of the channel, from one bank to the other, in a heel-toe step fashion, picking up the first rock touched by the index finger at the toe of each step. This rock was then measured using a Gravelometer. Rocks too large to pass through the Gravelometer template were measured with the scale on its side.
width of the channel had been crossed, the observer shifted approximately 0.5m upstream and repeated the process. At least 100 samples were measured per sample unit.

The measurement of fine sediment cover was conducted in tandem with the Wolman pebble count. A random number generator was used to select five numbers, each with values between 1 and 100, which corresponds with the minimum number of samples taken for the pebble count. During the pebble count, when the sample was reached that corresponded with the random number that was selected, a 4-cm² 81-square grid was dropped to the right of the observer. The cells that could be identified as being mostly fine sediment, as determined by professional judgment as being less than 2mm in diameter, were counted. The average of the five samples was used to calculate the percentage of fine sediment cover per sample unit.

Wetted channel width measurements were taken at the one-third, one-half, and two-thirds longitudinal locations of the reference, study, and recovery sample units using a 30-m measuring tape. Stream depth and velocity were measured at the center channel of these locations. Depth was measured with a 1-m metal ruler. Velocity was measured using a Flo-Mate Portable Velocity Meter (Model 2000).

A YSI 556 Multiprobe System was used to measure dissolved oxygen, pH, conductivity, total dissolved solids, and temperature. The measurements were taken near the center of each sample unit with the probe completely submerged, but suspended above the channel bottom.

Canopy cover was estimated using a concave Spherical Densiometer. From near the center of the sample unit, the observer took measurements in each cardinal direction. A canopy cover average was calculated from the four measurements.

Benthic macroinvertebrates were collected using an 800-µm mesh D-frame net. Five macroinvertebrate samples were taken from each sample unit in proportion to instream
microhabitat. For example, if the sample unit was 80% cobble and 20% vegetated banks, four samples would be taken from cobble and one from vegetated banks. The five benthic macroinvertebrate samples were combined and preserved in 91% alcohol, creating one composite sample. This process was repeated in each sample unit. Specific methods, as described by Barbour et. al (1999), were used to collect benthic macroinvertebrates from different instream microhabitats. While the sampling protocol differed for each habitat, the duration of collection was limited to 30s in order to establish standardization in sampling between microhabitats (Table 2).

<table>
<thead>
<tr>
<th>Microhabitat</th>
<th>Collection Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobble</td>
<td>D-frame net is placed on the bottom of the stream and 0.25-m² of substrate directly above the net is disturbed by shifting the substrate. When large rocks are present they were rubbed and lifted or shifted.</td>
</tr>
<tr>
<td>Snags</td>
<td>Strongly disturb habitat and sweep a D-frame net back and forth through the debris.</td>
</tr>
<tr>
<td>Vegetated Banks</td>
<td>Jab D-frame net into microhabitat and swept through the debris multiple times.</td>
</tr>
<tr>
<td>Submerged Macrophytes</td>
<td>Drag D-frame net from the bottom to the top of macrophytes area repeatedly.</td>
</tr>
<tr>
<td>Sands and Other Fines</td>
<td>Strongly disturb habitat and sweep a D-frame net back and forth through the debris.</td>
</tr>
<tr>
<td>Bare</td>
<td>Place D-frame net on surface and rub 0.25-m² of the surface directly above the net.</td>
</tr>
</tbody>
</table>

Table 2: Specific collection methods used for each type of instream microhabitat.

Benthic macroinvertebrates were identified to family level in the laboratory using a 20X dissecting microscope. Each benthic macroinvertebrate composite sample was counted as completely as possible by examining small sample quantities at a time. Merritt and Cummins (1996) and McCafferty and Provonsha (1998) were used as the major taxonomic references.

All data were compiled in spreadsheets, organized by stream reach and sample unit. Macroinvertebrate distributional patterns were summarized using non-metric multidimensional scaling (NMDS), a multivariate ordination technique commonly used in ecological community
analysis (Clarke 1993). Bray-Curtis dissimilarity index was calculated among the sites. The NMDS projects each site in a species-defined ordination space with 2-3 dimensions based on their ranked dissimilarity. The goodness-of-fit for the NMDS projections was measured as a stress value which measures a deviation from a monotonic relationship between the distance among sites in the original Bray-Curtis dissimilarity matrix and the distance among sites in the ordination plot. The NMDS was run 20 times each with a random starting configuration. The final NMDS dimension was selected based on the lowest stress value among the best solutions. Environmental fitting was performed on benthic macroinvertebrate, physical habitat and water quality data to identify which environmental variable may best correlate with changes in macroinvertebrates. Both NMDS and environmental fitting were performed using R (Anon. 2004).

Results

Compared to the reference and recovery sample units the study sample units were considerably altered. The major alterations of instream microhabitat (Figure 3) occurred in the habitat types of cobble and sands and other fines. When compared to the reference and recovery sample units, the percent cover of cobble microhabitat in the study sample units decreased by about half, and the percent cover of sand and other fines increased by about four times.
The first, second, and third quartiles (D25, D50, D75) of the Wolman pebble count (Table 3) showed an interesting trend, with a decrease in average size at the study sample units compared to the reference and recovery sample units.

<table>
<thead>
<tr>
<th>Average Substrate Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Unit</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>Alder Creek</td>
</tr>
<tr>
<td>Reference</td>
</tr>
<tr>
<td>Study</td>
</tr>
<tr>
<td>Recovery</td>
</tr>
<tr>
<td>Cedar Creek</td>
</tr>
<tr>
<td>Reference</td>
</tr>
<tr>
<td>Study</td>
</tr>
<tr>
<td>Recovery</td>
</tr>
</tbody>
</table>

Table 3. First, second, and third quartile of Wolman pebble count. Measurements of diameter in millimeters.

The measurement of fine sediment cover (Table 4) showed the Alder and Cedar Creek study sample units had up to four times more fine sediment than the respective reference and recovery sample units.
Hydrology between the sample units for both stream reaches was considerably altered. At the study sample unit the average channel width and depth increased by about two times, while the average velocity decreased by up to more than half. The reference and recovery sample unit measurements were more similar to each other than to the study sample units.

Cedar Creek was heavily shaded with 95% canopy cover in both reference and recovery sample units while Alder Creek was relatively open. The average canopy cover (Table 5) at the reference and recovery sample units were both greater than the canopy cover at the study sample units. The reduction of canopy cover was more pronounced in Alder Creek (73% reduction) than in Cedar Creek (17% reduction).
### Canopy Cover

<table>
<thead>
<tr>
<th>Sample Unit</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alder Creek</td>
<td></td>
</tr>
<tr>
<td>Reference</td>
<td>30%</td>
</tr>
<tr>
<td>Study</td>
<td>8%</td>
</tr>
<tr>
<td>Recovery</td>
<td>10%</td>
</tr>
<tr>
<td>Cedar Creek</td>
<td></td>
</tr>
<tr>
<td>Reference</td>
<td>95%</td>
</tr>
<tr>
<td>Study</td>
<td>79%</td>
</tr>
<tr>
<td>Recovery</td>
<td>95%</td>
</tr>
</tbody>
</table>

Table 5. Average canopy cover.

Water quality measurements (Table 6) showed a distinction between the Alder and Cedar Creek stream reaches. The measurements, Specific Conductance (SpC µS/cm), Temperature (Temp ºC), and Total Dissolved Solids (TDS g/L) were greatest in the Cedar Creek stream reach. The measurements, Dissolved Oxygen (DO mg/L) and pH were greatest in the Alder Creek stream reach. Within each stream reach there was little variation of water quality, with the exception of the pH measurement.

<table>
<thead>
<tr>
<th>Sample Unit</th>
<th>SpC µS/cm</th>
<th>Temp ºC</th>
<th>DO%</th>
<th>DO mg/L</th>
<th>TDS g/L</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alder Creek</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference</td>
<td>50.582</td>
<td>7.37</td>
<td>109.2</td>
<td>10.61</td>
<td>32.91</td>
<td>9.81</td>
</tr>
<tr>
<td>Study</td>
<td>50.188</td>
<td>7.34</td>
<td>110.1</td>
<td>10.72</td>
<td>32.61</td>
<td>9.17</td>
</tr>
<tr>
<td>Recovery</td>
<td>50.001</td>
<td>7.31</td>
<td>109.8</td>
<td>10.47</td>
<td>32.54</td>
<td>7.51</td>
</tr>
<tr>
<td>Cedar Creek</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference</td>
<td>67.528</td>
<td>12.86</td>
<td>110.1</td>
<td>8.67</td>
<td>43.90</td>
<td>6.49</td>
</tr>
<tr>
<td>Study</td>
<td>67.591</td>
<td>12.14</td>
<td>109.3</td>
<td>8.74</td>
<td>44.00</td>
<td>7.80</td>
</tr>
<tr>
<td>Recovery</td>
<td>67.832</td>
<td>11.64</td>
<td>107.2</td>
<td>8.70</td>
<td>44.12</td>
<td>7.51</td>
</tr>
</tbody>
</table>

Table 6. Water quality measurements.

The non-metric multi-dimensional scaling (NMDS stress: 2.399344e-14) plot, with a Bray-Curtis (BC) distance (Figure 4) overlay, shows the distance, or dissimilarity, between sample units. The greatest dissimilarity was found between the reference and study sample units. For the Alder Creek stream reach, the BC distance at the reference sample unit (AU) and the study sample unit (AC) was 0.43. For the Cedar Creek stream reach, the BC distance at the reference sample unit (CU) and the recovery sample unit (CC) was 0.46.
Figure 4. NMDS plot of sample units and Bray-Curtis distance.

The proportion of Ephemeroptera, Plecoptera, and Trichoptera (EPT) taxa (Figure 5) followed a similar trend at both stream reaches. The EPT taxa in the Alder Creek stream reach was 80% at the reference sample unit (AU). It decreased to 63% at the study sample unit (AC) and increased to 72% (AD) at recovery sample unit. In the Cedar Creek stream reach, the EPT taxa was 68% at the reference sample unit (CU). EPT decreased to 62% at the study sample unit (CU) and increased to 69% at the recovery sample unit (CD). In both stream reaches, EPT taxa were more prevalent at the reference and recovery sample units.
The dominant feeding groups (Figure 6) in the Alder and Cedar Creek stream reaches were scrapers and collector-gatherers. The scraper functional feeding group dominated the reference (AU, CU) and recovery (AD, CD) sample units. The dominant feeding group at the study sample units (AC, CC) was the collector-gatherer feeding group.
Environmental fitting (Figure 7) of physical and water quality measurements against the benthic macroinvertebrate community data showed the variables most likely to exert control on the structure of the benthic macroinvertebrate community. The instream microhabitat of cobble and the average substrate size D75 (third quartile) were significantly correlated (P < 0.05) to the structure of the benthic macroinvertebrate community. Percent cobble was higher in Cedar Creek than in Alder Creek. However, within each creek, percent cobble decreased from the reference unit to study unit. On the other hand, the average substrate size D75 mainly reflected the substrate differences between two streams.
Discussion

Environmental stress induced by road culverts may substantially alter stream ecology. NMDS (Figure 4) is used to show the strongest pattern within a set of ecological data (McCune and Grace 2002). In the NMDS plot there is a clear separation of the Alder and Cedar Creek stream reaches based on the benthic macroinvertebrate data. This is expected, as no lotic ecosystem is exactly similar. More interesting are the patterns between the sample units within each stream reach. The reference sample units are further from the study sample units than they are from the recovery sample units. This could indicate that the culvert is responsible for altering the benthic macroinvertebrate community. This is especially evident at the Cedar Creek stream reach since reference and recovery sample units are close to each other. Based on family level taxonomy, the BC distance (Figure 4) shows trends that lend support to the alteration of the benthic macroinvertebrate community in relation to the culvert. The distance, or dissimilarity,
between the reference and recovery sample units is less than the reference sample unit distance to the study sample units. This shows the benthic macroinvertebrate community at the study sample units is most dissimilar to the reference sample units. The recovery and reference sample units on the Cedar Creek stream reach are the least distant from each other, indicating these sample units have similar benthic macroinvertebrate communities. In this longitudinal study design, the BC distance between the reference and study sample units indicate the presence of a disturbance that alters the benthic macroinvertebrate community. The shortest BC distances are found between the Alder and Cedar Creek reference and recovery sample units. This may indicate that the benthic macroinvertebrate communities have recovered from a disturbance located somewhere between the two sample units.

