Of Playgrounds, Produce & Peace

A Toolkit of Parts for Edible Therupeutic School Gardens and Envisioning Community Hubs

by Kristine Parr | Master's Project in Landscape Architecture | University of Oregon | June 2021

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University of Oregon, June 2021
Kristine Parr

Approval

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Personal Acknowledgements:

I'm incredibly grateful to God, and learning to share in Your heart for beauty, healing, rest and connetion. It has been a wonderful adventure, and I am always inspired by You.

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Thank you to my friends, who were always quick to encourage, listen and feed me through all the stress and success. You all family and mean so much to me. Abi, Victoria, Lynne and Connor- you are the real MVPs! Thank you for all the laughs, tears, vent sessions and Puckler's runs. Thank you to my cohort, I wish we could have had more time face to face; you all are incredible. I am so proud of each of you, and all the amazing work you have done!

Lastly, thank you to all the professors that have invested so much time and energy into me and my work. The kindness you have shown me has been impactful. A big thank you to Roxi and Chris for helping to make this project what it is!

Land Acknowledgement:

All outdoor education and natural environments in Eugene take place on traditional Kalapuyan homelands. A few indigenous children's books to enrich a child's understanding of First Nations peoples:

Most Beautiful Thing You Know About Horses? -*Richard Van Camp*
The Elders Are Watching -*David Bouchard*
Rabbit & Bear Paws: Sacred Seven -*Chad Solomon*
When We Were Alone -*David Alexander Robertson*

Abstract

The benefit of both urban agriculture and therapeutic gardens are historically acknowledged and legitimized in landscape architecture. In their own ways they seek to address issues of resiliency and quality of life. However, there is little cross-pollination between landscape designs that provide nourishing produce and those that nourish mental and emotional wellbeing. This is especially true for children's landscapes, whose school environments are known for their unhealthy lunches and fluorescent classrooms. Mapping food insecurity shows that many students within Eugene's urban growth boundary are vulnerable in the current systems of scarcity. They are placed at the forefront of both food insecurity and corresponding mental developmental crises; all exacerbated by stressors associated with COVID-19. Therefore, envisioning schools as whimsical oases of accessible, foraged produce and inclusive beauty could richly impact Eugene communities as a whole. Placing a ½ mile radius over every school doubled the footprint of access to fresh food and therapeutic spaces. Therefore, the proposed "toolkit of parts" features combined agricultural and therapeutic elements in the forms of ***Community Learning Circles****,* ***Medicinal Food Meadows*** *and* ***Healing Food Forests****. Each piece, and their many possible configurations, builds gracious, inclusive and adaptable school gardens as bountiful community hubs.*

Table of Contents:

How to read this document:

1. First Stop!

A summary of each chapter's key takeaways can be found here

This document is separated into 2 parts. Part 1 defines the research question, and tackles a multifaceted and interconnected Literature Review by dividing it into into parts, each with a corresponding precedent study.

Part 2 takes the information from Part 1, translates it onto the ground through site analysis, design uses and recommendations for implementation.

Themes found throughout the literature review in Part 1 will reappear as symbols in Part 2 in connection to the design elements. The color of the symbols in Part 2 will correspond to the color of the chapter they were drawn from (note the colors on the edges of the outer pages). The symbols are as follows:

Lessons from Nature:

 *Pollinator friendly*

 *Ecological Relationship*

Inclusive Urban Agriculture:

 *Edible City*

 *Agrarian Neighborliness*

Accessible Therapeutic Gardens:

 *Therapeutic Garden Design*

 *Indicators of Soft Fascination*

0 Introduction: Where We Are

Key Takeaways

1. Providing schools with edible and therapeutic gardens would protect children from hunger and nourish mental and emotional resiliency.
2. The city of Eugene has ideal conditions for this project, including numerous like-minded community groups.

Adverse Childhood Experiences:
Systematic Stressors, Food Insecurity & COVID-19

Vaccines have lessened the panic surrounding COVID-19, yet its destabilizing nature have sifted a myriad of needs to the surface. Issues of food security and food justice have consistently emerged on the social radar, and the mental and emotional toll of grief, loss and have drastically deteriorated our society's daily well-being. While these truths are relevant for us all, they are even more so for underrepresented populations, including the subject of this study, namely children and young adults. Children and teens often absorb the feelings of their parents and guardians without the space to emotionally process. Adverse Childhood Experiences mentally and emotionally handicap a child's coping mechanisms. Schools have the potential to serve as an oasis for a child's wellbeing.

At its heart, this project aims to support physical health and emotional resilience for K-12th graders in the Eugene area through an experimental design tool kit for edible therapeutic school gardens. Gracious design, in this context, is defined as proactive kindness. Underlying research topics include food justice, sustainability and trauma-informed design. As community wellness hubs with ½ mile spheres of influence, the combination of Eugene 4J and Bethel school district schools have the potential to blanket a majority of urban and residential Eugene with fresh produce and natural therapeutic elements accessible to children.

Children are already subject to the same physical, emotional and mental stresses that plague adults; experiencing and enduring abuse, anxiety and depression. The additional stresses of food insecurity wreak havoc on a child's long term development (Learey, 2019). Therefore, by focusing on the needs of the most vulnerable, the project can more graciously and inclusively address community needs than the current system.

The presence of gardens has been shown to be a positive influence on children's mental and physical health. Elementary to high school students have various developmental capacities for therupeutic garden elements, however research indicates positive mental health indicators in each developmental stage. Gardens and wilderness have been utilized as places of meditation for thousands of years. Relatively recently in history, therapeutic gardens and horticultural therapy have been established as emotionally and mentally beneficial havens in times of distress. These practices have shown success as mediums and partners for stress rehabilitation, offering meaning to everyday tasks while addressing physical and mental needs (Adevi et al 2012).

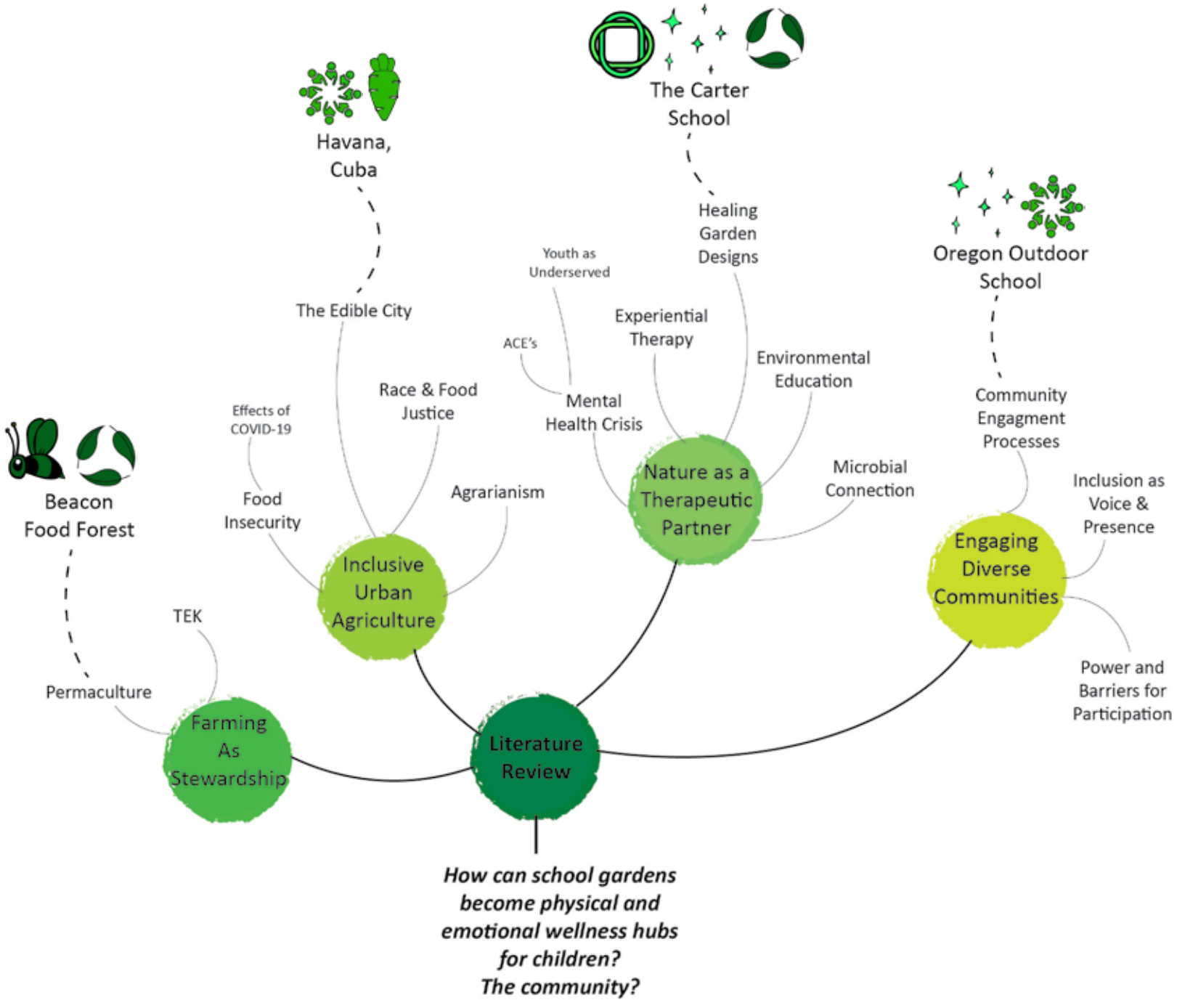
Landscape architects, designers and city planners have become advocates for public landscapes that nourish safe and healthy communities to combat the isolation brought about by COVID-19. Projects like the proposed 42nd St greenway in NYC, and Portland's Green Loop are proposels for a socially just physical resolution to meet the social needs of the times. Local organizations, including the Food for Lane County Youth Farm and Hosea Youth Services, are already deeply committed to serving at-risk youth in Eugene, and providing positive outdoor experiences. Similarly, the Oregon Farm to School, and many other organizations, are currently researching outdoor classrooms and park spaces adjacent to schools as ways for students to safely return to school while practicing social distancing.

This project seeks to follow current frameworks for creating synergistic health and wellness areas, with the distinction of addressing the present and predicted food security and mental health crises for an underrepresented population. "[Humans of any walk of life] weren't made to be ignored. And though we try to pretend that it doesn't really matter, the collective effect of living in a world apathetic to our existence is doing damage to our souls" (Eldredge, p125). Therefore, design must be intentionally directed towards the underserved. Those that already benefit from the current system have a responsibility to make a place for those not represented (Strang). Due to time constraints, this project assumes the previously established methods for tracking mental health, as further discussed later this chapter.

While it is naive to assume the presence of a garden will cure all systemic and internal pains, or that children and the community would be interested in such an idea, its envisioning is a start. Striving to meet physical needs through radical inclusivity and accessibility to healthy foods and experiential therapy is a combination that could feed hungry children and offer safe places to wonder and explore. At the least, every child deserves their fundamental needs met with beauty and support.

Part 1: Research

(Figure 1.1) The research portion of this project began with a literature review on the topics of permaculture, urban agriculture, and nature as a therapeutic partner. Each various subtopics that created an interconnected focus. The next step included finding precedents and gleaning key design features. The topic of Engaging Diverse Communities emerged as a factor in thinking about project implementation. However, as it was heavily researched, it is mentioned in the research portion.


Havana, Cuba
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TEK
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Literature Review
How can school gardens become physical and emotional wellness hubs for children? The community?

1 Farming As Stewardship

Key Takeaways

1. Ecology is about connectivity and relationship
2. "Permaculture" is a design ideology sensitive to nature and human needs
3. "Agrarianism" is a social movement that treasures community and the environment

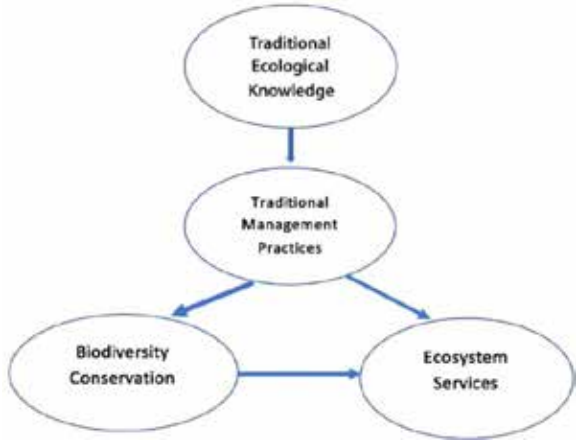
"The more clearly we can focus our attention on the wonders and realities of the universe around us, the less taste we shall have for destruction"

-Rachel Carson

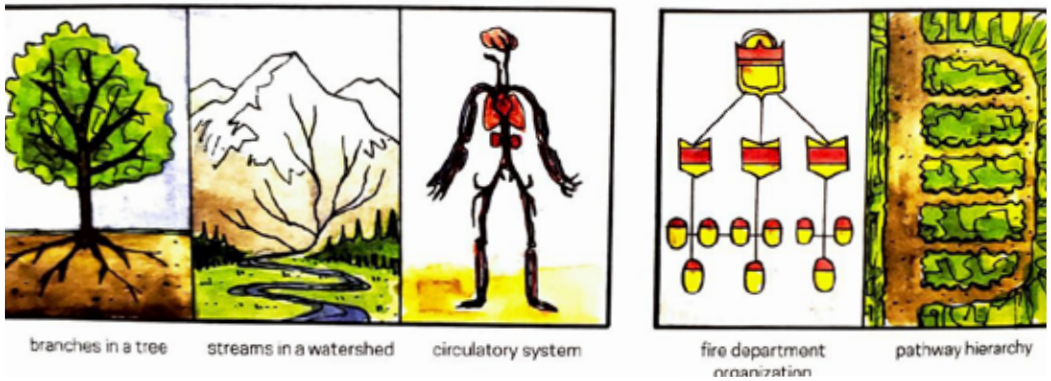
If you look closely, you will find that the environment celebrates connectivity and relationship. As creatures intrinsically interwoven in these relationships, the knowledge of them offers gracious and treasured insights into our health and wellbeing, and that of our non-human neighbors. Although competitive, the interrelation between species often produces balanced and mutualistic relationships. For example, the study of soil science leads us to the beginnings of all growing things and beautifully encapsulates the essence of dynamic synergistic partnerships. In the rich darkness of the soil, the rhizosphere, or area where roots interact with its soil-dwelling neighbors, is alive and bustling with activity. Plants, microorganisms (ike bacteria and fungi), macrooragisms (such as worms), all are a part of many complex chemical and physical actions and reactions. The quality of the soil, indicated by the richness of microbial diversity, effects the quality of a plant's fruit, its *terroir*. The quality of food effects quality of health of the individual, which in turn effects the quality of health in the community. Intentional replication of ecological diversity requires less external input, grows healthier food and becomes a more resilient community. Life is either won or lost in the soil. Generations of First Nations peoples understood and practiced within these intimate relationships for hundreds of generations.

Additionally, repeated patterns in nature can be found in multiple scales. Waves, spirals, and branching are all examples that carry over into designed landscapes. The ability to make loops, either through waves or spirals are key features in therupeutic garden design. These familiar patterns are both comforting and intriging. Further discussion on the relationship between the natural world and the human experience will be discussed in later chapters.

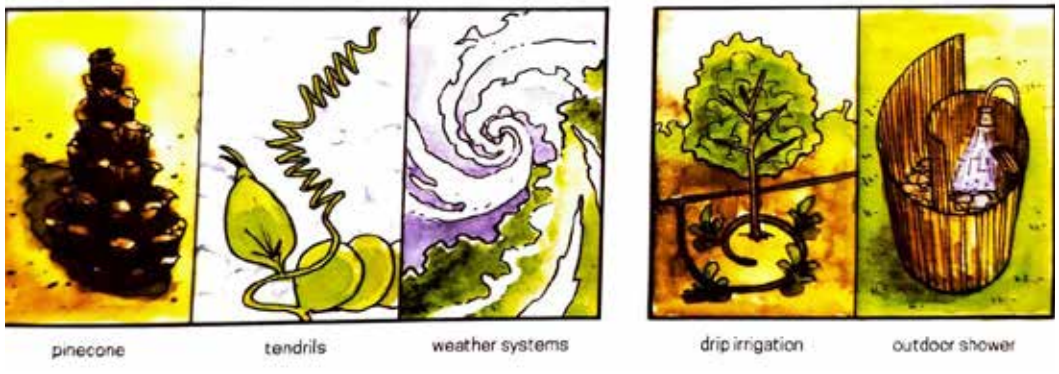
Image 1.1: "Waves & Meanders" illustrates the effects of manipulated edges in achieving specific goals. These patterns are generally the most productive and energy efficient (Bloom & Boehnlein, p53)



(Image 1.2) McShane, 2020. Traditional Ecological Knowledge (TEK) is arguably the most valuable lens to view environmental interactions. Many of these traditions have been historically suppressed, and difficult to research. However, their resurgance celebrates a human- environmental relationship built on respect. These traditional management practices are as old as time; the following permaculture principles are mere second hand glimpses compared to traditional First Nations' management practices.



(Image 1.3) "Branching" is a pattern that relies on heirarchies in descending or ascending scale. Examples include stream orders, and the relationship of tree trunks to branches. These configurations distributes energy and resources in an energy efficient manner. (Bloom & Boehnlein, p53)



(Image 1.4) "Spirals" are the final repeating ecological pattern to be discussed. (Bloom & Boehnlein, p54)

Lastly, learning from principles of restoration ecology also gives insight into the power of interconnected habitat patches. Healthy habitats are important for healthy communities. Like animals, accessibility to food, shelter and community are important in creating a safe environment for child-raising. Clusters of stepping stones will help connect food resources, especially for those in food insecure areas. The more opportunities for access to healthy habitats increases movement between them. To create a more gracious and hospitable environment, the input of healthy habitat patches is necessary, especially as they provide access for underserved populations.

