Envision Alachua
UF/DCP 4941

From Food to Community:
A Systems Perspective for
Urban Development
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Executive Summary

This report is a synthesis of the concepts and considerations that emerged during the Fall 2011 semester of the University of Florida College of Design, Construction, and Planning (UF/DCP) Practicum in Sustainability and the Built Environment (Course #4941). The class required advanced undergraduate students in architecture, landscape architecture and planning to apply their knowledge and analyze a land development scenario in the context of agricultural urbanism. The opportunity to use Plum Creek lands in eastern Alachua County as a case study provided a unique learning experience for the students and a framework for synthesizing information about the site and potential new ideas in the context of the Envision Alachua planning endeavor.

One of the ideas explored in the class is that the city of the future will not be about creating places to “live, work, and play.” These emergent properties of cities are best left to adaptively self-organize as their denizens arrive and interact. As it has always been and is still today, tomorrow’s cities and towns will most simply provide food and water, mobility, shelter, and community...the foundation of our human endeavor. The best cities and towns create the stage for residents to eat to thrive, move to arrive, dwell to survive, and commune to realize.

This report, encapsulating the UF/DCP 4941 practicum course, aims to clarify this stage and these actions as they apply to the Envision Alachua process. Despite the “agricultural urbanism” focus of the course, our discussions often came back to the need to avoid the creation of yet another green planning, design, and building niche. Rather we chose to take a broad view of the creative process of community design within which local food and agriculture could best be promoted. Though the details and technologies are constantly evolving, these four core human actions get closer to this whole. Individually and collectively, the actions are enabled through five stages of goods and services: (1) production; (2) processing; (3) distribution; (4) consumption; and (5) conversion (of waste). The quality and quantity of the natural and human resource stocks and flows that feed these consumer goods and services ultimately lead to outcomes and system “states” bounded by positive and negative extremes. Food safety, food security, human health and wellness, soil quality, and farmer livelihoods are but a sampling of the various outcomes with continuums bounded by these desirable and undesirable extremes.

This report has three major sections. Section 1 provides some broad context and legacy narratives on the human food web. Section 2 provides context on the five stages of agricultural goods and services in Florida with specific considerations for Alachua County. Section 3 provides a series of speculative goals, objectives, and actions that we believe deserve deeper exploration and consideration. The four major goals and their related objectives and actions for consideration are summarized as follows:

1. **Eat to Thrive**
   a. Become an agroecology innovator. **Actions:**
      i. Partner with UF/IFAS to create a new Department of Agroecology with an on-site satellite campus focused on more sustainable food systems.
ii. Organize and plan agroecological food production, keeping high intensity and high input practices in the most rural sectors.

iii. Evaluate and integrate multi-species models of pasture and forest based animal husbandry and grazing for meat production.

b. Establish a food system incubation hub integrated across the transect. **Actions:**

i. Create a food system innovation and incubation hub focused on best management practices and technology transfer across the five major phases of the food system: (1) production; (2) processing; (3) distribution; (4) consumption; and (5) conversion.

ii. Utilize and improve the adjacent transportation corridors (e.g., the railway, the Gainesville-Hawthorne Rail Trail, SR-20).

iii. Create a food system informatics and social engagement incubator designed to serve all five phases of the food system.

iv. Transparently manage the community waste conversion stream from cradle to grave.

v. Ensure that every building has at least one viewshed/plane that provides a snapshot and a connection to the local food system and/or ecological systems.

vi. Prioritize edible landscapes over simple ornamental species.

vii. Create opportunities for the “niche meat” market across all stages of the food system.

viii. Work with UF/Levin College of Law Conservation Law Clinic to develop CCR and model code language allowing incorporation of food production in urban settings/environments.

c. Reinvent the school lunch. **Actions:**

i. Create the ecological, social, and economic structures to supply the majority of food for the public school system from within the local foodshed.

ii. Link this objective to Shelter Objective 3.2 in order to revolutionize the kitchen.

2. **Move to Arrive**

a. Enable multi-modal mobility across scales and domains through smart growth, walkability and multi-modality designs including mass transit options to/from Gainesville and UF.

b. Connect origins to destinations in meaningful and intuitive ways. **Actions:**

i. Integrate seamlessly into the City of Hawthorne with design and management decisions compatible with Hawthorne’s vitality and citizen livelihoods.

ii. Create unique urban and natural spaces that showcase the community as a destination and node of attraction.

iii. Create a world-class culinary institute with a certified commercial kitchen.

iv. Integrate agrotourism and ecotourism with retreat services into the community.

v. Integrate mobility patterns and routines into community design.

c. Manage the distribution logistics for a lively local economy.

3. **Dwell to Survive**

a. Adaptively layer active systems over passive fail-safes. **Actions:**

i. Design all buildings with passive survivability, system redundancy, and backup capacity for critical systems and services.
ii. Integrate decentralized energy and water harvesting, storage, and distribution systems.

iii. Provide human powered alternatives to replicate base level machine services if needed.

iv. Ensure every room in every building has daylight views with natural lighting.

v. Ensure all interior spaces offer passive, cross-ventilation capacity with simple, manual controls.

vi. Utilize universal design principles to enable aging-in-place and full accessibility for persons with disabilities.

vii. Design with an expectation of multi-generational households and their needs.

viii. Build according to modular design principles (see Shelter Objective 3.3) to enable flexible and adaptive home improvements, renovations, and additions.

ix. Design and manage for “district” and “block” infrastructure and services (e.g., heating, cooling, water heating, food storage, etc.).

x. Create a revolutionary kitchen design (see Shelter Objective 3.2) that is self-sufficient, efficient, grid-independent, and capable of preserving and preparing food and water in all seasons and under the most probable disturbance events.

xi. Design for passive heat exchange in creative and constructive ways.

b. Revolutionize the kitchen...from personal to commercial. **Actions:**

i. Create a world class culinary arts and hospitality management institute with a certified commercial kitchen.

ii. Create a town “food square” with infrastructure and services for all five stages of the food system.

iii. Integrate low-power residential kitchen modules powered by independent circuits running from district supplied renewable energy and back-up power.

iv. Thermally separate the kitchen module from living quarters as much as possible.

v. Seamlessly integrate solar oven capability (passive cooking).

c. Design buildings and sites to be modular and reconfigurable. **Actions:**

i. Create a factory-built modular housing, engineered wood products, and/or structural insulated panel production plant on site.

ii. Design for changing situations.

iii. Plan and design parcels and building infrastructure in a modular, scalable, deconstructable, and rebuildable way to change as building space needs evolve.

d. Make wood heating efficient and fashionable. **Actions:**

i. Create a biomass energy division to manage production, processing, and distribution of utility-scale woody biomass and building-scale wood pellets.

ii. Incorporate agroecology practices to produce both heating and cooking quality wood for pelletization.

iii. Design all residential and small commercial buildings to be warmed by 100% renewable wood pellet heating in efficient ducted wood pellet stoves or boilers.

iv. Create a biochar waste recovery network to capture the wood heating waste ash for conversion into a nutrient rich and carbon sequestering soil amendment.

4. **Commune to Realize**

a. Treat disease and promote health/wellbeing across nested systems. **Actions:**
i. Create a new type of community “pattern book” akin to a comparative catalog of healthy patterns (to encourage) and diseased patterns (to discourage).

ii. Design and manage the community to maximize the health and wellbeing of residents and ecosystems.

iii. Minimize disturbance of existing ecosystem function, soil quality, and site hydrology.

iv. Create a community healthcare option focused on preventative medicine.

b. Engender expression and nurture personal potentials. **Actions:**

i. Treat information as the highest form of energy and connection as the highest form of value through community education.

ii. Maximize social equity and community affordability while attracting a diversity of community residents and local businesses.

iii. Prompt positive cultural norms through community design.

iv. Reduce the “barriers to entry” on purchasing, consuming, and disposing of fresh, local, seasonal food.

v. Work with UF and Shands to integrate health monitoring and research within the community as a civic laboratory as detailed in Community Objective 4.3.

c. Create a quantified community powered by participation. **Actions:**

i. Partner with UF/DCP and UF/PREC to create a civic laboratory approach to the planning, design, construction, and operation of the community.

ii. Promote design strategies and technological structures reflecting the value of internal growth in connectivity over external accumulation of matter.

iii. Leverage the rapidly evolving consumer electronics and social media sectors to capture citizen science data streams.

iv. Establish meaningful and achievable building performance benchmarks with appropriate energy and water budgets.

v. Minimize inputs (e.g., energy, water, material) for all land management activities across all transects community-wide.

vi. Focus on process and outcomes instead of products and outputs across the community.

vii. Create iterative and adaptive sustainability indicators and make their monitoring, measurement, and verification a community cultural norm.

viii. Design and manage the community as a living laboratory of sustainable lifestyles with transparency and accountability utilizing open data and “commons” standards of information sharing.

ix. Create a community governance structure that prioritizes the inclusion, representation, and participation of all residents and businesses within the community.

During the historically novel, recent wave of dramatic growth in human population and urbanization, we have failed to realize (or at least failed to act upon) the fact that we are what we eat, we move with purpose, we dwell among others, and our communion with “the other” defines us as social animals. Brought down to the local scale, the Plum Creek Envision Alachua study site within eastern Alachua County provides the seeds of the ecology, society, and economy that may arise in its place. Whether it
becomes a larger and maturing City of Hawthorne, or its younger sibling city, the University of Florida Program for Resource Efficient Communities (UF/PREC) and the students of UF/DCP 4941 believe the best vision will be the one that first focuses on the landscape laid out before us today. That landscape includes both complementary and contradictory visions that cascade across individual, community, and organizational boundaries. There are no definitive answers...only the opening or closing of opportunities competing to fill the space they are given.

We believe Plum Creek should focus on its heritage as a timber company and let your newly added land development presence emerge from within. Furthermore, we believe some of the most potent possibilities for Plum Creek to explore in the pages that follow are those that integrate your legacy with those legacies already present in the local community in ways that may create solutions to clear and present problems. These fertile seeds can (and likely should) be nurtured even prior to breaking ground on the first house. In fact, they don’t even necessitate a long-term residential community plan be completely hashed out in advance. As such, they may offer a more organic community with traits naturally selected from the seeds that already exist in the local ecology, society, and economy. These most potent and prominent seeds are as follows:

- Partner with the University of Florida to create an on-site living laboratory in silviculture, agriculture, and ecosystem management and health with a satellite campus housing systems-oriented, degree-granting departments or programs in agroecology¹, evolutionary medicine²,³, culinary arts⁴, and hospitality management⁵.
- Partner with the University of Florida, the Alachua County School Board, and the Florida Department of Agriculture and Consumer Services Farm to Schools program to refocus Alachua County schools on local food systems and healing our children and young adults through a new culture of food...starting with a revisioning and reinvention of the existing schools within the City of Hawthorne.
- Fuse these “food-forward” schools with a world-class culinary arts and hospitality management institute in partnership with the Institute of Culinary Arts at Eastside High School with a mission to educate and empower individuals, chefs, entrepreneurs, and hospitality service providers...be they within a household, within a business, or within a public school.
- Integrate the UF satellite campus and the culinary and hospitality institute with an on-site food system innovation and incubation hub synced with Innovation Square at the University of Florida and Innovation Gainesville.⁶,⁷

¹ UF recently created an online Agroecology “concentration” within the Agronomy Department. http://agronomy.ifas.ufl.edu/agroecology/admissions.shtml
² UF does not yet have a specific department or program for evolutionary medicine, but lists “Faculty Related to Medical Anthropology” (http://www.clas.ufl.edu/users/cgravlee/faculty.html), from which a related course, “ANG 6930 – Evolutionary Medicine” is offered (http://www.anthro.ufl.edu/courses/11FallSyllabi/ANG_6930_EvolutionaryMed_Young_Fall2011.pdf)
⁴ No higher education culinary arts schools currently exist within Alachua County (http://www.culinaryschools.org/us/florida-cooking-schools/), however, the Eastside High School Culinary Arts Program is nationally renowned and offers a perfect launching point for an expanded local offering (http://www.sbc.edu/~ehs/magnet/ica/index.html).
⁵ The UF College of Health and Human Performance’s Eric Friedheim Tourism Institute offers program areas in “hospitality management” and “ecotourism and heritage tourism”. http://www.hhp.ufl.edu/trsm/ctrd/default/activity/program_areas.php
⁶ http://innovationsquare.ufl.edu/
⁷ http://innovationgainesville.com/
• Tap Plum Creek’s current heritage and the existing local infrastructure to generate new jobs and industries for the City of Hawthorne...starting with a revisioning and reinvention of the shuttered plywood manufacturing plant into a wood-framed modular housing and home heating and cooking wood pellet manufacturing plant linked to the rail network and designed to serve the needs of the entire Southeastern U.S. from Gulf to Atlantic.
Section 1 – Our Food Web: Legacy Narratives

Something New Under the Sun

How the majority of humans currently eat, move, dwell, and commune today differs a great deal from how our ancestors did for many thousands of generations that came before us. If we view *Homo habilis* as our most distant (but still human) ancestor, then the following Table 1 adapted from Carrera-Bastos et al. (2011, p.16) shows the number of generations and the percent of total time in human history that has passed since various physiological and social milestones.

**Table 1. Snapshots in Human History**

<table>
<thead>
<tr>
<th>Historical Milestones</th>
<th>Generations</th>
<th>% Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Homo habilis</em></td>
<td>76,667</td>
<td>100.000%</td>
</tr>
<tr>
<td><em>Homo erectus</em></td>
<td>60,000</td>
<td>78.200%</td>
</tr>
<tr>
<td>Modern <em>Homo sapiens</em></td>
<td>6,666</td>
<td>8.700%</td>
</tr>
<tr>
<td>Neolithic revolution</td>
<td>366</td>
<td>0.480%</td>
</tr>
<tr>
<td>Industrial revolution</td>
<td>7</td>
<td>0.009%</td>
</tr>
<tr>
<td>Modern age: Industrial food (junk) &amp; inactivity (sedentarism)</td>
<td>4</td>
<td>0.005%</td>
</tr>
</tbody>
</table>

Studies about the average span of a single human generation vary from 20-35 years, so for the sake of consistency let’s assume 30 years. When viewing this chart, it gives the reader the appreciation of the temporal novelty of human lifestyles over the modern age (i.e., the last 120 years), the industrial age (i.e., the last 210 years), and the Neolithic age (i.e., the last 11,000 years) as compared to the period of time over which our most human genetic traits evolved (i.e., the last 2.3 million years). In other words, if we collapsed this relationship into the span of the average lifetime of a single U.S. citizen, that person would live a “modern” lifestyle for 1.4 days, an “industrial” lifestyle for 2.5 days, and “Neolithic” lifestyle for 137 days of their entire 78.2 year life. Maybe we should accept that the 2.289 million years of human evolution prior to the Neolithic age may provide some lessons about living that are worth adapting into the modern age?

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8 (Carrera-Bastos et al. 2011, p.16)
We Are What We Eat

The scientific endeavor increasingly shows evidence of what humans have long known intuitively, that we are what we eat...ecologically, socially, and economically. Ecosystems and the organisms they house are in a constant dance influenced by the flow of energy and information across food webs. Human anthropological, archaeological, and physiological science suggests that the evolution of the increasing size and connectivity of the human brain (and the adaptive capacity it engendered), the opposability of the human thumb to its hand and other fingers (and the dexterity it offered), group hunting tactics (and the social cooperation they necessitated), and the decreasing coverage of hair across our skin (and the dynamic thermoregulatory function it powered) were in some form or fashion being selected for as humans adapted to an ever more heterogeneous, energy and nutrition dense, omnivorous diet (Aiello & Wheeler 1995; Gibbons 2007; Leonard et al. 2007; Marlowe 2005). In a virtuous feedback loop for human development, these traits allowed for synergistic changes in the way our human ancestors ate, moved, dwelled, and communed, thus changing both us and the increasing number of environments in which we could survive and thrive (Foley & Gamble 2009; Laland et al. 2001).

Additionally, it is hypothesized that the increasing control of fire allowed for new types of ecosystem management (K. S. Brown et al. 2009; Pausas & Jon E. Keeley 2009) and for hunted and gathered food to be cooked, further unlocking its stored energy and nutrition and reducing the metabolic expense of digestion within the human gastro-intestinal tract, as well as creating additional social and cultural exchange opportunities around the campfire (Aiello & Wheeler 1995; Pennisi 1999; Wrangham 2009; Gibbons 2007). It’s no wonder that some of the oldest artwork attributable to humankind seems to express a reverence for the powerful beasts that may have made us who we are (Figure 1). So what did our ancestors eat? In another adaptation from Carrera-Bastos et al. (2011, p.19), Table 2 shows a brief summary of both the common foods that shaped our genetic heritage back then as well as those that were generally unavailable to our ancestors, but are now common as a result of the agricultural and industrial revolutions.

