Service-Learning in the GeoSciences

Sustainability Acupuncture in Community Engagement

Service-Learning in Undergraduate Geosciences Workshop

National Academy of Sciences Building, Room 125
2101 Constitution Ave, NW, Washington D.C.

Caroline Davies
Department of Geosciences
University of Missouri Kansas City
April 20 & 21, 2016

SERVICE-LEARNING IN THE GEOSCIENCES:
Different Scales Of Enegagement

Intro ENVSC 110

Introductory course - group community service learning activitiy

Evolution and Geologic Record

Major course - individual service learning opportunities

ENVSC 332 Environmental Sustainability

Large scale, upper Dividsion Gen Ed course requires individual sustainability community engagement projectts

SERVICE-LEARNING COURSE GOALS

- emphasizes integration of geoscience and social challenges

- exposure to service learning/hands-on/community engagement

- develop science communication

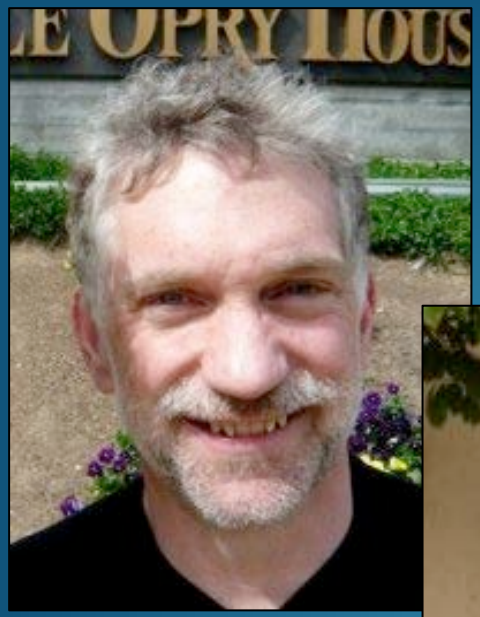
- develop change agent skills

ENVIRONMENTAL SUSTAINABILITY
ENVSC 332

- large scale, upper dividsion General Education course

- required individual sustainability community engagement projects

- more indepth community commitment and expereince



Dr. Michael Frisch,
Environmental Urban Planning

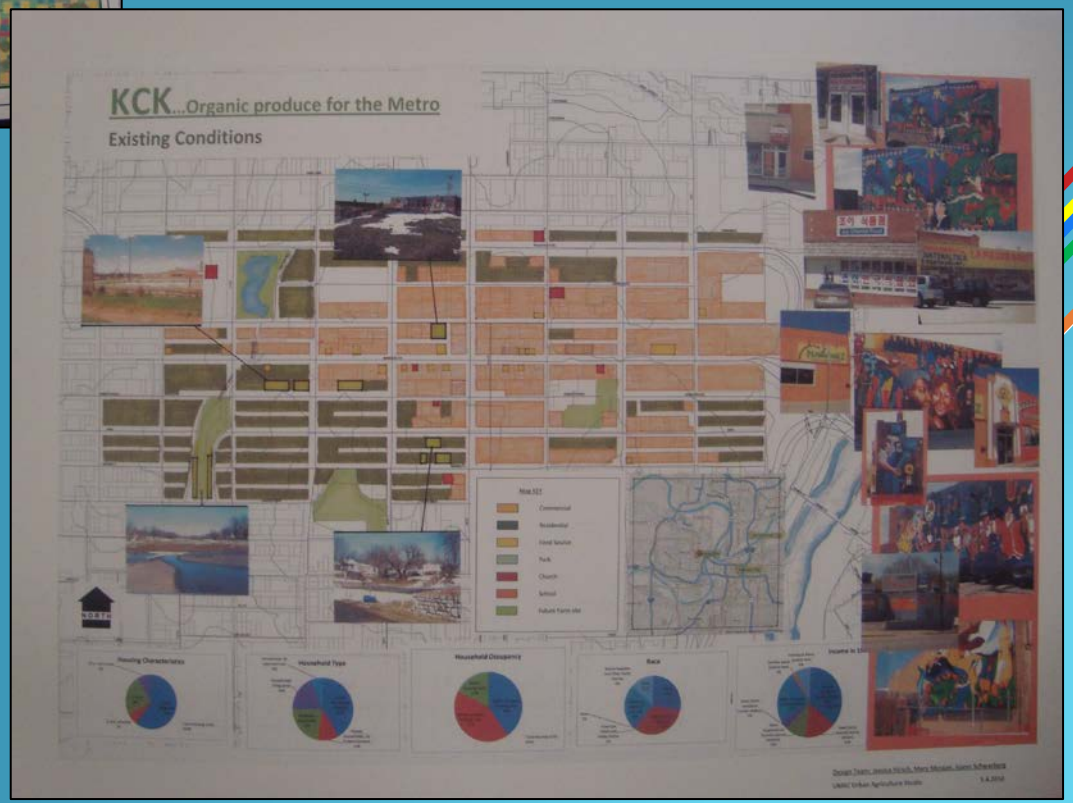
Dr. Jake Wagner,
Historic Preservation & Community Development

Dan Dermetzel, *Associate Director, Kansas City Center for Urban Ag, Urban Planner, Farmer, Philosopher*

Dr. Caroline Davies,
Geosciecnces

Neighborhood Assessment Plan

- pre and post assessment of environment
- future design
-



E2

Reducing UMKC Energy Consumption Using Occupancy Sensors

Penny Harrell

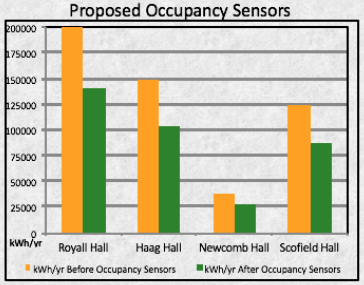
Abstract

My Environmental Sustainability Community Engagement Project was to explore and pursue installation of dual-technology occupancy sensors in Royall Hall, Haag Hall, Newcomb Hall and Scofield Hall by completing a Cost Benefit Analysis for UMKC Facilities Management.