Adverse effects of road culverts on stream ecology are evident as indicated by declining of EPT taxa in the sites below road culverts. The EPT taxa (Figure 5) are generally recognized as the most sensitive taxa to chemical and physical stressors of lotic ecosystems. Because of this sensitivity to stressors, they can be used to determine if there is an alteration to ecological conditions (Barbour et. al. 1999; Lenat and Penrose 1996; Merit and Cummins 1996; Voshell 2002). There was a consistent pattern of EPT taxa between Alder and Cedar creek sample units. The highest proportion of EPT taxa were collected at the reference sample units followed by the recovery sample units. The lowest proportion of EPT taxa was collected at the study sample units. Barbour et. al. (1999) indicate the proportion of EPT taxa will decrease in response to stressors. The lower proportion of EPT taxa at the study sample units points to the presence of a stressor that is altering the local ecology. The proportion of EPT taxa may be influenced by morphohydraulic units (MUs). In a study by Pastuchova et. al. (2008), the abundance of EPT
taxa corresponded to morphohydraulic units. They found EPT taxa are most abundant in rapid-type (fast-flowing water) MUs. This corroborates the findings in this study where EPT taxa were most common at the reference and recovery sample units where water velocity was greatest.

Presence of road culverts may also alter the dominant benthic macroinvertebrate functional feeding groups (FFGs) (Figure 6). Grouping of feeding groups within the benthic macroinvertebrate community is a way to link the benthic fauna, through their morphology and adaptations to food source acquisition, to the physical environment. The similarity of the FFG is expected to alter with the availability of habitat (Merritt and Cummins 1996). In the reference sample units the benthic macroinvertebrate community was composed of a greater proportion of the scraper FFG. These sample units, when compared to the study sample units, were composed primarily of cobble instream microhabitat. They had a larger average substrate size and greater water velocities. The scraper FFG group is morphologically adapted so they are able to feed upon algae, which commonly grows on larger substrate sizes in faster flowing water (Voshell 2002). The greatest FFG proportion in the study sample units was the collector-gatherer. This functional grouping is synonymous with environmental conditions where detritus has fallen out of suspension and is either positioned on or mixed within the substrata. The benthic fauna in this group have evolved to move and feed on top of or within the substrata (Voshell 2002) where food sources have collected. The dominant functional feeding groups seem to be correlated with the sample units that are best suited to fulfill their needs based on their morphological adaptations to the physical environment. This type of pattern is not uncommon. Wallace and Webster (1996) found the physical environment is correlated to the presence and abundance of functional feeding groups.
Alteration in physical habitats induced by road culverts may closely associate with the changes in macroinvertebrate assemblages. There was considerable alteration of instream microhabitat within each stream reach. Environmental interpretation (Oksanen updated 2009, Feb 12) of the physical and water quality data (Figure 7) showed that cobble instream microhabitat and substrate characterization classification of D75 were significant (P <0.05) to the composition of the benthic macroinvertebrate community.

Substrate is an important component of the habitat for benthic fauna. Duan et. al. (2008) found that substrate size has a considerable affect on the macroinvertebrate assemblage. Large substrates like hewn stones, cobbles, and pebbles provide greater interstitial space that macroinvertebrates use as primary habitat and a refuge from physical disturbance and predation. Buss et. al. (2004) found similar results. Their study showed that the benthic macroinvertebrate community was affected by the availability of substrate size and that the availability of substrate is affected by hydrology. This is similar to the findings of this study. The benthic macroinvertebrate community was affected by the availability of substrate size, and the substrate size seemed to be affected by the water velocity, as there was a clear sorting centered on the road culvert, where velocities within the stream reach differed.

Conclusion and limitations of the study

This study showed correlations between the composition of the benthic macroinvertebrate community and the presence of road culverts. While these are interesting correlations, the study’s spatial and biologic scales limit them. Future investigations should include more stream reaches, with more sample units. This would allow a greater variability in stream reach conditions and longitudinal environmental range to be investigated. There are stressor-related generalities at the family taxonomic level. Taxonomic resolution should be increased to genus.
Physiology and morphology are less generalized at this level and the community composition should be more strongly altered by stressors. These measures would increase the ability to test, more precisely, whether a road culvert affects the benthic macroinvertebrate community, how it is affected, what the stressors are, and how the local ecology is affected.
References


-Peterson 21-


-Peterson 22-


Community Learning Garden Programs in the Portland Area:

How do Learning Gardens help low-income families access fresh locally-grown foods?

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McNair Scholar

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Portland State University

January 17, 2010
Abstract

Community learning garden programs help families grow and prepare their own food. The skills and knowledge gained from these programs can help families access more fresh locally-grown foods. However, locally-grown foods are often perceived to be too expensive for low-income families. Economic barriers such as transportation and access to convenient food sources and the perceived high cost of fresh foods limit the amount of fresh foods available to low-income families and individuals. This study was designed to analyze how participation in community learning garden programs helps increase low-income families access to organic and/or fresh locally-grown foods. Although the preliminary sample findings are relatively small, key trends and findings identified can be used for further research.

The community partner selected for the study was the Oregon Food Bank’s (OFB) Seed to Supper learning garden program. The OFB learning garden programs “address the root causes of hunger through increased nutrition, self-reliance and community food security (Learning Gardens, n.d. para.1).” An analysis of OFB survey results helped assess the effectiveness of the Seed to Supper program and the impact the program has on food security for targeted populations. In addition, participants from the program were interviewed to document qualitative outcomes of the program. The interview and survey process clarified how much fresh produce the participants grew and where and how much produce they purchased. Two Seed to Supper instructors and two key community members were interviewed as well to gain valuable insight from their perspectives about the program. The suggestions and recommendations in this study offer many creative and practical solutions to help alleviate food insecurity.
Community Learning Garden Programs in the Portland Area:

How do Learning Gardens help low-income families access fresh locally-grown foods?

**Introduction**

Portland, Oregon is considered one of America’s leading sustainable and “green” cities, and supports a growing urban agriculture community. There are dozens of community gardens and learning gardens located in neighborhoods throughout the city. Community supported agriculture (CSA), farmer’s markets and food co-ops have prospered and grown in membership and participation over the past few years and Portland ranks high in sustainability areas such as land use planning, recycling, green buildings and green economies.

In spite of this growth in urban agriculture, there are serious food insecurity issues for many low-income populations in the city. Food insecurity is the term used to define the number of households that struggle to afford food. Currently, “nearly a half-a-million Oregonians can be described as food insecure” (VanderWonde, 2008, p. 2). Food insecurity is addressed by the Oregon Food Bank’s Nutrition Education and Learning Garden programs which offer cooking, nutrition and gardening classes in order to help carry out their mission to address the root causes of hunger. The Oregon Food Bank developed these educational programs to foster greater food security for families in Portland. “Community gardening is an educational process for changing the minds and actions of people so they can “help themselves” attain economic and social well-being” (Patel, 1991). Although home and community gardens supply only 8% of the food
supply for families surveyed by Oregon Food Bank in the Profiles of Hunger & Poverty in Oregon 2008, community learning gardens play a large role in today’s focus on sustainability and greater self reliance.

This study focuses on the impact of the community learning garden education program—Seed to Supper—offered by OFB to families and individuals who meet low-income guidelines. The Seed to Supper program goals include reducing root causes of hunger, empowering people to grow their own food, and providing classes and services to support these efforts. This study seeks answers to the following questions: What impact do community gardening classes and cooking with fresh foods have on participating families and individuals? Do families and individuals continue to use fresh foods in daily food preparation after the classes and gardening season ends? What are the barriers to growing gardens in their yards, neighborhoods and region? Where do participants purchase additional fresh produce? What services are available to them to ensure success in the garden? Does Oregon Food Bank’s Seed to Supper program provide these services? This study attempted to answer questions and examine the root causes of food insecurity in the Portland Metro and surrounding area.

The Environment/Landscape

The perception that Portland is a green city with a rapid expansion of sustainability projects is important to keep in the foreground as one analyzes this community learning garden program. Although the city is a leader in sustainable practices, the need for a major cultural food shift is apparent because the impact of food policy on public health issues such as food insecurity and community gardens is critical for real change. Sustainability has become a focal point in Portland with a movement
toward local, earth-friendly food and public health policies to support these trends. There is a growing movement to integrate these trends and create a more unified approach to food policy and social justice with sustainability and public health in mind. Portland’s food policy council was formed in 2004 confirming its role as a progressive city dedicated to creating a sustainable model. However, the lack of a national food policy has been identified as a major issue for the 21st century by authors and activists Michael Pollan – *In Defense of Food*, Francis Lappé – *Hope’s Edge*, and Mark Winne in *Closing the Food Gap*. Cities like Portland help lead the way and set the standard for a national food policy.

The two key community leaders interviewed for the study identified the need to integrate cultural and economic diversity when addressing food security issues in the Portland region. There are areas of Portland where there are few options to low-income families in terms of obtaining healthy fresh foods. In addition to the economic disparity that plagues many families in our community, commercial agribusiness and its retail culture offer few nutritious foods to low-income families. One public official interviewed for the study, pointed out that many street intersections in business and neighborhood sections throughout the city offer only fast-food restaurants or convenience stores on each corner. Research and investigative reporting by authors like Eric Schlosser (2001) of *Fast Food Nation* and documentaries such as *Super Size Me* by Morgan Spurlock (2004) have shown us that the food sold in these establishments is highly processed and lacks nutritional quality. Many neighborhoods in Portland offer little more than fast and convenience foods creating “fresh-food deserts” for its inhabitants. According to the United States Department of Agriculture (USDA, 2009) the
need to understand the effects of food deserts on low-income populations became a goal of the 2008 farm bill, and published a report to Congress in June 2009. It is in this landscape and political setting that organizations like OFB work to counter food insecurity. Community learning gardens are one alternative to the prevailing fast food culture and diverse populations often embrace gardening and bring their knowledge to learning garden programs and the community.

**Literature Review**

In order to fully assess the value and success of a community learning garden program, it is necessary to understand the history and context of community gardening. The following provides a framework for the discussion and analysis of community learning garden programs and some of the key issues and trends.

Agencies and non-profit organizations like Oregon Food Bank have been drawing attention to the realities of food insecurity over the past few decades. Food insecurity has been defined as being “uncertain of having or being able to acquire enough food to meet basic needs of all household members because of insufficient money and other resources for food” (USDA, 2009). This definition is the grim reality for many Oregonians and according to the Oregon Center for Public Policy (OCPP) and the Oregon Department of Human Services, 11.9 percent of Oregon households were food insecure during 2004-2006 (OCPP, 2008).