Figure 1. A Paleolithic cave painting of aurochs (extinct wild ancestors of domestic cattle), deer, and horses in Lascaux, France estimated to be 17,300 years old.
Table 2. Foods Consumed During the Paleolithic Era (i.e., 99.5% of Human History)  

<table>
<thead>
<tr>
<th>Foods Available to Our Ancestors</th>
<th>Foods Not Available to Our Ancestors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insects</td>
<td>Dairy (except for human milk during weaning)</td>
</tr>
<tr>
<td>Fish, shellfish, and other marine animals</td>
<td>Cereal grains (with the exception of occasional intake in the upper Paleolithic)</td>
</tr>
<tr>
<td>Reptiles, birds, wild terrestrial mammals and eggs</td>
<td>Legumes (except certain varieties that were consumed seasonally)</td>
</tr>
<tr>
<td>Plant leaves, seaweed, sea grasses, and algae</td>
<td>Isolated sugar</td>
</tr>
<tr>
<td>Roots and tubers</td>
<td>Isolate oils</td>
</tr>
<tr>
<td>Berries and wild fruits</td>
<td>Alcohol</td>
</tr>
<tr>
<td>Nuts and seeds</td>
<td>Refined salt (even sea salt would be available only for shore-based populations who may have dipped their food in sea water)</td>
</tr>
<tr>
<td>Honey (occasional intake)</td>
<td></td>
</tr>
</tbody>
</table>

The degree to which, and the details of how, this natural food web and our ancestral kitchen made us who we are today may be debatable, but it seems clear that the acts of procuring food are central to the human condition, first through hunting and gathering and eventually through domesticating plants and animals for cultivation and husbandry respectively. At a genetic and cellular level, food may merely be another form (maybe the deepest and most sacred form) of communication whereby energy and information accumulated and stored in other organisms flows into us ultimately launching a cascade of reactions that define our place in this world. From this assumption, one might argue that a significant portion of what we currently perceive as problems in the world today may be tied back to changes in the human food web that have reverberated across nested ecological, social, and economic realms.

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10 (Carrera-Bastos et al. 2011, p.19)
The Cost of Convenience

Over the last decade, it has become clear that the modern western lifestyle brings both benefits and costs in the “conveniences” it enables for how we eat, move, dwell, and commune. What is gained from these modern conveniences is often interpreted as more time, less expense, less effort, and faster reward in our brain’s pleasure centers. Of course, these are all subjective perceptions of the benefits of convenience. Somewhere along the way, we have collectively determined that there are burdens within the production, processing, distribution, consumption, and conversion phases of these four key human actions. So we’ve allowed much about these phases to be usurped by others with the belief they will undertake these efforts with the same due diligence we might individually.

Our deep-seated, hunter-gatherer ancestral heritage necessitated that an individual either directly undertake or collaborate with, and share the effort among, known family or tribal members for all five phases for all four base actions of living. The modern age pushes these phases into a cloak of secrecy away from view by the consumer of these goods and services and creates mechanisms to tightly control the product packaging and message framing of this behind-the-scenes process in a fashion that twists our evolutionary preferences. For example, sweetness is a taste found in somewhat limited distribution in the natural world and is almost exclusively a signal that something is both edible and non-toxic (e.g., fruit). This intermittent indulgence was a tasty treat that often came densely packed with nutrients, fiber, and caloric energy.

In the modern age, the taste found in sugar, high fructose corn syrup, and other natural and artificial sweeteners is neither intermittent, nor accompanied by other healthy components. The dose makes the poison, and there is growing evidence that sugar, in its modern ever-present availability and dosage may be toxic (Gupta 2012; Taubes 2011; Lustig et al. 2012), addictive and prompting withdrawal symptoms similar to drugs like alcohol (Fortuna 2010; Lustig 2010) and morphine (Colantuoni et al. 2002; Hoebel et al. 2009; Avena et al. 2008; Avena et al. 2009), and a major contributor to chronic diseases (Johnson et al. 2009; Lim et al. 2010; Nguyen et al. 2009). However, some of these findings are not without their contrarians (Benton 2010).

One recent study suggests the global cost of non-communicable diseases (NCDs) accounts for 63 percent of the worldwide deaths in 2010 with a cumulative output loss of U.S. $47 trillion dollars projected over the 20 year period from 2010-2030 (Bloom et al. 2011, p.9). These diseases are primarily cardiovascular diseases (CVDs), cancers, chronic respiratory diseases, diabetes, and mental health diseases. The Partnership to Fight Chronic Disease summarized six “unhealthy truths” about chronic disease in the United States.  

1. Chronic diseases are the No. 1 cause of death and disability in the U.S.
2. Treating patients with chronic diseases accounts for 75 percent of the nation’s health care spending.
3. Two-thirds of the increase in health care spending is due to increased prevalence of treated chronic disease.

http://www.fightchronicdisease.org/facing-issues/about-crisis
4. The doubling of obesity between 1987 and today accounts for 20 to 30 percent of the rise in health care spending.
5. The vast majority of cases of chronic disease could be better prevented or managed.
6. Many Americans are unaware of the extent to which chronic diseases could be better prevented or managed.

And these are merely the obvious and most easily quantifiable economic costs of changes in human health in some way attributable to the modern industrial food system. For brevity, this report doesn’t stretch these “costs of convenience” into the fuller discussion of community health and our modern built environment that can be found in many existing publications (Aboelata 2004; Ewing & Kreutzer, Richard 2006; Lee & Rubin 2007).
Healing Our Wounds

The rapid regeneration of injured skin tissue, the restorative regrowth of broken bones, the fevered recovery after a seasonal flu: these are a few of the human body’s self-healing ways. Food was once the sacred medicine that empowered our self-healing. Yet, in an age of mechanical and pharmaceutical responses to human sickness and disease, society seems to be losing its collective memory and physical connection to how we eat, move, dwell, and commune…and thus to the potential for self-healing so graciously bequeathed to us from our ancestors.

We need to envision more than “sustainable” communities because we’ve already fallen far from where we began and to sustain our current state would be to perpetuate a sickness that is still misunderstood. One empirical study 19 of 21 “societies shifting subsistence from foraging to primary food production [i.e., agriculture] have found evidence for deteriorating health from an increase in infectious and dental disease and a rise in nutritional deficiencies…[and a] counterintuitive increase in nutritional diseases [that] resulted from seasonal hunger, reliance on single crops deficient in essential nutrients, crop blights, social inequalities, and trade” (Mummert et al. 2011, p.284). We need to envision, and bring to fruition, healing communities that restore form, function, and fitness of individuals and communities to a state before illness took hold. Stated another way, we need form befitting modernity with function informed by antiquity.
Section 2 – Our Food Web: Florida Context and Considerations for Alachua County

Production

A community food systems assessment provides a planned and systematic process for determining the food needs of a given community. UF/PREC roughly estimates that the existing local farming community within Alachua County, currently over 200 farmers in the greater Gainesville area, could likely satisfy the need for a significant portion of the fresh, local food for the Envision Alachua Community for some time to come. This systematic assessment would allow for a close examination of the best sites for raising animals and/or cultivating crops and provide the knowledge necessary to begin incorporating organic material into the existing soils as well as engineering for drainage and planning for future growth. It would also allow for the investigation of protected agriculture as well as using the planted pine areas as multi-purposed for livestock and crops through concepts integrated in agroecology. As such, this focus on conventional farming would be of a regional scale.

Production at the community scale would be encouraged throughout each phase of the development so that every household is within a short walking distance to at least one community garden. Those purchasing property would be given a plot where they may undertake gardening while those not desiring to do so able to barter or loan their plot to another resident of the community wanting additional space in which to garden. This community wide impact will be highlighted by the health of the community due to the ease of access to fresh, healthy food during most of the year. Fruit and nut trees, present alongside many walking paths and public areas could lead to “free grazing” areas although due care needs to be exercised in choice and maintenance of same. A small fee could be imposed when a home is sold or on a monthly basis to existing homeowners that could be used for maintaining the infrastructure for the community gardens.

Lastly, the individual scale of production would be nonrestrictive. Since the health of people is directly linked to the food they eat (Levine & Labuza 1990), this is an opportunity to expose food systems in order to reconnect the people to their health. These small-scale individual personal gardens could be incorporated into the individual landscapes.

Crops (i.e., Fruits & Vegetables)

The most limiting factors to growing crops on the Plum Creek property will be the issues of frost/freeze protection and drainage. The publication Sustainability Assessment of Fruit and Nut Crops in North Florida and North Central Florida is a very good overview of the suitability and marketability of the following fruit and nut crops for this region of Florida:

- Pecan
- Peach and nectarine

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12 [http://alachua.ifas.ufl.edu/agriculture/commercial_horticulture/directory.shtml](http://alachua.ifas.ufl.edu/agriculture/commercial_horticulture/directory.shtml)
13 [http://edis.ifas.ufl.edu/mg367](http://edis.ifas.ufl.edu/mg367)
- Plum
- Blueberries (southern highbush and rabbiteye)
- Grapes (muscadine and bunch)
- Apple and pear
- Oriental persimmons
- Blackberry
- Mayhaw
- Chestnut
- Fig
- Citrus (Satsuma and kumquat)
- Note: Appendix 1 lists Florida crops and seasonal availability, both state-wide and locally

The issues of water quality and quantity will also be in the forefront. However, what would happen if water that is oftentimes “allocated” to lawns and landscapes in a development is re-directed to food production? Table 3 provides an analysis of an example development proposed for Volusia County, Florida, called Restoration. The analysis estimated that if just 13% of the irrigation water used for conventional landscaping was diverted to farming it could supply the entire community (estimated at 20,400 people upon build-out) with their annual consumption of the 13 fresh-market vegetables (all fresh except squash).
Table 3. Estimated water needed to supply potential residents of Restoration with their per capita consumption of 13 selected, commercially produced, fresh, and processing vegetables and melons (using 2010 data)*

<table>
<thead>
<tr>
<th>Crop</th>
<th>Per capita consumption (lbs/person)</th>
<th>Persons</th>
<th>Yield (lbs/acre) ++</th>
<th>Acres</th>
<th>Water needed/ growing season (gal/acre) +++</th>
<th>Gallons/Crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potatoes, Fresh</td>
<td>35.6 x</td>
<td>20,400</td>
<td>/ 33,700 = 21.5259 x</td>
<td>638,824</td>
<td></td>
<td>= 13,751,284</td>
</tr>
<tr>
<td>Lettuce, all</td>
<td>26.9 x</td>
<td>20,400</td>
<td>/ 25,575 = 21.4569 x</td>
<td>638,824</td>
<td></td>
<td>= 13,707,177</td>
</tr>
<tr>
<td>Tomatoes, Fresh</td>
<td>20.8 x</td>
<td>20,400</td>
<td>/ 20,000 = 21.2568 x</td>
<td>638,824</td>
<td></td>
<td>= 13,579,354</td>
</tr>
<tr>
<td>Broccoli, Fresh</td>
<td>5.6 x</td>
<td>20,400</td>
<td>/ 6,825 = 16.6787 x</td>
<td>638,824</td>
<td></td>
<td>= 10,654,742</td>
</tr>
<tr>
<td>Bell peppers, fresh</td>
<td>9.9 x</td>
<td>20,400</td>
<td>/ 18,550 = 10.8873 x</td>
<td>638,824</td>
<td></td>
<td>= 6,955,089</td>
</tr>
<tr>
<td>Sweet corn, Fresh</td>
<td>9.2 x</td>
<td>20,400</td>
<td>/ 18,517 = 10.1796 x</td>
<td>638,824</td>
<td></td>
<td>= 6,502,985</td>
</tr>
<tr>
<td>Cucumbers, Fresh</td>
<td>6.8 x</td>
<td>20,400</td>
<td>/ 12,375 = 11.1602 x</td>
<td>638,824</td>
<td></td>
<td>= 7,129,431</td>
</tr>
<tr>
<td>Squash, all uses</td>
<td>4.3 x</td>
<td>20,400</td>
<td>/ 12,600 = 6.9619 x</td>
<td>638,824</td>
<td></td>
<td>= 4,447,432</td>
</tr>
<tr>
<td>Cabbage, Fresh</td>
<td>7.5 x</td>
<td>20,400</td>
<td>/ 26,250 = 5.7897 x</td>
<td>638,824</td>
<td></td>
<td>= 3,698,608</td>
</tr>
<tr>
<td>Snap beans, Fresh</td>
<td>1.9 x</td>
<td>20,400</td>
<td>/ 5,400 = 7.0644 x</td>
<td>638,824</td>
<td></td>
<td>= 4,512,937</td>
</tr>
<tr>
<td>Celery, Fresh</td>
<td>6.2 x</td>
<td>20,400</td>
<td>/ 41,500 = 3.0674 x</td>
<td>638,824</td>
<td></td>
<td>= 1,959,512</td>
</tr>
<tr>
<td>Cauliflower, Fresh</td>
<td>1.3 x</td>
<td>20,400</td>
<td>/ 10,500 = 2.6034 x</td>
<td>638,824</td>
<td></td>
<td>= 1,663,133</td>
</tr>
<tr>
<td>Sweet potatoes</td>
<td>6.3 x</td>
<td>20,400</td>
<td>/ 25,000 = 5.1245 x</td>
<td>638,824</td>
<td></td>
<td>= 3,273,641</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>143.8 Acres Total (Single Crop/yr)</th>
<th>91,835,323 Total Gals/Crop (13 vegetables)</th>
</tr>
</thead>
</table>

* Number of residents in Restoration: 2.4 residents/household x 8,500 units = 20,400 total residents. Source of per household number in Volusia County: [http://quickfacts.census.gov/qfd/states/12/12127.html](http://quickfacts.census.gov/qfd/states/12/12127.html)

+ Per capita vegetable consumption (all except squash): Table 1 of the USDA Vegetable and Melons Yearbook - [http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1212](http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1212)

Squash consumption from Table 73 of the USDA Vegetable and Melons Yearbook

++ Celery yield from [http://edis.ifas.ufl.edu/pi035](http://edis.ifas.ufl.edu/pi035); Sweet corn yield from [http://edis.ifas.ufl.edu/pi034](http://edis.ifas.ufl.edu/pi034); All other yields from IFAS Farm Pocket Handbook ([http://jefferson.ifas.ufl.edu/agriculture/pocket_notebook_pdfs/Farm%20Pocket%20Notebook_pdf_all.pdf](http://jefferson.ifas.ufl.edu/agriculture/pocket_notebook_pdfs/Farm%20Pocket%20Notebook_pdf_all.pdf))

+++ Water needed during the growing season (given as average for all vegetables of 638,824 gallons/acre) from Hanlon et al 2011: [http://edis.ifas.ufl.edu/ss452](http://edis.ifas.ufl.edu/ss452)
A soil survey of the property reveals Millhopper, Monteocha loamy, Newnan, Pomona and Sparr fine sands as being common on the property. \(^{14}\) Soil test results on this predominantly pine flatwoods property indicate a pH of 3.9 to 4.1, very low phosphorus and potassium levels, low magnesium levels and low organic matter content.

In light of these soil characteristics, the use of protected agriculture may be one approach to crop production on the Plum Creek property. Protected agriculture includes a wide variety of methods but basically refers to structures that can be covered with transparent or semi-transparent materials that allow the producer to modify the microclimate for crop production (Figure 2). \(^{15}\) Specifically high tunnel structures, with their unheated, passive ventilation combined with fine pine bark beds and black groundcover have resulted in increased crop growth and performance and increase water savings in an experiment with blueberries in Alachua County. \(^{16}\)

At current prices of approximately $20,000 per acre installed compared to greenhouses at approximately $100,000 per acre, crop production using high tunnels on the property is worthy of consideration. \(^{17}\) In addition, the use of pine bark as a growing medium (“aged” and with some amendments) would encourage use of the pine trees that are currently growing on the property. In the future, this may result in planting the pines at a different density than currently practiced.