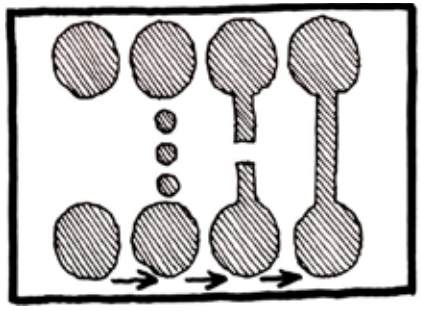
Understanding existing natural processes on a site can inspire and inform designed edible ecosystems. This type of design thinking is called permaculture,

and has led to valuable typologies, such as the food forest. Imagine a typical forest ecosystem, with its interconnected transferral of resources and relational complexities. Now embed site sensitive edible plants into the forest, and a food forest is born. (Nordahl, p196).

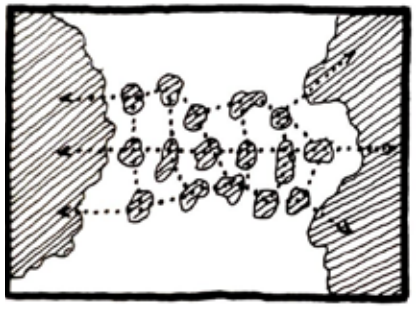
Permaculture is defined as an "ethical design system inspired by nature" founded on ideas of "Earth Care, People Care and Fare Share" (Heckert, p97). Since its emergance, the practice of permaculture has offered caloric relief to human users, as well as created and maintained habitat for more-than-human users. "An alternative approach [to reactionary politics fueled by fear and guilt] is to recognise those patterns of relationships, human and more-than-human, which nourish freedom, equality and vitality. What are ways of relating, organizing and being that help us to become more deeply aware of being alive?" (Heckert, p99) This design code of ethics seeks to partner with nature through thoughtful obsveration.

As a design ideology, the development of permaculture principals has led to valuable agroecology typologies, such as the food forest. "The concept of a food forest is a core concept of permaculture design derived from wild food ecosystems, where land often becomes forest if left to its own devices. In a food forest, everything from the tree canopy to the roots is edible or useful in some way" (Nordahl, p176). Traditionally, habitat layers in a natural forest are mimicked in a food forest, like upper canopy and understory trees, shrubs, vines, herbaceous and root horizons. The structural diversity created also creates vital microclimates and closed loop systems that caters to a variety of plants without a high degree of human input.

The co-benefits of ecologically savvy food systems and social justice are starting to gain attention, especially during the current pandemic and subsequent food crisis. In June of 2020, DEEM magazine hosted "Designing for Dignity", with a session on "Designing Hyperlocal Food Systems". Key case studies included Oko Urban Farms, an aquaponics operation led by Yemi Amu, that focuses on non-human centric design. Instead, she honed into, "...an empathetic ecosystem of birds, bees and microorganisms..." that views food production, "...not to be an extraction, but a relationship." She asks "What am I getting back? How am I honoring water and land? It is a gift to have anything from the land...A relationship based on reciprocity. A framework of care. What does it look like to make farms truly accessible?" The second speaker, Naima Penniman of Soul Fire



(Image 1.5) Connecting patches creates corridors between habitats. The greater number of patches creates an uninterrupted route.



(Image 1.6) Redundancy is a hallmark of resiliency. Having a large enough number of patches offers alternative routes to resources.

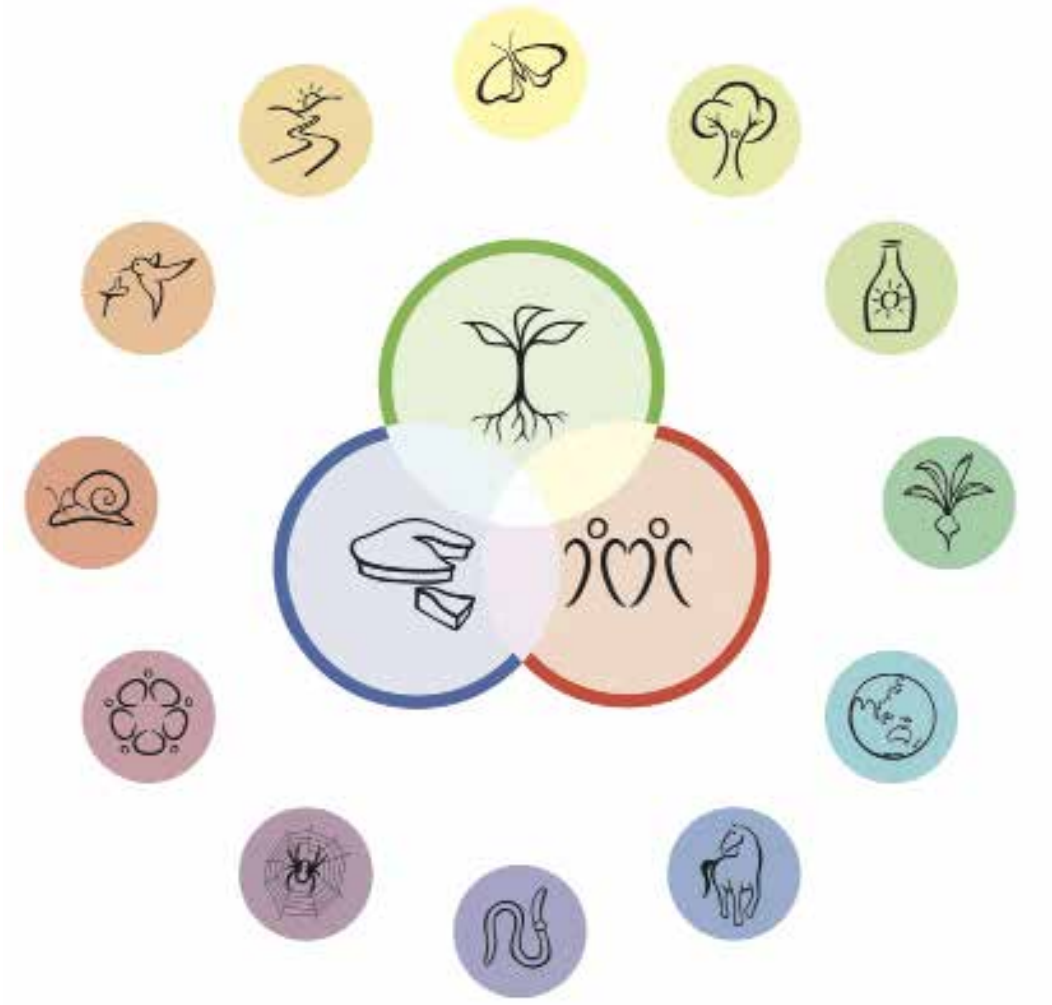
(Drumstad, p. 38)

"The soil is the great connector of lives, the source and destination of all. It is healer and restorer and resurrector, by which disease passes into health, age to youth, death into life. Without proper care for it we can have no community, because without proper care for it we can have no life."
-Wendell Berry

Farm, would agree, adding that a fundamentally transformative relationship with the land, "...honors each fruit of the harvest, each leaf of the harvest" (Designing with Dignity, June 2020).

We are living in a time of great uncertainty, the trademark of societal transformation. Introducing free, accessible permaculture-grown produce in public environments offers, "...design methods for nurturing abundance for all beings rather than either accepting or rejecting the logic of scarcity" (Heckert, p100). We are living in a time of great uncertainty, the trademark of transformation. Introducing free, accessible permaculture-grown produce in public environments offers, "...design methods for nurturing abundance for all beings rather than either accepting or rejecting the logic of scarcity" (Heckert, p100).

Designing for local food abundance not only solves questions of distributing and preserving resources, but, "... it aims to enrich life through developing a deep awareness of, and thus nourishing, the connections within and among the ecosystems of our body-minds, the land and each other" (Heckert, p100). Establishing plant and animal refuges for local threatened species is part of the permaculture ethics regarding natural systems. What if refuges were established for threatened members of our community?



Ethics & Design Principles

(Image 1.7) As a design practice, permaculture values environmental, human individual and communal wellbeing. Therefore, these design principles offer a framework for holistically healthy and mutual relationship between people and the environment around us.
Source:urbansustainability.snre.umich.edu

"... forms of public produce were established in many neighborhoods, involving many neighbors, they helped build and nurture community, as well."

Rooted in Agrarianism

Agrarianism began in the 1950s, at the height of post-WW2 industrialization of the American farmland. It is a community-based agricultural movement that praises "neighborliness" and the cherishing of nature as an invaluable gift to be protected rather than exploited for corporate profit. In resource-insecure times, cultural differences are reconciled, as desperate residents, "...rely on social cohesion to generate social support and to catalyze collective action within their neighborhood, especially in the absence of government support" (Korn et al, p2) These ideologies, still alive in the national Farm to School movement, revolve around four core principles of land: beauty, food, work, and community (Donahue, p37). The cumulative results of unified small-scale agricultural efforts can be staggering. In the United States, "By 1944, there were an estimated twenty million victory gardens yielding eight million tons of produce, collectively providing 40 percent of the nation's vegetable supply" (Nordahl, p23). Community and victory gardens transcended food and were meant as a psychological counter to the onslaught of war. These gardens offered hope through nutritional, social and emotional returns for families uncertain of their future or fate of their loved ones.

Traditionally marginalized populations, the unemployed, elderly, women and children, were given an expression of agency, voice and purpose; as a form of engaged recreation, these working agrarian ideals offered a momentary escape in desperate times. "More than food, however, victory gardens and their earlier urban farming counterparts promoted self-reliance, self-respect, and economic independence, providing financial, physical, and spiritual well-being. And because these forms of public produce were established in many neighborhoods, involving many neighbors, they helped build and nurture community, as well" (Nordahl, p186). The Permaculture Research Insitute claims, "Without permanant agriculture there is no possibility of a stable social order".

This is further explained in terms of freedom, of having the capacity to live humbly, gratefully and in harmony with the earth, to give care and cherish, "...as users of some things they did not make, and of some things they cannot make" (Berry, p26). Intertwined and flourishing local community relationships are also praised in this mindset, as the idea of neighbor helping neighbor echoes the dependence on personal relationships establishes sustainable practices. "The agrarian standard, inescapably, is local adaption, which requires bringing

local nature, local people and local economy, and local culture into practical and enduring harmony" (Berry, p33). Imagine the social and emotional benefits of weaving children into these tight-knit networks of gracious support and humble responsibility. Although it is naive to think gardens can solve every heartbreak and injustice in the human experience, the connections between the soil and human communal and individual holistic well being cannot be overstated.

Neighborhood communities, including those marginalized by the distance from the local school or in an economically disadvantaged area of town, are still viable opportunities for civic agriculture. Schools and shared open space in these neighborhoods can play a critical role as community farms; this framework still offers experiential learning that has been proven effective in outdoor education. "Hands-on, constructivist learning [opportunities]... can serve as living laboratories in which students can see what they are learning and in turn, apply that knowledge to real world situations" (Klemmer, p452).

For the agrarian, there is a reverent awe and emotional connection to the land and its resources, therefore practices are developed through an ecologically sensitive lens. The natural environment, in its diverse, vibrant and efficient systems, is a beautiful inheritance. Furthermore, the idea of place-based "landedness" is, "...worth what life is worth" (Berry, p29). Exposing children and young adults to environmental and garden-based education is a dynamic medium to develop the awareness, empathy, knowledge and skills needed to engage with environmental issues in a meaningful way. In short, the case is to be made for school districts to prioritize garden based education by providing opportunities where able, and letting the agrarian work itself be the agent of transformation.

Teaching Agrarian Neighborliness

Returning to agrarian ideals of neighborliness, what follows are examples of relational elements that create ecological, social and economic resilience; such would benefit any community. In practical terms, this is a call towards reestablishing regionally based producer/consumer associations that are "neighborly" in their looking out for the other. Increased land prices are common intense stressors that lead farmers to adopt unsustainable practices of growing subsidized monocultures (thereby increasing chemical input and decreasing genetic diversity). A solution to this can be found in community supported agriculture (CSA's) and land trusts; these allow economic risk sharing

"It requires imagination, local knowledge, entreprenuership, a long-term commitment to place, and a strong working relationship with others- all characteristics of new agrarians."

by either investing in the farmer or, as a community, protecting the land and sharing cost via co-ownership. This process begins with the procurement and preservation of vital ecological habitat by community shareholders; this in turn removes that land off the market and out of reach from monetarily minded developers. Once the land is protected, communal agricultural farms and privately owned 100 acre plots are embedded into the landscape and consolidated into "neighborhoods".

These neighborhoods focus on "kindly use", or agricultural and development practices that prevent erosion, protect waterways from livestock waste and, "...have a broad ecological margin" (Donahue, p36). At their core, these alternatives are citizen based and require attention and commitment. "It requires imagination, local knowledge, entrepreneurship, a long-term commitment to place, and a strong working relationship with others- all characteristics of new agrarians" (Witt, p218). This sense of community is highly uncommon in today's society, as financial pressures drive individuals to pursue their own securities. Inherent social competition also fuels defensive and skeptical attitudes about relational investment. However, the building of community is a grassroots ideology, focusing on the nourishment and celebration of each member, one at a time.

Locality, investing where you are, is the missing link. "[Local] currency would retain a constant local value related to a natural resource and would make visible once again the connection between the health of a local economy and the health of the land" (Witt, p220). This is grown out of love of place and community that can only be achieved through exposure to both. Establishing intergenerational outdoor and agricultural community programs help to establish empathetic connections to the natural world and each other.

In his essay, The Agrarian Standard, Wendell Berry would argue the responsibility of the urban "landless" to participate in local gardens and food economies (Essential Agrarian Reader, Berry, p27). This too can be a form of environmental education, and can be summed up by the following: "Agrarian farmers [and environmental educators] know that their very identity depends on their willingness to receive gratefully, use responsibly, and hand down an intact inheritance, both natural and cultural, from the past. [Environmental education is] the proper use and care of an immeasurable gift" (EAR, Berry, p26). Wirzba describes the wisdom and love needed to nourish this relationship with the natural world; prescribing acts of humble and tenacious commitment that require acute augmenting attentiveness (Wirzba, p95). These acts include investing creatvity,

care and resources into the education and wellbeing of future generations.

"Success is thus directly tied to our ability to get our egos out of the way and fit in and work with the natural processes around us" (Wirzba, p94). Mirroring the ideals of Wendell Berry, to place the soul back into the natural world is, "...to be aware of the gifts and limits of place...and the costliness of those gifts, since the presence of life are always intertwined with the processes of death" (Wirzba, p94). Therefore, a life that is entirely committed to intentional and genuine acts of relationship, including relationship with self, interpersonal and environmental, are actions of fulfillment. The presence of any civic agricultural practice, including school farms, community gardens and public produce, has the potential to be wildly impactful and leave a legacy of compassion and stewardship. The inner workings of these relationships with nature are further explored in the following sections.

Precedent Study: Permaculture Food Forests

1. Ecological planting (permaculture: creating plant guilds, mirroring natural habitat, creating microclimates, etc) decreases water usage

2. Invite community knowledge and higher education programs for workshops

3. Pass on passion through dedicated teams and "champions"

Beacon Food Forest in South Seattle, WA

(Image 1.8) The master plan of Beacon Food Forest is deliniated into zones based off of maintanance needs. Traditional crops are grown closest to the southern entrance. As less intensive typologies, orchards rows and edible forests are farther away.

Situated in the outskirts of urban Seattle, Beacon Food Forest is an edible public garden that was founded on permaculture principles. Beacon Food Forest envisions a, "...world where every community participates in creating local food systems" (BFF p20, 2019). Their mission begins and ends in community care; care for the environmental and non-human communities and for the people of south Seattle and beyond. "We are on land stolen from the Duwamish, Suquamish, Muckleshoot, and other peoples, stewards and co-creators of abundance with the land since time immemorial. We work to dismantle an unjust food system rooted in white supremacy and conquest by nurturing its replacement, already alive and ready to grow. Through open harvest and collaboration within and among communities, we work to create a fair share for all" (BFF p20, 2019). Similarly, they orient this philosophy into practice through the guidance of three principles read at every board meeting:

1. Who is not here, and what can we do to make participation in the food forest more accessible to them?
2. What decisions will we make at today's meeting, and what implications do they have for racial equity?
3. How can we expand our thinking about what we currently do at the food forest to be more relevant to and inclusive of POC?

This strong work of nourishing community has helped BFF flourish in its vision.

(Image 1.9) A drone shot capture the diversity of canopy structure and cover.
Source: Beaconfoodforest.org

In 2019 the Beacon Food Forest welcomed an unprecedented 338 volunteers in their community work parties. Partnered with the Seattle Conservation Corps, Seattle Giving Garden, Jefferson Horticulture Facility, and after school programs from Wing Luke Elementary and Solid Ground and a core group of 12 volunteers, BFF is committed to community involvement. A total of 7,072 volunteer hours were recorded in 2019 alone. Invitations for community work parties are proffered the third Saturday of each month, except December, and are rewarded with a handpicked organic lunch from the garden afterwards. Activities include sheet mulching, pruning fruit trees, establishing rain gardens, constructing mason bee housing, controlling noxious weed populations and improving ADA path accessibility through maintenance. In addition, hands-on education in ecological practices included training in species identification, propagation and wetland management techniques. Each of these skills are taught by experienced task leaders to build up a more environmentally literate volunteer population. Additionally, on their website, Beacon Food Forest opens the door to empower community members and invite their expertise to teach classes.