Much of the literature and research about food insecurity focuses on developing nations. However, by the mid-1990s research revealed increasing food insecurity in the United States. The authors of *Food Insufficiency Exists in the United States: Results*
from the Third National Health and Nutrition Examination Survey, report that “some Americans do not get enough food to eat [and has] existed for decades, and recent studies conducted by advocacy groups suggest that food insufficiency is a persistent problem in the United States” (Alaimo, et. al, 1998, p. 419). This report focused on populations living in a home (not homeless) between 1988 and 1994. The interviews, which included socioeconomic demographics and food insufficiency data, revealed “an inadequate amount of food intake due to lack of resources” (Alaimo, et. al, p. 420). The evidence of increasing food insecurity has reached a critical point and Oregon Food Bank has had to expand its services in order to supplement state and federal food aid programs (i.e. food stamps, WIC and other food aid programs).

More recently, author Mark Winne (2008) in Closing the Food Gap, describes the growing food insecurity in the U.S. and quotes a U.S. Department of Agriculture survey showing up to 12% of the U.S. population is food insecure. The Oregon Food Bank Seed to Supper program is a response to the increased need for fresh fruits and vegetables and focuses on teaching about gardening and nutrition to help bring an increased awareness and understanding of nutrition, self-reliance and food security.

Researchers have shown the positive impact of community gardening in developing countries in Central America, Asia and Africa. These studies focus on the potential for a daily increase of vegetable consumption and the positive effect of building gardens based on indigenous knowledge (Marsh, 1998). Similarly, Patel (1991) found that gardening improved economic and social well-being in the United States. The study’s findings showed community garden programs have significant benefits that help increase fresh nutritious food among low-income families and individuals.
Much of the research about the benefits of urban agriculture in low-income communities has focused on small-scale agriculture in third world countries. In *Biotechnology in development, Experiences from the south*, Ruivenkamp (2008) illustrates how scientists and farmers have worked to create effective and safe farming techniques for urban and rural settings. Ruivenkamp (2008) writes of the importance of “a network era in which scientific knowledge has become an integral part of economic production” (p. 31).

In the United States, there is evidence of a “social” movement to grow more urban gardens in communities, schools and civic centers. However, there is a need for more research with data showing the results of this movement. There are numerous national magazine articles extolling positive impacts of community gardens in cities across the United States. Cities like Portland and San Francisco have planted public community gardens in front of their city halls to exhibit the positive outcomes of gardening in urban settings. There is also increasing participation in Master Gardener programs and nutritious school lunch programs, but the true outcomes of these programs require closer examination.

This study explores the question, “who benefits from these activities”? The assumption is often that organic and fresh locally-grown foods are an elitist food privilege, and not affordable for low-income populations. Moschitz (2008), in *Knowing food-a privilege for the concerned consumer?*, quotes researchers Goodman and Dupais (2002) “...community supported agriculture ‘is an utopian entertainment for a few middle class consumers and their fortunate few farmer friends’” (p. 1). This same critique can be made for gardening training programs. The cost to become a Master Gardener is
relatively high and therefore most low-income families may not be able to afford programs like the Master Gardener program. Does the Seed to Supper program, to which low-income populations have easier access, provide an effective level of training comparable to the Master Gardener program? Understanding the needs of low-income populations as we create public agendas that push for more access to locally grown foods is imperative for real change.

During the 2008 Presidential campaign, author Michael Pollan (2008) wrote a fifteen-page letter to the incoming “Farmer in Chief” addressed to the President Elect of the United States regarding the need to re-design food policy. He stressed the need to address the food crisis we face as a nation. He makes the case that food will be the number one issue for the United States within the near future. In his letter he lays out a detailed plan for the incoming President regarding U.S. food policy and frames his argument as a “critical issue of national security.” This lack of a national food policy has had the biggest impact on low-income families and has become a major social justice issue for many people.

The urban community garden has a long history dating back to the late 1800s as a strategy to help low-income families access fresh grown produce. According to Winne (2008), the significance of the urban agriculture movement over the past thirty years is small when compared to the need (p. 156). In Pollan’s (2008) letter to the “Farmer in Chief”, he makes the case for the renewal of victory gardens. Victory gardens developed during World War II and contributed to feeding the nation during war-time. Pollan suggests more federal grant programs for community garden development and more land acquisition should be considered for the future food security of our nation state.
According to the April 2009 *Organic Gardening* “About 1 million people belong to the estimated 18,000 to 20,000 community gardens in the United States.”

Winne(2008) in *Closing the Food Gap* has also suggested a historical context for “looking back at lessons learned” (p. 66) and lists the following as barriers to successful community gardens: skepticism towards growing healthy food in the city, lack of funding, lack of government support – in terms of land-use policies, toxicity of urban plots, crime and vandalism, and lack of gardening and farming skills (p. 67). These barriers are critical to analyzing a community garden education program and the context/climate in which it operates. Lastly, Joan Twiss (2003) and colleagues have published a report in the American Journal of Public Health showing enhanced nutrition and physical activity in California cities where successful community gardens exist. They point to social capital, improved access to resources and a multitude of other garden initiatives as improving overall community health.

One of the perceived barriers to organic urban/rural agriculture is the belief that production cannot maintain yields to support populations with enough foods. The emphasis has been on large-scale agricultural activities with an assumption that these activities would have the biggest impact on food security. The agricultural models in countries like Cuba, India and Ecuador challenge these assumptions (Ruivenkamp, 2008). The linkages between science and urban agriculture may be critical to create successful community garden programs. This research study examines the local agricultural expertise and the impact this expertise has on garden training programs like the Seed to Supper Program. Are low-income populations receiving access to adequate training to produce fresh locally grown foods? To help us understand the impact of learning gardens
programs, we asked this question along with the eating and shopping habits of Seed to Supper participants.

Methodology

Quantitative

A survey using a combination of forced choice questions with Lickert scales and open-ended questions was used to assess the Seed to Supper program (see Appendix A: OFB Survey). The survey was administered by the Oregon Food Bank staff and volunteers to participants of the Seed to Supper program beginning in April 2009 and continues through the fall of 2009. This study reflects the results of 36 surveys through July 2009.

Qualitative

Open-ended interviews based on a standard series of questions (see Appendix B), ranged between 10 – 30 minutes long and were held either in the participant’s garden or in a nearby reception area. The interviews were audio recorded and notes were taken. The study used grounded theory analysis to categorize interview results using coding and heading methods developed from content. Interviewees included nine participants in the OFB Seed to Supper training program, two instructors from the same program and two community leaders active in the area of food security and urban agriculture training. The majority, but not all of the Seed to Supper participants live in public housing projects or have access to community center with a community garden.
Results/Findings

Using grounded theory methodologies of coding, participants’ strengths and weaknesses in relationship to the research question of assessing fresh locally grown food were determined. All of the interviewees recognized the importance of eating fresh locally grown fruits and vegetables, and indicated that the classes gave them some of the tools needed to grow their own fruits and vegetables. However, the issues of cost, space, transportation and availability dominated the interviews. Most of the survey respondents and interviewees had grown some of their own foods over the past two years – mainly through their involvement with the Seed to Supper program and had access to a community garden in their public housing complex. Having access to a garden plot in their housing project often made the difference between having a garden and not having a garden. This highlights the need for more community resources to develop more garden spaces for low-income families.

The sense of independence and satisfaction gained by interviewees in the program were important to key participants who became active volunteers in the program. They shared how they often helped others in their community succeed in accessing more fruits and vegetables and in learning about food preparation. In each community garden setting the Seed to Supper program succeeded in building community ties and networks within the public housing or community center project. Participants and key community leaders stressed the need for more educational opportunities and public policy addressing land reform. Lastly, educators and leaders who are creating public policy or educational
curriculum for learning garden programs need to consider the importance of cultural diversity.

The following question, headings and categories evolved from the interview process and analysis of the data: What are the barriers to low-income families in accessing fresh-locally grown foods? Using grounded theory methodologies of coding, the following headings/patterns developed which showed the participants’ strengths and weaknesses in relationship to the research question of accessing fresh locally grown foods.

**Economics/Food Insecurity**

- Cost
- Space to grow gardens
- Conveniently located grocery stores with local options
- Transportation
- Access to community resources

**Social Conditions and Issues**

- Human aspects – healthy lifestyles
- Community – Public Health
- Educational
- Public Policy

**Economics: Food Security and the high cost of fresh foods**

The majority of the survey respondents and interviewees agreed cost is a major consideration when purchasing fruits and vegetables (see Figure 1). One instructor explained how people often have to make difficult and careful choices when using a limited amount of food stamps to purchase foods, especially fresh fruits and vegetables. Although the majority of the participants interviewed reside in public housing projects and have a degree of stability in their lives, the issue of cost, a space to garden in, and transportation were major barriers to accessing fresh fruits and vegetables. Some of the
participants have problems with access to more affordable discount grocery stores like WinCo and Food for Less, often due to the lack of transportation. Public transportation is viewed as too cumbersome for shopping long distances from their home.

Figure 1 – Factors that prevent access to fresh fruits and vegetables

![Bar chart showing factors preventing access to fresh fruits and vegetables]

Table 1
Interview question
What influences your decision to buy fruits and vegetables?

<table>
<thead>
<tr>
<th>Most important Influences</th>
<th>Least mentioned influences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost – 6</td>
<td>Availability – 2</td>
</tr>
<tr>
<td>Nutritional Value - 5</td>
<td>Transportation – 2</td>
</tr>
<tr>
<td></td>
<td>Other - 0</td>
</tr>
</tbody>
</table>

Interviewees were given the above choices for the question.

Most participants shop at the grocery store nearest to their home due to limited transportation. When respondents were asked in the interview what influences their decision to buy fruits and vegetables, cost was the number one factor (Table 1). This was
consistent with survey results, which showed 32% of the respondents checked cost as a factor in obtaining fruits and vegetables (see Figure 1). The second factor that interviewees said influenced their positive decision to buy fruits and vegetables was nutritional value – see Table 1. 70% of the survey respondents agreed that they purchase more fruits and vegetables - when they filled out the survey following their Seed to Supper workshop (Figure 2). However, when asked during the interview if they felt they ate enough fruits and vegetables during the interviews, one half of the interviewees said they do not eat enough fruits and vegetables.

Figure 2 – Shopping patterns in the Seed to Supper Program

One interviewee belonged to a Community Supported Agriculture (CSA) organization and occasionally shopped at New Seasons (a local grocery store known for its excellent selection of locally grown foods) and Trader Joes. Only 2 people shopped at farmer’s markets, and everyone agreed that farmer’s markets are too expensive. All participants in interviews shop at the supermarket closest to where they live: primarily
Albertsons and Safeway (see Table 2). They shop at these stores because of convenience, not necessarily because they are less expensive. WinCo was often mentioned as a shopping place to find good value – but getting to a WinCo store is difficult for most, because they rely on public transportation. Several of the interviewees said they preferred fruit and vegetable stands to farmer’s markets and three participants regularly shop at local fruit stands because of freshness and good prices. Traveling to fruit stands was an issue for them all, but they felt it was worth the savings if they could get there.