Vertical, aquaculture, hydroponic, and aquaponic farming methods are all deserving of further investigation for this property. \(^{18}\) Agroecology is another viable farming method worthy of consideration, especially given the proximity and accessibility of a nearby pioneering researcher in a related discipline, Dr. P.K. Ramachandran Nair, Distinguished Professor of Agroforestry and International Forestry and Director of the Center for Subtropical Agroforestry in the University of Florida School of Forest Resources and Conservation. \(^{19}\)

The UF Small Farms & Alternative Enterprises website offers a lot of information on aspects that both small farmers and allied organizations have identified as critical issues facing small farms. These issues, including access to technical information, profitable marketing, evaluating an alternative enterprise and

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\(^{15}\) Vegetable and Small Fruit Protected Agriculture Handbook 2012 (expected release date August 2012, IFAS/UF)


\(^{17}\) Personal communication (Dr. Bielinski Santos and Dr. Kathleen Ruppert) on April 16, 2012 in Gainesville, FL


\(^{19}\) [http://www.sfrc.ufl.edu/faculty/nair/](http://www.sfrc.ufl.edu/faculty/nair/)
much more are all found in one place on the web. Regional small farms conferences and an annual state-wide conference are also available to those interested. In addition to UF/IFAS educational resources, The Southern Region Small Fruit Consortium is another good source of information specific to blueberries, brambles, bunch grapes, muscadine grapes, and strawberries.

- **UF Small Farms & Alternative Enterprises**  
  [http://smallfarms.ifas.ufl.edu/](http://smallfarms.ifas.ufl.edu/)
- **Southern Region Small Fruit Consortium**  

For the homeowner or small farmer, many relevant UF/IFAS publications can be found online and in print form at the local Alachua County Cooperative Extension Service Office. These materials afford the individual numerous opportunities to learn the what, how, when, and where of fruit, nut and vegetable growing.

- **Fruit and Nut Varieties For Alachua County** (available locally in print form)
- **Florida Vegetable Gardening Guide**  
  [http://edis.ifas.ufl.edu/vh021](http://edis.ifas.ufl.edu/vh021)
- **Manual of Minor Vegetables**  
- **Vegetable Gardening in Florida**  
- **Hydroponics for Small Farms and Gardens**  
- **Dooryard Fruit Varieties**  
  [http://edis.ifas.ufl.edu/pdffiles/MG/MG24800.pdf](http://edis.ifas.ufl.edu/pdffiles/MG/MG24800.pdf)

Not to be overlooked would be the possibility of including entertainment farming, agritourism and/or nature-based tourism. For example, the nearby UF/IFAS St. Johns County Cooperative Extension Service worked with a grower who turned part of their farm into a sorghum maze that drew 35,000 members of the general public and over 10,000 youth to the farm over a two-year period. The MAiZE Incorporated Company out of Utah assisted with the design. A recent article describes consumer trends and the degree of understanding of agricultural-related tourism terms on the part of the public.

### Florida Farms: Size

According to USDA statistics, approximately 93.4 percent of Florida agricultural operations are either very small farms (less than $5,000 market value of products sold) or small farms ($5,000 to $249,000 market value of products sold). This compares to a United States average of 90.5 percent. Based on

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20 [http://www.uky.edu/Ag/CDBREC/introsheets/agritourism.pdf](http://www.uky.edu/Ag/CDBREC/introsheets/agritourism.pdf)
22 Central District 2012 Extension Faculty Symposium: Program and Abstracts, April 26, 2012, Sumter Co. Extension, Bushnell, FL
26 Ibid
the 2007 Census of Agriculture, Florida had 26,368 very small farms (averaging 52 acres in size) and 17,965 small farms. Note that the USDA reported 44,300 combined very small and small farms in Florida in 2010—33 fewer than for 2007.

There were 1,268 Florida farms having sales of $1 million or more and 248 (i.e., approximately 20 percent) of those farms had less than 50 acres. This is due in part to the ability of Florida farmers to raise a number of “specialty” commodities that can be produced on small acreages that yield similar sales volumes as larger farms in other States. In addition, approximately 59 percent of the very small farmers were reported as age 55 or older and approximately 63 percent of the small farm operators were age 55 or older. This compares with approximately 58 percent for both categories across the United States.

Florida Farms: Organic Certified

Based on the 2007 Census of Agriculture, Florida and the U.S. as a whole reported less than 1 percent of all farms involved in organic production. However, that number is now thought to be higher. To assist in report accuracy, the USDA is conducting a Certified Organic Production Survey from December 2011 through April 2012 to “… help shape decisions regarding farm policy, funding allocations, availability of goods and services, community development and other key issues.” For example:

- “RMA’s Federal Crop Insurance Corporation (FCIC) will use the information published to provide better insurance coverage for organic crops, as required by the 2008 Farm Bill.”
- “USDA’s Natural Resources Conservation Service will use the detailed data on agricultural products produced using organic practices to enhance programs like the Environmental Quality Incentives Program.”
- “USDA’s Foreign Agricultural Service will use the information to evaluate the potential expansion of the Market Access Program to allow for more exports of organic agricultural products.”

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27 Ibid
30 Ibid
31 Ibid
Processing

Though Florida has an extensive history and still vibrant cattle ranching industry, much of the current food system model of beef production has constrained Florida to a predominantly cow-calf state of operation. This has resulted in a minimal number of USDA-certified beef processing facilities within Florida and necessitates that most of Florida’s grazed calves be shipped considerable distances out of state to be finished and processed in concentrated animal feeding operations (CAFOs). Similar events have transpired to shift pork and poultry processing to other states as well. However, these trends may be shifting as a new USDA-inspected slaughterhouse is under construction in the Fort McCoy area of Marion County (about 30 miles to the southeast of the property) and is due to be completed by the end of 2012.  

However, it is important to note that the cattle operation on Adena Springs Ranch associated with this slaughterhouse is not without its detractors. Additional information about meat processing can be found at the following resources:

- USDA-Inspected Livestock Slaughter Facilities in Florida
  [http://edis.ifas.ufl.edu/pdffiles/AN/AN20300.pdf](http://edis.ifas.ufl.edu/pdffiles/AN/AN20300.pdf)

- Custom and Retail [USDA Regulation] Exempt Meat Processing
  [http://edis.ifas.ufl.edu/pdffiles/AN/AN20400.pdf](http://edis.ifas.ufl.edu/pdffiles/AN/AN20400.pdf)

A major challenge to local food systems is developing local food producer-consumer relationships through a healthy food processing sector and distribution systems that allow for a fair price for farmers and ensures that low-income consumers and price-sensitive institutions are able to participate. While incorporating fresh produce into the diets of residents is the top priority, some food processing is necessary to preserve food for off-season. As such, an on-site processing facility could be very beneficial to this proposed community, especially if allowed to be rented or leased by local farmers for short periods of time. Traditional large processing facilities require specialized equipment and are very expensive.

It’s possible that this development could become a centralized hub for both processing and distribution in the North Central Florida region thus improving food security in the region and creating jobs within these sectors. In addition to on-site processing facilities for farmers, a certified kitchen, refrigerated storage area, canning center (such as the one in Duval County), and mobile meat processing units could be incorporated into the development. Processing facilities of some kind would be necessary in order to provide the community with many value-added products as well.

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36 [http://class.fst.ohio-state.edu/fst401/Information/Elements-Food-Processing.html](http://class.fst.ohio-state.edu/fst401/Information/Elements-Food-Processing.html)
37 [http://duval.ifas.ufl.edu/canning_center.html](http://duval.ifas.ufl.edu/canning_center.html)
Distribution

Alachua County has developed a demand for locally grown food over the years. From farmers’ markets\(^3\) to community supported agriculture (CSA)\(^\) to local restaurants advertising locally grown/raised menu items,\(^4\) individual consumers and restaurants have been able to access and afford locally grown products. However, most major food distributors do not feature much in the way of local food as they are gauging demand and determining costs, including the upfront investment.\(^5\) In 2009, Florida Organic Growers,\(^6\) a local 501(c)(3) not-for-profit organization, began a one-year project focused on increasing food security for low income Gainesville residents. The outcome of their work can be found in the following report with further benefit from a similar case study in Wisconsin:

- **Community Vision for Food System Development in Gainesville-Alachua County: A Local Food Action Plan**
- **Goods Raised Only With Nature (GROWN) Locally**

Distribution could also be in the form of on farm market stands, through “bicycle traffic” on the nearby Gainesville-Hawthorne bike trail, and via local convenience and grocery stores (e.g., Hitchcock’s in nearby Hawthorne). Institutional distribution, as related to schools, prisons, and hospitals are also possibilities along with the idea of onsite restaurants and bakeries.

In addition, with the CSX railroad line running along the eastern side of the property adjacent to Highway 301, with double tracks in some areas, there would need to be allowance for a distribution center placed close to the rail. Of note, rail freight is estimated to be approximately 2-times to 6-times more efficient as a means of transportation over truck transportation.\(^7\) Excess fresh products and value-added products could be shipped with revenue benefitting the farmers and the development. The Florida MarketMaker is a free service to Florida producers, consumers, retailers, wholesalers, processors and others within the food supply chain to help businesses market their products:

- **Florida MarketMaker**
  [http://fli.foodmarketmaker.com](http://fli.foodmarketmaker.com)

The United States Department of Agriculture (USDA) recently responded to the lack of distribution infrastructure and services for producers to take greater advantage of the growing demand for locally and regionally grown food in larger volume markets such as grocery stores, schools, hospitals, etc. This information and idea packed document from April 2012 also includes a listing of some foundations and nonprofit organizations that have funded activities in this arena and can be found at the following:

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• The Regional Food Hub Resource Guide: Food hub impacts on regional food systems, and the resources available to support this growth and development
  http://www.ams.usda.gov/AMSv1.0/getfile?dDocName=STELPRDC5097957

Another USDA publication includes, among several examples, information on the New North Florida Cooperative: Producer-Driven Model located in the Florida panhandle. This producer-driven distribution group sells sweet potatoes, green beans, and chopped fresh collard greens to independent grocery stores and several school districts in the Southeast. The National Policy & Legal Analysis Network to Prevent Childhood Obesity recently published a report containing ideas for using healthy food at the retail level as an economic development strategy. Both reports can be found at the following:

• Moving Food Along the Value Chain: Innovations in Regional Food Distribution
  (http://www.ams.usda.gov/AMSv1.0/getfile?dDocName=stelprdc5097504)
• Green for Greens: Finding Public Funding for Healthy Food Retail
Consumption

Creating a “culture of food” while providing healthy locally sourced options to the residents should serve as the main foci of this development. Therefore, the shortest amount of both time and distance possible from farm to plate is clearly the most desirable. Convenience is a key component of the food consumption chain. It’s important to keep in mind Florida’s retail food establishment permitting requirements.45

The United States Department of Agriculture46 reported that the food supply provides 3,800 calories per person, per day. Of this number, roughly 1,100 are lost due to spoilage, cooking, plate waste, etc., therefore resulting in an average intake of approximately 2,000 calories per person, per day. In 2010 the obesity rate in Florida was 26.6 percent47, with Alachua County just behind the state average at 25.4 percent based on 2007 data.48 During the 2008-2009 school year, Alachua County public schools reported that approximately 34.2 percent of the students were overweight or obese.49 However, in Hawthorne High School, located adjacent to the Plum Creek property, the rate was 45.7 percent.

Providing fresh and nutritious food along with educational and recreational opportunities is something this development can and should address.

Specializing in locally owned and operated restaurants, which serve local foods and offer value-added goods, could be a large marketing tool for the community. This could be a reason for residents to dine out and for people outside the area to visit. Along these lines, a culinary institute could be constructed, serving both the local and community residents as well as a “camp” for children and adults from other areas who wish to learn how to prepare fresh produce and create healthy, nutritious meals. This program could team up with the Institute of Culinary Arts at Eastside High School in Gainesville.50

A website specific to the development could be developed that highlights local food producers and restaurants to showcase information about their goods and services and to describe how eating local, seasonally-available produce can have health benefits for residents, the local economy, and the environment. Once agreements with local institutions are established, interested farmers would be more willing to participate as a large portion of their produce would be pre-sold.

In 2010, an outside research firm conducted a study to determine what consumers think about vegetables and herbs and to identify the best messages to use to attract their attention and pocketbook.51 A relevant excerpt about “Vegetable and Herb Gardening” from this study is included below:

1) 40% of those surveyed started with vegetable and flower gardening at the same time.
2) Vegetable garden locations are determined based on the amount of sun and convenient access, but are most often placed “out of sight.”

45 http://www.freshfromflorida.com/fs/permitrq.html
47 http://www.cdc.gov/obesity/data/trends.html
48 http://www.wellflorida.org/docs/The%202010%20Alachua%20County%20Health%20Needs%20Assessment.pdf
49 http://www.wellflorida.org/docs/The%202010%20ACHNA%20Technical%20Appendix.pdf
50 http://www.sbac.edu/~ehs/magnet/ica/index.html
3) More than half of all “vegetable gardens” are actually in pots and containers.
4) A vegetable garden is seen as functional, not beautiful.
5) The #1 driver of variety decisions by consumers is flavor.
6) Consumers look first for healthy plants. This means: “sturdy stalks”; “large size”; “watered and cared for”; and “flowers or buds” especially on tomatoes and peppers.
7) 73% purchased veggies and herbs as plants, rather than seed packs.
8) Newer gardeners are more likely to start from plants instead of seeds.
9) Independent garden centers are the “primary store” for respondents but research shows that box and chain stores have more than 50% of the veggie and herb business.
10) Casual gardeners plant veggies once each year. Enthusiastic gardeners plant twice.

Table 4. Perceived Strengths and Weakness of Vegetable and Herb Gardening

<table>
<thead>
<tr>
<th>Strengths (+) of Vegetable Gardening</th>
<th>Weaknesses (-) of Vegetable Gardening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better taste</td>
<td>Weeding is hard work</td>
</tr>
<tr>
<td>Healthier eating</td>
<td>Watering takes time</td>
</tr>
<tr>
<td>Pride and accomplishment</td>
<td>Pests are frustrating</td>
</tr>
<tr>
<td>Sharing with others</td>
<td>Risk of failure</td>
</tr>
<tr>
<td>Learning opportunity for kids</td>
<td>Failure is disappointing</td>
</tr>
</tbody>
</table>

\[52\] Ibid
Conversion (of Waste)

The last stage of the food system takes place after the consumption of end-user food system goods and services. This “post-consumption,” or waste management, stage is oftentimes the most overlooked. Yet in reality, waste management takes place continuously throughout every step of every stage of the cycle of goods and services. Even the food itself creates “waste,” from the inedible or undesirable trimmings of a vegetable to the indigestible tissues of the plants and animals that pass through our digestive systems and end up excreted into modern municipal sewer systems.

A more apt term for waste management might simply be “conversion.” Given enough time, enough space, and enough energy, water, and matter, these food system wastes are eventually converted into something that becomes a new raw material for some other natural process. Municipal waste management programs manage both solid and liquid waste streams. The solid waste typically ends up in landfills, gets incinerated, or may get diverted. These solid waste diversion programs combine reduction (or prevention), reuse, recycling, and composting processes. The liquid waste typically goes through a treatment plant and ends up being distributed back into the environment through a variety of application processes.

Organic waste from food waste and yard waste could be collected with the finished compost applied to the areas where crops would be planted in the future. Florida Statute 403.7032, which came into effect in 2010, created a 75% recycling goal by 2020 for the State of Florida.\(^{53}\) Alachua County currently operates a nearby transfer station on Highway 20 that includes drop off of recyclable goods. With this in mind, it makes sense that this development is dedicated to zero waste with residents encouraged to reduce, reuse, and recycle thereby keeping landfill waste to an absolute minimum and a place of last resort.

Community and individual goals should be set with a community-wide “waste equals food” mentality where all waste feeds back into production whenever possible. It’s important to realize that consumers are not a homogenous group so how you convince them to be good stewards of the land and deal with the issues of sustainability is, by necessity, varied.\(^{54}\) However, a community of 20,000 has the power to change a city and the people within and around it.