Description

Occupancy sensors typically provide a cost effective way to reduce energy use. New dual-technology "uses both passive infrared and ultrasonic sensing technologies to activate the area light fixtures" (Lovorn, 2009) and monitor room occupancy. The project utilizes five types of sensors to best retrofit the wide variety of spaces in the four buildings.

Projected Total Annual UMKC Energy Reduction for Lighting for Rooms with Proposed Occupancy Sensors



Projected total annual UMKC energy reduction in kilowatts. Savings calculated at 30% for Royall hall, Haag Hall, Newcomb Hall and Scofield Hall. Note: All calculations are based on rooms projected to receive occupancy sensors.

Results

Occupancy sensors will reduce UMKC's carbon footprint *and* lower current and future energy costs. Annual projected energy savings are calculated to be $13,315. The initial bids are $9,732 for in-house labor and $23,455 for material. We are optimistic that with the KCPL energy rebate, this endeavor will pay for itself in 1.5 years. A "decreased use of energy means less to pay for energy bills, reduced load on the grid and less environmental impact" (ul Haq, 2014).

Discussion

UMKC classrooms and offices were surveyed for number of lights, number of lamps and room dimensions. Ross Hassler, Applications Specialist from Mercer Zimmerman Lighting and Rob Durham, UMKC Lead Master Electrician walked the project site to provide their recommendations. Drawings for sensor implementation and placement were mapped on UMKC floor plans. All project steps were reported to Mike Norris, UMKC Energy Manager as they occurred.

Reflection

This project came together with many people stepping up to assist in a common goal – reducing UMKC consumption of non-sustainable resources. "Many staff will be aware of and interested in environmental issues in their home life, so there can be a natural desire to see success…Awareness needs to build upon this general interest" (Energy Consortium, 2012). The study opened dialogue about energy use within the UMKC community.

Acknowledgements

This project could not have been accomplished without the encouragement of Dr. Davies and Dan Dermitzel. Randy Shingleton and Mike Norris of UMKC Facilities approved and supported the study. A special thanks to Ross Hassler and Rob Durham for their assistance.

References

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Mohammad Asif ul Haq, Mohammad Yusri Hassan, Hayati Abdullah, Hasimah Abdul Rahman, Md Pauzi Abdullah, Faridah Hussin, Dalila Mat Said, A review on lighting control technologies in commercial buildings, their performance and affecting factors, Renewable and Sustainable Energy Reviews, Volume 33, May 2014, Pages268-279, ISSN 1364-0321

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ENVSC 332 2014

E4

Sustainability at the Emanuel Cleaver YMCA

Kelsey Pierson

Abstract

The Emanuel Cleaver YMCA closely budgets high operating costs. Despite potential savings, there is no room for implementing sustainable practices due to high upfront cost. A sustainability audit was performed to recommend small-scale practices that would reduce use of electricity and pre- and post-surveys were given to staff to evaluate their attitudes toward sustainability. Results showed minor changes in attitude, but a greater appreciation towards overall sustainability. Potential overall savings were calculated to be $17,000 annually.

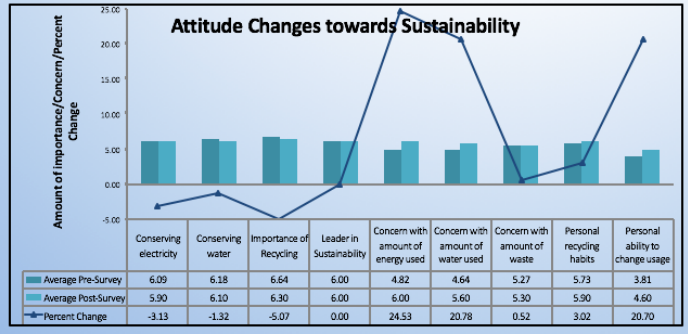
Description

A pre-survey was given to staff ranking concern and importance of various questions from 1 to 7, with 1 being the lowest and 7 being the highest. A sustainability audit was performed, and changes were implemented to decrease the use of electricity, water and waste. A post-survey was given to the staff to determine change in attitude towards sustainability.

Results

Potential savings were calculated and are shown below. Comparison of the pre- and post-survey showed four areas in which the percent change in attitude was positive. Staff indicated they were more concerned with the amount of water and electricity use and that they recycle more. The staff also feel more positive towards their ability to make a difference. Implementing these practices can result in a reduction of the annual electrical bill by $17,083.71. This was calculated multiplying the Kilowatt hours by the cost of electricity.

Recommendation	Annual Savings ($)
Use natural lighting	1,236.94
Custodian clean during operational hours	2,473.88
Replace light bulbs with CFL or LED	12,918
Printers in standby mode	14.13
Computers in standby mode	387.48
Allow clientele to turn off wall-mounted TVs	53.28
Total:	**17,083.71**



	Conserving electricity	Conserving water	Importance of Recycling	Leader in Sustainability	Concern with amount of energy used	Concern with amount of water used	Concern with amount of waste	Personal recycling habits	Personal ability to change usage
Average Pre-Survey	6.09	6.18	6.64	6.00	4.82	4.64	5.27	5.73	3.81
Average Post-Survey	5.90	6.10	6.30	6.00	6.00	5.60	5.30	5.90	4.60
Percent Change	-3.13	-1.32	-5.07	0.00	24.53	20.78	0.52	3.02	20.70

Discussion

Though the savings seem small, this number can increase as some activities become more common practice. Many proposed activities would reduce the cost, but there was no way to measure the reduction. The sustainability survey has put sustainable cost-reducing activities on the forefront of the staff's mind and they have found creative ways to save money and reduce use.

Reflection

This project has increased my awareness of sustainability and the staff at the YMCA seem to be applying techniques learned at the YMCA to their home. More importantly the YMCA has signed up for a lighting audit, is purchasing with sustainable practices in mind and has an overall better awareness of what each individual can do to reduce use and save money.

Acknowledgements

Thank you to the staff at the Cleaver YMCA, especially Carolyn Pollmeier for all her help.