<table>
<thead>
<tr>
<th>Locally grown Fresh Food Sources</th>
<th>Large-scale Grocery Stores</th>
<th>Public and Community Food Assistance*</th>
<th>Non-traditional food sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Supported Agriculture - 1</td>
<td>Albertsons - 5</td>
<td>Food Pantry - 0</td>
<td>Ethnic grocery - 1</td>
</tr>
<tr>
<td>Farmer’s Market – 2</td>
<td>Food For Less -1</td>
<td>Oregon Food Bank - 2</td>
<td>Fruit &amp; Vegetable Stand - 3</td>
</tr>
<tr>
<td>Food Co-op - 0</td>
<td>New Seasons - 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural Food Store - 0</td>
<td>Safeway - 3</td>
<td></td>
<td>Trader Joes- 1</td>
</tr>
<tr>
<td>Your garden - 0</td>
<td>WinCo - 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Totals:</strong> 3</td>
<td><strong>12</strong></td>
<td><strong>2</strong></td>
<td><strong>5</strong></td>
</tr>
</tbody>
</table>

* Food from food pantries and Oregon Food Bank range from USDA commodities to state and local foods.

This pattern of shopping closest to home is consistent with national trends (USDA 2009), and contributes to lack of access to fresh locally-grown foods. And according to author Mark Winne, since the early 1970s, the growing gap in food quality between upper and lower income populations has soared. Mark Winne(2008), a long-time advocate for equity in our food systems makes a case for “history repeating itself”
He is referring to the 1970s when food prices soared due to the oil embargo and striking truck drivers. This historic period also created an imbalance in food availability because small grocery stores began to close, and supermarkets located in the suburbs created price gaps between those most in need of affordable food and those with plenty. Affordable fresh food became difficult for inner city and poorer populations to access. Since this time, conservative free market economics and less government regulation have led to an aggressive large-scaled industrialized and globalized food system.

This system has led to many food and health related issues for Americans—hunger, obesity, diabetes, heart disease, and many believe cancer has increased as well (Winne, p. 10). Winne’s (2008) main point is that there are “growing food gaps” and food deserts in our cities; Portland is not an exception to this trend especially in light of the Oregon Food Bank’s data (see Profiles of Hunger & Poverty in Oregon 2008). Winne (2008) makes the case that in spite of efforts to alleviate food insecurity—the percentages of food insecurity has not changed since the mid 1990s. He advocates addressing the root causes of hunger—social and economic inequity. Until we resolve these issues --- history will continue to repeat itself (Winne, 2008).

The issue of equity was apparent when listening to the stories and responses shared by the interviewees. Their struggles with health, transportation and sudden life changes impacted their ability to access fresh food. One instructor’s main mission is to bring less processed foods to what he refers to as his “congregate” and meals distribution program. For one gardener, food independence and the comfort of growing your own food means he can survive and he is empowered by this – life has been better for this
individual and he is motivated by sharing what he has with others in his community. Food equity is a public health issue and one that contributes to the overall health of the community, according to the elected public official interviewed for the study. This interviewee pointed out the connection between needed health reform and food security and healthy lifestyle trends in our Portland communities.

These responses from survey respondents and interviewees give us greater insight into food equity issues and insecurity in the Portland area. The Seed to Supper classes provide skills and knowledge that empower individuals to create an environment of self-sufficiency. For many these skills help provide comfort.

**Human Aspect**

During the interviews participants often used terms such as self-sufficiency, satisfaction, comfort and security when discussing their involvement with gardening in the Seed to Supper program--all of which were important to their lives. These were dominant themes. 100% of the interviewees referred to their participation and involvement in gardening and the classes with satisfaction. The OFB survey results also showed satisfaction and respondents agreed they would use something they had learned from the class and they felt encouraged (Figure 3).
In addition to adding value to their lives and enhancing their lives, a small core of the interviewees had very active roles in the Seed to Supper program as volunteers and stressed the importance of self-reliance, satisfaction, security and comfort. They indicated that volunteerism was an important part of their lives, and these few were dedicated to spreading the word about gardening, nutrition, and food preparation to others in their community. It was apparent in the interviews that they were active and had created healthy lifestyles. They were busy growing gardens, teaching about nutrition and networking in their communities. One participant interviewed was involved in five different community gardens; his role was to help distribute the harvests from the gardens to his community meal program.

The public official interviewed expressed that gardening and cooking with fresh fruits and vegetables helps to create healthy lifestyles. She indicated this is critical to successful communities and to health reform. She expressed the need for public incentives to encourage these kinds of activities in schools, public housing, and in city and county buildings.
Community Health

The participants of the Seed to Supper program all mentioned the community-building process that had resulted from their experiences in the community gardens and the gardening classes in their public housing projects and community centers. At one housing project, a table is put out during harvest time for sharing extra fruits and vegetables – even those who can’t garden or do not have a garden space can access fresh fruits and vegetables during the height of the harvest season.

The enthusiasm generated by the gardening activities at another public housing site prompted the members of the project to petition the management to plant a public orchard. The interviewees were confident that there was enough collective knowledge to manage the orchard. A blueberry patch has already been successfully installed and a decision on the orchard should be reached by fall of 2009.

Public policy leaders in Portland have identified community health as a key factor for encouraging healthy urban agriculture activities. The city of Portland formed a Food Policy Council (FPC) in 2004 that oversaw several studies including Diggable City, and the impact of Measure 37 on Portland’s local food system. This progressive council addresses public health and nutrition policy for Multnomah County. The activity of a food council along with the support of public officials and community volunteers for urban agriculture creates a friendly environment to support healthy communities and foster urban agriculture for local food production (see Appendix C: FPC Governing
Principles). This kind of support is critical for future growth of community garden programs. One official spoke positively about the Seed to Supper program and other learning garden programs throughout the city and the important role they play in providing learning environments for participants.

Community health and cultural diversity are important concepts to focus on when we examine public health. Portland has a culturally diverse population which could contribute to a natural learning environment that could teach us more about food preparation using fresh locally grown foods, including food culture from many divergent ethnic groups such as the Mexican, African, and Ukrainian populations.

One community garden that was observed for this study has a large group of multicultural gardeners, who are known for their gardening abilities. When talking to many of the gardeners they spoke with admiration and respect for each other and their ability to garden successfully. One gardener suggested that any expansion of the garden could easily be accomplished because of the collective expertise. This is a positive way to integrate diverse populations and one example of what other cultures teach us about healthy eating, daily food preparation and gardening.

**Education**

Over half of the participants--61% of the survey respondents and half of the interviewees--indicated they had gained enough experience to grow some of their own fruits and vegetables. Additionally, 64% of the survey respondents indicated they would like more garden training. A positive educational example of the Seed to Supper model was evident in an early childhood education program, where the teacher (an interviewee) arranged for a one-time container gardening class, 25 people arrived (the parents and
children) to learn how to grow tomatoes, basil, and salad makings on their balconies and small yards. The container gardening workshop connected the school’s curriculum for growing plant starts at school and sending the plants home for successful gardening. The Seed to Supper program organizers brought containers, soil, plants and amendments. By bringing the Seed to Supper program to the parents, they were able to use the school curriculum to create a positive gardening experience for children and parents. The opportunities for educational experiences and examples are numerous showing the success of the Seed to Supper program.

**Nutrition**

Nutrition is an area of education that can provide critical knowledge for low-income participants and their families. Many of the participants indicated in the interviews they needed to know more about nutrition and connection between growing your own food and healthful consequences. Health-related issues like Diabetes influenced several of the interviewed program participants. According to the Centers for Disease Control and Prevention’s 2007 website, “23.6 million people or 7.8 percent of the population has diabetes” ([http://diabetes.niddk.nih.gov/DM/PUBS/statistics/#i_people](http://diabetes.niddk.nih.gov/DM/PUBS/statistics/#i_people)).

One gardener shared that she had recently learned she had adult-onset diabetes. She has utilized the Seed to Supper program and has learned as much as she can about gardening and cooking with fruits and vegetables. She recently had started teaching cooking classes to others in her housing project and will work one-on-one with members of her community tailoring lessons for special dietary needs, like food allergies, heart
disease and other health conditions. She wants to spread the word; all of her efforts and work are voluntary.

Demystifying the process of growing your own food!

There are those in the industrial agricultural system who maintain that growing our own food is too complex and requires specialized equipment and chemicals. In the July 2009 edition of *The American* a critic of “agri-intellectuals” wrote a front-page editorial entitled: *The Omnivore’s Delusion: Against the Agri-intellectuals*. The article is largely targeted against food writer Michael Pollan and those who follow his advice for small-scale farming and seasonal eating practices focused on locally grown fresh fruits and vegetables. In an interview with a Seed to Supper instructor, he expressed that his primary goal is to demystify the process of growing your own food. His second goal is to serve fresh foods instead of processed foods to his congregate. He convincingly made the relationship between working the soil in the past and now. For centuries people have farmed the Willamette Valley – farming starts with a seed and our hands in the soil, there is no great mystery. He made this strong connection to the past, which adds a poetic element to teaching gardening – whether on roof tops, plots in front of city hall to a backyard in Vancouver, Washington. This instructor finds inspiration from the history of the region and is motivated to find public spaces to farm and people to help him deliver fresh locally grown food to his “congregate.”

One of the interviewees is a community educator who trains Master Gardener students, these students often teach in the Seed to Supper program. He stressed the need for training low-income gardeners using a Master Gardener curriculum that would be more specific to the needs and issues of gardeners in public housing projects. The
existing Master Gardener program is a 10-month rigorous course – which costs approximately $350 and requires giving 70 hours of volunteer hours back to the community. Several of the Seed to Supper participants interviewed, volunteer upwards of 30 – 40 hours per week – so meeting that criteria would be no problem. However, the cost, transportation and format of the Master Gardener model might need to be adapted to the needs of this population. This community educator also suggested the need for more data on the benefits of gardening education and the correlation between these programs and increased access to fresh fruits and vegetables.

The miracle of gardening and the awe of growing your own food is an important component of gardening education. One Seed to Supper interviewee, who was previously a farm worker for ten years, spoke passionately about the wonderment of growing food. Although she had spent years in a commercialized farm setting, the Seed to Supper experience taught her about the soil and the amendments needed to create healthy microorganisms. She spoke of her reluctance to add chicken manure to soil that would produce food she gave her children. But once she understood how it improved the soil she realized its importance. She gained respect and wonderment for the miracle of growing things.

**Spreading the Word - Volunteerism**

Of all the participants, those that were active volunteers had greatest access to fresh fruits and vegetables. This was because of their networking and exposure to other gardeners and resources. Although only a few of the participants were involved in volunteerism, for this small group volunteering had become an important activity in their lives. For others, incorporating knowledge from the classes into their personal lives was
enough—they were dedicated to trying new fruits and vegetables and learning more about gardening and food preparation. (See previous sections Nutrition and Human Aspects for more examples of volunteerism in the Seed to Supper Program.)

**Diversity**

During one interview, a public official described the need to move from “processed to fresh foods” and the enormous task of educating the public about the benefits of fresh foods. She spoke of economic barriers and the cultural influences of the media, including the constant exposure to cheap processed foods advertised on billboards and on television. She pointed out that we have all been conditioned to think that when we arrive home from a long days work, we often open the freezer and pop a frozen (and usually highly-processed) food into the microwave oven for our dinner. People have come to expect convenience and speed. She pointed out that one key resource for improving this situation could come our diverse populations. She suggested these populations have a lot to teach us. She asks the question, “How can we access this knowledge?” She felt the community garden is a place where the cultural barriers can be crossed and we can benefit from learning about new foods and food preparation. The example used in the previous section on Community Health illustrates how effective an ethnic group can be in the gardening setting when given the opportunity, the Seed to Supper Program has helped facilitate this group by providing a classroom setting with interpreters to help facilitate the class.