In the same vein, relationships with formal educational institutes are a key gateway to introduce and capture volunteer interest. The idea for BFF began in

(Image 1.9) Beacon Food Forest volunteers discuss maintainance activities. As a public garden, the food forest is helped by community involvement, and is helpful in providing fresh produce.
Source: Beaconfoodforest.org

a permaculture design class, and now has university students from South Seattle College, Seattle University and Oregon State University utilizing the wealth and breadth of knowledge coming out of the food forest and its community. Beacon Food Forest has a presence in annual gatherings like Sustainable Northeast Seattle, family resource fairs in local elementary and high schools, Community Alliance for Global Justice, and youth advocacy groups, including the YMCA's Environmental Leadership Summit. Additionally, the presence in schools is augmented through a collaboration with the Northwest School to develop a field trip curriculum, again highlighting the importance of youth involvement. This curriculum is founded upon the ideals of food justice and exemplifying sustainable agroecology practices. Middle school students rotate between stations; creating compost, weeding and woodchipping, as well as learning about bee hive maintenance and pollinator health. These experiences inspired students to implement the same care and techniques in their own school gardens.

The successes and teachable moments in Beacon Food Forest's maintenance regimes are outlined in their annual report. Utilizing sustainable design principles, the majority of compost is produced on site through sheet stacking cardboard and plant materials. This adds much needed organic materials into dense clay soil, and in addition, arborist wood chips are used on pathways to suppress weeds, increase soil biodiversity, and retain moisture in the dry season.

The food forest, Helix garden and others are open harvest zones, available for anyone to "harvest gently" for what is ripe and abundant. Less familiar edible plants, including Gooseberries, Aronia berries, Jerusalem Artichokes and Cardoon, are relatively prolific but are often skipped over by human foragers. Ecologically, the BFF Plant and Pruning Committee refined a plant palette according to, "community input, bioregional adaptation, disease resistance, productivity and cultural significance. The upper and understory canopy of this food forest features fruit and nut tree guilds, such as persimmon, quince, pomegranate, apple, hardy almond, mulberry, jujube, autumn olive and fig. This is partnered with a shrub layer of berry bushes; kale and chard are planted for edible groundcovers. Perennial plants, including sunchokes, orache (drought and saline tolerant), burdock and cardoon, are dispersed throughout the site. A 2,000 square foot Helix vegetable garden for annual greens, roots, squash and nightshades. These easily recognizable vegetables are a helpful confidence builder for first time foragers. Open 24/7, staff observed an average of ten people per day to pick summer vegetables. "Over a 4-month season the Helix is harvested from about twelve hundred times. We

notice that most people pick at least 1,200 pounds of vegetables shared from the Helix this year (BFF, 2019). Medical and culinary herbs are both in spiral gardens and individually placed around the food forest. P-patches are traditional rented plots found in community gardens, and are therefore only accessible to their renters.

Beacon Food Forest provides a model for ecologically and socially sensitive practices. Focusing on plant diversity and natural processes, such as composting, creates an effective and productive plant palette. As a community oriented organization, the mission of BFF is deeply aware of the needs of the community. Therefore, volunteers and visitors feel welcomed, and enjoy working with the food forest that is working for them.

Quantity (lbs)	Produce	Quantity (lbs)	Produce
50	Apples	1200	Helix Garden (beans, peas, beets, kale, chard, collards, squash, tomatoes)
10	Artichokes	20	Horseradish
150	Aronia	20	Honeyberries
1	Asparagus	100	Jostaberries
30	Autumn Olive	1	Kiwi
100	Blackberries	20	Medicinal Herbs
50	Blueberries	3	Medlar
20	Boysenberries	30	Mulberries
10	Burdock	2	Nettles
1	Butternuts	3	Peaches
250	Cardoon	20	Pears
2	Chocolate Berries	2	Persimmon
20	Culinary Herbs	200	Plums
50	Currants	125	Quince
30	Elderberry	75	Raspberries
10	Figs	8	Rhubarb
10	Fuki	1	Seabuckthorn
3	Goji Berries	1	Shipova
5	Goumi	150	Sunchokes
15	Grapes	10	Thimbleberries
5	Edible Flowers	10	Wineberries
TOTAL		2823 lbs	

(Figure 1.2) Produce yield from Beacon Food Forest, 2019 Annual Report.
Source: Beaconfoodforest.org

2 Inclusive Urban Agriculture

Key Takeaways

1. Traditionally marginalized communities are at greater risk for food insecurity and symptoms of chronic stress
2. The "Edible City" takes advantage of every opportunity to plant produce in public and private spaces

"So many of our dreams at first seem impossible, then they seem improbable, and then we summon the will, they become inevitable." -Christopher Reeve

Food Insecurity & Youth Wellbeing

Before increased unemployment and scarcity caused by the COVID-19 pandemic, "...an estimated 14% of families with children (13 million children) were food insecure, meaning they had limited or uncertain access to enough food for a healthy and active lifestyle" (Kinsley, p332). Combined with the negative short term effects of food insecurity on child developmental, social and emotional health, the multifaceted effects of the pandemic are expected to be substantial and prolonged (Nordahl, Melchior, Kinsley, Mercado). Lack of nutritious food deeply affects the community structure, beginning with its most vulnerable.

Based on the Child Behavioral Checklist and Preschool Behavior Questionnaire, children in food insecure environments often replaced positive mental health indicators, such as critical thinking and imagination, with symptoms of anxiety and depression, such as nervousness, difficulty having fun, hyperactivity, impulsivity, inattention and aggression (Melchior, p2). For a growing mind under the duress of a pandemic and all its corresponding trauma, access to nutritional food for young people is vital in offering any means of much needed support.

Disproportional Mental Health Effects for Marginalized Communities

The Kaiser Family Foundation estimates the public health crisis will severely impact mental health of American families (Fitzpatrick, p 17). Compared to the majority white middle class population, disproportionate effects have also impacted communities of color and already underserved communities, which includes their children. Financial and circumstantial stresses are multiplied as essential workers, associated with minorities, clock-in and put themselves at risk for infection. Fears of medical bills, foreclosures, providing food for their families all amount to an ever-present atmosphere of stress and hopelessness. "Additionally, significant bivariate relationships were found between socially vulnerable respondents (female, Asians, Hispanic, foreign-born, families with children) and fear, as well as with mental health consequences (anxiety and depressive symptoms). Depressive symptoms, on average, were high (16 on the Center for Epidemiologic Studies Depression scale), and more than 25%of the sample reported moderate to severe anxiety symptoms" (Fitzpatrick, p17).

What is required is a health and wellness system that is truly gracious and accessible for every person in the population; that, "...our [holistic] health systems must be robust and resilient. The response must include those who now suffer disproportionatey—the poor and the vulnerable" (Benjamin, p1). Such sensitive,

proactive and responsive infrastructure is advocated in the current World Health Organization priorities concerning both COVID-19 and the health impacts of more severe weather events caused by climate change (Benjamin, p1). Underserved populations are systematically bound to a lack of adequate access to public health infrastructure. Again, where the parent experiences these stressors, the child often does as well. Therefore, public health interventions to encourage healthier choices, education and overall social support, must intentionally address these inequities.

Race & Food Justice

There can be no discussion of equity and food justice without the effects of race on food and resource accessibility. An "...examination of Black agency through a lens of 'what is happening?' reveals particular Black geographies, namely "geographies of self-reliance", that are embedded within communities with unequal access to food" (Reese, p408). These communities of self reliance are models of the necessity of public garden space and community to meet needs left unmet by systemic resources. "Thus, geographies of self-reliance call attention to how spatial, historical, and racial dynamics intersect and insist that Black folks navigate inequalities with a creativity that reflects a reliance on self and community" (Reese, p408). The "self" in self-reliance almost always reflects an interest in and commitment to community, despite any social and interpersonal ills that may plague it.

When interviewed, a participating gardener, "...was hopeful about the garden—precisely because she considered it a type of action that countered apathy," thereby also serving an emotional role establishing a positive identity in a misrepresented neighborhood (Reese, p415). Similarly, in the face of evictions and building foreclosures, "...this garden was a form of resistance in which the garden symbolically represented their determination and desire to remain where they had planted roots" (Reese, p420). When designed by and for their community, gardens can become urban oases and places of safety and identity.

Another such example comes from the historically black community of Frenchtown in Tallahassee. Residents empowered themselves to reclaim underutilized land, invoking a powerful stance against systemic racism and marginalization. Hite and other social researchers argue that community gardens are meaningful expressions of social resistance when given the agency to exact change. It became a symbol of resilience against the often violent effects of living in a marginalized

community. “Through garden activities, residents transcend race, culture, income, and neighborhoods, while also promoting health, heritage, place-making, and economic opportunities. Place is constituted by spatial politics in a cultural milieu, evident in the community’s ability to intersect diverse institutional boundaries via gardens…[illustrating] how a community-based participatory research project successfully resists violent environments through spatial transformation” (Hite, et al, p55). Oftentimes, youth from lower income families, particularly in communities of color, are raised in violent environments that, “...emerge from a complex entanglement of multiscalar power relations and material transformations, partly attributed to access to and control of resources ” (Hite et al, p56). This is true for Frenchtown children, who utilized the garden as sanctuaries to safely and authentically socialize with their peers. “Though subtle as it may be, a garden became a source of empowerment for African American youth who have had to negotiate the systemic and symbolic violence of living in a marginalized community.” (Hite et al, p64).

Therefore, the act of inclusive agency in designing and running a community garden empowers and engages formerly silent members with a voice. This requires the physical design to be accessible and inclusive especially to those underrepresented. Additionally, a racially, economically and gender diverse advisoy board would prove useful in defining the processes for including marginalized communites.

“...a garden became a source of empowerment for African American youth...”

A Fragile System (Pre-COVID) & Augmented Stressors (during and post-COVID)

In a 2010 report, the World Bank included food distribution, social unrest, geo-physical climatic disasters, and susceptibility to pandemics as points of failure for urban environments; all exacerbated by climate change (Nursey-Bray, World Bank 2010). Ten years later, and 2020 has proven it all to be true, thus unmasking current infrastructural fragility. The terrifying and far reaching impacts were deeply felt and experienced even the small city of Eugene. Again, the goal of this project is to envision a resilient reality that holistically protects and provides for future generations. Let us begin with a most basic need: food.

It's no secret that the food system in America is dependent upon huge conglomerate operations making and distributing high fructose filled products and select regional patches of produce that are transported hundreds to thousands of miles away. "That increasing distance to market- measured in 'food miles'- is of great concern in the face of a shrinking oil supply and its ever-rising cost" (Nordahl, p8). Therefore being caught in an ever deepening cycle of dependency on chemical inputs for fertilizer and fossil fuels for transportation, commercial agriculture as we know it is responsible for carbon emissions that rapidly increase the effects of climate change. Possible solutions will be discussed in more detail further in the chapter. However, offering a taste of what's to come ushers in a focus on community and locality; eating fresh and seasonal produce increases connectivity within a community as well as with the land around you. "Not only do seasonal crops reduce the need for the transnational shipment of foods, and hence reduce embodied energy due to transport, but also they have implications for how crops are grown locally" (Viljoen, Bohn, Howe, p28). The Italians would call this the "Slow food movement," what this paper will refer to as "agrarianism".

Returning to the commercial agriculture system, dependence on chemical inputs drastically harms soil health and natural productive ecosystem processes, which in turn influences farmers to input more chemicals to produce a yield (Nordahl, Berry, Lyson, Shiva,Viljoen, Bohn and Howe). This massive amount of chemical input leaves very little tolerance for resilient ecological processes to serve, as it always has, as a climatic buffer. Therefore, commercial agriculture is left increasingly vulnerable to the growing severity of storm events and pestilence due to climate change. Additionally, monocrops lack genetic diversity, and are suceptible to single-crop failure. Often described as deserts, these fields are harsh environments that do not support insect pollinators and fauna needed for vital mycorrhizal interactions in the soil. Similarly, current commercial agriculture

creates additional energy inequalities in terms of its effect on soil health; "... worldwide, we are seeing uni-directional food and therefore nutrient flows, from the country to the city, never to be returned to the land" (Giradet. p34).

Decreased productivity at major agricultural nodes trickles down and affects every facet and scale of the food production system. "History has taught us that we can no longer believe that community health and prosperity lie in a centralized, corporate system of food production" (Nordahl, p188). If such systemic issues are not addressed, a greater percentage of Americans, as well as the rest of the world, will face hunger and malnutrition.

In fact, the growing disconnect between commercial agriculture and ecological health is also reflectively seen as the ever increasing chasm of misperception between American's and the origins of their food. "[We] have become a food dysfunctional society. For a nation founded on agrarian ideals—when crops permeated every nook and cranny of our towns and cities for centuries—it is baffling we would bristle at the thought of fruits and vegetables in parks and plazas, along our streets, and around our civic buildings…[a] great ideological shift in how we Americans produce, and subsequently view, food" (Nordahl, p4).

Under the current system, low-income families are driven to buying highly processed, less nutritional foods because of their low price (Melchior). Areas of urban poverty are generally associated with high food insecurity; areas are devoid of healthy and affordable food, yet saturated with fast food and other unhealthy dining options. They are known as food deserts. High quality and high nutrition food is being systematically situated in neighborhoods that can afford it (Nordahl). Yet food deserts and urban poverty are issues that span beyond economics into resource and community management (Mercado, p10). The presence of hunger should not disengage the community, but rather serve as a call to action as everyone in all walks of life has the same needs.

Food accessibility programs, such as SNAP, are helpful ways for families to feed themselves, yet there still may be trade-offs for important needs (such as paying rent or medical bills). Even before the COVID-19 outbreak, formerly food secure middle class families sought help from local food pantries (Nordahl). Due to necessity, food-insecure households have reported a complex series of techniques, in addition to SNAP, to make ends meet; relying on charitable food sectors and relational networks like neighbors and family (Kinsley).

However social distancing guidelines made these interactions all but impossible. "The complex and strategic food shopping patterns financially insecure families

Women & children will be the most effected by COVID related health and food disruptions

employ have been upended by the COVID-19 crisis. Many low-income households visit multiple food stores in search of the most affordable products, often traveling long distances to acquire food" (Kinsey, p332). Conversely, the opposite can be true. Citizens who are unemployed, or without access to reliable transportation, like youth and other vulnerable community members, rely on proximity, walk and bikeability for food access. Therefore for those in food deserts, nutritious food is less likely to be a practical and consistent choice.

Inclusive access to nutritious food has become a privilege. "As the demand—and need—for affordable, locally produced food rises, it is becoming abundantly clear...that the most effective food policies lie not within a central government body, but within a local one." (Nordahl, p.197). It must be a change beginning with and from within the very fabric of the community.

Projections

"Given current demographic trends [before the pandemic], the majority of all urban inhabitants in years to come will suffer disproportionate exposure to the triple burden of ill health: injuries, communicable diseases, and noncommunicable diseases." (Mercado, et al, p9). Similarly, UNICEF predicts that globally women and children particularly, face the bleakest outlooks regarding disruptions in food and health industries, including malnutrition, due to COVID-19.

Therefore, innovative infrastructure solutions are needed to lessen the inevitable pressure placed upon an already fragile food system, and an equally fragile social structure. "The World Health Organization (WHO) Commission on Social Determinants of Health (CSDH) has posed a provocative question for public health: Why do we keep treating people for illnesses only to send them back to the conditions that created illness in the first place?" (Mercado et al, p. i7). There is no solution that offers accessible and inclusive support for a growing vulnerable population within the current food system. "Poverty is likely intractable, but hunger does not have to be. Public officials need to recognize hunger's pervasiveness across the country [especially during and after the COVID-19 pandemic], and fight to eliminate it. Programs and policies need to be crafted and resources set aside to ensure that all of life's basic necessities are met: health care, shelter, clothing, as well as food" (Nordahl, p.120).

Emerging Possibilities: The Edible City

What is the scale needed at which policies and resources will freely supply food and other necessities in a public urban environment? What will ensure

written that ‘being a designer means being an optimist’ and simultaneously being a realist (2009). Designers, in his view, can include not only those professionally trained in design fields but de facto or ‘everyday’ designers who strategically link broad visions with concrete local activities, engaging in design by social – or even ‘radical’ – innovation, the latter of which leads to transformation of systems and the very way we think of them” (Reynolds, p.46).

The concept of the edible city engages a harsh urban environment with radical and innovative generosity and graciousness through designed networks of food provision. In his book, Public Produce, Darrin Nordahl asks and answers a similar question: “Is it possible to add fresh-produce choices and agricultural efforts in our urban settings, exploiting the food producing potential of our current network of underutilized public spaces? Indubitably” (Nordahl, p.56). The edible city model practically illustrates the “3 Legged Stool” of sustainability: social and cultural, economical, and environmental nourishment. If any of these three elements are to havet the longevity and impact needed for systemic change, they must be resilient to many forms of trials and catastrophes.

(Image 2.1) The Dubai Expo 2020 features edible city designs. The global community are looking at edible city models to recreate food systems as ecologically sustainable and resilient.
Source: expo2020dubai.com

Resilience

Resilience is," The amount of change the system can undergo and still retain the same controls on function and structure (ii) the degree to which the system is capable of self-organisation, and (iii) the ability to build and increase the capacity for learning and adaptation (www.resalliance.org/index.php/resilience)" (Nursey-Bray, p.14). This applies to each leg of the sustainability stool, and is addressed by elements of the edible city that will be threaded through each section.

A resilient edible city system would continually meeting needs at both the individual and communal scales while withstanding powerful and unexpected disruptions (Nursey-Bray). Sensitive generational adaption is an evolutionary trait found in nature, but lacking the current industrialized food system. The ravenous metabolism of commercial agriculture consumes more than it replenishes, while simultaneously causing severe harm to its dependents and the natural system it operates in. Consequences are escalating, leaving successive generations little to no time to find a solution to meet their own needs, let alone consider the future. It is to be argued that a resilient system plans and provides for their grandchild's generation; that solutions found in the present not only sustain the present, but often sustain the grandchild's generation in more encompassing ways than before.