References

Assessing Student Attitudes Towards Sustainability Issues. (2012) North Carolina State University.

Michalos, A.C. et. al. (2011). Measuring Knowledge, Attitudes and Behaviors of Sustainable Development among Tenth Grade Students in Manitoba. International Institute on Sustainable Development.

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Sports and Leisure, Introducing Energy Saving Opportunities for Business. (2013). Carbon Trust.

ENVSC 332 2014

R12

Raymore-Peculiar East Middle School First Annual Textile Drive

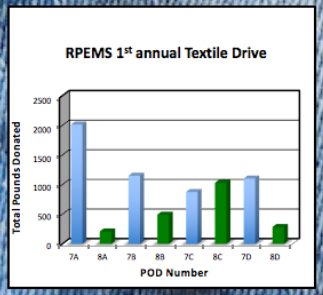
Kaycie Reasoner

Abstract

An annual textile recycling drive at Raymore-Peculiar East Middle School (RPEMS) in conjunction with Mo-Kan Goodwill to raise community awareness of the need to fully use and then recycle textiles to keep them out of landfills.

Description

A competition within the local middle school to encourage the charitable donation of textiles to an organization with an end-of-life recycling plan. Education through PowerPoint presentations and classwork assignments ties textile recycling to other sustainable living practices.



Results

Partnering with Goodwill, the school district and local businesses, over 7,000 lbs. of textiles were collected in one week, garnering local news coverage. Students, parents and school staff got involved, filling a 14' U-Haul truck and 68 passenger school bus. The school earned close to $1,000.00 ($.15/lb. donated) which it plans to use to fund future drives on an annual basis.

Discussion

At the onset of my project, many of the participants were unaware of textile recycling, in spite of actively participating in other recycling programs. My goal was education through a competition within the school. RPEMS is a very environmentally-conscious community and embraced the project as a part of their Green Education week.

Reflection

My experience was extremely positive. Everyone involved in my project was enthusiastic and the results were amazing. I plan to be involved in future drives at the school and hope to expand my "community" through better planning next year.

Acknowledgements

David Mitchell, Principal, RPEMS

Chalise, Jim and Nordia at Mo-Kan Goodwill

References

Koch, K. and Domina, T. (1999), Consumer Textile Recycling as a Means of Solid Waste Reduction. Family and Consumer Sciences Research Journal, 28: 3–17. doi: 10.1177/1077727X99281001

Raymore-Peculiar School District. (2011, December). Honored as high performance green building Ray-Pec East Middle School awarded LEED gold certification. *Raymore-Peculiar School News*.

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ENVSC 332 2014

W4

Greening Corrections at Fort Leavenworth Federal Penitentiary

Kevin Clark

Abstract

The goals of this project are to plan, coordinate, and ultimately accomplish a series of sustainable projects at Ft. Leavenworth Federal Penitentiary. These projects include an energy audit of the site, a waste cleanup of chemicals from a prior printing operation, as well as an audit of the cafeteria's kitchen.

Description

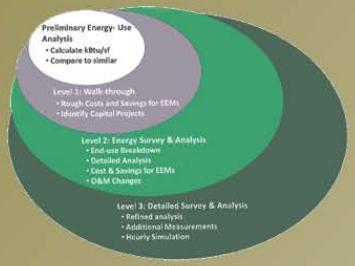
I attended the safety orientation for non-employees. I then began research into how to implement the projects. I have written out guides regarding the proceeding of the projects. I have located the appropriate tools, such as a thermal imaging camera for the energy audit. Many of the tools are already on site at the prison.

Results

I believe that I won't have any major issues with the kitchen audit and recommendations are primarily habit based for employees. The chemical removal should also be straightforward. The energy audit shouldn't be too difficult with a kill-a-watt sensor, thermal camera, and blower should cover most areas. I have set up a process so that I can start without delay and work without interruption.

Reflection

I am exceedingly happy with the amount of enthusiasm and support offered by employees of the penitentiary. I was disappointed in slow way that the cogs are turning however. If I were able to start this project over again I would have started the process in November, to allow for the cutting of bureaucratic red tape.



Discussion

I am exceedingly happy with the amount of enthusiasm and support offered by employees of the penitentiary. I was rather disappointed in extraordinarily slow way that the cogs are turning with regards to the background check however. If I were able to start this project over again I would have started the process in November, to allow for the cutting of bureaucratic red tape.

Acknowledgements

Fort Leavenworth Federal Penitentiary; Justin Callahan; Dr. Caroline Davies

References

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MI Department of Corrections Muskegon / Marquette Prisons Energy Performance Contract. (n.d.). Retrieved April 10, 2014, Sustainability in Prisons Project. (n.d.). Sustainability in Prisons Project. Retrieved April 10, 2014,

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ENVSC 332 2014

ENVIRONMENTAL SUSTAINABILITY FORUM:

Conversations Across The University

Please join us in a campus discussion with administrators, faculty and students on sustainability in academics

Royall Hall 111
Tuesday, April 22nd, 2008
7-9 pm
Refreshments Will Be Served

Featuring Community Engagement Projects:

Tyler Antrup	Global warming public art on campus
Andrew Benyo	Engaging The Goodwill in glass recycling
Devprakash Bharij	Assessing UMKC sustainability planning
Erin Boyce, Andrew Smith	UMKC recycling attitude survey
David Buchheit	Encouraging Sustainability at the Cherry Street Residence Hall
Evan Burton	Ivanhoe community garden w/Gillis school
Travis Carson	Energy audit Locarno apartment building and resident education
Andrew Clarke	Establish lunch recycling at Attuks school
Kristian Corbin, Casey Hartline, Andrew Orel, Joey Pruett	Washington Wheatley: Neighborhood Assessment
April Craig, Candis Desselle, Margaret Lamping	University composting: Coffee Grounds- Are they sustainable?
Chris Green	GIS analysis of KC water consumption and prediction of hotspots
Jerame Grey, Rachel Smith, Travis Wears	KC Originals businesses sustainable practices
Emily Hagy	The I-670 Project: Mitigating Pollution, Revitalizing Downtown
Christina Hentzen, Rachel Landes	Elementary school recycling- pare down
Daniel Jones	Sustainable Education in urban school
Justin Lasater	Eco footprint of apartment building
Natalia Logan	KC green rebuilding
Jasmine Lowe, Kate Waldron	Analysis of Green Homes
Mason Malcik	Analysis of High-speed Electric Rail for the Kansas City Regional Area
Jon Matthew	BTG sustainability awareness survey
Sean McClain, Tammy Yasar	UMKC carbon footprint
Margaret Meadows	Sustainability of Consumption
Amanda Newell	Behind bars: prison recycling
Toni Norwick	Neighborhood community rain garden Cliff Drive
Terry Pugh, Branden Criman, Robert Dove, Jamie McDonald	Teaching Sustainable Water Habits - The Importance of Clean Water: Garden Elementary School, Parkville
Erin Rackley	Bravo Recycling
Ana Rivas-Herrera	Sedalia recycling/Truman Hospital waste
Karen Roppa	Initiating recycling at work- American Eagle
Aaron Stover	Environmental Sustainability Education at the Discovery Center
Stephan Schmitz, Jesse Merriman	School energy audit and education
Jonathan Woerner	Sustainability of watersheds and stream buffers
Kara Tholen	Burns & MacDonald green roof research
Spencer Yaw	Public Art- recycled building

Final Project Presentations

Juried presentation to panels of professionals in downtown art space with lots of organic food!

Panelists included:

KC Chief Climate Officer
City Planners
City Code Officer
Architects
Neighborhood leaders
Urban farmers

102 research projects

Categories: *water, energy, recycling, food, education, gardens, products, transportation*

Auditing and Improving Energy and Water Sustainability at Oak Place Apartments

Preschool Recycling at Alphabet Academy

Pharmacy Drug Recycling

Greening Grunauer - Sustainability in Restaurants

Organic Cleaning for the Small Business

Saving Paper at the Credit Union

Sustainability Research Fair 2012

84 research projects

Categories: *water, energy, recycling, food, education, gardens, products, transportation*


MILLER NICHOL
Garden
Soil Restoration and Garden Project

Sustainability Research Symposium

Environmental Sustainability Cluster Course 332

Student Community Engagement Projects

Miller Nichols Library

May 5th, 2014

Participating Companies and Institutions

BASYS Processing
ColorMark Printing
Heartland Community Credit Union
HyVee
Kansas City Hydraulics
Salon Oasis and Day Spa
Sprint Center
TradeNet
Wal-Mart

Leavanworth Federal Penitentiary
Truman Medical Center
Emanuel Cleaver YMCA
Kansas City Sports Commission
UMKC Hospital Hill
UMKC Facilities
UMKC Oak Place Apartments
UMKC Bloch School

Granfalloon Restaurant
Jack Stack Bar-b-Que
Johnny Jo's Pizza
Mission Hills Country Club
Millennium Café
One More cup
Starbuck's Coffee
The Rosterie
Woodside Tennis and Health Club

St. Therese School
Raymore-Peculiar East Middle School
Foreign Language Academy
Blue Springs Middle School
Maple Park Middle School
Lincoln Preparatory High School
816 Bicycle Collective
Macedonia Baptist Church

IMPACT ASSESSMENT AND REFLECTION

Final Reflection

The class really inspired me to look outside the norm and see what could be instead of what is. It also inspired me to get out there and make a change, to plan and design for sustainability and for the good of our communities. Even thought the design project was a lot of work, I absolutely loved it. It has been hands down my favorite project in my college career. It was fun and challenging trying to push the envelope and design something that could actually work. The idea that our designs could possibly be implemented is exciting. With all of the knowledge I have gained from this class I hope to use it in my career someday. My major is Environmental Science, and I hope to use what I've learned in the future for whatever I may be doing. I think this was a great class and is a great addition to the school.

Allison Richards, 2010

I have thoroughly enjoyed this class and working with my incredible design group. I have learned so much about urban agriculture and what it's all about. Another concept is sustainability, I thought I had an okay idea of that before coming into this class, but now I feel like a have a great handle on it. 2012

Thank you! Also, I wanted to let you know what an amazing class this was. It was honestly life changing for me and I am considering changing my major because of the class. We were given such amazing opportunities to learn, and listened to so many amazing speakers, I just want to personally thank you for the hard work and dedication you and Dr. Dermitzel put into the class. So, thank you! :)