**Public Policy**

The largest barrier to growing food in an urban environment is space—places to plant gardens. The public housing projects are fertile places to start community learning
gardens but space is the number one issue in the Portland metro area. The Portland Parks and Recreation Community Garden Program offers 32 city-wide gardens and there are over 1200 people on waiting lists to access community garden plots. Often it takes three-to-five years to get enrolled into a garden near your residence. In Portland, people have created other models like yard sharing and Growing Gardens. In addition, guerilla gardeners have taken to the streets using parking strips, empty lots and pieces of property in transition. Often these gardeners are using the land with permission. For many low-income populations, the costs, transportation, water, and garden supplies, like soil amendments, seeds, tools, etc. complicate the community garden experience. Land reform is needed to address the issues of equity. Property tax incentives for landowners can help to encourage use of fallow land and empty city lots. This kind of reform would contribute to the needs of low-income populations’ ability to access fresh locally-grown foods. Portland has several public agencies and organizations addressing policy needs including the Multnomah County Food Policy Council, Oregon Food Bank, and other ad-hoc groups like Real Wealth of Portland, a faith-based group conducting informal information sharing about gardening and urban agriculture.

There are other viable urban agriculture models to learn from, mostly in the southern hemisphere, i.e. Havana, Cuba. Cuba developed a successful program where government intervention has structured land use laws for re-zoning of urban land, allowing for variances, and the use of empty city lots. An example in Portland of the creative use of fallow land owned by the county took place this summer when Multnomah County in cooperation with Hands On Greater Portland, a volunteer organization, decided to farm a two-acre tract of land in Troutdale – once part of a project called the “poor farm” in 1911.
in order to grow fresh produce and distribute additional fresh produce through the Oregon Food Bank’s network.

Figure 5 - Comparison of unused empty lot on left, and temporary community garden on future development site on right.

**Suggestions/recommendations**

Interviewees provided suggestions for improving the Seed to Supper Program. Often these suggestions related to the housing projects they occupied and are included here because of similarities in the participant’s needs for the Seed to Supper program and the garden communities they live in. The survey responses are included separately as Appendix D.

Over half of the participants interviewed had participated in the Seed to Supper gardening classes for two seasons. Although not dissatisfied with the classes, the participants felt the program was somewhat repetitive (see Appendix E for Seed to Supper curriculum). The respondents had additional specific questions related to gardening techniques including adding soil amendments, crop rotations, pest management and watering. Several expressed the need for more one-on-one mentoring in the garden. Everyone indicated they needed more resources including soil and garden space, seeds, plants and fertilizers.
Creative ideas for expansion of community efforts in their housing projects ranged from creating a community kitchen for canning, to installation of a public orchard. Several individuals expressed the need for transportation services to grocery stores and shopping services. All felt repeating the courses had been beneficial, but they needed more hands-on and advanced gardening techniques. The majority of survey respondents and interviewees rely on friends and family for gardening advice. A compilation or online network of gardening suggestions might be useful, such as a handbook of where to access gardening expertise and resources or a gardening support group might be adapted to each community situation.

The instructors cited the need for more financial resources and more assistance with recruitment for classes. Each of the instructors was dedicated to expanding their students’ awareness of the benefits of growing fresh fruits and vegetables and taking advantage of the resources available.

As one educator suggested, there is a need for more data collection in order to help justify additional gardening and nutrition training. He felt this would help agencies find resources to fund additional training programs. Additionally, he noted that more data on the role education plays in helping low-income populations access fresh locally-grown foods would contribute to improving and increasing these kinds of programs.

Many of the community leaders and educators interviewed conveyed how crucial land reform is to further the community garden effort in Portland. Also, a major cultural food shift towards more fresh and local foods is needed to improve the health of our communities and city. There is an opportunity for non-profit groups and agencies to capture the attention and focus of public officials for collaborative efforts to develop
more community partnerships and to raise money and volunteers to improve access to fresh foods for our low-income populations. There are innovative food distribution mechanisms and models throughout the state of Oregon and in the Southern hemisphere, if implemented on a larger scale these urban agriculture models could help improve the health of Portland’s low-income populations. Portland’s sustainability movement aspires to make the city a livable and healthy place with fair equitable food systems for all and by adapting more of these models Portland can achieve this goal.

**Conclusion**

In conclusion, this study set out to assess effectiveness of the Seed to Supper participants in gaining access to fresh grown foods. It also sought to identify the strengths of this population. I found that this community possesses particular strengths such as community volunteerism and the strong desire to access and consume fresh locally grown fruits and vegetables. Yet, there are many barriers preventing this population from full access to affordable nutritional foods. These barriers include: cost, space and supplies to garden with, transportation and access to convenient local food sources and distribution of fresh foods to people in need. Oregon Food Bank and other food distribution groups can continue to support these populations by providing more opportunities to access fair-priced foods, greater education and training opportunities for the individuals interested in teaching and mentoring others in their communities. Additionally, state and local governments have identified food security and urban agriculture as key issues and are addressing policy changes for creating more land reform and venues for fair-priced foods. These policy changes along with stronger educational opportunities could encourage low-income populations to access more fresh-locally
grown foods. Clearly these populations want more fruits and vegetables and are willing to make lifestyle changes to accommodate more access. These changes and a national agenda for health care reform that would focus on preventative and healthy lifestyles could help to significantly diminish the current barriers that low-income families have in accessing fresh locally-grown foods.

* It is important to note that this study is presented as a preliminary, pilot study. The sample sizes are small so statistical inferences cannot be made at this point, and the samples are not intended to necessarily be representative (i.e., people are going to self-select for the interviews, so it is not surprising that everyone said they had a positive experience with the program, etc). Nonetheless, this preliminary study identifies some key themes and findings that can be followed up on in a larger study in a broader time frame.
References


Oregon Food Bank Official Website: Seed to Supper

(www.foodbank.org/ofb_services/food_programs/learning_garden.html)
Appendix A

Workshop Title: ___________________ Date (w/year): __________

Please respond to the following statements with:

1 = disagree, 2 = maybe, 3 = agree

1. This workshop taught me something that I will be able to use in my garden.
   1   2   3

2. This workshop has encouraged me to plant a garden.
   1   2   3

3. I grow some of my own produce.
   1   2   3

4. I have gained enough experience to grow some of my own fruits and vegetables.
   1   2   3

5. I would like more gardening training.
   1   2   3

6. Within the past two years I have grown some food.
   1   2   3

7. I purchase more fresh fruits and vegetables.
   1   2   3

8. I currently use a community garden space
   1   2   3

9. I have a garden in my yard
   1   2   3

10. I volunteer at Oregon Food Bank’s Learning Gardens
   1   2   3

Circle or check boxes.

11. How often do you eat fresh fruits and vegetables? (Circle most often)

   3 times per day    1 time per day    5 times per week    1 time per week

12. What additional things do you need to grow a garden?
   (Check all that apply)
   ✔ Seeds
   ✔ Garden Advice
   ✔ Labor in Garden
   ✔ Access to how-to Garden books
   ✔ Garden space
   ✔ Help putting in your garden
   ✔ Gardening Tools
   ✔ Money to buy garden supplies
   ✔ Other __________

13. What prevents you from obtaining fresh fruits and vegetables or growing your own?
   (Check all that apply)
   ✔ Cost
   ✔ Availability
   ✔ Garden space
   ✔ No time to garden
14. What would you recommend changing or adding to improve these workshops?

15. Please share a story about your gardening as a result of this workshop?

16. Do you need more information or advice to grow a garden? If yes, please explain

17. Where do you get your gardening questions answered?

**Income Information – Learning Garden**

Oregon Food Bank’s Learning Garden programs work to address the root causes of hunger through increased nutrition, community food security and self-reliance in our community. In order to make sure our programs are effectively reaching those who may be in need, we would like to find out how many volunteers and educational participants earn less than 200% of the Federal Poverty Level. This form is optional, but your participation will help us refine our programs and outreach efforts. This information will be kept completely confidential. Simply find the number of people in your household and determine whether you make more or less than the income listed. Check the appropriate box below.

- [ ] My family earns *less than* the amount listed below
- [ ] My family makes *more than* the amount listed below

<table>
<thead>
<tr>
<th>Number of People in Household</th>
<th>Combined Annual Income</th>
<th>Combined Monthly Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$ 21,660</td>
<td>$ 1805</td>
</tr>
<tr>
<td>2</td>
<td>$ 29,140</td>
<td>$ 2428</td>
</tr>
<tr>
<td>3</td>
<td>$ 36,620</td>
<td>$ 3052</td>
</tr>
<tr>
<td>4</td>
<td>$ 44,100</td>
<td>$ 3675</td>
</tr>
<tr>
<td>5</td>
<td>$ 51,580</td>
<td>$ 4298</td>
</tr>
<tr>
<td>6</td>
<td>$ 59,060</td>
<td>$ 4922</td>
</tr>
<tr>
<td>7</td>
<td>$ 66,540</td>
<td>$ 5545</td>
</tr>
<tr>
<td>8</td>
<td>$ 74,020</td>
<td>$ 6168</td>
</tr>
</tbody>
</table>
Appendix B

Seed to Supper: Interview Questions

1. As a result of taking a learning garden workshop, have you gained enough experience to grow some of your own fruits and vegetables. If yes, explain. If no, why.

2. As a result of taking a learning garden workshop, do you eat more fresh-grown produce? If yes, what kinds, did you grow them or purchase them?

3. Were you growing fruits and vegetables before the workshop Y/N, or after the workshop Y/N.

4. How has this workshop changed the kind of food you eat?

5. Where do you purchase or obtain most of your fresh produce?

   Farmer’s Market  Grocery Store  Your or your neighbor’s garden
   Food For Less    Food Pantry   Community Supported Agriculture
   Oregon Food Bank Food Co-op   Natural Food Store
   Other___________________________________________________

6. What influences your decision to buy fruits and vegetables?

   Cost  Availability  Convenience  Nutritional Value  Taste  Transportation
   Other___________________________________________________

7. Why do you grow your own fruits and vegetables?

   Taste  Availability  Cost  Do not grow my own produce  Other_______

8. What would you recommend changing or adding to improve these workshops?

9. Please share a story about your gardening or meal experience as a result of this workshop?

10. Do you need more information or advice to grow a garden?

11. Where do you get your gardening questions answered?

12. Have you taken other gardening classes? If yes, which ones.

13. Do you work outside of the home?
14. Is there anything you would like to share about the Seed to Supper Program experience?
Governing Principles - May 18, 2006

The City of Portland and Multnomah County will promote, support and strengthen a healthy regional food system, based upon the following principles:

1) Every City and County resident has the right to an adequate supply of nutritious, affordable and culturally appropriate food (food security).

2) Food security contributes to the health and well being of residents while reducing the need for medical care and social services.

3) Food and agriculture are central to the economy of the City and County, and a strong commitment should be made to the protection, growth and development of these sectors.

4) A strong regional system of food production, distribution, access and reuse that protects our natural resources contributes significantly to the environmental well-being of this region.

5) A healthy regional food system further supports the sustainability goals of the City and County, creating economic, social and environmental benefits for this and future generations.

6) Food brings people together in celebrations of community and diversity and is an important part of the City and County’s culture.