For this to occur, revisiting the concept of a "city's metabolism" is helpful. The damage and fragility of a far reaching agricultural system has been previously discussed; energy inequalities are too great to nourish the interconnected systems that very much impact and are impacted by commercial agriculture. Through investing locally, the edible city is less affected by transportation lines, and reinvests energy where it is extracted. Implementing a local food system creates and establishes social bonds that are needed to weather circumstantial, mental and emotional hardships. It invests community money back into that same community, as opposed to financing global corporations. Similarly, perennial food producing plants, especially trees, can take years to establish and bear fruit. Lastly, the edible city lessens the environmental impact of transcontinental transportation and offers a holistic, organic approach to food that also encourages mental wellbeing. Therefore, the edible city proposes such a generational mindset of local abundance, generosity and graciousness, to ensure that the maximum number of people, the maximum amount of diversity in that community, thrives and continues on.

Social and Cultural Resilience

The edible city engages the community in civic agriculture, which agrarian writer Thomas Lyson would say, strengthens local communities through economic, environmental, and socially sustainable food production (Nordahl, p12). The origins of the edible city, a landscape in which freely accessible food is available for harvest, dates back thousands of years and is seen in the ancient Jewish tradition. "'When you reap the harvest of your land, do not reap to the very edges of your field or gather the gleanings of your harvest. Leave them for the poor and for the foreigners residing among you.'' (Leviticus 23:22, NIV). These spiritual and legislative policies provide the groundwork for a community to be completely invested in the wellbeing of their neighbors, fulfilled through the presence of nutritious food and the act of gleaning (or foraging). It offers a safety net for those who fall through the cracks of systemic wellbeing, adding another layer of social resilience. Public gleaning and foraging adds another layer of support for familes pinched for time and money (Nordahl, p108). The accessible presence of food to be freely harvested and gleaned offers redundant routes to fresh produce.

Additionally, in its various forms, urban agriculture offers numerous and well documented solutions to food insecurity and its corresponding physical and mental health crises (Nordahl). The act of participating in gardening activities has been shown to produce a boon of positive effects in low income areas. These include, but are not limited to, improved food security, increased physical health and nutrition, reduced stress and likelihood of cardiovascular disease, diabetes and cancer, and facilitates social inclusion and community connection (Korn et al).

Free or affordable access increases the likelihood of choosing nutritious foods, and encourages opportunities for outdoor physical activity along already utilized urban greenways. Thus nourishing overall health and operating easily in daily urban patterns (Proksch and Roher, Nordahl). Imagine a child hand picking an apple instead of buying a bag of chips. Or a neighbor being able to forage a healthy meal instead of skipping meals to pay the bills (Nordahl, p 107).

This economy of need is seen in low income communities utilizing their gardens for food production, while middle class gardens were underutilized or ornamental (Hite, et al, p63). Children today, can benifit from foaraging by increasing feelings of self-sufficiency and food literacy. (Nordahl, p6). The consideration of children and the urban poor ensures that access to healthy food remains an attainable basic right.

(Image 2.2) A neighborhood map indicates fruit tree locations. Shared knowledge maps, such as these, invite community access. Mapping and questing are especially formative experiences for middle to high school age students. This will be further discussed regarding outdoor education.
Source: Nordahl, Public Produce, p103

Public foraging has the potential to strengthen relational bonds within the community, as well as create frameworks that follow suit. For example, Fallen Fruit is an organization that advocates for social equity, public health and environmental stewardship entirely from public space gleaning and foraging (Nordahl, p103). Similar organizations include Seattle's Solid Ground, LA's Food Forward, Baltimore's Orchard Project, Maui's Waste Not Want, Vancouver's Edible Garden Project and Portland's Fruit Tree Project amongst many others. To encourage social cohesion and educational opportunities, these organizations host harvesting parties, inviting their friends and neighbors to harvest and distribute fresh foods. To the same ends, other community centered urban agriculture offer opportunities for allotment plots, and demonstration gardens for workshops. (Proksh and Roehr, p4). These spaces are backdrops for the creation of collective knowledge shared between community members.

The presence of these agricultural opportunities highlight the collective ignorance of food science, as well as plant and soil biology. City Fruit is a Seattle based organization that harvests fruit from residential trees. They believe public produce is an incredible community resource. Yet, they understand food literacy is a huge hurdle in gleaning (Nordahl, p100). Therefore, an entire section of this project is dedicated to outdoor and garden based education, both formal and informal, because it is so fundamentally important to establishing and maintaining a functionally gracious and productive edible city.

Landscape architects, as designers of our urban public spaces, are trained in ecology and aesthetics. Imagine the possibilities if traditional and native edible plants were added to the design palette (Nordahl). Basic needs of water, sun, soil type and maintenance are required for every plant, edible or not. The messiness and perceived pruning hassle of fruiting plants have kept them out of the public sphere, where the stringent maintenance regimes of trimmed lawns are executed in various forms daily. A critical examination of plants in urban public spaces reveals a multitude of creative opportunities for agricultural intervention without major infrastructural or maintenance changes.

If a city government is on board, a preliminary step requires mapping the current city's "open" and underutilized land. Yet here there is a tension between commercial development, with their revenues that support city projects, and what's commonly misunderstood to be not-for-profit agriculture. Yet cities such as Chicago, are creating financial allowances in their municipal budgets to prioritize urban agriculture for the mental benefit of their residents (Nordahl).

Innovative social activism can spring from municipal support, as further seen in the "Farmers of Chicago" program, which is intended to offer stability to food insecure communities through agriculturally revitalized vacant lots. The utilization of available schoolyards offers another creative solution to this tension, as the competing land uses are within the school itself. The proximity of potential resources available for boosting student wellbeing cannot be ignored.

Economic Resilience

The next leg of the sustainability model pertains to economics; sustainable practices must influence the market economy if they are to stay relevant. This can come in terms of goods delivered back into the market as abundant harvests produce more than expected. On an urban scale, both economic and community gains are undoubtable. "In 2013, City Fruit [in Seattle] gleaned 8,500 pounds of fruit from 135 sites; 7,000 pounds were donated to local food banks and meal assign orchard stewards, or other specialized maintenance. In Seattle similar programs receive financial assistance from Seattle's Parks Department and Washington State's Department of Natural Resources, further emphasizing the importance of municipal and state support (Nordahl, p101).

Opportunities including gleaning for restaurant usage also become viable. This practice increases knowledge of food and creates local partnerships with volunteer organizations or the houseless populations. This establishes a system of informal education holding to the standard of professional chefs who will teach gleaners as their produce is either accepted or declined. Additionally, individual cities or neighborhoods can brand their produced or gleaned goods. An example within a current Eugene community garden would be if the Huerta de Familia garden plot produced authentic, local and organic Mexican and Ixtapan salsas. This could be marketed as such and earn a profit for the garden's growing materials or events funds. He continues, "...gleaning and foraging in the city, the biggest benefactors will always be the most financially challenged [and their families]" (Nordahl, p114).

"...nourishing overall health and operating easily in daily urban patterns."

The fragility of the global food system is nothing new. Cities all over the planet have been experimenting with urban agriculture to find sustainable ways to locally and sustainably feed their populations. Huge international metropoli, like Shanghai, Dubai, Singapore, Beijing, St. Petersburg, and Montréal have incorporated urban agriculture as a vital component in their economic systems. In the neighboring cities of the Pacific Northwest, urban agriculture has been integrated into city policy and planning in the urban centers of Vancouver, Seattle and Portland (Simpson, 2013). Locally grown urban agriculture has become a serious solution to a fragile global food system.

(Image 2.3) A stylized rendering of growing spaces in Havana, Cuba. Vertical gardening via trellis and stacked PVC pipe allow for a greater density of plants.
Modified from source images by K. Parr

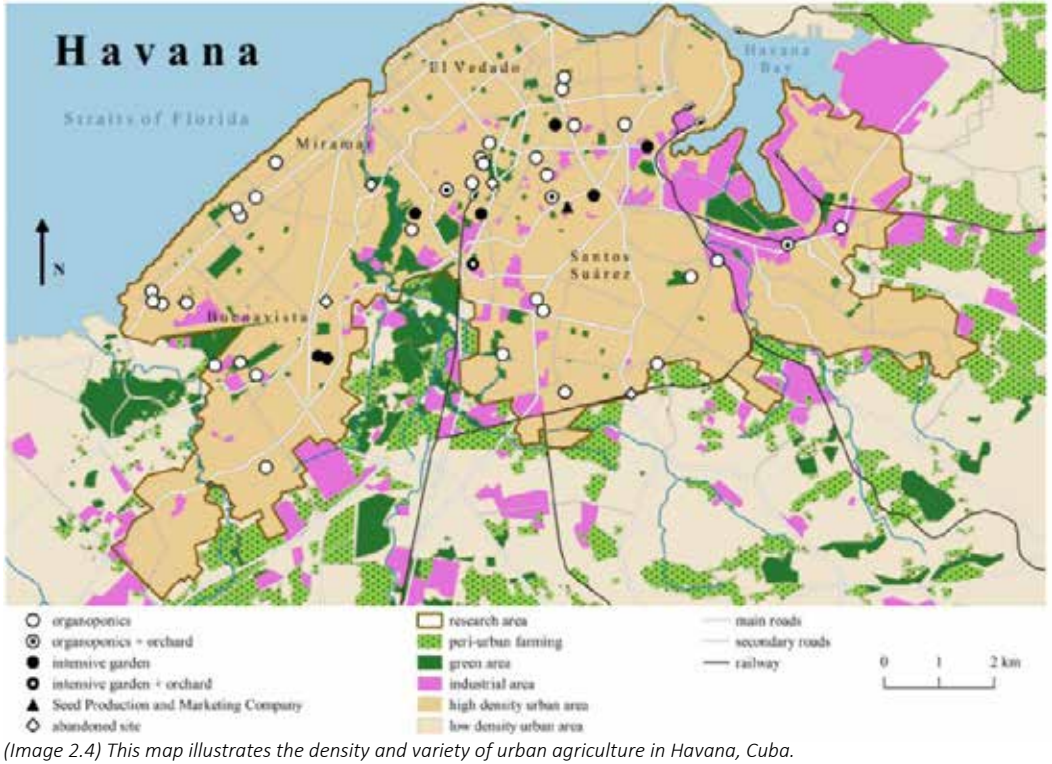
Precedent Study: The Edible City

1. Creative community led initiatives can help systemically marginalized folks
2. Growth in collective food literacy

Accessible Urban Agriculture: Edible City and Streetscapes

Havana, Cuba

For over 20 years, Havana Cuba has been the revolutionary example of fully integrated urban agricultural systems that has inspired edible cities around the globe is found in Havana, Cuba. After the collapse of the Soviet Union, communist supported Cuba lost 57% of its caloric intake and oil derivatives overnight, forcing rapid and innovative solutions to feed its population. The capital city of Havana supported 2.2 million people at the time (Quirk, 2012). A mere two years later, every neighborhood in Havana had a way to grow their own food; utilizing gardens and farms in various shapes and sizes, ranging from balconies and backyards to reutilized vacant lots. In fact, this guerilla audacity played a huge part in radically reorganizing Cuba's food system into a self-sufficient urban agriculture economy in a very short period of time (Quirk, Clouse, Thomas).



(Image 2.4) This map illustrates the density and variety of urban agriculture in Havana, Cuba.
Source: Quirk, 2012

By nature of their circumstance, there was limited access to oil and chemical inputs, thus Green Revolution industrial equipment formerly used to harvest, refrigerate and transport goods failed. Therefore these organoponics, or organic gardens, became such out of necessity. As natural and man-made distasters continue to grow in frequency and intensity, transportation and agricultural systems are growing increasingly fragile. Cuba models a self-sufficient alternatives to these systems (Thomas, 2012).

While Cuba's food crisis was linked to the fall of communism, the American food system is equally susceptible to systematic failures. Throughout the past year, this truth has been highlighted by the insecurities associated with the COVID-19 pandemic. Accessibility to fresh produce, especially for children without as many as 15 school meals a week in quarantine, is needed for physical and mental development. The immersive and fierce community driven nature of Havana's urban agriculture addresses that issue.

This style of urban agriculture utilizes any salvageable materials for planter bed material, thereby keeping materials cost low. Recycled plastics, hoses, and concrete are creatively implemented in the garden, making their construction cheap, practical and adaptable. Closed-loop permaculture principles allow for the recycling of organic waste materials, water collection and ecological synergies to encourage exceptionally productive spaces while preserving resources.

Similarly, the organoponics are organized, "...by the community, to produce food for the community"(Birch, 2009). After government intervention, subsidies created economically viable enterprises as the organic produce was sold at half the price of traditionally farmed goods. The fortification of these impromptu gardens by the local government bolstered impact through solidification of resource channels and training. "In 1994, the newly formed Urban Agriculture Department undertook a few key actions: (1) it adapted city law to the planning concept of Usufruct, making it not just legal, but free to adapt unused, public land into food production plots; (2) it trained a network of extension agents, community members who monitor, educate, and encourage gardeners in their neighborhoods; (3) created "Seed Houses" (agricultural stores) to provide resources/information; and (4) established an infrastructure of direct-sale Farmers' Markets to make these gardens financially viable. [3]" (Quirk, Clouse). Bolstered by state support, Havana alone became home to over 8,000 private and state run organic gardens, which produced a staggering half of the country's vegetables.

Precedent Study: The Edible City

Image 2.5: Havana organic farming plot.
Source: organicsa.net

"...over 8,000 private and state run organic gardens, which produced a staggering half of the country's vegetables."

The benefits of Havana's integral shift towards urban agriculture have been extensive and offer a vibrant visualization of the "Three Legged Stool" of sustainability: economics, social equity and environmental impact. Specifically, these benefits address the sister issues of resource scarcity and food security. Havana's edible city model bolsters resiliency in food supply chains as well as the individual health of its citizens through improved nutrition by greater accessibility to fresh produce. Similarly, ecological benefits of stormwater filtration, increased biodiversity and decreased energy and fossil fuel usage were also noted (Thomas, 2012).

Now, a pandemic threatens an already fragile food system and its frayed users; necessity is bearing down again. Pursuing informed, practical and opportunistic designs that follow in the footsteps of Cuba's interwoven urban agricultural thread could revitalize food systems into that of abundance and offer foliage filled oasis for the weary minded. These opportunities are everywhere. Edible schoolyards focus on children, yet are not limited to student use. Deeply engrained in neighborhood structures, schools are a natural choice for a community hub. "In Cuba, that's how it all began – involved citizens taking action in response to a crisis...If we let food once again be our guide to urban design, then the first step will be to use design to shorten – not just the physical distance – but the conceptual distance between us and our food" (Quirk, 2012).

Image 2.6 (above) & 2.7 (below) Founded in 1992, a cooperative has run the 44th Street and 5th Avenue Organoponico. Each year they grow leafy greens, such as lettuce, spinach, bok choy, arugula; and other annual vegetables like carrotsm broccoli and radishes. A community growing their own produce can determine what vegetables represent their culture and taste, like acelga espanol. Similarly, money made from organoponicos is invested back into the community.
(Source: Scott Braley and Robin Reichhardt)

3 Accessible Therupeutic Gardens

Key Takeaways

1. Youth are under-served
2. Positive biological connections between the human gut-brain axis and soil bacteria
3. Kids who participate in environmental education and experiential therapy have shown positive mental health indicators (fascination, empathy, critical thinking, etc).

"A garden is a grand teacher. It teaches patience and careful watchfulness; it teaches industry and thrift; above all it teaches entire trust." -Gertrude Jekyll

Youth As Underserved

Due to the increase of the population and current lack of supportive infrastructure, data suggests homeless and at-risk youth are a population that easily falls through social support networks. Approximately 20% of Lane County residents living in poverty. This percentage is higher than both state and national averages. (Lane County CNA 2019, p8). In addition the Eugene 4J school district, the largest of Lane County, ranks 6th in the state with their number of homeless students (Lane County CNA 2019, p6). Even amongst housed families, one in five children do not have consistent access to food (Lane County CNA 2019, p12).

Children who lack consistent access to food, safe environments and adverse childhood experiences are more likely to experience mental illness without coping mechanisms. (American Academy of Pediatrics, p1207). Emotional distresses and various violences lead to deeply ingrained traumatic thinking, yet without services and infrastructure to offer safety. Therefore, there is a greater likelihood of these youth engaging in high risk sexual behaviors (leading to teen pregnancies), drug use, assault and violence, perpetuating increasingly severe spirals of anxiety, depression, PTSD, and other mental health disorders (American Academy of Pediatrics, Wong et al).

As previously stated, the effects on youth should not be ignored, and to do anything less would propel generational hopelessness during and after the pandemic. "[The Kaiser Family Foundation advocates]...prioritizing mental health including child & adolescent mental health [as] an essential component of any universal, community led response to COVID-19 Pandemic" (Fitzpatrick, p1). Especially in the age of COVID-19, closures for the safety of teachers and students have unfortunately dissolved already thin educational and formative childhood experiences, as well as the meals many families count on to feed their children. "Our schools face a problem of epic proportions …[and]...distance learning created massive inequities of POC and poor households" (Strang). As more than half of the students in Eugene qualify for free and reduced lunch, indicating financial hardships are commonplace.