2014

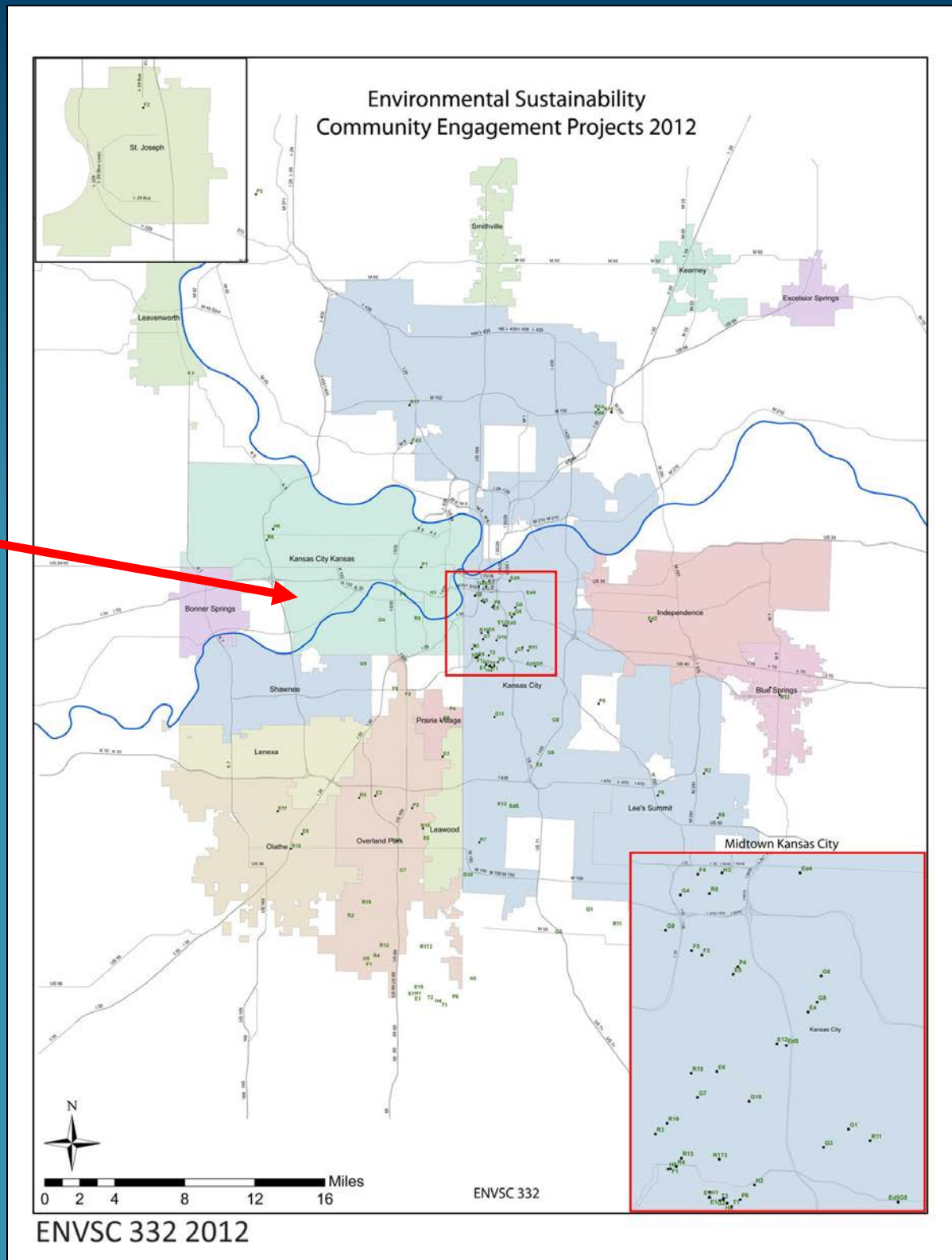
I just wanted to say that I originally was not thrilled at the prospect of having to do a community project, but now am so thankful that you made us do it! The community involvement was so positive for me and the response so completely amazing, it renewed my faith in my ability to make a difference.

2014

Couse Impact

Year	# Students	# Community Projects
2008	80	35
2010	30	10
2012	110	102
2014	94	84
2016	96	96
Total	410	327

Impact one student, one project at a time.



ENVSC 332 2012

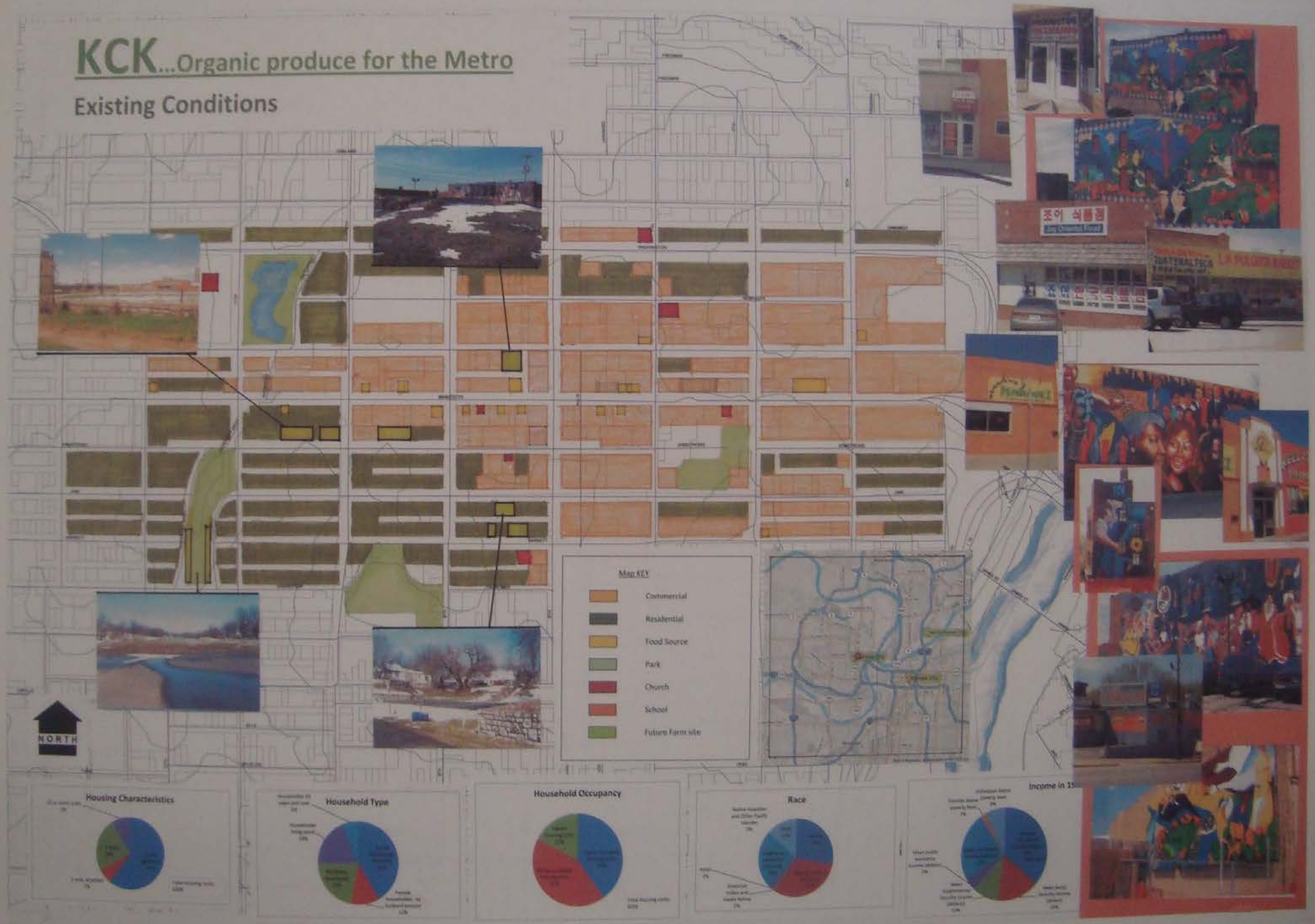
NEWS:

WAR ROOM TAKES HOME TOP HONOUR AT SHIPPING EFFICIENCY AWARDS

Extra slides

KCK...Organic produce for the Metro

Existing Conditions

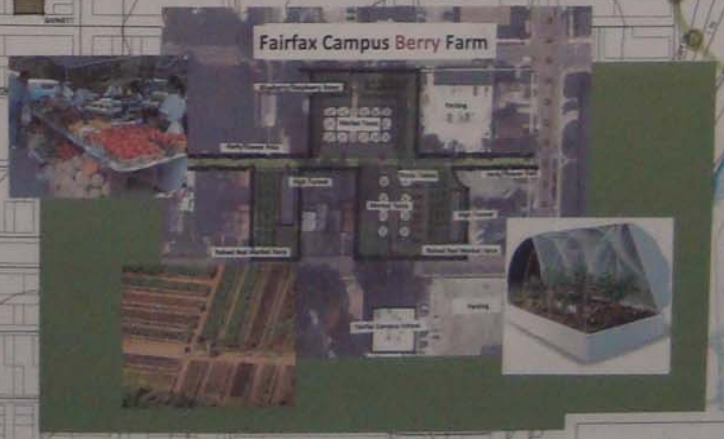


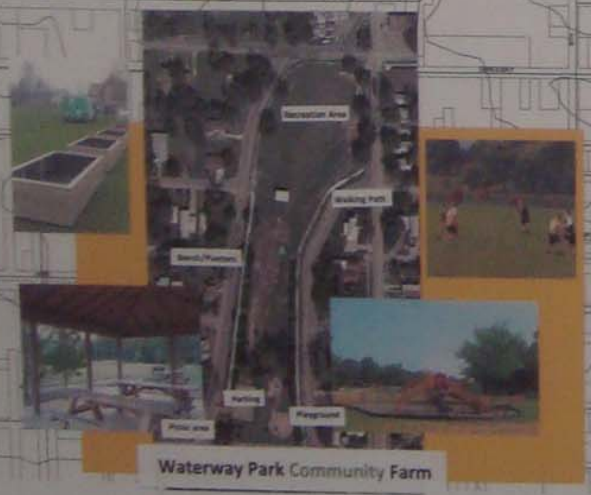
Design Team: Jessica Nitsch, Mary Morgan, Joann Schwarberg
UMKC Urban Agriculture Studio

5.4.2010

KCK...Organic produce for the Metro

Interventions





Interventions

Connected

Inclusive/Accessible

Three levels of agriculture:

- Community
- Income Producing
- Education

Design for Ecological Democracy

Centeredness

Connectedness

Fairness

Accessibility

Inclusion

Equal distribution of resource and amenities

Continuous Productive Urban Landscapes (CPULS)

Urban food growing and Local Consumption, locally managed, mainly organic

City-traversing open space, connected.

Designed primarily for pedestrians, bicycles and engineless vehicles.

Vegetation, ok, the horizon will flow in and out

Green natural, topographical, low, slow and socially active, tactile, seasonal and healthy.

More food with less space

Sustainable urban development

Food miles

Changing consumer behavior

Social role of community farms

Recycling systems at the urban scale

Permaculture- producing food in an environmentally sound way. People growing their own food, on their own land, using it for themselves, their immediate family and possible their local community.

NORTH

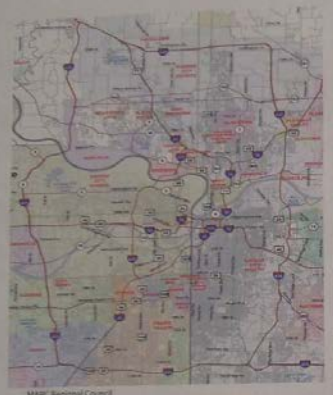
Map KEY

- Farm sites
- Market Farm Corridors
- Food Planters for Wayfinding

Design Team: Jessica Hirsch, Mary Morgan, Joann Schwarzberg
UMKC Urban Agriculture Studio

5.4.2010

Kansas City, Missouri 2010 Central Business District Current Land Use and Food Map



MARC Regional Council

Census Tracts

CBD Statistics		
Year	1990	2000
Total Population	4297	3479
Total Housing Units	2401	1448
Median Income	9588	22331

Kansas City CBD: Design Interventions

Land Specified for Income Urban Agriculture	3.3 Acres =
Available Rooftop Space	15 Acres =
Total Acreage	18.3

Food Type	Yield Based on 18 Acres of Farm Space	Maturity range from planting to harvest
Asparagus	81000 lbs	3 mo.
Cucumbers	12600 bu	6-8 wk.
Mushrooms	8100 bu	11-14 wk.
Onions	360 tons	12-15 wk.
Peas	8150 bu	9-10 wk.
Peppers	14400 bu	10-12 wk.
Potatoes	9000 bu	14-15 wk.
Pumpkins	99000 fruit	14-16 wk.
Snap beans	3600 bu	7-8 wk.
Squash, summer	270 tons	7-8 wk.
Squash, winter	270 tons	14-16 wk.
Strawberries, June bearing	126000 lbs	15 mo.
Sweet corn (ears)	21600 dozen	9-11 wk.
Tomatoes	9000 bu	9-12 wk.