City and County commitment

In order to play its role in creating a healthy regional food system, the City and County will:

1) Support an economically viable and environmentally and socially sustainable local food system.

2) Enhance the viability of regional farms by ensuring the stability of the agricultural land base and infrastructure and strengthening economic and social linkages between urban consumers and rural producers.

3) Ensure ready access to quality grocery stores, food service operations and other food delivery systems.

4) Promote the availability of a variety of foods at a reasonable cost.

5) Promote and maintain legitimate confidence in the quality and safety of foods available.

6) Promote easy access to understandable and accurate information about food and nutrition.

For more information:
Steve Cohen                                          Kat West
City of Portland                                          Multnomah County
(503) 823-4225                                          (503) 988-4092
Appendix D - OFB Survey Questions:

<table>
<thead>
<tr>
<th>Question</th>
<th>1 - Disagreed</th>
<th>2 - maybe</th>
<th>3 - Agreed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. This workshop taught me something that I will be able to use in my garden.</td>
<td>0%</td>
<td>8%</td>
<td>89%</td>
</tr>
<tr>
<td>2. This workshop has encouraged me to plant a garden.</td>
<td>0%</td>
<td>11%</td>
<td>86%</td>
</tr>
<tr>
<td>3. I grow some of my own produce.</td>
<td>17%</td>
<td>6%</td>
<td>72%</td>
</tr>
<tr>
<td>4. I have gained enough experience to grow some of my own fruits and vegetables.</td>
<td>6%</td>
<td>28%</td>
<td>61%</td>
</tr>
<tr>
<td>5. I would like more gardening training.</td>
<td>11%</td>
<td>19%</td>
<td>64%</td>
</tr>
<tr>
<td>6. Within the past two years I have grown some food.</td>
<td>22%</td>
<td>14%</td>
<td>58%</td>
</tr>
<tr>
<td>7. I purchase more fresh fruits and vegetables.</td>
<td>6%</td>
<td>11%</td>
<td>70%</td>
</tr>
<tr>
<td>8. I currently use a community garden space</td>
<td>42%</td>
<td>6%</td>
<td>47%</td>
</tr>
<tr>
<td>9. I have a garden in my yard</td>
<td>33%</td>
<td>14%</td>
<td>47%</td>
</tr>
<tr>
<td>10. I volunteer at the OFB community garden</td>
<td>75%</td>
<td>9%</td>
<td>12%</td>
</tr>
<tr>
<td>11. How often do you eat fresh fruits and vegetables?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3x per day</td>
<td>30.60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 per day</td>
<td>47.20%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 times per week</td>
<td>11.10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 time per week</td>
<td>2.80%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. What additional things do you need to know or have in order to grow a garden?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Needs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seeds</td>
<td>36.10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garden Advice</td>
<td>25.00%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labor in Garden</td>
<td>11.10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to how-to Garden books</td>
<td>13.90%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garden space</td>
<td>38.90%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Help putting in your garden</td>
<td>11.10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gardening Tools</td>
<td>23.00%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Money to buy garden supplies</td>
<td>30.60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>25%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. What factors prevent you from obtaining fresh fruits and vegetables or growing your own?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>36.00%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Availability</td>
<td>13.90%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garden space</td>
<td>44.50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of time</td>
<td>16.70%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix E

Seed to Supper: A workshop series for beginning gardeners

General Description: This is a 5-week series of classroom-type, indoor gardening workshops designed to cover all of the information one would need to know to start a garden. These workshops are usually held in the fall, winter and early spring (before the gardening season starts).

Class Format: Each of the 5 classes is 1.5 hours long and covers a different topic (see below for the topic descriptions). Within each class, 3-5 different subtopics are covered (for example, the healthy soils class covers bed preparation, composting, cover cropping, crop rotation and organic fertilizers).

Assumptions: The workshops are focused on providing basic, practical information, but they do include some scientific and theoretical information to provide a foundation. We assume that people who sign up for a 5-week gardening class want some theoretical / scientific information to accompany the practical information. This has been affirmed in the workshop evaluations. Some of the slides use ‘garden / agriculture’ specific language, but it is assumed that the workshop presenter will define any of these words. The workshops are also focused on low-cost solutions because the target audiences are individuals who earn less than 200% of the Federal Poverty Level (less than $44,100 annually for a family of 4). While we recognize that adults learn best by doing, it is not always practical to have hands-on activities built into the workshops; these workshops are designed to arm the new gardener with information and confidence as they start their new garden.

Class materials: For each class there is a set of 3-5 relevant handouts, a visual outline of the topics covered by the presenter (depending on the setting, this will be a flip chart or a PowerPoint presentation using a projector or an overhead projector), and demonstration materials when appropriate and feasible. There will also be laminated pictures to pass around.

Specific Workshop Descriptions:

Week 1: Creating healthy garden soil. Healthy soil is the foundation for a productive vegetable garden. Participants will learn how to maintain soil fertility throughout the years. Topics will include crop rotation, composting, cover crops and organic fertilizers.

Week 2: Planting. Different plants require different planting techniques. Participants will learn how and when to plant different vegetables, fruits and herbs. This workshop will cover direct seeding, transplanting, growing your own transplants and other common propagation methods.

Week 3: Garden Maintenance. Participants will learn to take care of their garden to maximize your harvest. Thinning, weeding and watering strategies will be covered as well as tips for caring for specific plants.

Week 4: Organic Pest Management. Participants will learn natural, organic ways to control pests in your garden. This workshop will cover beneficial insects, keeping plants healthy and recipes for simple pest control concoctions.

Week 5: Garden Planning. Careful planning is the key to growing a healthy, abundant garden all season long. Participants will learn how to create a garden plan that will guide them step by step as they plant and harvest throughout the spring, summer and fall.
Misguided Men: International Law and the Closing of Guantanamo

Michael Tonn

Dr. David Kinsella, Faculty Mentor

Abstract

With the signing of the Executive Order to close Guantanamo Bay, the need for research has arisen to address the possible solutions. A framework of analysis, built upon various legal factors, is needed to formulate acceptable legal options that coincide with political goals. The difficulty lies in the moral and ethical willingness to pursue these ends. However, only by adhering to the rule of law can the US government effectively close the detention center at Guantanamo and also implement a plan to deal with future incidents regarding possible terrorist suspects.

Introduction

Closing the detention center at Guantanamo Bay is a complex, intricate, and important problem facing the US government today. Much has already been written discussing treatment of the detainees, evidence regarding the detainees gained from interrogation, and the difference between torture and degrading treatment. Key issues of debate among scholars have been the limits of presidential power¹ and the need for balance between the three branches of government.² While these issues are of upmost importance, they are not the main focus of this paper. The purpose of this paper is to discuss the current condition facing the Obama Administration as it searches for solutions on how to properly release the detainees held at Guantanamo Bay. Past conditions will be addressed to construct a framework of analysis and thus making an informed policy recommendation.

This analysis will begin by considering context provided by the “War on Terror.” The strategic logic employed by the Bush Administration will be discussed to draw attention specifically to the detainees’ legal status. This legal status will then be compared to provisions of international law.

Turning back to domestic policies, a review of policy actions and reactions will show how the separate branches of the US government addressed the concerns of national security and international law. Lastly, by analyzing the commission process, a legal solution is recommended that acts in concurrence with both domestic and international law.

**Context of “War on Terror”**

In the week following the attacks of Sept. 11th, Congress authorized the President to use force in what would become the “War on Terror.” The Authorization for Use of Military Force (AUMF) states quite well the range of actions available to the President. As Section 2 (a) states:

> That the President is authorized to use all necessary and appropriate force against those nations, organizations, or persons he determines planned, authorized, committed, or aided the terrorist attacks that occurred on September 11, 2001, or harbored such organizations or persons, in order to prevent any future acts of international terrorism against the United States by such nations, organizations or persons.

Osama bin Laden was soon named public enemy number one along with the al-Qaeda network. The connection between the Taliban government of Afghanistan and bin Laden, who had been allowed to run terrorist training camps within the Afghan countryside, was established by US intelligence. Quickly, the US military was mobilized to invade Afghanistan and overthrow the government, in accordance with the AUMF of Sept. 18th, 2001. Even though customarily forbidden by international law\(^3\), Congress made no objection to the President instructing the US military to overthrow a foreign government. The political atmosphere following Sept. 11th, both

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\(^3\) Charter of the United Nations, Chapter 1, Article 2
domestically and internationally, was filled with claims of solidarity, knowledge of the new threat, and calls of action ranging from justice to revenge.

In this frenzied environment of political and military activity, operations were begun in Afghanistan with little regard to international customs of war. Parts of Afghanistan were carpet bombed, even though they contained civilians, including women and children. Pamphlets were distributed promising “wealth and power” to anyone who turned over al-Qaeda suspects. Those captured or handed over to the US military were shipped to Bagram Air Base in Afghanistan. Bagram became the jump off point for interrogations and for some, the first step towards indefinite detainment at Guantanamo.

**Bush Administration Strategic Logic**

Following the recommendation contained in a memo sent by Deputy Assistant Attorney General John Yoo and Deputy Assistant Attorney General Patrick Philbin to Department of Defense General Counsel William Haynes II in December 2001, men began to arrive at Guantanamo. As part of the Department of Justice Office of Legal Counsel, Yoo and Philbin maintained that if the detainees were held at Guantanamo, they could be denied access to the US legal system. The Naval base was assigned to US jurisdiction and control as part of 1903 treaty agreement with Cuba. While the Cuban government still retains ultimate sovereignty over the land itself, the US has complete jurisdiction and control over the base.

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The Bush Administration needed a place to further interrogate men captured in the war in Afghanistan. They justified the detention center at Guantanamo by exploiting the difference between sovereignty and jurisdiction. The Office of Legal Counsel claimed that by holding them on foreign land, the detainees would not have access to the American court system and could be held indefinitely or until the War on Terror concluded. Using this justification created a “legal black hole” as British Lord Steyn described it.7 The detainees could not seek due legal process in American courts or any court system initially. Given the amorphous character of the War on Terror, detainees could be held indefinitely by claiming that they would return to the field of battle to plot more terrorist attacks and kill more Americans.

On January 9, 2002, Yoo and Special Counsel Robert Delabunty produced another memo concluding that international treaties and federal laws do not apply to members of al Qaeda or the Taliban.8 In this memo, the authors state that al-Qaeda and the Taliban are not nation-states and therefore, the Geneva Conventions do not apply. Also, the War Crimes Act, Title 18 U.S. Code 2441, does not apply for the same basic reason. But even more disturbing is that the authors of the memo concluded that “customary international law, whatever its source and content, does not bind the President, or restrict the actions of the US military, because it does not constitute federal law recognized under the Supremacy Clause of the Constitution.”9

Within this legal black hole came a new legal definition by the Bush Administration- “unlawful enemy combatant.” Both of these adjectives have been used in place of each other to denote the same detainee’s status- either “enemy combatant” or “unlawful combatant.”