\(^{53}\) [http://www.alachuacounty.us/Depts/PW/Waste/Pages/Strivefor75.aspx](http://www.alachuacounty.us/Depts/PW/Waste/Pages/Strivefor75.aspx)

\(^{54}\) [http://www.springerlink.com/content/m6w46522g24j4t14/](http://www.springerlink.com/content/m6w46522g24j4t14/)
Additional Resources for Local Food System Visioning

Agricultural Economic Development for the Hudson Valley

American Farmland Trust: Guide to local planning for agriculture in New York

Cutting Through the Red Tape: A resource guide for local food policy practitioners & organizers

Farmland Protection Action Guide: 24 strategies for California

Florida Greenhouse Vegetable Production Handbook – Volumes 1, 2 and 3
http://edis.ifas.ufl.edu/topic_book_florida_greenhouse_vegetable_production_handbook

FoodWorks: A vision to improve NYC’s food System

Food-sensitive Planning and Urban Design: A conceptual framework for achieving a sustainable and healthy food system

From Farm to Fork: A guide to building North Carolina’s sustainable local food economy
http://www.cefs.ncsu.edu/resources/stateactionguide2010.pdf

Local Food Systems: Concepts, impacts, and issues

National Sustainable Agriculture Information Service – ATTRA
https://attra.ncat.org/publication.html

Organic Industry in Florida
http://edis.ifas.ufl.edu/topic_organic_industry

Partnership for Sustainable Communities: Urban Farm Business Plan Handbook

Planning for Agriculture: A guide for communities
http://www.doa.state.wi.us/dir/documents/ag_guide.pdf

Policy Guide on Community and Regional Food Planning
http://www.planning.org/policy/guides/adopted/food.htm
Preserving Rural Character Through Agriculture: A resource kit for planners

Supporting Data and Analysis for Alachua County Comprehensive Plan Evaluation and Appraisal Report (EAR) Based Amendments

Sustainable Agriculture Research & Education Program
http://www.sare.org/publications

Understanding the Dynamics of Produce Markets: Consumption and Consolidation Grow
http://www.ers.usda.gov/Publications/AIB758/

United States Department of Agriculture Alternative Farming Systems Information Center – AFSIC
http://afsic.nal.usda.gov/

United States Department of Agriculture National Agroforestry Center
http://www.unl.edu/nac/

Vegetable and Small Fruit Protected Agriculture Handbook 2012
To be released August, 2012, from IFAS/University of Florida

Vegetable Production Handbook for Florida 2012-2013
http://nfrec.ifas.ufl.edu/vegetable_handbook.shtml
Section 3 – Speculative Goals, Objectives, and Actions for Creating a Legacy Community

Goal 1: Eat to Thrive

Industries, careers, and personal stories are built on questions of food, nutrition, and health...and the answers are rarely static. As such, no short summary could satisfy the depth, detail, and diversity of opinions and outcomes within this rich and evolving aspect of life. A recent scathing review of the 2010 update to the U.S. Government’s Dietary Guidelines for Americans sheds light on how contentious and unresolved are these many questions on human health and nutrition (Hite et al. 2010). Yet, it is clear that food is more than the mere sum of its parts and a simple daily allotment of digestible calories is not true sustenance. UF/PREC believes a healthy community should strive to create the conditions in which their denizens eat to thrive.

Humans are like chameleons when it comes to food. We are able to shift our preferences and our choices to match the diversity of edible plants and animals on variably available around the planet. Yet, we are also like puppet-masters who shift the conditions in our favor to support a select few plants and animals that are the most profitable and most manageable in the modern industrial economy. Eating to thrive does not necessarily require a retreat to a historical, less industrial time. However, it likely does require that we observe and mirror the patterns of our more natural and ancestral food webs. The small farm and locavore movements seem nicely aligned with these more natural patterns. Additionally, the types of plants that can be cultivated and the types of animals that can be husbanded in this region of Florida are well suited to providing the high quality energy and nutritional density required for optimal health and wellness. In the objectives that follow, both within this goal as well as within the other three major goals, UF/PREC believes these preferential patterns will become more evident. We hope that Plum Creek accepts the challenge and responsibility of taking the path less traveled in an effort to find our way back home.

“Let thy food be thy medicine, and thy medicine be thy food.”
—Hippocrates
Food Objective 1.1: Become an agroecology innovator

Figure 3. Clint Lightsey moves cattle to the cowpen. Lightsey Cattle Company received the 2006 Environmental Stewardship Award from the National Cattlemen’s Association.55

Rationale:
Plum Creek’s transition into more diversified agricultural practices and urban development should ideally leverage the existing corporate culture and skills. In light of the soils in the case study parcels in Eastern Alachua County being sub-optimal for row crops, UF/PREC believes Plum Creek should strive to become an innovator in the rapidly expanding agroecology discipline. Agroecology, the fusion of agronomy and ecology, is “the application of ecological science to the study, design, and management of sustainable agriculture [and food systems]” (De Schutter & Vanloqueren 2011). Differentially “interpreted as a scientific discipline, as a movement or as a practice,” (Wezel & Soldat 2009) agroecology arose in response to the “sharp increase in pest outbreaks [and downstream pollution]56 in modern monocultures” and the increased understanding and observance of “the effectiveness of traditional farming systems” (Wezel & Soldat 2009).57 By better “valuing nature,” agroecology strives for

57 http://www.rodaleinstitute.org/fst30years
mutually beneficial agricultural and ecological outcomes such as more balanced nutrient flows, improved soil conditions, more natural microclimate management, and enhanced biodiversity, genetic diversity, and biological interactions (Farley et al. 2012).

It could be argued that cattle ranching and silviculture, both long established in Florida for many hundreds of years, are the predominant drivers of land conservation and management across the state. One potential agroecological starting point for Envision Alachua might be to revisit the relationship between rangelands, pinelands, and ruminants that once defined Florida’s past. Early European settlers found suitable “free” foraging services for their cattle in the open, grassy, fire-dependent longleaf pine ecosystem predominant in the Southeastern United States at that time. Descendants of Spanish cattle brought to Florida in the 1500s, Florida Cracker Cattle once roamed through our state’s scrubby flatwoods and unimproved pastures. Though typically smaller, with low milk production, and lacking the full suite of characteristics selected for in modern industrial beef cattle, these Cracker Cattle survived and adapted to the low quality nutrition found in these natural Florida habitats. In fact, these very adaptations embody the principles of agroecology in that these Cracker Cattle have excellent longevity (often calving past 20 years old), possess high heat tolerance, require limited (potentially no) antibiotics nor growth hormones, may have increased resistance to internal parasites (thus precluding the need for chemical controls), and can serve as natural habitat management systems via their less restrictive grazing preferences (potentially even offsetting or replacing existing mechanical, chemical, and/or fire management regimes).

Beyond simple nostalgia, there are emerging trends that suggest revisiting our past may reap a reward in the future. Rotational grazing and holistic management are maturing and receiving international recognition as evidenced by the 2010 Buckminster Fuller Challenge Winner, “Operation Hope: Permanent water and food security for Africa’s impoverished millions.” Compared to their confined and sheltered counterparts, one USDA study found that pastured dairy cows foraging exclusively on perennial grasslands reduced air pollution, reduced greenhouse gas emissions, produced more high quality fat and protein, reduced sediment erosion by 87%, and reduced phosphorous runoff by 23%.

Furthermore, a recent study suggests that versus conventional concentrated grain-finished practices, beef produced from grass-finished cattle provides “lower total saturated and monounsaturated fat content with higher contents of n-3 fatty acids and a lower n-6 to n-3 ratio...[and] greater contents of B-vitamins and antioxidants (vitamin E and beta-carotene)” (Duckett et al. 2009, p.2961). A first of its kind “randomized, double-blinded, dietary intervention study” on the consumer blood profile effects of eating beef from these competing production processes suggested, “consuming red meat from grass-fed animals compared with concentrate-fed animals as part of the habitual diet can significantly increase consumer plasma and platelet LC n-3 PUFA status” (McAfee et al. 2011, p.80). Another Australian study investigating the differences in the “low-grade inflammatory response (‘metainflammation’)” resulting

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58 http://www.auburn.edu/academic/forestry_wildlife/longleafalliance/teachers/teacherkit/cattlerange.htm
59 http://crackercattle.org/what.shtml
61 http://www.youtube.com/watch?v=FyWQkJz2Vc&feature=player_embedded&mid=55023
62 http://www.savoryinstitute.com/
64 http://challenge.bfi.org/winner_2010
Ranchers in Florida are already finding profitable business models and winning awards for practices focused on exclusively pastured livestock ranching models. One multi-generational ranch in Georgia, White Oak Pastures run by the Harris family, returned to these “traditional” methods in 1995 when the fourth generation came “full circle...reinstituted the multi-species rotational grazing practices of his forefathers...[and] made the conscious decision to return to a production system that is better for the environment, for our animals, and for the people who eat our meats” after the third generation “eroded” the legacy practices by introducing a “bevy of new chemical tools to the farm,” shifting to calf production only, and replacing on-site abattoirs with “centralized and distant” industrial concentrated animal feeding areas (CAFOs). The “Appalachian Pasture-Raised Beef: Economic, Market, & Risk Assessment” project conducted by West Virginia University through funding by the USDA/ARS, found this beef production model is “potentially more profitable...[earning] more than double that required to cover operating expenses...[provides reduced] price risk [and less volatility than live cattle prices] by direct marketing harvested beef...showed overwhelming [consumer] preference for grass-fed product...[with] appearance and nutritional information most commonly cited reasons for preference...[and demanded] retail-level premiums of $2 to $5 per pound above conventional beef prices.”

Maybe consumers are finally waking up to the benefits of grass-fed/finished beef practices? From books, to movies, to television shows, to mainstream magazines, to web-based sourcing lists, this “clean meat movement” continues to grow. Demand for the “artisanal” product of this more ancestral food system model is even going mainstream here in the Southeastern U.S., as evidenced by White Oak Pastures grass-fed beef, lamb, and poultry being available in Florida and Georgia supermarkets such as Publix and Whole Foods and via direct on-site community supported agriculture (CSA) memberships.

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67 http://www.deeprootsmeat.com
68 http://www.cognitofarm.com
69 http://www.youtube.com/watch?v=PpaI0QS_YC0
70 https://whiteoakpastures.com/tradition.html
71 Quotes excerpted from project conference poster preliminary findings. Additional resources include:
72 http://www.amazon.com/Good-Meat-Complete-Sourcing-Sustainable/dp/1584798637
73 http://www.imdb.com/title/tt1286537/
74 http://www.pbs.org/wnet/nature/episodes/holy-cow/green-beef-catches-on/1810/
75 http://www.time.com/time/magazine/article/0,9171,1200759,00.html
76 http://eatwild.com/environment.html
78 http://artisanbeefinstitute.com/artisan-beef/grass-fed-white-oak-pastures-gateway-beef/
79 https://whiteoakpastures.com/retail-stores.html
Actions:

1. Partner with UF/IFAS to create a new Department of Agroecology with an on-site satellite campus focused on hypothesizing, testing, and launching a more sustainable food system.\(^8^0\)

2. Appropriately organize and plan agroecological food production according to the optimal mix of ecological, social, and economic factors.
   a. Strategy: Keep high intensity and high input practices in the most rural transects.
   b. Strategy: Keep low intensity and low input practices in the most urban transects.

3. Evaluate and integrate multi-species models of pasture and forest based animal husbandry and grazing for meat production.

\(^8^0\) Note, the UF College of Agricultural and Life Sciences, in joint collaboration of the Agronomy and Soil & Water Science Departments, plans to begin a new online “Agroecology Master of Science” degree in Fall 2012. [http://news.sfcollege.edu/2012/04/25/new-online-agroecology-degree-at-uf/] and [http://agronomy.ifas.ufl.edu/agroecology/admissions.shtml]
Food Objective 1.2: Spawn a food system innovation hub integrated across the transect

**Figure 4.** "RealTimeFarms.com is a crowd-sourced nationwide food guide...[that enables consumers] to trace [their] food back to the farm it came from, whether staying in or dining out, so [they] can find food [they] feel good about eating...[and restaurants the ability to] manage & publish their menus across multiple platforms & connect consumers, on a per ingredient basis, to the images, stories, & growing practices of each producer."81

**Rationale:**
Innovation happens continuously in every industry. For many decades, much of the innovation within the agricultural industry has been geared toward the largest, most industrial, and most concentrated production, processing, distribution, consumption, and conversion of food system goods and services. With the accelerating “cottage” and “niche” markets such as the small farms, farm-to-fork, locavore, and community supported agriculture (CSA) movements, the most innovative space in the agricultural industry appears in the more chaotic segments at the interface between producer and consumer as well as between rural and urban land uses.

Just as there is opportunity for innovation at each phase within the food system, there is opportunity for the integration and incubation of a “culture of food” across all points in the local transect of the Plum Creek site. The innovation necessary to bring this new culture of food that reconnects us to the land while expanding conventions of convenience is already underway. For example, within UF, the Office of Sustainability has created a “Food for Thought” initiative\textsuperscript{82}, works with UF Gator Dining Services and Aramark on innovative ways to increase the use of local vendors and the integration of local food into dining halls\textsuperscript{83}, and works with the GatorWell Health Promotion Services on a variety of local and sustainable food efforts such as a weekly community supported agriculture pick up on campus\textsuperscript{84}. Beyond UF, the University of Kentucky College of Agriculture has a Food Systems Innovation Center that was created to “provide technical and business development services to facilitate the profitable production, processing and marketing of locally produced and processed food by Kentucky-based enterprises and entrepreneurs.”\textsuperscript{85}

Private sector innovation is taking place within large businesses like IBM, which is developing “food traceability technology,”\textsuperscript{86} and within small start-up companies like Farmonic, which launched a field management platform designed to improve the connection between the “back” and the “front” ends of sustainable farms.\textsuperscript{87} Beyond private businesses, open source efforts are flourishing, such as online communities like the Open Source Ecology Global Village Construction Set\textsuperscript{88}, bloggers like Danielle Gould of Food+Tech Connect\textsuperscript{89}, and educational repositories like the Food Matters TED theme.\textsuperscript{90,91}

**Actions:**

1. Create a food system innovation and incubation hub focused on best management practice development and deployment and sustainable technology transfer across the five major phases of the food system: (1) production; (2) processing; (3) distribution; (4) consumption; and (5) conversion.
   a. Integrate this incubator with the UF satellite campus and the culinary and hospitality institute on-site and the Innovation Square at the University of Florida and Innovation Gainesville efforts off-site.\textsuperscript{92,93}
2. Utilize and improve the adjacent transportation corridors (e.g., the railway, the Gainesville-Hawthorne Rail Trail, SR-20).
3. Create a food system informatics and social engagement incubator designed to serve all five phases of the food system.
4. Transparently manage the community waste conversion stream from cradle to grave.
5. Ensure that every building has at least one viewshed/plane that provides a snapshot and a connection to the local food system and/or ecological systems.
6. Prioritize edible landscapes over simple ornamental species.

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\textsuperscript{82} \url{http://sustainable.ufl.edu/food/}
\textsuperscript{83} \url{http://www.bsd.ufl.edu/dining/sustainability.asp}
\textsuperscript{84} \url{http://gatorwell.ufl.edu/Local-and-Sustainable-Food.aspx}
\textsuperscript{85} \url{http://www.uky.edu/fsic/}
\textsuperscript{86} \url{http://www.foodandtechconnect.com/site/2011/10/19/using-technology-to-improve-food-traceability/}
\textsuperscript{87} \url{www.farmonic.com}
\textsuperscript{88} \url{http://opensourceecology.org/}
\textsuperscript{89} \url{http://www.foodandtechconnect.com/site/2011/09/17/how-can-information-and-technology-be-used-to-hack-the-food-system/}
\textsuperscript{90} \url{http://www.ted.com/themes/food_matters.html}
\textsuperscript{91} \url{http://www.huffingtonpost.com/2012/01/20/food-ted-talks_n_1219014.html}
\textsuperscript{92} \url{http://innovationsquare.ufl.edu/}
\textsuperscript{93} \url{http://innovationgainesville.com/}
7. Create opportunities for the “niche meat” market across all stages of the food system.94, 95
8. Work with UF/Levin College of Law Conservation Law Clinic to develop “language” allowing incorporation of food production in urban settings/environments.

94 http://www.nichemeatprocessing.org/
95 http://sfp.ucdavis.edu/niche_meats/
Food Objective 1.3: Reinvent the school lunch

*Figure 5.* A shift from the conventional school lunch (left image) to healthier fare like the options shown in this National School Lunch Program (right image) from Washington-Lee High School in Arlington, Virginia, is already underway. Expanding and extending this effort into the households beyond the school yard is the next step.

**Rationale:**

Understanding the costs and benefits of school nutrition programs is complex and challenging with mixed results. Yet, it seems clear that something needs to change...in school meals, at-home meals, restaurant meals, agricultural policy, cultural norms, or most likely an interactive mix of all the above. “Interest in an initiation of farm-to-school (FTS) programs have increased in recent years, spurred on by converging public concerns about child obesity trends and risks associated with industrialization and distancing in the modern food system.”