Green Schoolyards of America, an organization that co-founded the National COVID-19 Outdoor Learning Initiatice, has analyzed the initial results of online learning since the quarantine in the United States began in earnest in March. Many increased inequalities were uncovered. This is true in access to materials, relational guidance from their teachers and peers, as well as the safety to play and explore. Additionally, the parent's work situation greatly influences the

"Thoughtful exposure of youngsters to nature can even be a powerful form of therapy for attention-deficit disorders and other maladies."
-Richard Louv

emotional, financial and mental stability of the household, which is reflected onto the child. These common COVID era scenarios are poised to create a generational crisis of unusually large proportions, including mental health, reduced physical fitness, large scale budget cuts in education and job loss (Green Schoolyards of America). Children are a unique population with little support and means to acquire appropriate assistance. It is clear that schools are an obvious choice when providing inclusive and accessible wellness opportunities to children and young adults.

In the beginning, since the beginning

It has been said that, "...there are only two things that pierce the human heart: beauty and affliction. Moments we wish would last forever and moments we wish had never begun. What are we to make of these messengers? How are we to interpret what they are saying?" (Eldredge, p103). Where do we go to find out? Although it has recently gained attention, humanity has intrinsically known of the restorative qualities of exposure to nature for centuries. Social researchers theorize that many mental and emotional illnesses are byproducts of humanity's increasing disconnect from nature (Hinds, p451). Humanity's origin story in many cultures is deeply engrossed with natural elements, such as the soil. In the Jewish tradition the name Adam, the first man, means earth or soil. The first woman and his partner, Eve, means life. Together, their union symbolizes a deep interconnection between nature and humanity.

Society today has dismissed and subsequently forgotten this kind of relationship with the environment. The rise of industrialization and urban metropoli physically and emotionally separate us from natural processes. This is true in all walks of life. Scholars have theorized that, "...the reintroduction of humans to nature, particularly in terms of allowing children greater unsupervised play in natural environments, is both necessary to foster biophilia and for what it means to be human" (Hinds, p453). The denial of such has been argued as intentional blindness and unwillingness to live holistically healthy lives (Wirzba). Researchers, such as Richard Louv, have paired mental health symptoms like ADHD and depression to nature-deficit disorder (Kaplan & Kaplan 1995, Chow et al 2015, Maller 2009). The afflictions towards humanity's mental, emotional and physical wellbeing can only be countered by beauty. "Because this is so true, we must have a measure of beauty in our lives proportionate to our affliction. No more. Much more. Is this not God's prescription for us? Just take a look around" (Eldredge, p123). Nature

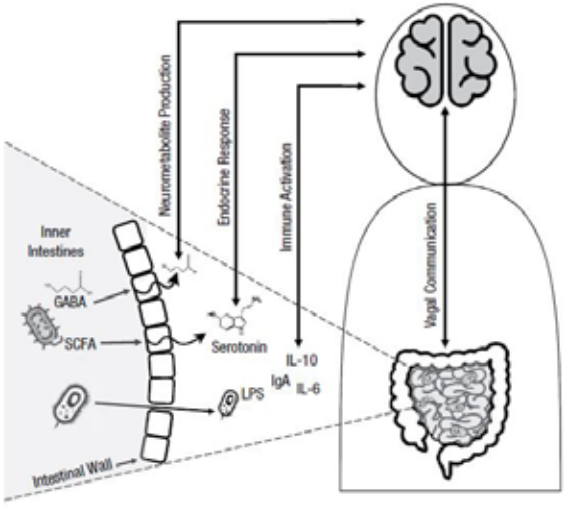
"The garden as a sanctuary, '...enhancing feelings of calmness, privacy and containment but also, specifically, a sense of intimacy."

offers an intrinsic solution. In paying closer attention to the gracious abundance of creation, we will see that, “In the peace of the whole creation, we will find our own peace” (Wirzba, preface).

A Microbial Connection

This fundamental association between human life and proximity for life-like processes, known as biophilia, can also be scientifically traced (Kahn, 1999). Specifically, biological and anthropological scientists are investigating humanity’s “old friends'', or ancestral microorganisms that were closely intertwined with the human and environmental microbiomes (Langgartner et al 2019, Rook 2013; Blaser 2017, Smith and Wissel, p398). These diverse microorganisms include prokaryotes, eukaryotes, and viruses, which together constitute the human microbiome. The presence of these bacteria are crucial in human holistic development. They shape affective states, process sensory and physiological information (L. F. Barrett & Bliss-Moreau, 2009; Siegel, Wormwood, Quigley, & Barrett, 2018), develop a sense of self (Damasio, 2003), establish social bonds and guide preservation and survival instincts (Smith and Wissel, p398). Our increasing rift between the natural world through our modern lifestyle is producing harmful and avoidable physical effects in human development (Hooper et al., 2002; Dave et al., 2012).

In fact, recent experiments investigating the “microbiota-gut-brain (MGB) axis” hypothesize that decreased contact with microbes not only affect physical wellbeing (allergies, auto-immune diseases, inflammatory bowel diseases, etc), but are also deeply entangled with humanity’s mental and emotional health (Rook 2010; Lyte & Cryan 2014, Smith et al, Bloomfield et al. 2016). The MGB axis is the major signalor between the GI tract, central nervous system and peripheral nervous system. The etiology and pathophysiology of anxiety and trauma-related disorders are complicated and intensely multifaceted, yet they are thought to involve interactions among internal and external conditions: the genome, epigenome, and environment (Nugent et al. 2011). Recently, the origins and compounding symptoms of these anatomic chemical disorders have grown to include the potential role of the MGB axis, as 90% of the body’s serotonin is along the intestinal tract (Berger, Gray & Roth 2009; Forsythe et al. 2010; Cryan & Dinan 2012, 2015; Leclercq et al. 2016). “As a species, we have spent many hundreds of thousands of years living and evolving symbiotically with our natural surroundings. Indeed, humankind may have a particular need to be near nature, in its many forms, in order to remain psychologically healthy” (Hinds, p451).



(Image 3.1) Emerging studies connect intestional bacteria , M. vaccae, with the production of serotonin, effecting mental and emotional wellbeing (Smith & Wissel, p400). M. vaccae can be found in healthy soil, and is nourished by fruits and vegetables.

"This reasoning has led to the development of strategies to promote stress resilience and to prevent or treat psychiatric disorders by restoring some of the lost "Old Friends" through microbial-based interventions" (Foxx et al, p3). The bacteria that has been repeatedly shown as a potentially useful countermeasure against negative outcomes to stressors is Mycobacterium vaccae NCTC 11659, or M. vaccae. This is a soil-derived bacterium with both anti-inflammatory and immunoregulatory properties that stabilizes the gut microbiome, and has proven effective in a "two hit" stress exposure model with mice. The first stressor is chronic disruption of rhythms (CDR); the impact of which is observed by reactive emotional coping strategies. These repeated patterns of coping strategies predict vulnerability to the subsequent development of anxiety and depressive-like behavioral responses (Koolhaas et al., 1999; Veenema et al., 2007; Wood et al., 2010; Wood and Bhatnagar, 2015). The second stressor studied is acute social defeat (SD). This is stressor is created by introducing and sustaining the presence of aggressors for ten minutes, then replaced back into the familiar home cage.

Behaviors of social defeat include increased isolation and enduring submissive tendencies. In juxtaposition, mice immunized with M. vaccae consistently showed greater socialization and shorter periods of submissive behaviors following aggressors, indicating a stress-resilient behavioral phenotype (Foxx et al, p15). The microbe-gut-brain axis of the immunized mice also altered the serotonergic gene expression in the dorsal raphe nucleus, the subregion of the brain that manages stress and anxiety chemical processing (Gardner et al., 2009a,b; Donner et al., 2018; Foxx et al., p19). Therefore, data suggests the beneficial properties of this soil-derived bacteria plays a key role in developing stress resilience and mechanisms that augment symptoms of depression and anxiety (Bellingrath et al., 2010; Rohleder, 2014; Eddy et al., 2016). While this is true for all ages, it is especially so for early childhood and adolescent stages in life.

As with any relationship, the human microbiome undergoes a coordinated and symbiotic development with the development of a person's central, peripheral, endocrine and immune systems (Hollister et al., 2015). The first critical period in establishing an individual's microbiome health begins with life, from 0-11 years old. At this stage, bacteria aid in nutrient uptake and absorption with positive neurodevelopmental outcomes. This includes intelligence, memory, learning and attention span (Smith & Wissel, p401). Lack of bacterial diversity or colony extinction in this period is suggested to produce long-term negative effects on the aforementioned cognitive abilities, as well as holistic wellbeing. Resilient

themselves, bacterial colonies can be repopulated and still stimulate positive effects. Introducing children from a young age to beneficial soil-based bacteria can produce happier, healthier and more stress-resilient children.

Therefore, intentionally encouraging this microscopic relationship beginning with children is shown to be a priority and paramount to their development. Eating organic produce increases the likelihood of adding M. vacce to a child's mircobiome. Recently, the origins and compounding symptoms of these anatomic chemical disorders have grown to include the potential role of the MGB axis, as 90% of the body's serotonin is along the intestinal tract (Berger, Gray & Roth 2009; Forsythe et al. 2010; Cryan & Dinan 2012, 2015; Leclercq et al. 2016). "As a species, we have spent many hundreds of thousands of years living and evolving symbiotically with our natural surroundings. Indeed, humankind may have a particular need to be near nature, in its many forms, in order to remain psychologically healthy" (Hinds, p451). Eating organic produce increases the likelihood of adding these "old friends" to a child's mircobiome.

Types of Healing Gardens and Emotional Significance

Gardens and wilderness have been utilized as places of meditation for thousands of years. Mental indicators of affective connection, such as wonder, creativity, curiosity and risk, are foundational in establishing empathy in relationships. Developing such with the natural environment is conceived and nourished by being fully present in the awe-inspiring ecological world around us (Appolloni et al 2016). Similarly Albert Einstein said, "The most beautiful emotion we can experience is the mysterious. It is the power of all true art and science. [They] to whom this emotion is a stranger, who can no longer wonder and stand rapt in awe, are as good as dead" (Young et al, p101). Truly observing nature is at once mysterious, invigorating, whimsical and calming. Relatively recently, therapeutic gardens and horticultural therapy have been established as emotionally and mentally beneficial havens in times of distress, hardship and severe need (Marcus et al 2014, .

Gardens, in particular, are successful mediums and partners for stress rehabilitation, which give meaning to everyday tasks and address physical and mental needs (Adevi et al 2012). While deeper connection is a learned response through repeated beneficial stimuli, "...importantly allied to the biophilia hypothesis is the idea that specific sensory cues can elicit…innate affective or emotional meaning'" (Hinds, p452). This is a buttress for the ideology that recognizes

(Image 3.2) A stylized rendering of a healing garden. Modification of original sources by K. Parr

the restorative relationship between humans and nature; the cornerstone of therapeutic gardens. “To put it simply, therapeutic landscapes are places that encourage feelings of well-being amongst their users'' (Butterfield, p698).

Examining this relationship further, research explains the process of renewing fractured physical, psychological and social fatigue are met with restorative, calming properties in the healing garden (Kaplan et al 1995, Basu et al 2019). Retreat, fascination and exposure to nature are premiere factors in therapeutic design, the effects of which have been observed through affective changes in thought patterns (Ulrich, 1993; Kaplan and Kaplan, 1989, Hinds, Lau). In fact, 'soft fascination' proposed by Stephan Kaplan, proposes opportunities for reflection, a whimsical "effortless attention" that comes from caterpillars inching across leaves, or hummingbirds hovering in near flowers (Kaplan, 1995). Building upon existing research, Romes and Lam summarize that, “The risk of developing mental health issues are reduced when young people are given the opportunity to develop resiliency ...and this is compounded through being in natural spaces ...and connecting with others...” (Romes & Lam, p388). Therefore repeated exposure to such natural restorative elements, “...help to create what we call ‘narratives of resilience’, whereby individuals may articulate their understanding of their [trauma] and begin to craft their response” (Butterfield, p703). The focus is on locality, and fostering a sense of awe regarding the unique ecosystems around them; this in turn builds confidence, awareness and a strong sense of place and belonging. Nature abounds with opportunities for soft fascinations and whimsical mosaics of observation meeting imagination.

Healing gardens exist for people suffering from chronic mental illnesses, like elderly with dementia and for veterans with PTSD. Thus, various renditions of these principles have been honed into design typologies that address a diverse spectrum of human obstacles towards well-being. Hospitals, hospice, and other healthcare facilities utilize therapeutic elements for the wellbeing of their patients and families, as well as their healthcare providers. “As staff at Maggie’s [a cancer treatment facility] have observed, when people are unwell, in shock or dying, they often experience a crisis that challenges perception, purpose and meaning... Their gardens offer thresholds at a physical, cognitive and symbolic level” (Butterfield, p701). Beauty speaks into affliction; healing gardens speak into an ailing human condition.

Patients, family members and staff of Maggie’s cancer centers have described their experiences in the garden as a sanctuary, “...enhancing feelings

of calmness, privacy and containment but also, specifically, a sense of intimacy" (Butterfield, p703). The same word was used by African American youth regarding their Frenchtown community garden. Reinforcing the effect of sensitive spatial design in harmony with natural elements (Menatti and Casado da Rocha 2016, Winterbottom and Wagenfeld 2015). "Such a relational sense of place, between people, space and the affective ties between them, opens up an understanding of the complex composition and intimate experience of the designed environment in the experience of well-being" (Butterfield, p703).

Recently, college campuses have been designed with therapeutic elements in mind, seeking to alleviate the anxiety of students in the pressures of the academic system (Marcus & Sachs). Small, more intimate settings tucked away are proven equally powerful in providing a safe place to reflect. Sensory rich designs encourage engagement, invite us out of our minds and ground us in natural beauty. "The special texture of plants can draw people to touch them... encourage direct interaction between people and natural elements"...soft sounds "can create a natural symphony that brings relief to people"...rhythms of wind and rain, birds and insects that sing in the trees, and a fountain that spouts tiny water columns"...scent ranging from sweet to earthy" (Lau et al, p453). In fact, for panic attacks a useful grounding technique involves hyper-observation; for example, trying to count the leaves on a tree. In a time of collective grief, anxiety and insecurity, public spaces should also provide opportunities to combat these things by providing abundance, rest and contemplation. All of these elements in tandem help users understand the relational dynamics at the core of restorative places and processes (Butterfield, Hinds and Sparks 2008, Kaplan 1995).

Care farms operate as the culmination of natural therapy by prolonged exposure and interaction with nature through traditional farming techniques. These environmental activities for therapeutic purposes fall into the category of "Green care," and has an established reputation in western Europe benefiting disadvantaged populations. Those utilizing care farms for various mental and emotional therapy include those with learning disabilities, substance misuse, dementia and offenders. Findings indicate other measures of success, such as reduced symptoms of anxiety, depression, and has been useful for people undergoing addiction rehabilitation.

It is worth noting that the complex, multifaceted nature of care farm interventions do not easily produce identifiable empirical evidence as to its effectiveness. However, behavioral observations of the changes in quality of life were measured

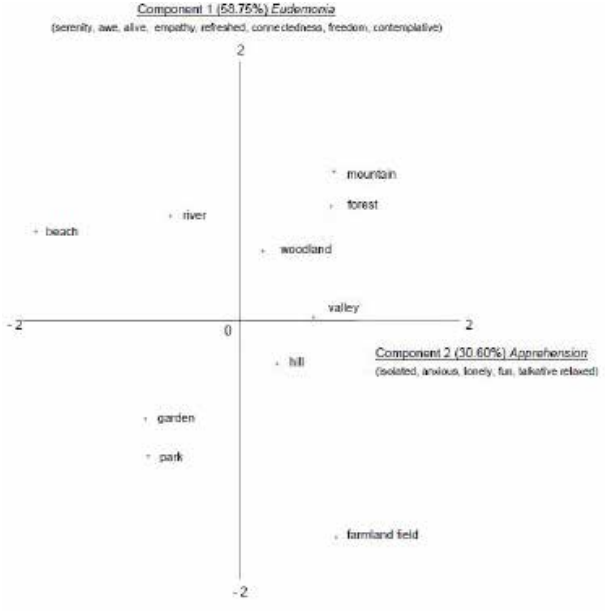
"To put it simply, therapeutic landscapes are places that encourage feelings of well-being amongst their users."

(Image 3.3) Rooftop Healing Garden by Live Green Landscape Assc, LLC. Waves, meanders and spirals are ecological patterns and key elements in therupeutic garden design. This biophyllic relationship is continually explored for deeper connection to human health and wellbeing. The creation and completion of cycles are also symbolic for processing emotional journies.

Experiential states	*Eudemonia* (58.75%)	*Apprehension* (30.60%)
Refreshed	.99	
Connectedness	.96	
Contemplative	.95	
Serenity	.95	
Alive	.94	
A sense of awe	.90	
A sense of freedom	.87	
Empathy	.82	
Talkative		-.85
A sense of fun		-.83
Relaxed		-.81
Lonely	.55	.81
Isolated	.56	.81
Anxious	.54	.78

Figure 3.1 (above): Positive mental indicators (Eudemonia) as well as their opposites (apprehension) participants experienced in experimental sites.
(Hinds, p 459)

Figure 3.2 (below): Illustrates the relationship between Eudemonia and Apprehension in various outdoor settings. Valley (meadow) and woodland/ forest showed positive correlations, and therefore were the environments chosen for the edible therupeutic garden typology.
(Hinds, p 460)



Effects of environmental exposure on experiential states

against the Clinical Outcome in Routine Evaluation-Outcome Measure; and thus implied increased cognitive functioning, life skills and beneficial social interaction. More than 2,000 of these therapeutic farm landscapes are scattered throughout Europe (Elsey et al). As their presence and worth become more commonplace, various case studies of a range of target populations and ailments suggest the long term efficacy of care farms in the United States.

In summary, healing and therapeutic gardens are sensory rich places that transcend constant reminders of identity, illness or circumstance to allow users the opportunity to be fully present and experience beauty. A place to simply be still or enable a "Freedom to tarry" either individually or in community (Butterfield, p703). Thus physical design is given affective social and symbolic qualities (to linger, to be) for nothing else but the hope of wonder, restoration, and healing.