Commercial Vegetable Production -- A Small Farm Opportunity?
By Henry G. Taylor

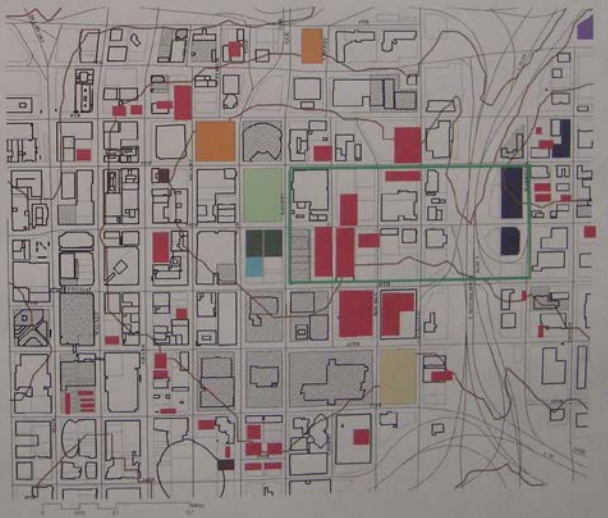
Indoor water collection

Wind Farm

Living wall

Rain Gardens

Community Cistern



Community Compost

Raised Beds

Green Walkway

Green Walkway

Bioswale

Rooftop Gardening

VERTICAL URBAN FARM

FOOD PRODUCTION: This high rise design includes 1.35 acres of farmland on its terraced rooftop gardens, planters and greenhouses, maple and native oak trees, as well as a chicken farm on the lower terrace.

HOUSING: The buidling, designed for a green building challenge, could contain 318 residential units made from retrofitted, recycled shipping containers.