“From just a handful of programs in the late 1990’s, Farm to School is now operational in more than 10,000 schools spanning all 50 states.” To reinvent the school lunch is not simply to shift from the processed industrial food model to a local farm fresh food model. True reinvention would leverage the economies of scale of the K-12 public school system to generate demand for local agricultural products as well as to serve as a node from which both school-age children and their families learn better dietary habits.

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96 [http://www.flickr.com/photos/wlscience/4569761556/]
97 [http://www.flickr.com/photos/usdagov/6276717595]
98 [http://jhr.uwpress.org/content/45/3/640.abstract]
99 [http://dx.doi.org/10.1093/aepp/ppr023]
100 [http://dx.doi.org/10.1007/s10460-008-9173-6 (pg. 107)]
101 [http://www.farmtoschool.org/aboutus.php]
**Actions:**

1. Create the ecological, social, and economic structures necessary to supply the majority of the food for the public school system from within the North Central Florida foodshed.
2. Link this objective to Shelter Objective 3.2 in order to revolutionize the kitchen.
Goal 2: Move to Arrive

Within the context of urban development, mobility is often framed as a question of urban transportation networks and available mode options. This is a critical consideration within our built environment. But the act of motion is much more dynamic than this limited frame of reference allows. Our cities and the social interactions they generate affect mobility in multiple dimensions from the physical and mental to the social and economic. They even create opportunities and constraints in multiple domains, such as the mobility of non-human species via habitat fragmentation, wildlife corridors, and gene flow. Though stretching the metaphor, one could argue our entire reality is merely a result of the movement and interaction of simple energy and matter.

Physical mobility relates to the movement of a person through space. This covers a wide spectrum of issues including transportation engineering, access and capacities of persons with disabilities and aging populations, and exercise and physical fitness to name a few. Mental mobility “refers to efficient and adaptive change in cognitive performance, as well as to spontaneous introduction of novelty into intellectual functioning.”102 Social mobility is the “possibility or ease with which one may change position in the social stratification system.”103 Economic mobility is embedded within the larger domain of social mobility.

Within this discourse about mobility, intention is often a forgotten factor. By setting a goal to move to arrive, UF/PREC believes a properly Envisioned Alachua will involve a more thoughtful and interdisciplinary perspective and practice of mobility grounded by the reflection on our individual and collective points of origination and the intention deriving from our desired destination regardless the dimension or domain of motion. For everyone hopes to arrive somewhere, and the best communities will be those that optimize the potential pathways for these individual and shared journeys.

“We shall not cease from exploration. And the end of all our exploring will be to arrive where we started and know the place for the first time.”

- T.S. Eliot, Little Gidding

102 http://dx.doi.org/10.1016/0191-8869(91)90151-Z
103 http://cw.routledge.com/textbooks/9780415485395/glossary.asp
Mobility Objective 2.1: Enable multi-modal mobility across scales and domains

Figure 6. Where are you going? Like the complex and dynamic transportation network and modes in this slice of Japanese life in Tokyo, effective communities are diverse in dimensions and domains of mobility.¹⁰⁴

Rationale:
Like matter and anti-matter, mobility may be a zero sum game. The process of enabling certain mobility options bounded by any one or more scales in space and time will undoubtedly constrain other options. Designing a roadway for optimal car use often prevents optimal bicycle or pedestrian use. Fostering physical fitness patterns for one user need (e.g., weight/resistance training) may fail to serve another (e.g., endurance training). Incentivizing the economy for one business sector may bias job opportunities in a fashion that limits social mobility for those individuals with differential skills or interests.

Context and compromise are key. As stated previously, create signposts that provide cues for community attention and prompt individual intention to explore and engage with mobility outside our current mental conventions. Though there will be no single ideal solution, the Envision Alachua process will need to fuse a strong evaluation of past, present, and future mobility needs to find a fruitful

framework for this more inclusive mobility milieu if its residents are to successfully move to arrive at their desired destination.

**Actions:**
Fostering smart growth principles and designing for walkability and multi-modality including mass transit options to/from Gainesville and UF are all important criteria for consideration as Plum Creek evaluates community mobility. Though UF/PREC chose not to create specific actions for this objective at this time, we would be happy to collaborate with Plum Creek further on these issues should the opportunity arise.
Mobility Objective 2.2:
Connect originations to destinations in meaningful and intuitive ways

**Rationale:**
The rationale in this section can be further expounded and developed upon request by Plum Creek.

**Actions:**
1. Integrate seamlessly into the City of Hawthorne and make community design and management decisions with Hawthorne’s vitality and citizen livelihoods in mind.
   a. *Strategy:* Evaluate and respond to the needs and desires of Hawthorne’s citizens (e.g., destinations) and its historical legacy (e.g., originations).
2. Create unique urban and natural spaces that showcase the community as a destination and node of attraction.
3. Create a world-class culinary institute with a certified commercial kitchen.
   a. *Strategy:* Create education and training opportunities for restauranteurs, the hospitality industry, K-12 cafeteria staff, K-12 and college students, homeowners, etc.
   b. *Strategy:* Create entrepreneurial opportunities and collaborative potential for businesses serving all stages of the food system.
      i. **Example:** The culinary institute and commercial kitchen could create a meal subscription plan (with non-subscribed quick serve options) for households who

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105 [http://www.flickr.com/photos/ameotoko/3577060137/]
have a desire for high quality, fresh cooked, “near homemade” style meals on regular intervals that coincide with familial obligations and time constraints.

4. Integrate agrotourism and ecotourism with retreat services into the community.
   a. **Strategy:** Create an outdoor “ancestral health”\(^{106}\) fitness and leadership retreat, informed by “evolutionary medicine”\(^{107}\) with integrated fitness trails across multiple community transects.
   b. **Strategy:** Work with the Cracker Boys Hunt Camp to build a hunting lodge and game management station.

5. Embrace the power of play, praxis, and pulses.
   a. **Strategy:** Make mobility playful by integrating informative wayfinding and game-style approaches to movement (be it for physical fitness or the daily commute).
   b. **Strategy:** Enable strong and sustained mobility patterns and routines to create community customs, habits, and use (i.e., praxis).
   c. **Strategy:** Plan the community as a pulsing system embedded in other pulsing systems as suggested by metabolic scaling and power laws across ecological systems.\(^{108, 109, 110}\)

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107 [http://dx.doi.org/10.1146/annurev.anthro.36.081406.094321](http://dx.doi.org/10.1146/annurev.anthro.36.081406.094321)
108 [http://jeb.biologists.org/content/208/9/1749.short](http://jeb.biologists.org/content/208/9/1749.short)
110 [http://www.pnas.org/content/104/17/7301.short](http://www.pnas.org/content/104/17/7301.short)
Envision Alachua: From Food to Community

Mobility Objective 2.3:
Manage the distribution logistics for a lively local economy

Figure 8. Direct marketing of vegetables, like this exchange between Rose Koenig and Mickie Swisher at the Gainesville Downtown Farmers Market, is one example of the farm-to-table local food economy. 111

Rationale:
The global economy has become the dominate supply chain as a result of cheap, abundant, incredibly dense energy resources as well as a complex, highly coordinated and adaptive logistics network. With limited knowledge and resources, local businesses often struggle to compete in this global context. When a local business is trying to sell and distribute their goods and services across the community while simultaneously competing with Amazon, Walmart, and UPS, it almost seems like an unwinnable proposition. Ease of exchange (e.g., Amazon), economies of scale (e.g. Walmart), and efficiencies in delivery (e.g., UPS) are just a few of the challenges that must be faced by local business upstarts. Though labor costs and raw material origins are less likely to change in the near term, the rapidly evolving information and communications sectors have begun to level the playing field.

111 http://news.ifas.ufl.edu/2000/05/19/direct-marketing-of-veggies-helps-both-consumers-and-farmers/
The ease of scheduled availability and bulk pricing exemplified by Amazon’s “subscribe and save” program are infiltrating local models like community supported agriculture (CSA) which locks consumers into mutually beneficial arrangements with the farmers supplying their bulk food shares each week. The economies of scale and affordability exemplified by Walmart’s business model might be mimicked by cooperatives of local farms and businesses unifying goals, objectives, and strategies to first serve the local consumers with the largest purchasing power (e.g., schools, local government units, etc.). The efficiencies in delivery exemplified by UPS’s daily algorithmical direction and chronology analysis which maximize right turns and minimize left turns for their drivers could likely be duplicated by smaller, more regional district distribution nodes for innovative cooperatives. It’s time for more than the consumer to start thinking globally and acting locally. It’s time for the local economy to heed the lessons learned in the global economy and out maneuver the entrenched, rigid, and “stay the course” big businesses with their more agile, adaptable, and nimble small businesses. UF/PREC sees a properly Envisioned Alachua that builds the stage and set pieces for this innovation to play out.

Actions:
No specific actions have been developed at this time.
Goal 3: Dwell to Survive

Life can be challenging. It often necessitates lifestyles that are ever changing. Though we can all feel the rapidity of change in the modern age, it has always been with us and only the minuta are different. Circumstances shift. Perceptions get altered. That is to say, external and internal conditions are both variable and interconnected. From the predictable and prosaic patterns of daily sleep-wake and weekly work day-weekend cycles to the unpredictable and uncomfortable events that seemingly crest and break like a tsunami superimposed over known tides, there is still always a rhythm to life.

Healthy communities recognize this unity in diversity and the need for adaptability. The path to achieve this community health is to focus on the essentials. Ask what is needed to create the stage for the familial play to unfold and not what is desired for a time and discarded in haste. This is like creating a few flexible boundaries for a game to emerge and evolve instead of attempting to force preordained rules of engagement on the players. Do the key things well instead of all things poorly. To paraphrase Plum Creek’s very own Todd Powell, urban renewal becomes a necessity because urban decay was an embedded possibility of a concept of community that was too rigid and brittle to maintain meaningful spaces under the constant pressure of change. What we had in the past and what we expect in the future are really not all that different from what is in the now. Think deeply and plan accordingly.

To dwell is both to live within, as well as to place attention upon, a specific space. To dwell to survive is to do these things in spite of the obstacles around us and within us. In short, it is to abide.
Shelter Objective 3.1:
Adaptively layer active systems over passive fail-safes

Figure 9. “The Cracker house” and its surrounding buildings provide visitors the opportunity to explore and learn about the form and function of each structure. For example, the Cracker house was built with an open hallway or ‘dogtrot’ and elevated on piers to allow for ventilation in the hot environment of North Florida.”

Rationale:
Comfort is subjective. Survival is objective. The original human dwellings offered protection from the elements and needed a strong foundation of passive features adapted to the continuum of local environmental conditions (e.g., floods/droughts, heat waves/hard freezes, calm weather/hurricanes, etc.) across background cycles expressed daily, seasonally, annually, and beyond (e.g., multi-year pulses in climatic and solar activity patterns). We dwell to survive so we can realize our own human potentials and comfort preferences. Livability is a mix of these survival and comfort considerations. UF/PREC envisions a future with resilient and adaptive buildings and urban infrastructure with key system redundancy that layers the active systems of modern creature comforts atop the passive fail-safes informed by “traditional ecological knowledge” and ancestral building practices. “Passive survivability” is

112 http://www.myparkphotos.com/51878/photographs.html
113 http://www.floridastateparks.org/history/parkhistory.cfm?parkid=65#resource
an emerging conceptual practice within the green building movement and some key actions are covered in Table 5.\textsuperscript{114, 115, 116}

\textit{Table 5. A Checklist of Key Passive Survivability Actions\textsuperscript{117}}

<table>
<thead>
<tr>
<th>True Passive Measures</th>
<th>Partial Passive-to-Active Support Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create storm resilient buildings</td>
<td>Provide solar water heating</td>
</tr>
<tr>
<td>Create a high-performance envelope</td>
<td>Provide solar photovoltaic (PV) power</td>
</tr>
<tr>
<td>Provide for natural ventilation</td>
<td>Configure heating equipment to operate on PV</td>
</tr>
<tr>
<td>Provide natural daylight</td>
<td>Where appropriate, consider wood heat</td>
</tr>
<tr>
<td>Limit building height</td>
<td>Provide for food production in the site plan</td>
</tr>
<tr>
<td>Install composting toilets</td>
<td>Install waterless urinals</td>
</tr>
<tr>
<td>Minimize cooling loads</td>
<td></td>
</tr>
<tr>
<td>Incorporate passive solar space heating</td>
<td></td>
</tr>
<tr>
<td>Store water on site; consider using rainwater to maintain a</td>
<td></td>
</tr>
<tr>
<td>cistern</td>
<td></td>
</tr>
</tbody>
</table>

In a sense, we need to view our built environment similar to how biologists and ecologists are beginning to view life itself...as a mixture of evolution and development, of genetics and epigenetics. What does this mean as applied to the built environment? It means we need to remember that our buildings are a mixture of “hardware” (like the genome) and “software” (like the epigenome or operating system). The hardware components (e.g., structural components and the mechanical, electrical, and plumbing systems) consist of forms and functions inspired by previous generations and lessons learned. They require high capital investment and are slow to change. The software components (e.g., building occupant behavior and control systems) consist of forms and functions inspired by tight feedback loops informed by environmental response, identity, and cultural norms. They require low capital investment and are rapidly mutable. Yet these apparent opposites are constantly engaged in an intimate dance of action and reaction. What are the built environmental equivalents of the passive fail-safes of the human autonomic nervous system that regulates our breathing, our heartbeat, and other key functions that are managed at a subconscious level?

\textbf{Actions:}

\begin{enumerate}
\item Design all buildings with passive survivability, system redundancy, and backup capacity for critical systems and services, such that base human needs and a minimal level of comfort and convenience can be maintained in a variety of potential future disturbance events.
\item Integrate decentralized energy and water harvesting, storage, and distribution systems.
\item Provide human powered alternatives to replicate all base level machine services (e.g., bicycle/pedestrian mobility network and products, manually operable windows and thermal shading or capture, hand crank small electronics recharging systems, etc.).
\item Ensure every room in every building has daylight views with natural lighting capacity.
\item Ensure all interior spaces offer passive, cross-ventilation capacity with simple, manual controls.
\item Utilize universal design principles to enable aging-in-place and full accessibility for persons with disabilities.
\end{enumerate}

\textsuperscript{114} http://www.buildinggreen.com/auth/article.cfm/2005/12/1/Passive-Survivability/
\textsuperscript{115} http://www.buildinggreen.com/auth/article.cfm/2006/5/3/Passive-Survivability
\textsuperscript{116} http://www.buildinggreen.com/auth/article.cfm/2008/3/31/Incorporate-Passive-Survivability-into-Building-Codes/
\textsuperscript{117} http://www.buildinggreen.com/auth/article.cfm/2006/5/3/Passive-Survivability-A-New-Design-Criterion-for-
    Buildings/?checklist=1
7. Design with an expectation of multi-generational households and the specialized needs that come with these diverse age groups.

8. Build according to modular design principles (see Shelter Objective 3.3) to enable flexible and adaptive home improvements, renovations, and additions as family dynamics change over time.

9. Design and manage for “district” and “block” infrastructure and services (e.g., heating, cooling, water heating, food storage, etc.).
   a. **Strategy:** (freezer “lockers”).

10. Create a revolutionary kitchen design (see Shelter Objective 3.2) that is self-sufficient, efficient, grid-independent, and capable of preserving and preparing food and water in all seasons and under the most probable disturbance events.

11. Design for passive heat exchange in creative and constructive ways.
   a. **Strategy:** Embed radiant heating style (e.g., PEX) potable water pipes into a solid, south facing concrete wall section to capture solar heat gain to passively pre-heat water before it supplies the water heater. Consider designing heat exchange connectivity between the kitchen cooking area and this water pre-heating wall.
Objective 3.2: Revolutionize the kitchen...from personal to commercial

Figure 10. “The [Philips] Microbial Home Probe project consists of a domestic ecosystem that challenges conventional design solutions to energy, cleaning, food preservation, lighting and human waste.”

Rationale:
UF/PREC believes home is where the heart is and the heart of the home is the kitchen. It nourishes both body and mind through the rhythms of daily life and it always seems to serve as the central node from which domestic entertaining and social interactions emanate. It might even be argued that the heart of a city is its kitchen...or rather its food system across all five phases: (1) production; (2) processing; (3) distribution; (4) consumption; and (5) conversion. UF/PREC believes this particular objective, though only loosely developed in this report, should be a foundational core objective of the Envision Alachua process.