Environmental Education and Experiential Therapy

Education needs to evolve and adapt to fit the needs of its students in an unstable world. Social scientists have observed, "...that modern children are part of a social fabric undergoing an accelerated rate of change where '. . . they are increasingly exposed to adult ways of thinking, experience, problems and pressures in ways that they may well not be equipped to handle" (Maller, p523). Therefore, promoting a child's mental wellbeing, even as young as elementary aged, offers a greater opportunity to learn beneficial coping strategies to help them confidently reach their full potential as adults. School gardens address multifaceted problems of urban condition, child development and civic engagement among many others. "Because gardening was considered a means to address a range of educational, social, moral, recreational, and environmental agendas, children's garden programs enjoyed a broad base of support from teachers, government agencies, institutions, garden clubs, social reformers, and civic groups" (Nordahl, p178).The holistic and reflective pedagogical approach of the outdoor school methodology seeks to address the physical and mental needs of the students as individuals, as well as encourage team-work.

This is the foundation for ecological theory, a school of thought beginning in the 1970s and deeply integrated within outdoor education pedagogy. "Ecological theory suggests that contact with nature is important for children because it promotes imagination and creativity, cognitive and intellectual development, and enhances social relationships...In addition, educational theory suggests contact with nature facilitates children's understanding of their place in the world, their

connections to the social and biophysical world around them." (Maller, p523). This includes relationships with mentors, peers, and perceptions of self, which will be described later on. Furthermore, Maller argues that in light of the potential transformational relationship described in ecological theory, it falls upon the school to provide children with natural contact through their grounds and curriculum. In an ironic twist of pandemic isolation, the environment itself has become the most accessible potential classroom.

Before months of quarantine, this notion was described by a member of a youth-centered community farm in Frenchtown. 'Anything that can be taught in a classroom can be taught in a garden' and someone from iGrow Dunn Street said, "when you want to learn something, just walk in a garden or in a forest" (Hite, et al, p62). In the field of environmental education, this increased attentiveness has been a critical element in the development of empathy, which in turn, fosters stewardship. This progressional thinking of "awareness to action" was developed in the 1977 Tbilisi Declaration, the first international environmental education conference organized by the United Nations Education, Scientific, and Cultural Organization (UNESCO) in cooperation with the U.N. Environment Programme (UNEP).

Experiential nature-based therapy for children has also been shown to increase physical health (lowers risk of diabetes, Vitamin D deficiency, and chronic asthma), as well as nourishing emotional health (higher self-understanding and greater empathy) through repeated focused observation (Hinds and Sparks 2008, Korn et al 2018, Maller 2009, Renwick et al 2019, Swank 2015). The following description from a school garden participant describes just that: "We feel more alive as we look around; we seem to notice more than usual. The things we notice...work together to make us feel more present in the place and moment" (Clark, p5). Changing brain patterning is achieved through "core routines", or daily acts of stillness, inquiry or play in the natural environment that engages emotions, sparks wonder, and encourages a holistic combination of sensory and imaginative curiosity. These methods are described in detail in Coyote's Guide to Connecting With Nature.

Environmental education, wilderness therapy and experiential learning practices have been shown to produce increased trusting relationships with adults and mentors in uncertain circumstances, when traditional methods were not effective (Green, Maller, Nordahl). This link has been first defined through a "sense of coherence", which includes capacity to comprehend, generate meaning

"The garden as a sanctuary, '...enhancing feelings of calmness, privacy and containment but also, specifically, a sense of intimacy."

(Image 3.4) A stylized rendering of a healing garden. Modification of original sources by K. Parr

"Nature facilitates children's understanding of their place in the world."

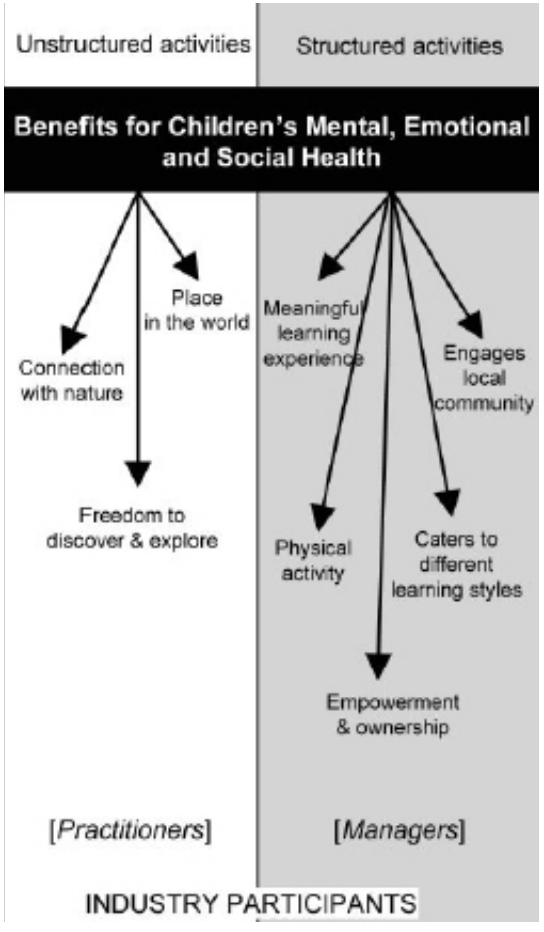
and knowledge of nature; and develops their capacity for cognitive, emotional and spiritual manageability regarding relationships and events. These are further defined by a person's "general resistance resources'', which can include a person's capacity to foster community networks, financial stability, and self-esteem (Schreuder, p141). "Questing", a combination of map making and scavenger hunt, is a purposeful environmental education tool that can inspire wonder and creativity through "civic engagement" (Clark, p11). "Exploring the landscape with friends. Trying to trick each other, lingering out from daylight through dusk and into the night- it is precisely these kinds of interactions that foster and nourish a sense of place, community, belonging, and wellbeing" (Clark, p8). Intergenerational farm experiences encourage elementary to high school students to build trust in relationships with their mentors in a setting of decentralized power and co-collaboration; when revisited five years later these relationships were still impactful (Mayer-Smith et al 2009, Romes & Lam). Similarly, when describing his own experience at his children's school farm, Public Produce author and city planner Darrin Nordahl commented on the community atmosphere: "The amount of food the garden yielded was modest. But the joy it brought kids and parents, and the interest in fresh vegetables that the garden sparked, was immeasurable" (Nordahl, p182).

Greater empathetic and communicative tendencies, or social emotional learning, found in environmental education has prompted, "...scores of at-risk youth [to go] on the straight and narrow simply from growing organic food,"...providing a much needed positive outlook (Nordahl, p193). This, "... permits children to visualize the future and to see themselves as proactive participants with a significant role to play" (Green, p12). Experiential therapy through environmental education has proven to children that their age does not define their agency to produce change through ecological advocacy and meaningful expressions of self. Children spend the majority of their childhood in school, creating relationships and learning about themselves. So, the school garden is a natural backdrop for youth centered empowerment, and are vital to address and meet these formative educational and relational needs (Romes & Lam, p388, Collado and Staats 2016).

Additionally, greater freedom of expression and exploration, found in environmental education, increases a child's resilience and intrinsic motivation, and is positively reflected in academic performance, even when not studying outdoor education curriculum (Kuo 2019). "Fifth grade students who participated in gardening activities as a part of their science education scored 14.9 points

higher on tests compared to students in the control group, which was statistically significant" (Klemmer, p550). More importantly, environmental education and experiential therapy empower students with the tools needed to discover meaning in their abilities, and healthy coping mechanisms. "Significantly [outdoor education]: promotes autonomous learning environments that support children's scientific, emotional, scholarly, artistic and ecological work, enabling them to draw on their different and subjective ways of knowing (Green, p12). Reflections from a child behavioral researchers describe students recognizing the metaphor of nurturing plants in the garden as understanding social and emotional growth (Renwick, p 395). The impact of experiential play therapy in nature on beneficial behavioural modification is indicated through resilience in hardship, greater engagement, self-discipline, enjoyment, and the confidence to explore and express freely (Green, Kuo, Maller, Taylor). Blurring the line betwen humans and our non-human neighbors often challenge a young person's presupposed view of themselves, as well as situate them as an important player in a beautiful and interconnected world.

A powerful case study, run by Anja Whittington, demonstrates the transformative effects of outdoor experiential learning regarding concepts of femininity in the wilderness. This social experiment took adolescent girls on a multi-day rafting trip, which included a daily circulation of roles and responsibilities designed to encourage leadership and camaraderie. "Results revealed that the girls challenged conventional notions of femininity in diverse ways. This included: 1) perseverance, strength, and determination; 2) challenging assumptions of girls abilities; 3) feelings of accomplishment and pride; 4) questioning ideal images of beauty; 5) increased ability to speak out and leadership skills; and 6) building significant relationships with other girls" (Whittington, p205). Strong interpersonal relationships with other girls established women as allies at a critical developmental stage. Food became a source of strength instead of a desire to be controlled, thereby promoting healthy eating habits in a demographic prone to eating disorders. In addition, a "feminine style" of leadership of cooperation, nurturance and consideration of the needs of the group developed alongside traditional leadership skills of decision-making and taking charge.



(Figure 3.3) There is an increasing field of study connecting children' holistic wellbeing to both structured and unstructured activities (Maller, p531). This supports the idea of experiential therapy found in outdoor education.

Encouraging Increased Inclusion

While far from perfect, environmental education seeks to bridge class and racial gaps amongst students and increases inclinations towards stewardship practices.

(Image 3.4) "Observing the natural cycle of new growth and budding of the plant also becomes a metaphor for patience, possibilities and recognition of the natural cycles in life" (Renwick, p 395). While this symbolism will be lost of the little kids, late middle to high school aged students could understand the connection.

"For a seed to achieve its greatest expression, it must come completely undone. The shell cracks, its insides come out and everything changes. To someone who doesn't understand growth, it would look like complete destruction." -Cynthia Occelli

Greater exposure to nature, no matter the background, has often been positively correlated with more deeply ingrained effects (Kuo, 2019). Garden Based Education increases self-esteem, self-efficacy and ability to navigate cultural and social tensions of diversity (Hoffman et al 2007). Students desire and should be given the agency to discuss their perceptions of their current community, and ways they believe it can improve (Hoffman et al 2007). Yet, the typical outdoor educational experience is still framed for middle-class, Caucasion, able-bodied male. "The environmental movement has always been a powerful social force affecting the work of Outdoor Experiential Education in some capacity; research shows that an urgent challenge is to "use the injustice frame to identify and analyze racial, class, and gender disparities and to emphasize improved quality of life, autonomy, and self determination, human rights, and fairness (Taylor, 2002, p. 41)" (Warren & Roberts, p91).

There is a call for greater facilitator sensitivity regarding participant race, gender and class status in outdoor education to create a more inclusive learning environment. "At risk" youth, including persons of color or abuse survivors, respond to standard "stress challenges" commonly found in outdoor education with instinctive behaviors that are counterproductive to their personal development and growth (Warren, p22). Facilitators are recommended to undergo unbiased training in the social and cultural backgrounds of their participants, as well as engage in self-reflective practices. The intended result disrupts traditionally set standards of participation, offering an experiential education that best benefits the student participant according to their needs (Warren, p22). Rethinking common outdoor educational practices can immediately assuage feelings of isolation and fear common in many minority experiences in the outdoors. The word "service" can harbor negative connotations for African American, economically disadvantaged and female participants. Environmental and community service are still an integral component, yet sensitivity to minority experiences is required for effective and inclusive framing. Similarly, the prioritization of "self-reliance" stems from historically Euro-American individualism that isolates cultures that value community. Individual displays of skill (including solos) and impersonal recognition (such as badges and certificates) are culturally at odds with the values of many people of color, women and working class students. Instead, community building activities, shared reflection time and personal feedback are recommended (Warren, p23).

While research continues to explore greater inclusion practices, the combined

effects of school gardens as opportunities for experiential learning and community building should not be ignored. “Environments that combine student learning with community responsibility not only create a more interesting and dynamic educational experience but also serve to improve overall academic performance among a wide range of students” (Hoffman, p403). The garden program at the case study community college offered a racially and economically diverse student body to grow in successful communication skills and comfortability with cultural differences, a confidence that was reflected in the increased quality of academic work (Hoffman, p404). “Gardens help residents transcend race, culture, income, and neighborhoods, and increase their ability to impact policy and social change” (Hite, p64).

Additionally, garden based education establishes a pattern of healthy eating for a child. As Ron Finley, the guerilla gardener from South Central discovered, 'When children grow kale, children eat kale” (Nordahl, p14). Michael Pollan, a nutritional expert, agrees. Pollan contends that we may never fully develop an appreciation and fondness for healthy foods until there is a significant change in our food culture. And that change, he says, “must begin with our children, and it must begin in our schools.” Pollan maintains that eating well is a critical life skill, and that “we need to teach all primary-school students the basics of growing and cooking food” (Nordahl, p179). In fact, “If public produce is to succeed in our cities, educational programs are needed to reacquaint us with food, to help us recognize which plants are edible and which are ornamental, and to teach us how to plant, how to care for, and how to harvest food” (Nordahl, p14).

In summary, access to free public garden space has transformational potential, with equal potential to meet intangible but vital needs. Whether, “...gardens are sanctuaries, places of spirituality or self-recognition,” they hold intrinsic value on communal and individual health and well-being (Hite et al, p62). “Some believe that the gardens have the power to transform neighborhoods and relationships, the ability to change perceptions on food and race, and bridge generations" (Hite at al, p 26). A stark differentiation is made by many between life within and outside the garden. One person from iGrow Dunn Street [Tallahassee] said, ‘When I’m here, I can be myself, I can walk barefoot . . . outside the garden it’s a rough world.” (Hite, et al, p62). However, creating and sustaining such an environment is filled with sensitive social issues and inherent challenges. “Of course, many hurdles lie in the way of providing a healthier, more equitable urban landscape. One of the tallest may be our newly gained ignorance of food. We as a nation

> "...use the injustice frame to identify and analyze racial, class, and gender disparities and to emphasize improved quality of life, autonomy, and self determination, human rights, and fairness."

"If you truly get in touch with a piece of carrot, you get in touch with the soil, the rain, the sunshine. You get in touch with Mother Earth and eating in such a way, you feel in touch with true life, your roots, and that is meditation. If we chew every morsel of food in that way we become grateful and when you are grateful, you are happy."
-Nhat Hanh

will have to re educate ourselves about food, what it looks like, where it grows, and when it is ready to harvest. In short, we need to get back to our agrarian roots" (Nordahl, p13). In short, success in public produce requires a commitment to understanding the intricate interweaving of ourselves, our communities, and the ecology around us.

Precedent Study: Therapeutic School Garden

(Image 3.5) A rendering of the Carter School Sensory Garden (Winterbottom & Wagenfield, p241).

(Image 3.6) Tall flowing grasses are visually and textually calming, and handrails create a safe environment to explore (Winterbottom & Wagenfield, p242).

Therapeutic School Garden
Carter School
(396 Northampton St, Boston MA)

Nestled in Boston's Roxbury neighborhood, the Carter School is the city's specialized environment for students with profound developmental delays. They have excelled in providing accessible learning with individualized focus so, "...students can realize their potential for maximum independence and the highest possible quality of life" (Williamecarterschool.org). Every classroom is one electronic door away from a 0.4 acre "sensory garden", designed by David Berarducci Landscape Architecture, Martha Tyson and in close partnership with Carter school families and faculty.