Legend

yougizendude.com

Key Coalition Neighborhood – Existing Conditions Analysis


The Top Spot


Ben's Market


Family Dollar


Sharks Fish and Chicken


Popeyes Chicken


CVS Pharmacy


Linwood Chinese Express


Walgreens Pharmacy


Big D's Market


BP Gas Station

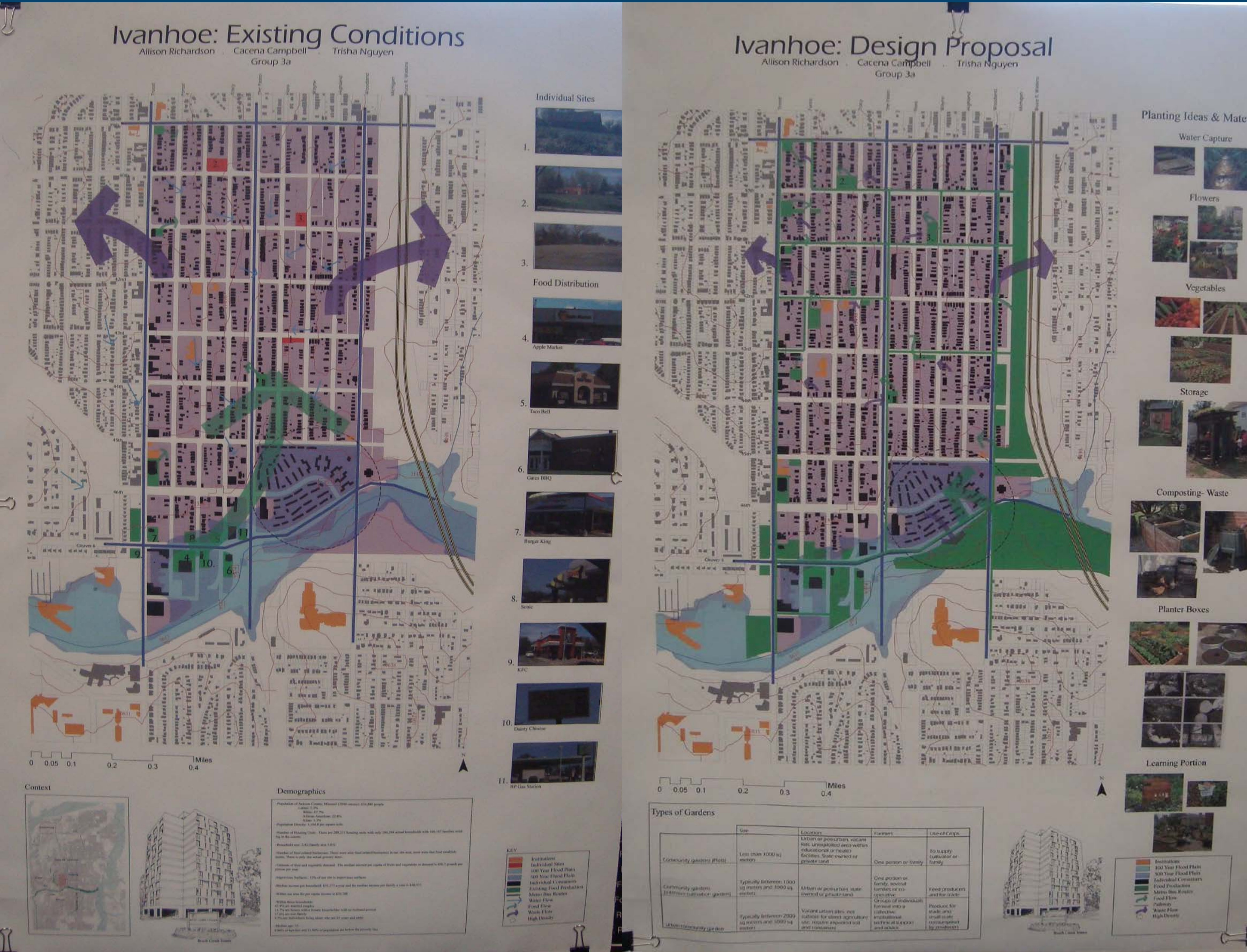

Midtown Groceries and Liquor

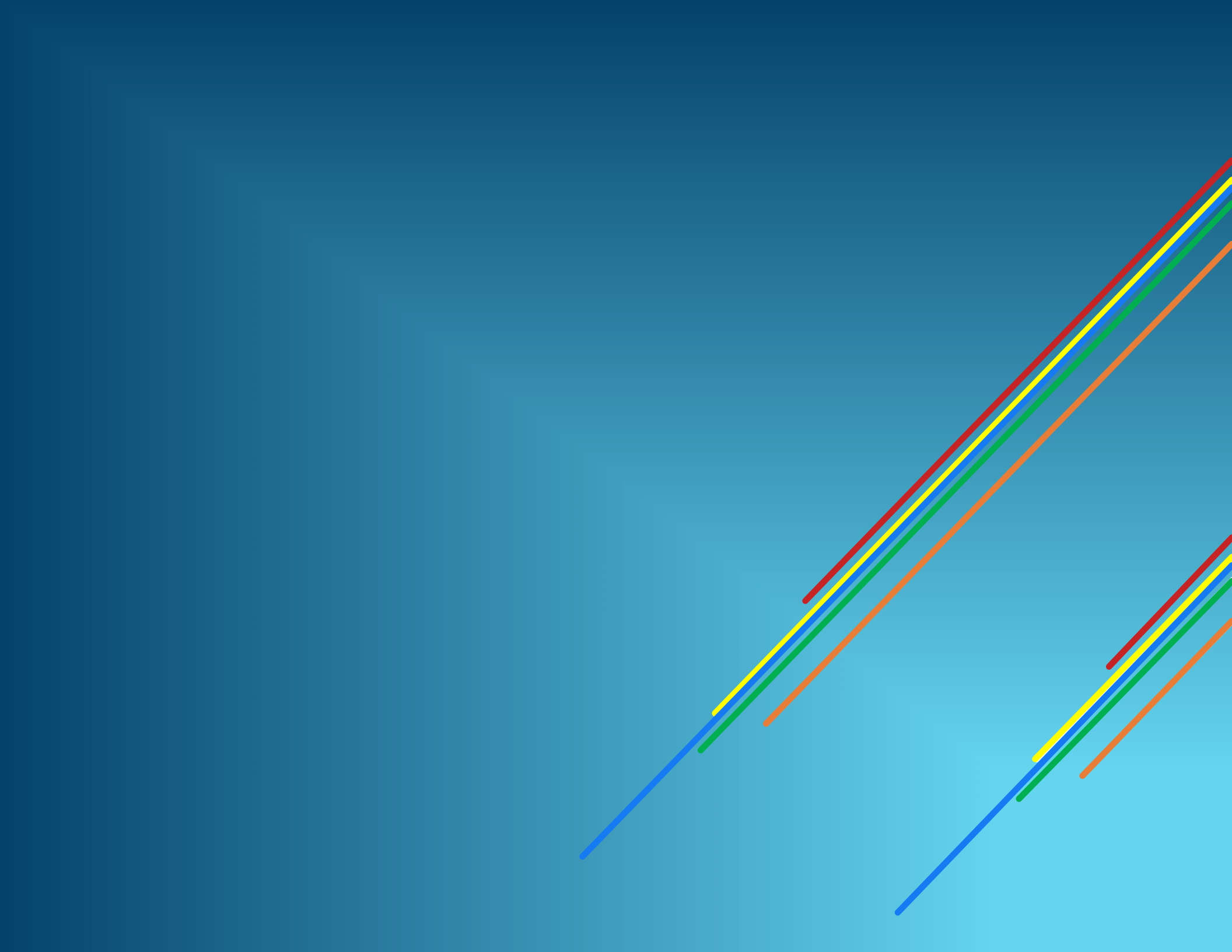

Ice Cream Hot Dogs and More


M & M Bakery and Deli

Total Key Coalition Population:	2,231
Population Density:	7.2 persons/ acre
Median Household Size:	2.5
Total Housing Units	1,172
Occupied Housing Units:	922
Existing Food Related Businesses:	13
Total Vacant Lots:	403
Percentage of Impervious Surfaces:	7%
Median Income:	22,000
Estimated Demand for Fruits and Vegetables (Per Week/Per Person):	13 lb

Lydia Friz - Amanda DeBrot


Ivanhoe: Existing Conditions
Allison Richardson . Cacena Campbell . Trisha Nguyen
Group 3a
Individual Sites
1.
2.
3.
Food Distribution
4. Apple Market
5. Taco Bell
6. Gates BBQ
7. Burger King
8. Sonic
9. KFC
10. Dainty Chinese
11. BP Gas Station
0 0.05 0.1 0.2 0.3 0.4 Miles
Context
Demographics
Ivanhoe: Design Proposal
Allison Richardson . Cacena Campbell . Trisha Nguyen
Group 3a
Planting Ideas & Mate
Water Capture
Flowers
Vegetables
Storage
Composting- Waste
Planter Boxes
Learning Portion
0 0.05 0.1 0.2 0.3 0.4 Miles
Types of Gardens
Size
Location
Farmers
Use of Crops
Less than 1000 sq meters
Urban or peri-urban, vacant lots, unexploited area within educational or health facilities. State owned or private land
One person or family
To supply cultivator or family
One person or family, several families or co-operative
Feed producers and for trade
Groups of individuals formed into a collective



INTRODUCTORY ENVIRONMENTAL SCIENCE ENVSC 110

- Class participates in Kansas City Wildlands conservation work days
- Restoration of native prairie ecosystems
- Removing invasive honeysuckle, replanting prairie species
- Learning about restoration while expereincing conservation practices specific to local area
- Provides exposure to local organizations and needed volunteer effort

IMPACT ASSESSMENT AND REFLECTION

- reflection paper

- recruting and retention

- builds college and community relationships

EVOLUTION AND THE GEOLOGIC RECORD GEOL 313

- upper division course for majors
- individual service learning opportunities at area schools, science fairs, and community requests:
    - *evolution lectures*
    - *fossil demonstrations*
- provides needed volunteer effort
- develops oral communication skills

TEAM TEACHING APPROACH

- emphasizes integration of disciplines
- multiple perspectives
- wide range of stakeholders, agendas
- need for different skill sets

Community Service part of Environmental Justice unit.

Harvesters, nationally recognized, best food banks & distribution Centers

Serves 26 counties &
620 non-profit agencies

Feeds 140,000+ people/month

http://www.harvesters.org/