Optimally, this objective would be addressed and unified from the residential to the commercial kitchen scales. One example of an innovative approach to revolutionizing the residential kitchen and its various tools and services comes from the self-experimentation of a retired Australian physics professor. He converted a conventional chest freezer into refrigerator that consumes only 0.1 kWh/day and actively

http://www.design.philips.com/about/design/designportfolio/design_futures/design_probes/projects/microbial_home/index.page
runs on average only 2 minutes/hour! This efficiency comes from the natural tendency for hot air to rise and for cold air to settle. With a refrigerator that opens from the front/side like all typical household models do, a wave of cold air pours out of the bottom of the fridge and the warmer air from the room replaces the void left at the top. This converted chest freezer opens from the top and thus traps the cold air within from the pressure of the warmer air above it. Would it be possible to take these principles and create a fridge that is a series of pull out drawers almost like a bedroom dresser, with 4 large drawers respectively for: meat/cheese, fruit/vegetables, beverages, and condiments/leftovers, that could be tucked within the cabinetry with matching face panels? How could this thinking lead to a reinvention of the kitchen?

Linking an ultra-low energy, DC powered fridge with an induction cooktop, a wood pellet oven/stove, and LED lighting all running off a DC micro-grid powered by batteries (or a flywheel) connected to solar photovoltaic panels would make for an amazingly resilient kitchen/nook module that could be run off a secondary and parallel circuit to the conventional electric grid. Combined with a strong local food system, this arrangement would run from the power of the sun...both electrically within the home and biologically within the silvicultural and agricultural fields. Could it be part of a modern modular house design rooted in the old dog-trot Florida cracker style?

Redundancy and back up capacity for food production, preservation, and cooking with a small bit of supplemental evening lighting to enable activities after sunset seems like a great next step toward scaling up both distributed renewable energy systems and more resilient building systems. Creating district-scale renewable energy generation and storage for the kitchen modules of small clusters of homes could be a good bridge toward a more luxurious future as the renewables slowly scale up to non-critical uses (such as space conditioning and entertainment systems) over time.

From a commercial kitchen perspective, UF/PREC believes that the town center and the public square might ideally be some combination of buildings, spaces, goods, and services that address all five phases of the food system. At the heart of these spaces could be a multi-purpose commercial kitchen linked to an open air farmers market. This facility could be linked to the University of Florida, the Alachua County School Board, and other relevant collaborators to serve as a world class culinary arts and hospitality management institute. The goal could be to provide the knowledge, attitudes, and behavioral skill sets necessary for training local food focused entrepreneurs and for transforming the K-12 school breakfast/lunch system into something for which the cafeteria staff (who would become true trained chefs) and administrators could be proud. This institute would be a huge node of attraction for the community that may arise on this Plum Creek property and it would provide an economic and social stimulus to rebuild the City of Hawthorne around a new culture of food. There are so many directions that this concept can and should take, we’ll leave it as a seed for now. However, UF/PREC looks forward to collaborating with Plum Creek should you accept this challenge to “revolutionize the kitchen!”

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119 http://mtbest.net/chest_fridge.html
120 http://www.beaconpower.com/products/about-flywheels.asp
**Actions:**

1. Create a world class culinary arts and hospitality management institute with a certified commercial kitchen.
   a. *Strategy:* Train restauranteurs, cafeteria staff (K-12, higher education, hospitality industry, etc.), college students, home owners, etc.

2. Create a town “food square” with infrastructure and services for all five stages of the food system.

3. Design and integrate self-sufficient low-power residential kitchen modules powered by independent circuits running from district supplied renewable energy and back-up power.

4. Thermally separate the kitchen module from the living quarters (e.g., the old Florida “cracker house” with a detached kitchen) to the greatest extent possible without degrading consumer expectations for room connectivity and/or open floor plans.
   a. *Strategy:* Place the kitchen on the south side of the dwelling as it makes sense for the room with the highest internal waste heat generating capacity to be spatially located in the highest heat gain solar orientation.
   b. *Strategy:* Create a retractable wall that can allow heat and moisture exchange from the kitchen to other rooms in colder, drier months and limit the exchange in warmer, wetter months.

5. Seamlessly integrate solar oven capability (passive cooking) into the suite of modern appliances (active cooking).
   a. *Strategy:* Exchange a portion of the conventional kitchen window over the sink design to allow for a solar oven door that accesses a building integrated and window hung solar cooker (i.e., like the cooking version of the window herb garden).
Shelter Objective 3.3: 
Design buildings and sites to be modular and mashable

Figure 11. Built in Kullman factory in Lebanon, New Jersey, by Garrison Architects\textsuperscript{121} the modular modern Koby Cottage will be delivered and installed to a site in Albion, Michigan.\textsuperscript{122}

Rationale:
Modular housing has come of age in recent years.\textsuperscript{123} Often confused with HUD-code manufactured housing, modular structures are constructed under tight tolerances, in weather controlled conditions, and subjected to local site codes. These homes are often modern in design with attractive aesthetics, built using wood framing, and showcase extensive green features.\textsuperscript{124} In light of the City of Hawthorne’s former plywood manufacturer plant closure, the community maintains a now under-utilized labor base and skill set that could be employed in a new modular housing factory on-site. This facility would provide a jobs and economic stimulus directly on-site while leveraging the legacy of Plum Creek’s DNA as a forest products company, especially if it were to utilize high efficiency wood framing and panelized wood construction systems. It could be used to serve the housing needs of the community in an iterative and scalable fashion as it grows over time. Additionally, if strategically placed in proximity to

\textsuperscript{121} http://www.garrisonarchitects.com/
\textsuperscript{122} http://modernmodularhouse.blogspot.com/2008/11/koby-cottage-completed-in-factory.html
\textsuperscript{123} http://green.blogs.nytimes.com/2010/02/09/the-rise-of-green-modular-homes/
\textsuperscript{124} http://www.thedailygreen.com/green-homes/latest/modular-homes-green-building-gorgeous
the existing rail network, it could offer access to housing markets across Florida and the Southeastern United States, one shipping container of module(s) at a time.

Modularity, or “a pattern of [physical and dynamical] connectedness in which elements,” or parts, are grouped to create a whole is “a fundamental aspect of biological organization...[and a module] is a part of an organism that is integrated with respect to a certain kind of process (natural variation, function, development and so on) and relatively autonomous with respect to other parts of the organisms” (Wagner et al. 2007, p.921).

**Actions:**

1. Create a factory-built modular housing, engineered wood products, and/or structural insulated panel production plant on site.
2. Design with the understanding that knowledge is flawed and incomplete. A perceived problem and potential solution today may be dramatically altered and contextually inappropriate tomorrow. Change is inevitable. Stasis is improbable.
3. Plan and design land parcels and building infrastructure in a modular, scalable, deconstructable, and rebuildable way that can change over time as building space needs evolve.
Shelter Objective 3.4:  
Make wood heating efficient and fashionable

Figure 12. Modern wood pellet stoves are stylish, efficient, quiet, clean burning and can be ducted into multiple rooms as shown with the EcoTeck HR100 (left) and the EcoTeck Veronica (right). Some models even provide remote control capacity via smart phone when away from home.

Rationale:
Learning to control fire was “civilization’s first great energy invention, and wood was the main fuel for a long time.” Prior to 1900, approximately 90% of American homes were heated with wood. Plum Creek’s expansion into community development provides a demand base for a complementary expansion into the use of woody biomass for energy generation as steam for electricity or direct heat for space conditioning and cooking. Recent trends suggest this is an expanding market with demand already exceeding supply and with the Southeastern United States primed for infiltrating the market. Additionally, beyond tapping its current land holdings and business practices, this market may offer diversification opportunities into additional tree species and silvicultural management via the differential wood pellet needs of space heating (often softwoods like pine and fir) and cooking (often hardwoods like hickory and hard maple).

125 [http://www.pelletstoves.ie/attachments/image/Ecoteck_new_stoves/boiler-stoves/img-HR100-large.jpg](http://www.pelletstoves.ie/attachments/image/Ecoteck_new_stoves/boiler-stoves/img-HR100-large.jpg)
128 [http://www.energysavers.gov/your_home/space_heating_cooling/index.cfm/mytopic=12570](http://www.energysavers.gov/your_home/space_heating_cooling/index.cfm/mytopic=12570)
Actions:

1. Create a biomass energy division within Plum Creek to manage production, processing, and distribution of both utility-scale woody biomass and building-scale wood pellets.
2. Incorporate agroecology practices to produce both heating and cooking quality wood for pelletization.
3. Design all residential and small commercial buildings such that 100% renewable wood pellet heating in modern efficient ducted wood pellet stoves or boilers is sufficient to warm the dwelling.
4. Create a biochar waste recovery network to capture the wood heating waste ash for conversion into a nutrient rich and carbon sequestering soil amendment.
Goal 4: Commune to Realize

Commune
- (n) a body of people or families living together and sharing everything
- (v) communicate intimately with; be in a state of heightened, intimate receptivity

Realize
- (v) be fully aware or cognizant of
- (v) perceive an idea or situation mentally
- (v) make real or concrete; give reality or substance to

If nearly every new urban development project aims to “create a sense of place,” why does so much of our modern built environment feel fabricate and “out of place?” Maybe we have too many “hard and fast rules” to plan these desired “places?” To transcend this rut, UF/PREC believes a progressive community should use “soft and adaptive rules of thumb” to bound interactive “spaces” where inhabitants **commune to realize** their individual and collective potentials in an emergent and evolving pattern via flows within phase-space interactions instead of frameworks in place-based design.

Say what? Okay, let’s take a moment to cut the jargon, dissect this statement, and cut to the heart of the matter. As most developers and building professionals are knowledgeable about conventional “sense of place,” let’s jump right into a definition of “phase space” (**sorry for one last bit of jargon**).

> “In classical mechanics, the phase space is the space of all possible states of a physical system; by ‘state’ we do not simply mean the positions \( q \) of all the objects in the system (which would occupy physical space or configuration space), but also their velocities or momenta \( p \) (which would occupy momentum space). One needs both the position and momentum of system in order to determine the future behavior of that system.”

So in layman’s terms what are we trying to say? The planning process has a skewed perspective of the way reality seems to work. Instead of “creating a sense of place” the planning process destroys all other potential places (i.e., “possible states”) within that phase space of a development site in order to manifest the singular place (state) the process came to desire. In other words, just like in the famous quantum mechanical “Schrödinger’s cat” thought experiment\(^ {134} \) or the real “double slit” experiment\(^ {135} \), the mere act of contemplating, measuring, and observing something actually affects the outcome and ultimately leads a “probability wave” in phase space to collapse into a singular particle (or conceptual master plan) with all the other potentialities lost at the moment of observation. Though all of this sounds esoteric, UF/PREC simply hopes to plant the seed for an alternative idea of planning based on limiting the destruction of possibilities instead of creating one singularly perceived optimal sense of place that came to be prior to the community itself. A place can only have a sense of itself by means of the energy and momentum of the actors bouncing into each other on the stage set before them.

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131 http://wordnetweb.princeton.edu/perl/webwn?s=commune
132 http://wordnetweb.princeton.edu/perl/webwn?s=realize
133 http://www.math.ucla.edu/~tao/preprints/phase_space.pdf
134 http://en.wikipedia.org/wiki/Schr%C3%B6dinger%27s_cat
Community Objective 4.1:
Treat disease and promote health/wellbeing across nested systems

Figure 13. Romanesco (left)\(^\text{136}\) and (right)\(^\text{137}\), a type of Brassica, or genus of cruciferous vegetables that also includes broccoli, cauliflower, cabbages, and mustards, reflects the self-similar fractal pattern commonly found in nature.

Rationale:
“A central premise in ecology...is that nature repeats itself with variations on a few main themes...[yet] we continue to miss just where it is that we fit in the writhing universe of living things.”\(^\text{138}\) As above, so below. Though society often views humans as separate from the world around us, the reality seems to suggest that our bodies are but one boundary defining a single self-organizing system (i.e., a human) nested among countless other self-organizing systems both internal and external to that human boundary. Like a metaphorical Russian doll, the potential self-similar nature of our reality, where parts are also wholes and vice-versa, has been suggested in art and culture for generations. Yet, it is only since the 1970s when Benoit Mandelbrot (2010; 1982; Schwarz & Jersey 2008) coined the term “fractal” and invented the innovative and new visual mathematics to describe the fragmented, infinitely rough, and self-similar characteristics of systems of energy and matter.

Since the 1970s, fractal calculus has been applied to an ever-more diverse mix of disciplines. Within the soil and geological sciences, fractal models may describe the structural pattern and temporal change of soils and rocks (Perrier et al. 2000; Perfect 1997; Perfect & Kay 1995; Loehle & Li 1996; Dathe & Thullner 2005; Christian 2000; Caruso et al. 2011). Within geophysics “a sudden drop of fractal dimension has been proposed as a quantitative indicator of damage localization or a likely precursor of an impending catastrophic failure” (Potirakis et al. 2011, p.1). Within ecological systems, fractal patterns are evident in

\(^\text{136}\) http://www.flickr.com/photos/isome1/3858656515/
\(^\text{137}\) http://www.flickr.com/photos/firepile/5168214483/
social networks, trophic (i.e., food web) structures, and movement patterns, in both human (Hamilton et al. 2007) and non-human (Ferguson et al. 1998; Hill et al. 2008) species. Within the human health fields, diverse organs and their subcomponents, such as the cardiovascular system (Jayalalitha et al. 2008; Lorthois & Cassot 2010; Raghavendra & Narayana Dutt 2009), the pulmonary system (Moledina et al. 2011; Glenny et al. 2000; Box et al. 1994; Copley et al. 2012; Glenny 2011) and the neurological system (Allegrini et al. 2010; Bassett et al. 2006; Nan & Jinhua 1988), have been described as fractal in both structure and output via multifractal cascades across time-series (West 2010; Goldberger et al. 2002).

“Consequently, the fractal dimension turns out to be a significantly better indicator of organismic functions in health and disease than the traditional average measures, such as heart rate, breathing rate, and stride rate” (West 2010, p.1). Cellular scale interactions between healthy human cells and non-human pathogens or cancerous human cells may have the potential for fractional explicable (Ji-Huan 2008; Dokukin et al. 2011; D’Anselmi et al. 2011; Bizzarri et al. 2011). Another example of the fractal nature of life is the symbiotic relationship humans have with bacteria. In fact, humans might better be described as an ecosystem than an organism as the total number of cells in the human microbiome (approximately 100 trillion) are an order of magnitude more than our human cells (approximately 10 trillion) (Zimmer 2011). Many of these microbial hitchhikers on our bodies are critical to human health and wellness (V. Brown 2010; Dunn 2011; Cogen et al. 2008). A recent study by researchers at the University of Florida found “that the variety of bacteria in a child’s digestive tract is strongly linked to whether that child develops type 1 diabetes,” primarily as a result of shifting balances in bacterial populations and an overall loss of microbial diversity in the gut (Hutson 2010). Despite the conventional perspectives about the homeostasis of living systems, the “scaling properties [evident in fractal analysis] suggest that the nonlinear regulatory systems are operating far from equilibrium, and that maintaining constancy is not the goal of physiologic control” (Goldberger et al. 2002, p.2466).

As mentioned earlier in this report, community health has an intimate relationship to the built environment. UF/PREC believes healthy urban communities must find design inspiration from emerging medical perspectives that suggest human aging and disease are dynamic and more often “associated with the loss of complexity and not with the loss of regularity” in function (West 2010, p.2). Christopher Alexander’s work on the nature of order in human and non-human systems and his proposed “pattern language” for towns and cities might be a window into this way of thinking and learning from the flux of life (Alexander et al. 1977; Alexander 2001; Alexander 2003a; Alexander 2004; Alexander 2003b). In a recent empirical study, an outdoor pavilion with a perforated shade structure inspired by a Sierpinski tetrahedron fractal pattern was found to effectively reduce temperatures at the roof surface and ground surface below the roof (Sakai et al. 2011). But UF/PREC would be remiss in failing to mention that these ideas are not new. In fact, these ideas might be more accurately described as “the old way of seeing.”