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8 Greenberg et al., Torture Papers, 38.
9 Ibid., 39.
Although used as an official status, the definition of an unlawful enemy combatant was not codified until the Military Commissions Act (MCA) of 2006. According to the MCA, an “unlawful enemy combatant” is a person who:

(1) “has engaged in hostilities or who has purposefully and materially supported hostilities against the United States or its co-belligerents who is not a lawful enemy combatant,” or (2) “has been determined to be an unlawful enemy combatant by a Combatant Status Review Tribunal (CSRT) or another competent tribunal” by a certain date.10

While it echoes similar language contained in the AUMF, this definition contains a discrepancy when put into practice. To determine an “unlawful enemy combatant”, many CSRT’s relied on faulty information gleaned through harsh interrogation techniques, unreliable sources, or plain nonsense. For example, according to a report by Seton Hall law professor Mark Denbeaux, some CSRT decisions where based upon the detainee using a guest house (a common sleeping arrangement in the country of Afghanistan), wearing olive drab clothing, or possessing a Casio watch.11 Too often, CSRTs based their determinations upon the recommendations already contained in the detainee’s files, most of which came from interrogators. It’s crucial to point out the circular reasoning here: men were determined to be “unlawful enemy combatants” because someone had claimed them to be “unlawful enemy combatants.” Then, using this determination as a legal status, these men were prohibited from seeking redress through US courts on the basis of habeas corpus, a universal right of international law, domestic law and common law.

The Bush Administration was looking to glean vital intelligence from these captured men but the
only way they could have detained and interrogated them was by denying them habeas corpus
through this new definition of “unlawful enemy combatant.” Prisoners of war are normally given
protection against unending questioning by Article 17 of the Third Geneva Convention: “Every
prisoner of war, when questioned on the subject, is bound to give only his surname, first names
and rank, date of birth, and army, regimental, personal or serial number, or failing this,
equivalent information.” If given POW status, the detainees could no longer be subjected to
endless interrogations, thus jeopardizing their usefulness to intelligence officials.

International Law

By deeming these men “enemy combatants” the Bush administration tried to justify their
indefinite detainment by denying them status as prisoners of war. Article 4 of the Third Geneva
Convention gives various criteria in regards to status as a prisoner of war. A person must belong
to one of the following categories:

A. Be a member of the armed forces of a party in conflict

B. Be a member of a militia belonging to a party in conflict and fulfill the following:
   1. Must be commanded by a person responsible for his subordinates.
   2. Wear a fixed distinctive sign recognizable at a distance.
   3. Carry arms openly.
   4. Conduct their operations in accordance with the laws and customs of war.

C. Be a member of an armed force that professes allegiance with a government or
   authority not recognized by the detaining power.
Delineation must be made between the Taliban and al-Qaeda with regards to these criteria. Members of the Taliban could fall under either criterion A or C. The Taliban was the ruling government and also the armed forces of the country of Afghanistan, which is a signatory of the Geneva Conventions thus fulfilling criterion A. Or, the Afghani armed forces professed allegiance to the Taliban government which is not recognized by the detaining power (i.e. the US), thus fulfilling criterion C.

Now, consider these criteria in regards to al-Qaeda, with criterion B being the essential condition. The first conditional could be argued to exist. The hierarchy structure of al-Qaeda is not under the command of true military commanders, but de facto leaders. As for a fixed sign, al-Qaeda carries no emblems, no flags, or insignia traditionally associated with military forces. However, they have been known to carry arms openly. As for the last condition, terrorists intentionally obscure the laws of war to conduct their operations. By avoiding the laws and customs of war, they can achieve their political goals through dramatic means. A definition of terrorism would be beneficial at this point. As Resolution 1566 of the United Nation states, terrorism is:

- criminal acts, including against civilians, committed with the intent to cause death or serious bodily injury, or taking of hostages, with the purpose to provoke a state of terror in the general public or in a group of persons or particular persons, intimidate a population or compel a government or an international organization to do or to abstain from doing any act.

Osama bin Laden and the al-Qaeda network definitely fit the definition of a terrorist. Most of the detainees do not. However, they drew no distinction between those captured and those actually
confirmed to be members of al-Qaeda, the Taliban or otherwise. Therefore, the Bush administration denied all the detainees’ status as prisoners of war, as the memo from Alberto Gonzales to the President, dated January 25, 2002, clearly indicates in which Gonzales provides the legal justification for such a decision.\textsuperscript{12} The Geneva Conventions makes it clear that anyone captured during armed hostilities is considered a prisoner of war and afforded protection under the Third Convention until deemed otherwise by competent tribunal, under Article 5.

Even though the Bush Administration maintained that the CSRT fit this necessity, using the word “tribunals” in this case is an equivocation: Article 5 tribunals are to establish status as POW’s, if such doubt exists. CSRT’s determine status as enemy combatants. The Bush Administration had already maintained that the detainees were not POW’s, so the CSRT’s are unable to replace or replicate the Article 5 tribunals. Unless used to grant POW status, CSRT’s do not qualify as Article 5 tribunals.

Even if detainees were deemed not to be POW’s they were still afforded protections under the Fourth Geneva Convention as Civilian Persons in Time of War. Everyone during a time of war is afforded protection by either the Third or the Fourth Convention; there is no lack of legal coverage. A person captured is given status as a POW and given protection under the Third Convention or they are considered a civilian and given protection under the Fourth Convention. However, the Bush Administration found a clever strategy: they made a new category of “enemy combatant,” labeled whomever they wanted, and placed these individuals outside the protections of the Third and Fourth Conventions. But as the United Nations stated in a report on the situation

\textsuperscript{12} Greenberg et al., \textit{Torture Papers}, 118.
of the detainees, ‘the ongoing detention of the Guantanamo Bay detainees as “enemy combatants” does in fact constitute arbitrary deprivation of the right to personal liberty.’

Action/Reaction

The Supreme Court and Congress had been doing a legal dance the entire time. The first step was the decision of Rasul v. Bush where the legality of the detainment was first broached. However, this case was not to determine whether the indefinite detainment was legal but whether the US courts actually had the jurisdiction to hear the prisoners’ cases. The decision in Rasul was merely to determine if the men held at Guantanamo could pursue habeas corpus through US courts. The dissenting judges stressed the point that America should not extend any protections to prisoners held under Department of Defense custody, citing the case of Johnson v. Eisentrager.

Eisentrager involved German nationals captured in China and tried in the American-occupied section of Germany. The distinction in this case is that the Guantanamo detainees are under American civil jurisdiction from the terms of the original lease with Cuba while the respondents in Eisentrager were never within territorial jurisdiction of the American civil system.

Congress reacted by signing into law the Detainee Treatment Act of 2005 (DTA). The DTA set up the Combatant Status Review Tribunals (CSRT) and the Administrative Review Boards (ARB). CSRT’s weigh available evidence to determine a combatant’s status is lawful or not. The ARB’s act much like parole boards, to determine whether the DOD should continue holding these men. The DTA also states that “no federal court, justice or judge shall have jurisdiction to

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hear or consider the application for the writ of habeas corpus filed by or on the behalf of an alien
detained by the DOD at Guantanamo”.

In 2006, the Supreme Court stepped forward with the decision of *Hamdan v. Rumsfeld*. Hamdan
petitioned that the neither congressional act nor law of war supports trial by commission for
conspiracy, and that the procedures adopted to try him violate basic tenets of military and
international law, including the principle that a defendant must be permitted to see and hear the
evidence against him. The District of Columbia Circuit court dismissed Hamdan’s challenge on
the grounds that the Geneva Conventions are not judicially enforceable and that, in any event,
Hamdan is not entitled to their protections. The Supreme Court ruled that neither of these
grounds is persuasive.

Congress made another concerted side step with the Military Commissions Act (MCA) of 2006.
The legislature returned to the notion that the detainees should be placed outside the protection
of the Geneva Conventions. Section 948b of the MCA states: “No unlawful enemy combatant
subject to trial by military commission under this chapter may invoke the Geneva Conventions as
a source of rights.” Here we have the highest law making body of the United States stating that
they want to deny the universal human rights protection of the Geneva Conventions, afforded to
all people of the world. According to Article 3 of Fourth Geneva Convention, the following are
prohibited at all times and apply to those not taking part in hostilities, including those who have
laid down their arms:

(a) violence to life and person, in particular murder of all kinds, mutilation, cruel
treatment and torture

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\(^{14}\) DTA Section 1004(a).
\(^{16}\) *Hamdan*, 62-63.
(b) taking of hostages

(c) outrages upon personal dignity, in particular humiliating and degrading treatment

(d) the passing of sentences and the carrying out of executions without previous judgment pronounced by a regularly constituted court, affording all the judicial guarantees which are recognized as indispensable by civilized peoples.

Perhaps it was political pressure not to give alleged terrorists any safe haven, even under law, or perhaps it was pressure from the Bush Administration to keep these men held there indefinitely.

Again we find the similar limited jurisdiction found in the DTA, which amends Section 2241 of Title 28 of the US code: “No court, justice, or judge shall have jurisdiction to hear or consider an application for a writ of habeas corpus filed by or on behalf on an alien detained by the United States who has been determined by the United States to have been properly detained as an enemy combatant or is awaiting such determination” (emphasis mine).\footnote{MCA Section 7(a).} Not only has Congress authorized the President to indefinitely hold anyone, but even those that are not yet deemed to be “enemy combatants”.\footnote{This is what happened to Brandon Mayfield of Portland, OR. In Steven Wax’s book Kafka Comes to America, (New York: Other Press, 2008) he gives a vivid description of his defense of Mr. Mayfield as federal public defender. Brandon had been, for all intents and purposes, ‘detained’ by the FBI during an investigation that pointed to Mr. Mayfield being an accomplice to the bombings in Madrid in 2004. The FBI did not present a warrant to Brandon when they took him from his private practice law office. Their investigation rested upon a fingerprint they had received from the Madrid police that matched Brandon’s. It was later found out that the fingerprint was not his, the obvious revelation being that Spanish police arrested the real suspect.}

Consider the cases of Jose Padilla and Yaser Hamdi, both of which were US citizens. Padilla was arrested in Chicago and held as an enemy combatant in a military brig in North Carolina. Hamdi
was captured in Afghanistan, sent to Guantanamo, but then transferred to the same military brig once his American citizenship was discovered. Not only were these men denied their international human rights but also their rights as citizens of the United States because of being labeled “enemy combatants.”

Once again, the Supreme Court answered with another decisive step in 2008. In Boumediene v. Bush, the Court ruled that the MCA “operates an unconstitutional suspension of the writ of habeas corpus”.19 It was argued that there were courts with applicable ability and jurisdiction to try the detainees and the military commissions were therefore unneeded. The Suspension Clause of the Constitution allows only Congress, and not the President, to suspend the writ of habeas corpus for the security of the United States in extreme circumstances. The judges also argued that with a fully functional court system, Congress was not authorized to suspend the writ for anyone, especially those held under detention by the Department of Defense. Once again, the Executive branch was treating the detainees as military personnel for prosecution purposes (to secure trial by military commission and to avoid the Judicial branch) and then also denying them status as military personnel (to escape the protections of the Third Geneva Convention).

The commissions lack due process in many crucial regards. Detainees are required to be assigned military counsel and cannot waive this right, effectively limiting their ability to act as their own counsel.20 They can also be denied notification of the charges against them, an essential element of habeas corpus, due to national security concerns.21 If told of their charges, detainees were thought to be able to notify operatives either inside or outside the prison of sensitive information in the making, and thus sparking more terrorist attacks. For the same reason, it was accepted that

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21 Military Commissions Act of 2006, Subchapter IV, Section 949d.
detainees were not required to actually be present for their trial. In fact, they could be removed if it was thought they were creating any kind of disturbance. However, a compromise was reached in which their counsel would be notified of all charges, but, of course, counsel could not actually discuss the charges with the detainee, limiting their ability to build a case and provide a thorough defense. Additionally, given the classified nature of some information, only lawyers able to secure a top secret clearance were be able to represent the men at Guantanamo. Anything discussed between the detainee and counsel was subject to the military censor’s review, violating attorney-client privilege, although it was claimed to be for strictly security purposes. Counsel could not notify detainees of current world events that might have contributed to their case, also due to security concerns. The military commission process effectively placed lawyers and detainees incommunicado, with the military as the mediator of anything that could be said. Additionally, the court of last resort is also placed within the military—meaning, the Commander in Chief, or someone from the Department of Defense he so designates. This means that all detainee appeals would eventually reach the President, the very official calling for their detainment, which clearly violates the impartially factor required by a court of law.