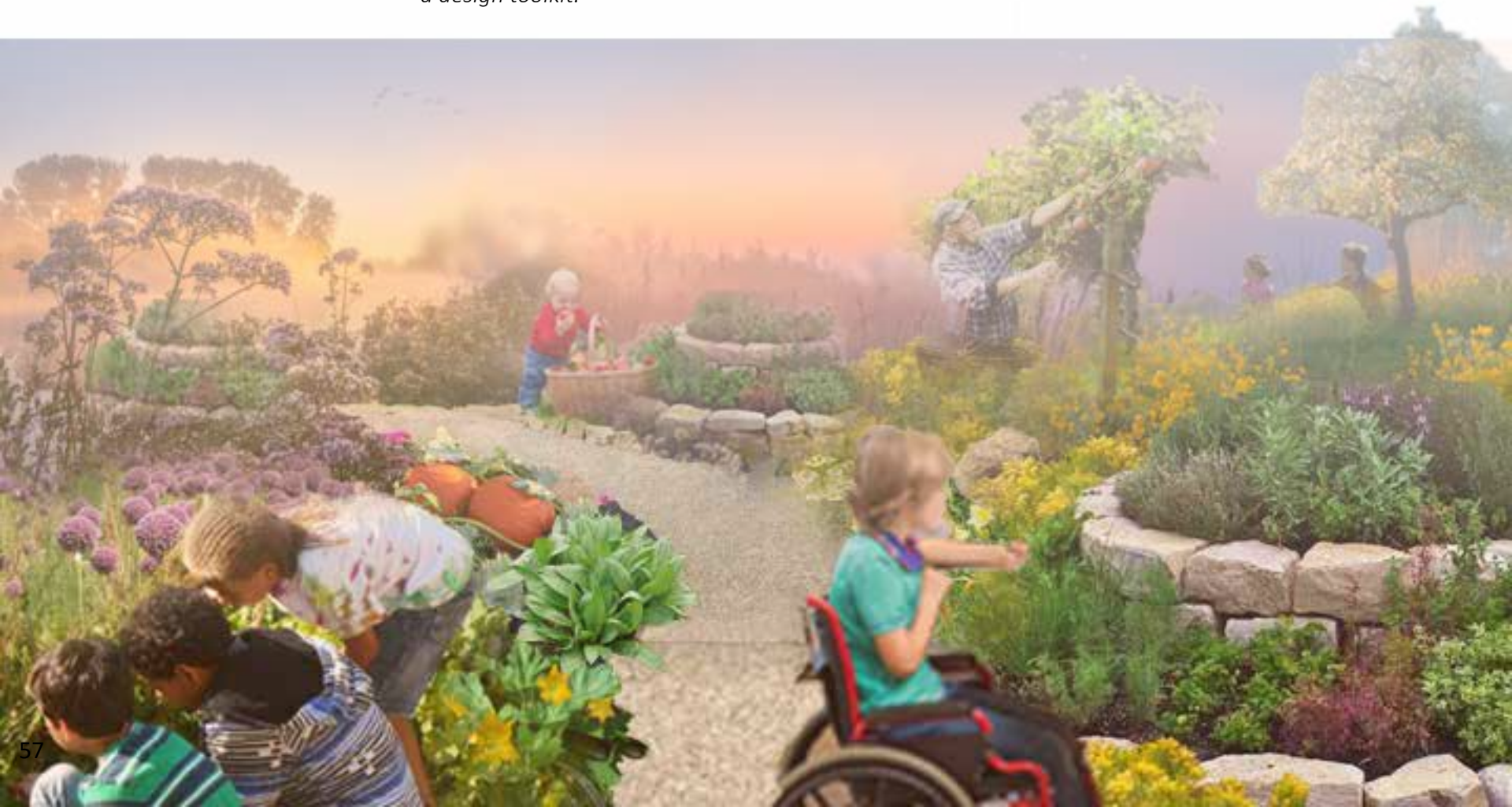
As all students are in a wheelchair or require ambulatory assistance, the garden paths curve in gentle figure eights; bounded by contrasting edging, handrails and plenty of visual interest. Students are able to reach out and touch feathery grasses, and smell flowers in wheelchair accessible raised beds and sensory boxes. This garden is a, "...place of peace and beauty", that utilizes sensory stimulation to foster attention and wonder. The lush and soft description of the garden speaks for itself. "Tall grasses create a waving serpentine walkway. Students feel the gently waving plumes as they travel through the path. Vegetables are grown in a raised planter that wheelchairs can get up close to and extend underneath. Students plant, weed, water and harvest the produce. The fruit patch has strawberry and blueberry bushes, and there is an entire area filled with scents of lavender, lemon balm, sage...Weeping cherry trees grace an open grassy area. A magnolia tree watches over the raised rock wall and gradual slope. In the very center of the Garden is a silver ball, which spins and provides the seated rider with a 360 degree view of the garden. Three open beamed pergolas form the support for flowering vines, which provide shade for outdoor tabletop activities" (Williamecarterschool.org). Thus, the Carter School Sensory Garden is an ideal precedent as it sensitively designs for the wellbeing of the most vulnerable, combining education and therapy into, "...a place of beauty, tranquility and sensory enrichment" (Winterbottom & Wagenfield, p243).

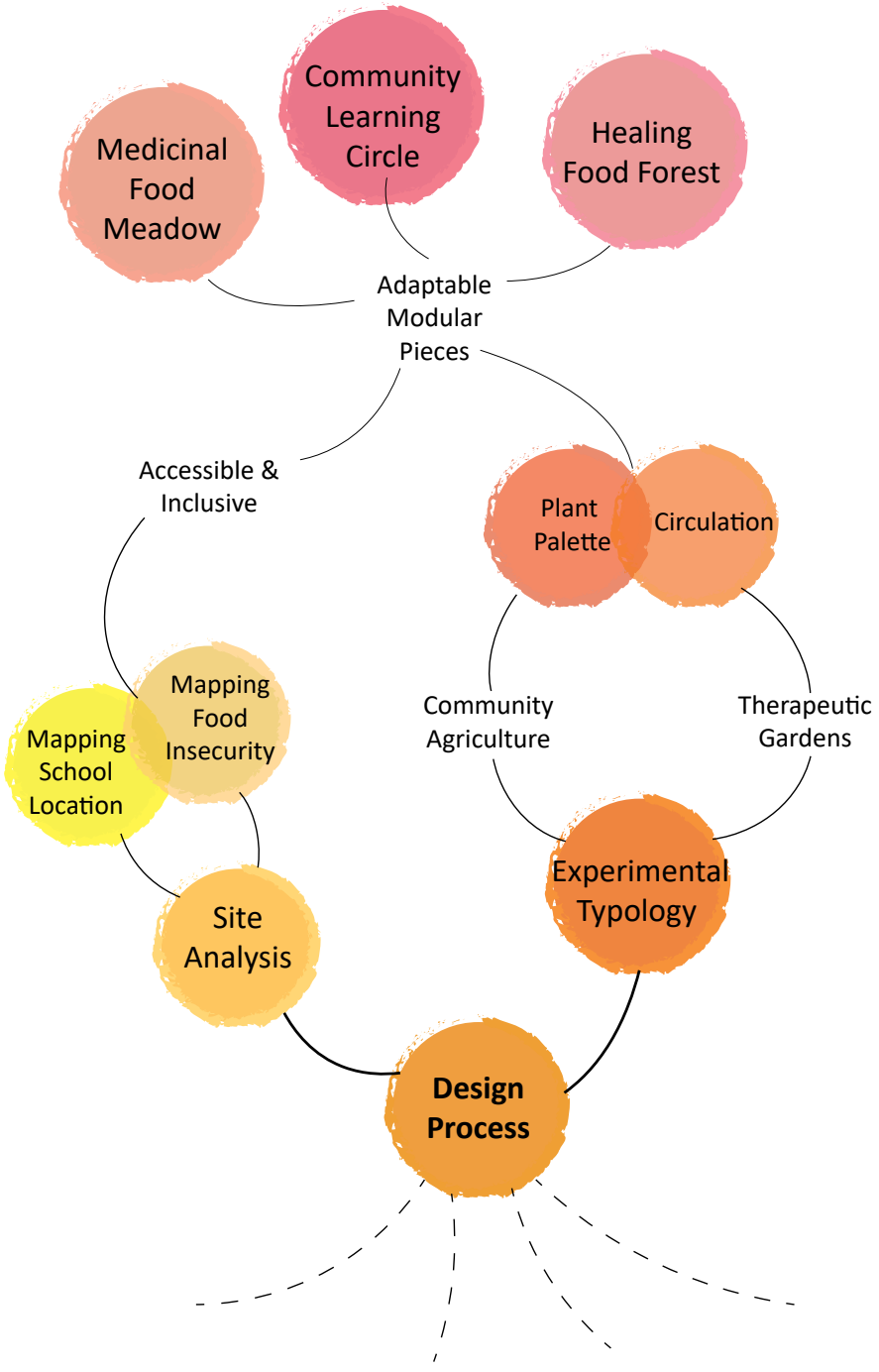
The Carter School offers a highly sensitive example of applying therupeutic garden design to be enjoyed by students with various handicaps. Soft sweeping paths are gently enveloped by full plantings with varied textures. An outdoor classroom is shelters mutlicolored sensory bins, where students can practice facination by examining leaves and other materials. These design elements were inspirational in combination with ecologically based designs.

(Image 3.7) Wheelchair accessible paths, shelter and sensory bins provide inclusive comfort for children with severe disabilities.
Source: Winterbottom & Wagenfield, p241

Part 2: Design

Edible landscapes (including school gardens, community gardens, etc), and therapeutic gardens both utilize natural processes to holistically benefit human wellbeing; however, they are often treated as two separate entities. The separate accessibility and inclusivity of these garden typologies were previously examined in Ch2: Precedents. Therefore, the current "gap in knowledge" this project seeks to address involves the strategic combination of edible and therapeutic design practices to benefit school aged children as an underserved population. This will be done through a creation of a design toolkit.





This phase sought to distill key elements from precedent studies into a Toolkit of Parts of combined edible and therapeutic school garden design features. Translating theoretical theories and global precedent studies into practical and adaptable design pieces meant an in-depth analysis of food security and child resources in Eugene, OR.

4 Eugene, OR: Site Analysis

Key Takeaways

1. 16.5% of Eugene taxlots have access to fresh produce
2. Majority of Eugene schools are in the lowest 2 median income brackets

"Start where you are. Use what you have. Do what you can."
-Arther Ashe

The Pacific Northwest is an ideal and ready socio-environmental context to attempt a child-focused edible and therapeutic school garden. As seen in the following analysis, utilizing schools as edible therapeutic gardens not only offers inclusive access to nutritious food and restorative recreational experiences, but additionally creates the beginnings of food and wellness corridors in the surrounding communities.

Existing Insecurities

As in other parts of the country, Eugene's existing food scarcity and mental illness needs are exacerbated by the effects of COVID-19. Again, as seen elsewhere, it is likely that these effects are most detrimental on people of color and low income families. The available mapped social data is a decade old, therefore circumstances could have changed.

This project uses the definition of food insecurity as it is defined and utilized by LeClair and Askan (2014). They define a food desert as an, "...inability to easily acquire food with high nutritional content" (LeClair & Askan, p538). "Price-distance", or the relation of costs regarding price of food against the price in time to travel the distance affects this definition also. Food scarcity suggests that families in lower income brackets can also little afford the time spent on public transportation in travelling to grocery stores for fresh produce.

Additionally, LeClair and Askan follow existing mapping criteria when exploring potential food deserts in Bridgeport, CT. These previous studies established "demand circles" of ½ mile for full scale major grocery stores, and ⅛ mile for smaller food retailers like convenience stores and bodegas. Based on their work. this project assumes that convenience stores do not carry a variety of fresh produce.

The aforementioned distances are utilized in mapping potential food insecurity in Eugene, OR, ans are found in Figure 4.1. Fast food restaurants fall under the same category as convenience stores, and also receive a ⅛ mile demand circle. As this project primarily focuses on child access to food, and the availability of corresponding food choices, a ½ mile circle will be drawn around schools in addition to grocery stores, as most child meals are produced by the schools. In 2020, a report from the State of Oregon revealed an average of 68.5% of students in the 11 Bethel School District schools and 48.4% of students in the Eugene 4J School District qualified for free and reduced lunch. Therefore it is no stretch of the imagination to see that access to affordable food is a priority for these families.

Figure 4.1: The median income map for Eugene (right), shows available food resources in geographic relation to schools. Currently, 16.5% of Eugene taxlots inside the UGB are within the featured food access buffers (Figure 4.2) Grocery stores (shown in coral) and seasonal farmer's markets (small green-dashed circles) represent the most likely places to aquire fresh produce, and form clusters. Schools are represented with a 1/2 mi radius (light green circle). The school radii not touching food resources and in lighter income zomes become areas of concern. Many neighborhoods have a high density of school communities supported by one grocery store.

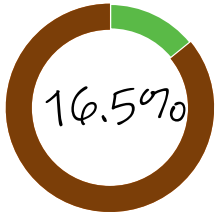
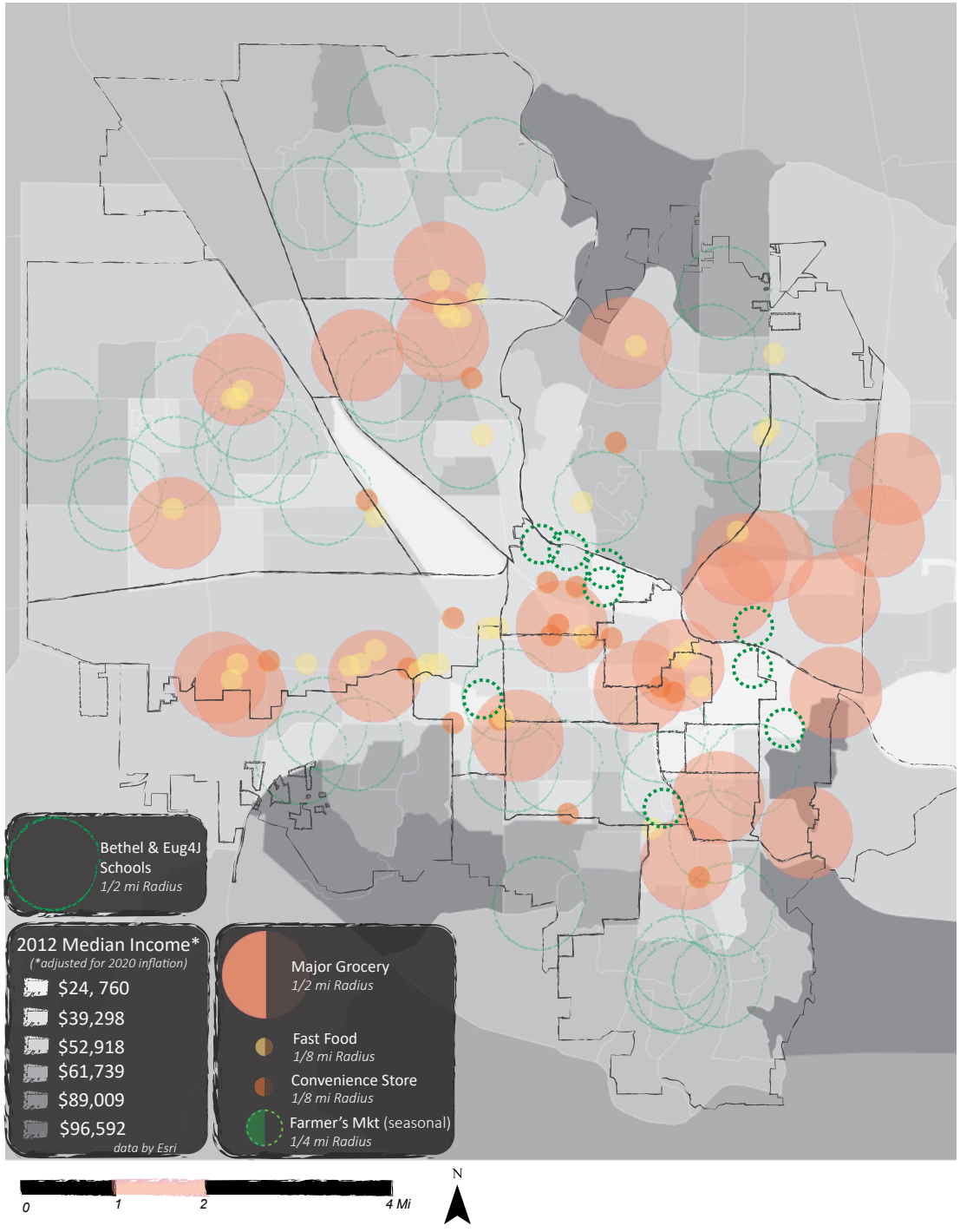


Figure 4.2



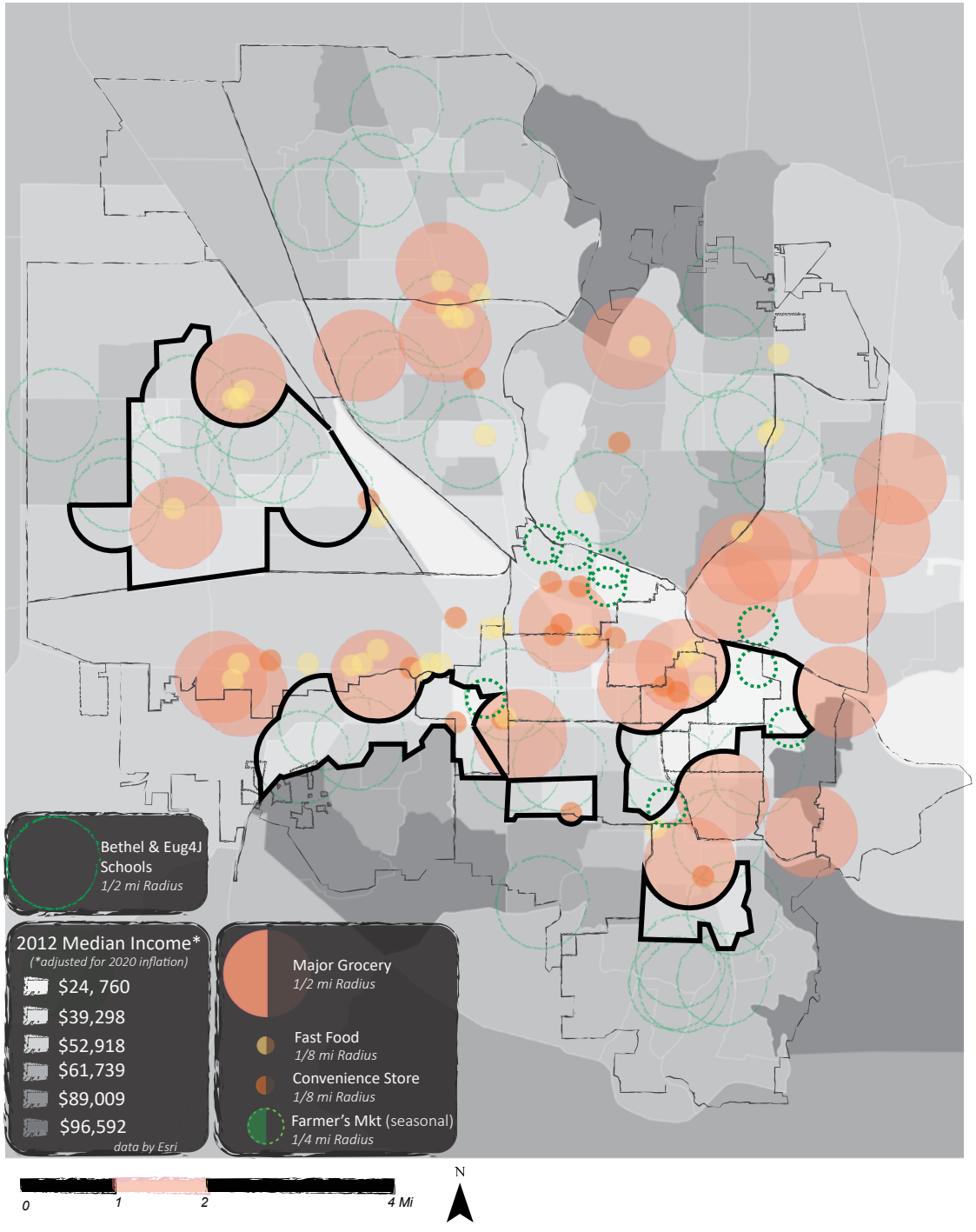


Figure 4.3: Areas of Concern (bold black outlines) were chosen by the qualitative overlay of median income brackets of $24,760 and $39,298 with density of schools. Many of these schools qualify as Title 1. These schools qualify for additional government resources because a certain paercentage of their students are in families with low income. Additional information on school demographics is found in the appendices. It is likely students and families in these areas struggle with food insecurity and its corresponding developmental and mental wellbeing drawbacks. Therefore it is concluded that an edible therapeutic school garden would increase access to free fresh produce and a restorative play environment for children and families in the area.