“Totally consistent with the Greek concept of geometry underlying life, increasing evidence shows that the geometry of the natural and built environments is responsible, to a large extent, for the quality of human life. Certain geometrical characteristics of natural and living structures, such as fractal scaling, mathematical symmetries leading to complex coherence, and structural invariants (patterns) found in disparate forms seem to be responsible for a fundamental healing connection between the body and its environment... Artificial environments that are the most healing emotionally and
physiologically embody traditional design techniques that themselves arose from imitating nature” (Salingaros 2010, p.1).

**Actions:**

1. Create a new type of community “pattern book” that is akin to a comparative catalog of healthy patterns (to encourage) and diseased patterns (to discourage), instead of a mere assemblage of design aesthetics and architectural rules.
2. Design and manage the community to maximize the health and wellbeing of both parts and wholes, from organisms to ecosystems.
   a. *Strategy:* Revolutionize the single-species silviculture model with a multi-species agroecological model that mixes diverse but complementary plants and animals.
3. Minimize disturbance of existing ecosystem function, soil quality, and site hydrology.
4. Create a community healthcare option focused on preventative medicine with special rates and services designed around the unique community structure and the “let thy food be thy medicine” spirit of its residents.
Community Objective 4.2:
Engender expression and nurture personal potentials

Figure 14. "Royal jelly is a complex, protein-rich substance secreted from glands on the heads of worker bees. A larva destined to become a queen is fed large quantities of royal jelly inside a specially constructed compartment called a queen cup (image)139. The larvae that develop into workers and queens are genetically identical.140 Ultimately, the “information” from this special nutritional substrate epigentically signals the genome to enable of these lucky larvae to grow into queens instead of their worker bee twins.

Rationale:
In the ever-changing landscape of sustainability, it’s hard to know where to place one’s attention on optimizing market transformation and individual behavior change. Arguably, our food system is the true frontline of sustainability. It has been said that people “vote with their forks three times a day.” When it comes to changing behavior and measuring shifting outcomes, there seems no better laboratory than our food system and our personal kitchens.

In some ways, food is really just an energy and information exchange node that comes in the form of concentrated sunlight, water, and matter (e.g., metals, minerals, antioxidants, etc.). It is one of the most important drivers of epigenetic variation and genetic expression. Our epigenome is a regulatory communication system that overlays and directs our cellular scale genetic programming (Kenneally 2011; Gabor Miklos & Maleszka 2011). The great advances in genetic mapping have only revealed how

140 http://learn.genetics.utah.edu/content/epigenetics/nutrition/
little impact it appears that our genes have on the chronic diseases of the modern age (Visscher et al. 2012; Latham & Wilson 2010). The key appears to be how behavior and environment effect our epigenomes and thus how our genes express. It increasingly appears we are not born sick or disadvantaged, we become so as a result of the world around us and how we interact with it. Thinking back to our phase space discussion in the introduction to this section on Community, we can visualize the epigenome as the information exchange system that perceives the probability wave of the environment around us in order to signal our DNA to preferentially collapse our genetic expression into one form over another based on these signals.

It is common knowledge that genes get passed down from generation to generation and change over very slow periods of time as evolution selects for certain traits over others. Yet the epigenome changes much more rapidly, even within the scale of a single lifetime. Interestingly, where science once thought that everyone starts with a blank slate epigenome at birth and only our own interactions in life effect our epigenome, it is starting to seem likely that we inherit some epigenetic functions as well.

This means that while behaviors like drinking alcohol, doing drugs, eating poorly, and being exposed to environmental toxins may not change our genes, they can change how those genes express. Thus our behaviors, both good and bad, cascade into our children and beyond harking back to the prior discussion on fractals. If we are simply the cosmic bodies of quantum bits and bytes, then food is like the "patch" that either adaptively repairs and maintains our program or the virus that maladaptively invades and degrades us. If this information can benefit or harm us, then our food system should facilitate the ability to “express ourselves for optimal health.”

If food is one of the most frequent and intimate ways we exchange information between our bodies and the world around us, it seems intuitive to accept the growing evidence that diet and nutrition are one of the most profound ways in which we alter our epigenomes and express our individual genetic potentials...for better or for worse (Waterland & Jirtle 2004; Feil 2006; Dolinoy et al.; Szarc vel Szic et al. 2010; Feinberg 2007; Greenwood 2011). Though the science is not refined enough for a personalized epigenome map quite yet, there is growing excitement about the potential for an entirely new nutrigenomics industry. Table 6 shows some of our early understanding of the nutrients that affect our epigenomes via foods we ingest. A great website to learn more about the rapidly emerging scientific discipline of epigenetics is hosted by the University of Utah Genetic Science Learning Center.

University of Utah – Epigenetics
http://learn.genetics.utah.edu/content/epigenetics/
Table 6. The Nutrients That Affect Our Epigenome and the Foods They Come From

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Food Origin</th>
<th>Epigenetic Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methionine</td>
<td>Sesame seeds, brazil nuts, fish, peppers, spinach</td>
<td>SAM synthesis</td>
</tr>
<tr>
<td>Folic Acid</td>
<td>Leafy vegetables, sunflower seeds, baker’s yeast, liver</td>
<td>Methionine synthesis</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>Meat, liver, shellfish, milk</td>
<td>Methionine synthesis</td>
</tr>
<tr>
<td>Vitamin B6</td>
<td>Meats, whole grain products, vegetables, nuts</td>
<td>Methionine synthesis</td>
</tr>
<tr>
<td>SAM-e (SAM)</td>
<td>Popular dietary supplement pill; unstable in food</td>
<td>Enzymes transfer methyl groups from SAM directly to the DNA</td>
</tr>
<tr>
<td>Choline</td>
<td>Egg yolks, liver, soy, cooked beef, chicken, veal and turkey</td>
<td>Methyl donor to SAM</td>
</tr>
<tr>
<td>Betaine</td>
<td>Wheat, spinach, shellfish, and sugar beets</td>
<td>Break down the toxic byproducts of SAM synthesis</td>
</tr>
<tr>
<td>Resveratrol</td>
<td>Red wine</td>
<td>Removes acetyl groups from histones, improving health (shown in lab mice)</td>
</tr>
<tr>
<td>Genistein</td>
<td>Soy, soy products</td>
<td>Increased methylation, cancer prevention, unknown mechanism</td>
</tr>
<tr>
<td>Sulforaphane</td>
<td>Broccoli</td>
<td>Increased histone acetylation turning on anti-cancer genes</td>
</tr>
<tr>
<td>Butyrate</td>
<td>A compound produced in the intestine when dietary fiber is fermented</td>
<td>Increased histone acetylation turning on ‘protective’ genes, increased lifespan (shown in the lab in flies)</td>
</tr>
<tr>
<td>Diallyl sulphide (DADS)</td>
<td>Garlic</td>
<td>Increased histone acetylation turning on anti-cancer genes</td>
</tr>
</tbody>
</table>

Actions:

1. Treat information as the highest form of energy and connection as the highest form of value.
   a. **Strategy**: Provide information to community residents that explains how the energy in food can also be described as informational messages that interact with our epigenomes and affect genetic expression.
   b. **Strategy**: Link this food, nutrition, and epigenome story to the goods and services available through the local food system of Alachua County and its supporting region.

2. Maximize social equity and community affordability while attracting a diversity of community residents and local businesses through a diversity of building types, job types, and income opportunities.

3. Prompt positive cultural norms through community design.
   a. **Strategy**: Create a business curfew (e.g., 12:00 am to 6:00 am) to discourage the stress, poor sleep habits, noise, and other nuisances of the modern 24/7 mentality.

4. Reduce the “barriers to entry” on purchasing, consuming, and disposing of fresh, local, seasonal food.
   a. **Strategy**: Create community generated and rated recipes with links to available ingredients in real time.
   b. **Strategy**: Help consumers communicate with farmers in advance regarding seasonal desires and expectations of ingredients such that farmers “sell it before they plant it.”
      i. **Examples**: A CBS Sunday Morning story about the French public school system 2-month advance menu plan.

141 [http://learn.genetics.utah.edu/content/epigenetics/nutrition/](http://learn.genetics.utah.edu/content/epigenetics/nutrition/)
5. Work with UF and Shands to integrate health monitoring and research within the community as a civic laboratory as detailed in Community Objective 4.3.

   a. **Strategy:** Create an open source (but anonymized and privacy protected) repository of human health data and tool sets for other researchers and professionals interested in the built environmental and urban agricultural effects on community health.¹⁴³


¹⁴³ One existing example, might be PhysioNet and its suite of resources including: (1) PhysioBank – physiologic signals, time series, and related clinical data; (2) PhysioNet Library – Tutorials, reference guides challenges, and publications; (3) PhysioNetWorks – Collaborative development of data and software for PhysioBank and PhysioToolkit; and (4) PhysioToolkit – Open-source software for data exploration and analysis. [http://www.physionet.org/](http://www.physionet.org/)
Community Objective 4.3:  
Create a quantified community powered by participation

Figure 16. With the rapidly evolving information technology and consumer electronics sectors we are on the verge of more closely unifying the virtual (digital) and physical (analog) worlds providing a more lasting memory of the past, a more authentic sensing of the present, and a more probable estimation of the future.144

Rationale:
The industrial revolution brought a wave of innovations in urban form and function often defined by population densities and social interaction. The information revolution is bringing a new wave of innovations defined by a different kind of density. Computational, communication, and sensory devices are exponentially increasing in speed and decreasing in size as modern technology continues to evolve. In the past, our models of the world were constrained by our ability to capture, store, and process information. In the present, our participation in the world is becoming ever more blurred between our physical world and our virtual world online. Civic laboratories are the future of our urban environments as each becomes a quantified community more democratically powered by a participatory populace fed actionable data streams to achieve measurable outcomes. A sampling of relevant private and public sector reports, initiatives, data repositories, and consumer applications of these data in actionable form are referenced below.

144 http://www.dmarlin.com/uf-then-now/
The Rockefeller Foundation – The Future of Cities, Information, and Inclusion

US Government - Open Government Initiative & Apps Showcase
http://www.whitehouse.gov/open
http://www.data.gov/developers/showcase

Data.Gov/Semantic - The Web Is Evolving
http://www.data.gov/communities/semantic/index

Publishing Open Government Data
http://www.w3.org/TR/gov-data/

City of Boston - Data Dashboard
http://www.cityofboston.gov/doit/databoston/app/data.aspx

City of Chicago - Datasets
https://data.cityofchicago.org/

New York City - Open Data
https://ncopendata.socrata.com/

City of San Francisco - Datasets, Apps Showcase, & Government Employee Collaboration
https://data.sfgov.org/
http://dataasf.org/showcase/
http://opensf.wordpress.com/

Washington, DC - Data Catalog
http://data.dc.gov/

OpenPlans - Initiatives
http://openplans.org/initiatives/

**Actions:**

1. Partner with UF/DCP and UF/PREC to create a civic laboratory approach to the planning, design, construction, and operation of the community.
2. Promote design strategies and technological structures reflecting the value of internal growth in connectivity over external accumulation of matter.
   a. *Strategy:* Make less the new more through conspicuous reduction.
3. Leverage the rapidly evolving consumer electronics and social media sectors to capture citizen science data streams.
4. Establish meaningful and achievable building performance benchmarks with appropriate energy and water budgets.
   a. *Strategy:* Create transparency in meter scale energy and water flows.
   b. *Strategy:* Create appropriate checks, balances, redundancy, and cut-offs for energy and water infrastructure across various scales.
5. Minimize inputs (e.g., energy, water, material) for all land management activities across all transects community-wide.
6. Focus on process and outcomes instead of products and outputs across the community.
7. Create iterative and adaptive sustainability indicators and make their monitoring, measurement, and verification a community cultural norm.
   a. **Strategy:** Work with all key UF units to develop instant, intermediate, and long-term human health indicators across individual and community scales.
      i. **Examples (Instant):** Blood pressure, markers of inflammation, fasting glucose, detailed blood lipid profile, vitamin D levels, personal perceptions, etc.
      ii. **Examples (Long-Term):** Cancer, cardio vascular disease (CVD), diabetes, obesity, etc.
   b. **Strategy:** Work with all key UF units to develop instant, intermediate, and long-term ecosystem and key organismal health indicators.
      i. **Examples (Instant):** Wastewater analysis, LakeWatch water quality.
      ii. **Examples (Long-Term):** Air pollution (smog, etc.), GHG emissions, soil quality, water quality/quantity.
   c. **Strategy:** Provide real-time and historical sensory connections between humans and wildlife.
      i. **Examples:** Critter cams, etc.

8. Design and manage the community as a living laboratory of sustainable lifestyles with transparency and accountability utilizing open data and “commons” standards of information sharing.
   a. **Strategy:** Hire a Chief Information Officer and create an open source data platform.

9. Create a community governance structure that prioritizes the inclusion, representation, and participation of all residents and businesses within the community.
   a. **Strategy:** Create a shareholder process that engenders a sense of ownership of the food, mobility, shelter, and communication systems within the community.

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145 One relevant inspirational example might be the Open Source Ecology network and their “Global Village Construction Set”. [http://opensourceecology.org/](http://opensourceecology.org/)
Moving Forward

This report is a synthesis of the concepts and considerations that emerged during the Fall 2011 semester of the University of Florida College of Design, Construction, and Planning (UF/DCP) Practicum in Sustainability and the Built Environment (Course #4941). As such, there are many voices behind this report. In some places, these voices may be heard in unison, like a choir singing in sync. In other places, these voices may be heard in debate, like the animal chatter in a lively forest. Like all voices, it is up to the listener to decipher and discover the signal pattern for the message within. Though this report is considerably more than a rough draft, to say it is raw might be a fair description. While the concepts and narratives expressed within this report can be read cover-to-cover as a book, they can also be referenced in isolation and revisited as needed. As Plum Creek considers this report and the opportunities and constraints inherent to your local land holdings and the surrounding community, we encourage your staff, consultants, and corporate leadership to not be constrained by current conventional thinking and design paradigms.

One potentially relevant framework is “Theory U,” created by Dr. C. Otto Scharmer in collaboration with Dr. Peter Senge (via the MIT Sloan School of Management). This leadership framework is the driving force behind the “Presencing Institute ...an awareness-based action research community for profound societal innovation and change... [creating processes for] a journey that connects us more deeply both to what wants to emerge in the world and to our emerging, higher self” (Figure 0).146

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146 Images, tools, case studies, and more can be found at the Presencing Institute. [http://www.presencing.com](http://www.presencing.com)
References (Not Already Cited in Footnotes)


Appendix 1. Livestock Considerations

The following considerations were raised and discussed during the Fall 2011, UF/DCP 4941 course and a guest seminar by Cindy Sanders, Alachua County Cooperative Extension Director and Livestock Agent. Further information, clarification, and applicability to the Envision Alachua process may be necessary and should include interaction with Cindy Sanders.

Cattle

1) Alachua has 48,000 head of cattle total (including 28,000 beef cattle) which is 8th most of all 67 state counties.

2) Overview...For grass fed beef, forage is a must. In the Gainesville area, bahiagrass and some seasonal annuals is about the extent of our forages. In addition, the typical fall and spring droughts will hinder pasture growth during these times. Traditionally during the dry springs, producers would have to feed hay since the bahiagrass will not germinate and grow until after June rains. In addition, for the past couple of years, the growing of winter annuals has not been great due to drought and warmer temperatures. Note that with stress, due to stocking rates of grass fed beef combined with trying to match cattle with forages, we sometimes find that during certain times of the year that our forages are in low quality and quantities. In addition, the price of fuels and fertilizers may hinder the proper fertilization and management practices to maximize forage quality, quantity, and cattle gains. Also, note that all fertilizer and limestone recommendations in this report are based on the results of soil tests conducted on the property and processed at the UF Soils Laboratory.