Detainees have also been unable to provide for their own defense by being denied the ability to contact key witnesses. Most of these men are poor and come from very rural parts of countries thousands of miles away from Guantanamo. At Guantanamo, it is ludicrous to think that providing legal processes in legislation is the same as providing them in reality.

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22 Ibid.
23 Smith, *Eight O’clock Ferry*, 132.
24 Ibid., 135.
Boumediene also challenged the CSRT’s by pointing out that detainee’s have limited means to find or present evidence to challenge the Government’s case, do not have assistance to counsel, and may not be aware of the most critical allegations that the Government has relied upon to order their detention. However, once a prisoner is labeled an ‘enemy combatant’ by the CSRT, he is then forced to convince them of his innocence. These men were considered guilty until proven innocent.

**Current Situation**

Of the approximately 800 men that have been detained as “enemy combatants” at Guantanamo, approximately 200 remain. With 200 dangerous, slightly dangerous or innocent men grouped together for release, the Obama Administration is faced with cleaning up a difficult situation within a self-imposed time frame of one year, commencing January 22, 2009.

Now that the executive order has been signed, what is to be done with the remaining 200 men that currently occupy Guantanamo? How should the dangerous detainees be tried? And, what kind of precedent is this setting?

The men fall into three categories.

First, there are the ones who have no ties to terrorist organizations. They have been held there arbitrarily and are awaiting release. However, finding them a home is the problem. Many come from countries that been known to violate human rights and returning these men to such countries would be a practice incongruent with international law. These men also carry the stigma of being detained at Guantanamo. Many countries are afraid to take these men because they have been labeled terrorists.
Second, there are the hard-line terrorists that deserve to be imprisoned for the crimes they have committed and readily admit. Khalid Sheikh Mohammed is such an example.

For the third grouping, the line becomes hazier. There are men who have spent time alongside al-Qaeda, often as support, such as drivers and suppliers. These men are dangerous enough to prosecute but it will be difficult to conduct a fair trial if the only evidence brought forth is hearsay evidence obtained though US intelligence or interrogation.

In a Congressional Research Service Report dated Jan 22, 2009, a three part solution was proposed: 26

1. Release those with no terrorist ties
2. Trial by commissions
3. Trial in civilian courts

Option number one has worked rather slowly for the innocent at Guantanamo. Nations around the world have been reluctant to take in these men. Bermuda took 4. France and Ireland have each taken one. The tiny Pacific island nation of Palau has taken 17 of the Uighurs, a group of Muslims from the southwestern Chinese Province of Xinjiang that are labeled as terrorists by the People’s Party of China. The Chinese had been expecting extradition but the US refused to send them there based upon Article 3 of the UN Convention Against Torture which prohibits sending prisoners to countries where it would be reasonable to assume that they would be tortured. This process is ongoing and depends much on the political savvy of diplomats and the willingness of foreign nationals to trust the reports of US intelligence asserting the detainees’ innocence.

26 Michael Garcia, et al, *Closing the Guantanamo Detention Center*. 
Option three has been utilized in the trial of Ahmed Ghaliani, a suspect in the bombings of the US embassies in Kenya and Tanzania, in the US District court located in New York City.

As for option two, the Obama Administration has expressed that the military commissions will be revived to try the detainees, albeit with greater legal protections. In a news story from May 16, 2009, White House spokesman Robert Gibbs stated that the new commissions will no longer use statements obtained by cruel, inhumane and degrading interrogations methods as evidence. Hearsay will also be limited, removing the burden of proof from the party who objects to its reliability. The accused will also have greater latitude in selecting their counsel. Additionally, basic protections will be provided for those who refuse to testify and the military commission judges may establish the jurisdiction of their own courts. These renovations of the commission process still seem to be at ends with the decision of Boumediene v. Bush. It was ruled that the commissions set up by the MCA were unconstitutional but now the Executive is again authorizing their continuation regardless, albeit with new rules. Some are calling this a step in the wrong direction. The military defender for Salim Hamdan, Lt. Colonel Brian Mizer, called them “disappointing.”

Tracy Schmaler, a Justice Department spokeswoman, said in a statement: “The administration is working on a legal framework that will restore military commissions as a legitimate forum for prosecutions in line with the rule of law. Under the previous administration, only three detainees were successfully prosecuted in over seven years. Meanwhile, federal courts have ordered some

detainees released and declared the flawed judicial system established to prosecute these detainees unconstitutional.”  

Exactly how the commissions can be changed to be both constitutional and effective in the face of the same legal obstacles that were faced previously is unclear. If the statements obtained through torture are thrown out, hearsay is limited, the accused select their own counsel, and other basic protections are provided, then the commission process effectively becomes equal to that of a civilian court. Once again, the commissions are no longer needed and thus, unconstitutional.

**End in Sight?**

On May 5th, 2009, the Obama Administration was dealt a significant blow when the Democratic Congress refused to appropriate funds for the closure of the Guantanamo detention facility. The proponents of the funding freeze lambasted the President for not providing a clear plan for the money. They were not ready to give the President a blank check regarding the closure of the facility, yet years prior many of these same men felt it necessary to give President Bush a blank check to detainee these men for the sake of American security. As the Associated Press reported on May 21st, 2009, a bipartisan contingency voted 90-6 to keep the prison open and forbid the transfer of detainees to facilities in the US.

Time and again, American politicians have expressed their dissatisfaction with the Obama Administration’s handling of the closure. Some have criticized the President for not having a

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strategy in place once he signed the executive order. They have also stressed to their constituents that President Obama wants to free terrorists onto American streets.

Policy Recommendations

Perched precariously between politically acceptable options and the rule of law, the solution to the closing of Guantanamo consists of three crucial elements based upon timeframes.

The first element to address is the past. The main recommendation here is to ban the inherited faulty military commissions. It would be disastrous to Obama’s human rights legacy to continue with the “ad hoc” legal system he condemned in his speech before the National Archives on May 21st, 2009. The very nature of the commissions stands in direct opposition to basic elements of due legal process, as was described above. Overcoming the unfair aspects of the military commission effectively renders them moot. As has been shown with the federal trial of Ghaliani, prosecution in US civilian courts is acceptable on a political front, and adheres to the rule of law.

The second element to address is the present. While it has been slow going, the Obama Administration is making small strides to resolve the release of innocent detainees to other countries. However, there still looms the possibility that some men will not be accepted by foreign governments, in which case the responsibility for their care will remain with the US. This predicament would most likely offend the political sensitivities of many American citizens and

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government officials, even though their judgment is passed primarily upon stigma, rather than true legal determination. The label of “Guantanamo detainee” is one that is not easily erased, regardless of whether the label “innocent” is attached as well. Additionally, there is legislation being pursued to ban the transfer of detainees to the US.

Perhaps the next best solution would be to return every detainee to their country of citizenry, regardless of circumstances. While a politically viable option in some cases, this could result in a blow to the rule of law, as international law forbids repatriation to countries under the reasonable assumption that one will be tortured. Either way, the Obama Administration needs to continue pursuing its present course of action for releasing the innocent detainees: using diplomacy, reaching out to foreign governments, and making compromises.

The third element to address is the future. The US will need to imprison those they try and convict in federal courts. It is very unlikely that any foreign government will accept these men. The city council of Hardin, Montana passed a resolution to accept detainees into the Two Rivers Detention Facility located there.34 While immediately opposed by Montana’s congressional members, this kind of solution is still present. Perhaps, it will take some federal handouts and promises that have come to be part of the Guantanamo closing solution.35 The legislation forbidding transfer of detainees will need to be vetoed as well. While politically unacceptable to some, this option is already a necessity being brought about with the federal trial of Ghalianni. Turning a US-convicted terrorist over to another country for imprisonment seems ironic and lacking in justification.

35 Palau has been promised $200 million in support for accepting the 17 Uighurs.
Another aspect of the future that needs to be addressed will be the precedent set by the trial of suspected terrorists in federal courts. Not all aspects of seeking a conviction in matters of national security lend themselves well to the civilian court process—namely the occasional need to rely on hearsay evidence and classified information for prosecution. A plan needs to be formulated to address these concerns. As has been suggested by some scholars, a national security court could be implemented. More than a federal court system, but not quite a military commission, the national security court could use hearsay evidence on a case by case basis. The use of classified information will still need to be reconciled. The main advantage of a national security court would be to conduct trial proceedings in an impartial civilian setting, outside the ‘command influence’ that is characteristic of the military commissions. Perhaps both civilian and military judges could preside together as a panel.

There is the need for stronger legislation outlining exactly what kind of legal process is necessary to try and convict future terrorists that attack the United States. As we have seen with the Bush Administration, inventing new legal processes while currently facing a situation can produce unwanted results. The time is now to address the prosecution of terrorists domestically, consistent with both US and international law.

**Conclusion**

Although closing the detention center at Guantanamo Bay is a complex and critical problem, it is not without possible solutions. The current situation facing the Obama Administration has been borne out of the Bush Administration’s strategic logic, the push-pull between the three branches

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of government, and the call for the application of the rule of law, both domestically and internationally.

A framework of analysis has been constructed by dissecting the military commissions, political situations, international law, and the standing Supreme Court ruling regarding the rights of detainees to pursue habeas corpus. Then the detainee’s status, in regards to evidence collected, has been summarized to place them into one of three groups. Overlapping these two parts, we can derive policy recommendations that include:

- Ending the military commissions
- Pursuing more cases in the federal court system
- Releasing those who are not to be tried
- Imprisoning those convicted of terrorist attacks
- Developing a plan to address future terrorist prosecution and imprisonment

The overwhelming issue in closing Guantanamo Bay is really a matter of moral and ethical fortitude. Time and again, the US government has been given a chance to readily apply the rule of law and grant the detainees basic human rights guaranteed both through the US Constitution and the Geneva Conventions, among other international laws.

It was abhorrent to hear the Bush Administration speak of idealistic concepts such as freedom and democracy, while it continued to detain innocent men for years, using unsubstantiated national security fears as justification. It is equally abhorrent to hear the Obama Administration
speak of resurrecting the same military commissions that denied these men their ability to seek recourse in a court of law.

What is needed is not a new system of laws, or rules, or processes, but men and women of government willing to implement the existing the rule of law, regardless of the potential repercussions. If there needs to be a new system of addressing a new classification of combatant, such as terrorist, then it needs to be built using existing principles of law, with their original intent intact. Distorting existing holes between domestic and international law (or creating new definitions arbitrarily) hurts the rule of law, the legitimacy of the government, and especially those that suffer under these new ‘ad hoc’ legal regimes. The conditions of prosecution and defense under the laws of war are changing; it is an appropriate time for the United States to honor the laws and treaties it has signed by pursuing a legal framework that can address these changes.
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I dedicate this paper to the men who suffered injustice at Guantanamo Bay and to those who fought for freedom for all, regardless of ethnicity, citizenship, or religious conviction.

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