3) Improved pasture includes:
   a) Bahiagrass is the most popular grazing grass.
      (a) Bahiagrass goes dormant by October
      (b) Most producers plant overwinter grazing species, which can include ryegrass (1 to 2 bushels of seed per acre), oats (1 bushel of seeds per acre), etc. that needs to be fertilized with 60 pounds of nitrogen per acre when the plants are 3 to 4 inches tall
   b) Bermuda grass should only be used for hay operations and not for grazing. Coastal Bermuda grass is the most popular.
   c) For bahiagrass pasture on the Plum Creek property
      i) Stumps must be removed
      ii) 1,779 pounds of dolomitic limestone added per acre divided into two applications at least 6 to 8 months prior to planting.
      iii) Establishment would require approximately 400 pounds per acre of 20-10-20 fertilizer with minors split into two applications.
         (1) The first application would occur once the grass is approximately 3 to 4 inches tall and the
         (2) Second application would be once the grass is 6 to 8 inches tall --- usually about 75 days after planting when adequate rainfall.
         (3) Bahiagrass seed is planted at the rate of 25 to 30 pounds of seeds per acre.
      iv) Maintenance of bahiagrass pasture would require approximately 400 pounds per acre of 20-0-20 fertilizer applied spring and mid-summer when adequate rainfall
      v) Pastures need to be aerated about every 3 to 5 years to maximize the health of the grasses. Good soil can allow 6 to 7 foot deep roots for bahiagrass.
4) Producers get greater return when they pulse the calving in one 3-4 month season.
   a) Bulls put out for 90-100 days in February or March to give December calves. Calves usually
don’t eat grass until about 4 weeks old and by January the rye grass is usually ready to be
eaten.
   b) Calves born in the summer time are lighter and don’t weigh as much when they are weaned
at 7-months of age.
   c) Grain fed calves are in concentrated animal feeding operations (CAFOs) by 9-10 months old
and must be slaughtered at less than 20 months of age due to Bovine Spongiform
Encephalopathy (BSE, commonly known as mad cow disease)...but typically they are
harvested at 14 months of age.
      i) Eye teeth come in at 20 months of age.
      ii) Mature cow weighs 1,000 to 1,200 pounds.
      iii) Calves are weaned at around 525 to 550 pounds at 7-months of age.
      iv) Producers are paid by the pound and some maintain ownership even through the CAFO
         and until they are harvested.
         1) Current prices are about $1.15/lb (entire animal)
         2) $3,000 in freight cost from Florida to Texas for a semi-trailer full of calves (Fall,
            2011)
   d) Grass fed/finished calves are harvested around 18-24 months instead of the typical 14
      months.
   e) Carrying capacity of native range is approximately one animal to 15 acres; under ideal
      conditions and managed, an improved bahiagrass pasture can carry 1 and a half cow-calf
      units per acre.
5) Florida breeds:
   a) Brahman have good tolerance to heat and parasites (aim typically for about ½ Brahman if
      mixed breed)
   b) Angus (good for beef quality) or Hereford (good at mothering/milking)
6) Mixing silviculture and livestock:
   a) Pine trees need to have 7 years of growth before introducing the cattle or they will
eat/damage the trees.
   b) Stocking rate can be the same and there is no perceived decrease in meat quality or taste.
   c) Plum Creek harvests pine needles off of their land to sell as pine straw mulch...which would
      be conducive and beneficial for managing improved pasture beneath the pine trees.
   d) Cattle typically do not eat pine bark, but may if they have a mineral deficiency.
      i) Cows can eat vegetable leftovers. Often seen in watermelon fields after harvest due to
         high protein content in the remaining vines.
      ii) If both the livestock and the vegetables are managed organically, then they can be
          rotated within the same lands. [Be alert to food safety rules.]
   e) Would need the right facilities:
      i) Working pen
      ii) Chute
      iii) Alleyway
   iv) Dr. Temple Grandin from Colorado State University
      (http://www.colostate.edu/features/temple-grandin.aspx) is the guru on animal ethics
      for agriculture and has developed designs for pens, etc. that are being adopted
      throughout the world. One of her documents, Cattle Behavior During Handling and
      Corral Design for Ranches, is available at
      http://www.iowabeefcenter.org/Beef%20Cattle%20Handbook/Cattle-
      Behavior Handling.pdf
7) Even with all natural or organic cattle production we would still need to treat some sick animals from time to time.
   a) All natural can still use deworming.
   b) Estrogen (growth hormone) cannot be used for “all natural” and are being used less frequently.
      i) It can increase weaning weights by 25-50 pounds.
      ii) Growth implants are now outlawed in dairy cows.
9) Typically a rancher needs about 200 head of cattle to make a profit.
Goats

1) Goats are good at clearing underbrush.
2) 2-5 head per acre (improved pasture…but could rise as high as 8/acre if the pasture is really good).
3) Require really good fences as they are curious animals.
   a) Need to use small squared fencing materials so they can’t get their head stuck in the fence
4) Good publications include:
   a) Oklahoma Basic Meat Goat Manual
      http://meatgoat.okstate.edu/oklahoma-basic-meat-goat-manual-1/
   b) Meat Goat Production in Georgia
      http://www.caes.uga.edu/Publications/pubDetail.cfm?pk_id=6272
      “Pasturing goats with sheep, cattle or other species maximizes productivity of the land. As a general rule, six mature goats equal one cow on improved pastures and 10 goats equal one cow on browse or brushy areas.”
5) Parasites are a major issue for goats.
   a) Goats need to be dewormed approximately every 30-45 days...or they will have serious parasite problems...especially boar goats which are more susceptible to parasites than the more traditional Florida Spanish meat goat.
   b) The goats obtain the parasites from eating the parasite’s eggs on the grass.
6) Meat goats are weaned at 8-weeks of age and are ready for harvest at 100 to 120 pounds which is about 4-6 months old.
7) Demand for goat meat is high, especially in South Florida.
   a) The Miami area could probably purchase a semi-load (22,000-30,000 pounds) full of goats every week.
8) Nutritionally the same as beef, but palatability is less than beef (probably more similar to pasture raised beef).
9) Organic goat meat uses “other” deworming techniques such as feeding them garlic. (Not IFAS recommended)
10) Dairy goats have to be milked twice a day, but are not very popular right now.
11) Sheep would be somewhat similar to goats.
   a) Sheep have more copper deficiency issues and need a free choice mineral.
   b) haired sheep are better than wooled sheep for Florida’s climate.
   c) haired sheep do well in Florida and act quite similar to the goats.
12) Burrows can keep coyotes away from the goats and sheep and they also help with cattle.
   a) A donkey and a burrow are the same, but a mule is a cross with a horse and it is sterile.
   b) Donkeys can sometimes step on babies when they are lambing, kidding, or calving so it is best to get the does into a separate area.
13) Alachua County has a coyote problem so this is an important consideration.
14) Goats gestate in 4 months, pigs in 3 months and both are very prolific and need to be managed properly.
   a) Castration is recommended for goats and cattle as it helps (steers are better than bulls) with meat quality and to control the population. Best to do before weaning…and with calves it can be done on the same day as birth.
15) Electric fences are often ineffective for goats as they can jump them.
16) Most ranchers are handling the birthing, deworming, and other common health issues on their own and do not directly consult with a veterinarian.
1) Becoming very popular in Alachua County
2) City allows 3 hens while County allows 5-10 hens per acre.
3) Roosters are allowed in rural parts of Alachua County.
4) Chickens need some coverage during the day for shade, but need full protection and coverage at night.
5) Need deworming approximately every 6 months.
6) Chickens are very easy to raise.
7) Egg laying can be delayed during molting for about 6 weeks.
8) *Salmonella* is a real concern. Sanitizing the coop is very important and should be done about every 6 months...which includes raking out the poop, liming, and adding Sevin dust (an insecticide that does not qualify for organic)...and sometimes bleach and water.
9) Raising chickens is pretty cheap...maybe 15-20 cents per day per hen.
10) Chickens can get mites. Sevin dust is approved for use as an external parasite treatment for chickens.
11) Chickens can produce eggs for 6-7 years and can live 8-10 years.
12) Broiler chickens are about 7-8 weeks old (market weight is 7-8 pounds) and it would not be good to eat an egg production bird after many years as they would not taste as good as a broiler chicken.
   a) Broiler chickens often have antibiotics in the feed itself due to parasites, etc.
   b) Pilgrim’s Pride Corporation in Live Oak is the closest large processing plant to the property.
13) Baby chickens can be bought online, from local feed stores, etc.
14) Currently not aware of anyone raising insects specifically for supplemental feed for chickens, etc.
15) Chickens are quite social, but their behavior somewhat depends on how they are raised.
16) Information on pasture-raised poultry can be found at [http://vfd.ifas.ufl.edu/pastured_poultry](http://vfd.ifas.ufl.edu/pastured_poultry)
Horses

UF/IFAS Cooperative Extension Contact: Dr. Ed Johnson, Animal Sciences Department

1) Alachua County has 4,000 head of horses (pleasure horses) which is 2nd in the state.
2) Many people do not qualify for agricultural exemption within the county because their horses do not foal every year.
3) Greenbelt law in Florida.
   a) If you have production agriculture on your land, you may qualify for exemptions and reductions on your property taxes.
      i) Common with goats, cattle, sheep, hay production, vegetables, fruit and nut trees, etc.
      ii) Whatever animal/crop is raised/grown, it must be used for production and sold as a product to meet the requirements of the Greenbelt law. Some of the other requirements are listed on the property appraiser’s website (http://www.acpafl.org/agclass.html)
4) Horses eat 24/7.
5) Horses are best stalled at night and provided supplemental feed.
6) Browsing areas will have no grass as horses eat so much.
7) Horses are incredibly expensive to raise and maintain.
8) Horses cannot be slaughtered in the U.S.
   a) This law went into effect about 2 years ago.
   b) Now many places are taking in rescue horses.
   c) Putting horses “down” has become a difficult and expensive activity.
Swine

UF/IFAS Cooperative Extension Contact: Dr. Joel Brendemuhl, Animal Sciences Department

1) Most of Florida’s swine industry has moved to North Carolina and Oklahoma.
2) You can raise grass fed (pastured) pork.
   a) They forage and eat the same grasses as goats and beef.
3) Definitely need to castrate baby pigs.
4) Pasture raised cannot have the same loading or production as penned pigs.
5) Pigs have 6-12 piglets/litter.
6) Baby pig tails need to be lopped because other baby pigs will chew/suckle on each other’s tails resulting in their tails having open wounds/bleeding/then infection.
   a) Needle teeth are also clipped (i.e., they would otherwise develop into the tusks).
7) Swine are not as compatible with silviculture because they root.
8) Swine are the smelliest of all the livestock.
9) Swine are best at eating all unused prepared food.
10) Requirement for pastured pork
    a) One producer on the east side of Alachua County raising Berkshires in rotated pens.
   i) She has them on bahiagrass, millet, ryegrass, etc.
   ii) Electric wire paddocks/cells are about ½ acre with 5-6 pigs and moves them every day.
   iii) Pigs wean at 21 days and reach market weight at 9-12 months of age (versus conventional market hogs who are at market weight by 4-6 months)...at 260-270 lbs.
   iv) Sells at South Marion Meats (a USDA inspected facility).
   v) The Jones Eastside sells her pork meat and she generally sells only wholesale, but is looking toward the retail market as well.
11) Wild hogs are common in Alachua County.
    a) Sometimes they are wild and domestic cross.
    b) True wild pigs are typically black or red.
    c) They carry brucellosis and tuberculosis and pseudo-rabies.
       i) They can pass these along to the hunting dogs, etc.
    d) They destroy peanut farms and yards, etc.
    e) Although they can be eaten, they can have some major parasite problems.
1) Dr. Hugh Popenoe started a large herd of water buffalo.
2) Mozzarella cheese is made from water buffalo milk.
3) They are temperamental animals and not docile.
4) Facilities and handling are major issues.
**Miscellaneous Considerations**

1) What are laws on animals who escape and get in the road, etc.?
   a) It comes back to the owner.

2) Electronic identification costs about $2/tag.
   a) This tag follows the animal all the way to the packing plant.
   b) Hot branding is less common because it ruins the hide, but freeze branding is sometimes used.

3) People are looking for land to rent for livestock operations in this area of the state.
   a) Currently beef cattle numbers are the lowest in history and the local livestock agent receives calls all the time for cattle ranchers looking for land to lease.
   b) Improved pasture is commonly leased for $20-40/acre per year.
   c) Sometimes owners make the ranchers pay for water and/or electric bills for their activities.

4) Important to understand Florida’s agricultural laws. See the *Handbook of Florida Agricultural Laws* at [http://edis.ifas.ufl.edu/topic_book_handbook_of_florida_agricultural_laws](http://edis.ifas.ufl.edu/topic_book_handbook_of_florida_agricultural_laws) for information on laws affecting all areas of agriculture
Additional Class Thoughts on the Topic of Livestock

1) Leasing the land for livestock seems the best option.
2) Class seems to think that the grass fed/finished model is more sustainable, though it may be more expensive than the calf/cow CAFO model.
3) A listing of some locations raising pasture raised animals in Florida can be found at [http://www.eatwild.com/products/florida.html](http://www.eatwild.com/products/florida.html)
4) Hay production is possible.
5) Pine straw production.
   a) Some concern about the extent and process of harvesting the pine straw and how it may remove nutrients from the soil and/or create a prompt for invasion by pine pests (such as the pine beetle).
6) Animals like it quiet and stress free.
7) Can reduced road speeds be a way to both minimize human injury from bike/car accidents as well as to minimize rancher liability for animals who have escaped from their fenced areas (i.e., a car hitting a cow at 25 mph is less dangerous than hitting a cow at 55 mph).
8) What about the attractive nuisance laws and the safety of humans and animals?
9) Boutique approach is too gentrified and costly and requires cheap labor from people who cannot afford to live within the community itself.
Appendix 2. Florida Crops and Seasonal Availability

A number of food and value added crops can be grown in Florida. The Florida Department of Agriculture and Consumer Services posts this chart on their website indicating typical seasonal availability of certain food crops in Florida ([http://www.florida-agriculture.com/marketing/seasonal_availability.htm](http://www.florida-agriculture.com/marketing/seasonal_availability.htm)).

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The 2011 Florida Agriculture Statistical Directory\textsuperscript{147} lists the following principal vegetable crops by production areas in the North and North Central areas of the state.

**North (from Leon/Wakulla Counties to the West and to Levy/Marion/Putnam/Flagler counties to the South)**

- **Suwannee Valley:** Beans, corn, cucumbers, greens, peas, peppers, potatoes, squash, watermelons.
- **Starke-Brooker-Lake Butler:** Lima beans, snap beans, blueberries, cucumbers, peppers, squash, strawberries.
- **Hastings:** Cabbage, potatoes.
- **Gainesville-Alachua:** Blueberries, bush beans, cucumbers, peppers, potatoes, squash.
- **Island Grove-Hawthorne:** Blueberries, cucumbers, peppers, sweet corn, squash, watermelons.

**North Central (from below Levy/Marion/Putnam/Flagler counties to the North to Pasco/Sumter/Lake/Orange/Volusia counties to the South)**

- **Oxford-Pedro:** Tomatoes, watermelons.
- **Sanford-Oviedo-Zellwood:** Cabbage, Chinese cabbage, sweet corn, cucumbers, greens, spinach.
- **Webster:** Cucumbers, eggplant, peppers.

More specifically the Alachua County Farmers’ Market website\textsuperscript{148} lists the following produce available by month in this area.

\textsuperscript{147}\url{http://www.florida-agriculture.com/pubs/pubform/pdf/Florida_Agricultural_Statistical_Directory.pdf}
\textsuperscript{148}\url{http://www.441market.com/seasonbymonth.htm}
### January

### February

### March

### April

### May

### June

### July
August

September
Bananas, Basil, Cantaloupe, Chestnuts, Corn, Cucumber, Eggplant, Grapes, Green Peppers, Hot Peppers, Lettuce, Limes, Okra, Papaya, Peanuts, Persimmons, Pineapple, Pumpkins, Radishes, Southern Peas, Sugar Cane, Sweet Potatoes, Tomatoes, Yellow Squash, Watermelon and Zucchini.

October
Arugula, Bananas, Basil, Cantaloupe, Chestnuts, Corn, Cucumber, Eggplant, Green Beans, Green Peppers, Hot Peppers, Lemons, Lettuce, Limes, Okra, Papaya, Pecans, Persimmons, Pineapple, Prickly Pear Cactus, Pumpkins, Radishes, Satsumas, Southern Peas, Sugar Cane, Sweet Limes, Sweet Potatoes, Swiss Chard, Tomatoes, Yellow Squash, Watermelon, and Zucchini.

November

December
Lastly, the Marion County Extension Service developed and published a “Marion County Harvest Calendar” as to what fruits, vegetables and value-added products are available by month in the county just to the south of Alachua. This calendar was developed as part of the county’s Local Food Network Initiative program and is available at the following:

- UF/IFAS Marion County Harvest Calendar

As determined by all of these calendars, which are best estimates as adverse weather and pest problems can greatly affect crop production and therefore harvest, July, August, and September are the months most lacking in the availability of fresh produce in this area of the state. This is understandably so as we generally experience a period of hot, moist weather where heavy rains due to regular weather patterns, tropical storms and/or hurricanes, can wreak havoc on any crop.