Eugene 4J Title 1 Schools:
(indicates OFSSGN affiliated school*)*
Arts and Technology Academy Middle School
Awbrey Park Elementary
*Camas Ridge Elementary**
*Cesar Chavez Elementary**
*Family School Elementary**
Holt Elementary
*Howard Elementary**
Kelly Middle School
McCormick Elementary
*River Road Elementary**
Spring Creek Elementary
*Willagillespie Elementary**
Village School (private/ not shown)
Eugene Waldorf School (private/not shown)
O'Hara (private/not shown)

https://www.4j.lane.edu/schools/

Neighborhood Analysis

Eugene is divided into 23 neighborhoods, or city wards. These will serve as the bounding lines by which the city's resources (and lack) will be analyzed. The following illustrates the presence of potential partners, such as OFSSGN and like minded community groups, in each neighborhood as well as the social economic situation surrounding the schools. Coming to an understanding of these facts will inform the placement of the network to benefit the areas without immediate access to fresh produce. Figure 5 depicts "Child Infrastructure", meaning schools, youth homeless shelters and parks. Noting these in relation to schools helps the reader to understand existing resources and hypothesize where children in need might go.

The site analysis process has revealed the current density of schools would provide the coverage needed for an interconnected network, whereas only the OFSSGN partner schools would not. Many schools are clumped together, making a 0.5 mile radius between hubs feasible. Additionally, in many places, the close proximity to a park also presents opportunity for a smaller scaled satellite edible therapeutic garden. Thus deepening the walkable interconnectivity of access and inclusion to an even greater proportion of the population.

Geographic and median income data was provided by Esri. Neighborhood data was provided by the City of Eugene and City Data.

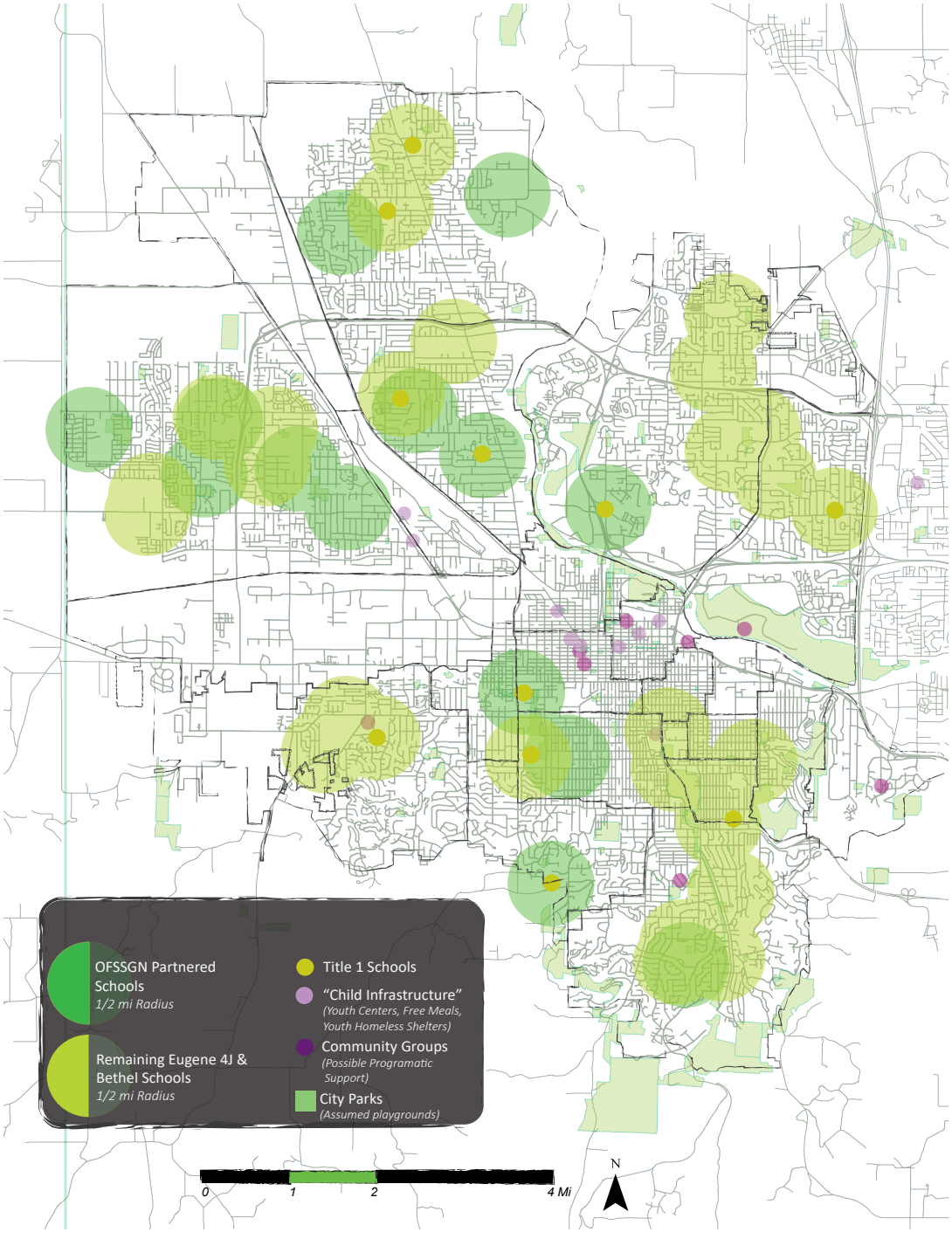


Figure 4.4: Additional child infrastructure, such as youth centers, parks and programs with free food, are also mapped with the intent of gaining a fuller picture of possible youth circulation in Eugene. Overall, the goal of this mapping exercise is to discover if and how low income areas affect a child's food choices, and what supportive child infrastructure is available.

" A society grows great when the old plant trees whose shade they know they shall never sit in."
- Greek proverb

Eugene 4J School District

In the Eugene 4J school district, 16 out of 40 schools participate in OFSSGN. As seen across the world, the effects of COVID-19 have disrupted food accessibility in Eugene's community. Many families count on school lunches to provide the necessary nourishment for their child during the day, as a matter of necessary fiscal saving. With both children and parents operating from home, the amount of food required increases, while due to illness or unemployment, the amount of income decreases. To address this income disparity, many schools throughout the school district are offering three grab-and-go meals each school day for students 18 and younger, with extra meals dispensed on Friday to cover the weekends. Additionally, if any family requires extra assistance in obtaining the school funded meal, due to distance or other factors, meal delivery is available. Similarly, the Eugene 4J website has uploaded links to local community food resources. Clearly, food scarcity for the youth and families of the area is an immediate concern.

Economically, the produce grown in school gardens could substitute contracts for delivered meals and offer economic opportunities for chefs back into school kitchens and beyond. Eugene 4J already offers such local and nutritious food offerings in line with its "Wellness Policy". The cafeterias feature Oregon-grown produce, such as apples, potatoes, radishes, onions, pears, cranberries and corn, as well as locally sourced dairy and breads. Increasing food literacy, the Willamette Farm & Food Coalition's Farm to School Program highlights produce from specific farms in the "Harvest of the Month" program. "Highlighted produce selections have included tomatoes, raspberries, and strawberries from Thistledown Farm, strawberries from Hentze and Johnson's Farm, and Braeburn apples from Detering Orchards" (Eugene 4J).

Furthermore, the 4J Wellness Policy prescribes that "All students should have opportunities, support and encouragement to be physically active on a daily basis," as integrated into the curriculum and not withheld as punishment (Eugene 4J). Secondly, "Foods served to students should be nutritious and healthy," as described by the district's healthy snack guidelines. A healthy snack is quantified by its calories from fat, weight from sugars and grams of sodium. These requirements encapsulate all foods sold or given in the classroom both before and after- school activities, and are exempt only to adults at sporting events. The Wellness Policy can be seen as rigid, however it does clearly display the district's commitment to continuing student physical health and establishing a healthy relationship with healthy food.

Lastly, the OSU affiliated Outdoor School is a diversity oriented organization that sponsors outdoor education programs for Oregon 5th and 6th graders. With stakeholder support, Measure 99 passed and ensured $22 million annually to Oregon environmental education initiatives. As an organization they are committed to their goal of providing positive environmental education experiences, whether affiliated with the Outdoor School or not.

Conscious of outdoor education's legacy marginalizing people of color and women in the community, core Outdoor School values explicitly state principles of equity, diversity and inclusion are at their missional forefront: "We believe every student has the right to an inclusive and transformative Outdoor School experience. We believe Equity, Diversity, and Inclusion is the lens through which we approach our work...We believe in increasing environmental literacy in Oregonians...We believe Outdoor School can inspire students and educators to be citizens and architects of a better world". According to the annual report, in the 2018-2019 school year every Oregon county was represented as almost 38,000 students (81%) had the opportunity to participate in Outdoor School Programs. An increased 94% participation was expected before quarantine forced school shutdowns in 2020; as restrictions eased, many schools opted for outdoor school as an alternative for indoor learning.

Their website offers incredible tools regarding TEK, evaluations for cultural responsiveness, and professional development materials for educators. As this project seeks to be accessible and inclusive to every child in school communities, utilizing existing frameworks for diversity are important. The Outdoor School offers another level of state and local support.

While Eugene 4J does a tremendous job in integrating healthy local foods and building a child's food literacy, there is still room for opportunity. Imagine a new generation of gardeners, deeply invested in the health of their world around them, and honoring the world inside of them. Edible therapuetic school gardens invite children to be a part of the process as gardeners and chefs, conservation researchers and empathetic listeners, experiential wanderers and energetic observers. Imagine the opportunities for agrarian neighborliness, ensuring everyone around a school the chance for a healhy meal. Imagine local companies, such a Wildcraft Cider or Mountain Rose Herbs, taking part in educating children and the community in making beneficial teas and tinctures from native herbs.

Additional Community Food Resources

Oregon Food Bank:

Organizations across the city of Eugene offer a variety of community food resources, ranging from SNAP benefits, cultural gardening opportunities and accessibility to a free meal. On their website, the Oregon Food Bank's "Food Finder" identifies over a dozen venues for a free hot meal. This is taken advantage of by families and individuals. Additionally, local growers in Cottage Grove offer "Gleaning Fridays", which invite local neighbors to glean produce for free. Although this is outside of this project's study area, its presence and endorsement by the Oregon Food Bank seemingly indicates a desire for such programs and events.

Food for Lane County:

As the name implies, Food for Lane County is a 501(c)(3) non-profit that exhibits tremendous dedication to creating opportunities for acquiring free or reasonably priced food for disadvantaged populations throughout the county. FFLC accomplishes this by, "...soliciting, collecting, rescuing, growing, preparing and packaging food for distribution through a network of 163 social service agencies and programs; through public awareness, education and community advocacy; and through programs designed to improve the ability of low-income individuals to maintain an adequate supply of wholesome, nutritious food." These social service resources include compiling emergency food boxes, providing aid at shelters, meal sites and rehabilitation facilities, as well as offering access to nutrition education, gleaning and community garden opportunities.

In terms of civic agriculture, Grassroots Garden and the FFLC Youth Farm are gardens open to volunteers. They open the way to fresh produce and the holistic wellbeing of time among the growing plants. Grassroots Garden hosts numerous workdays, in which, due to its popularity, community groups must register for well in advance. Seasonal operations include compiling compost, harvesting, planting and other garden related activities. At the end of each work party, the volunteers are rewarded by an organic lunch that consists only of the garden's bountiful harvest.

Similarly, the Youth Farm offers hands-on agricultural education to high school students. There, they are hired to work the farm, learning organic garden management techniques from experienced staff.

Huerto de la Familia:

While all non-white populations in Eugene are by far and away considered minorities in the area, the Latino/a/x community has established a strong civic agriculture tradition. Huerto de la Familia caters to hispanic populations through the protected subsidized garden plots in seven Eugene/ Springfield community gardens.

These garden plots are acquired and protected by Huerto de la Famila specifically to serve the latino/a/x community. This tactic increases food seasonal food security to this minority population, who historically have been excluded from community gardens due to fees or waiting lists. Additionally, Huerto de la Familia offers educational workshops, conferences and cultural events. In collaboration with Oregon Food Bank and the OSU Extension, “Siembra la Cena”, or Seed to Supper, teaches self-sufficiency through budget-friendly techniques to grow healthy produce. Similarly, hands-on workshops are in demand. While they depend on the season, popular topics include medicinal plants, cover crops, and compost. Lastly, Día del Agricultor Latino is an annual conference that partners with latinx and farm to table organizations, such as Adelante Mujeres, Next Door Inc, and Our Table Cooperative.

The city of Eugene has many resources that model civic agriculture and a deep desire for locally grown produce. Stategically placing more of these environments at schools increases child access, and offers practical and affordable produce in food insecure areas.

5 Design & Methodology

Key Takeaways

1. The Toolkit of Parts: Community Learning Circle, Meandering Food Meadow & Fairy Home Food Forest
2. Combinations can be adapted to grow with school needs
3. A "Child Wellness walkshed" doubles accessibility to fresh food

Envisioning An Edible Therapeutic School Garden:

The Oregon Farm to School School Garden Network has created an "envisioning" process for schools who are interested in establishing their own garden on site. The following framework is derived from their process and adapted for the scale and content of this project. This project, and proposed designs, are merely conversation starters; an "envisioning" process in and of itself.

Why Engage in the Visioning Process?

The city of Eugene, in its passion for holistic wellness, already has a reputation for promoting alternative healing methods, an emphasis on local community and a passion for environmental stewardship. This is seen in the numerous organizations that were discussed in the previous chapter. Therefore, an element of envisioning an edible and therapeutic garden network for kids is to identify and possibly mobilize assets and resources. On its own, OFSSGN has project leaders at every participating school that champions garden exposure as beneficial to children's physical health. Compounded with research of the mental and emotional benefits of nature to relieve symptoms of stress, anxiety and depression, as well as sparking positive indicators of wellbeing, such as fascination and curiosity; this network has the potential to work powerfully in the nourishment of the Eugene community.

To engage in this visioning process is to hopefully inspire practical possibility that leads to intrinsic transformation, both in the individual child and throughout the fabric of Eugene. Obviously this project is not assuming completion, but only imagining the breadth and beauty of gracious urban infrastructure for the youth and families of Eugene. The "what if's" of today, become the realities of tomorrow.

Values: Envisioning a Culture of Graciousness

As discussed in length in Chapter 1, the industrial food system is teetering on the edge of complete failure; children, families and adults alike have already been failed by a system that is responsible for a large percentage of global pollution and distribution of high fructose corn syrup filled products. In many American cities, children are left undernourished and overweight. Additionally, existing adverse childhood events, such as parental divorce, housing and food insecurity, as well as social pressures augmented by social media, create an assault on the mental and emotional wellbeing of a typical child.

All of these existing conditions have been augmented in the past year due to

ongoing stress, grief, anxiety and isolation rooted in the COVID-19 pandemic and other major social disruptions. Exposed infrastructural weaknesses have shown that “normality” in terms of food scarcity and mental wellbeing wasn’t all it was cracked up to be. The pandemic allows a reset on community values and distribution of resources. Additionally, events of 2020 have exposed such systemic weaknesses on multiple fronts. Tragic and devastating wildfires in the West Coast and Colorado, racial injustices uncovered links to food injustices, 100 year storms in multiple parts of the country produced a common cry of food scarcity and fear. Eugene has the capacity to take full advantage of a systemic reset to the benefit of not only their young people, but the city at large.

If you close your eyes, can you see strawberry stained smiles of children as they play under the summer sun? Can you hear their whispered squeals of excitement as they watch hummingbirds hover over a field of wildflowers? Can you feel the tear of grief as a teenager seeks solace among the soft gentle grasses, and smell the lavender, mint and chamomile in the air? Can you feel the sigh of relief of a single parent who can't afford to buy food, forage a full basket of vegetables for her family's dinner; or a houseless neighbor who can freely glean to feed themselves? How about a neighbor who can't afford medical help finding traditional remedies in the garden? Imagine the strangers connected, the knowledge shared and the communal support nourished in such a place. What an wonderful whimsical oasis that would be.

Vision: Where is could Lead

Sixteen of the forty-three schools in the Eugene 4J and Bethel school districts already work in tandem with OFSSGN. This project envisions an urban “food and wellness landscape” in which all schools are either operating with an on-site school garden or are in proximity to a suitable garden (or “hub”) alternative, such as a park (Figures 5.3). The theoretical inclusion of these schools seeks to open the door to future expansion opportunities in implementing garden based experiential learning and resources; thereby truly creating a system of maximum accessibility to all of Eugene’s youth. Additionally, due to the time limitations of this master’s project, suitable site analysis of Eugene 4J and Bethel schools and school gardens have not been performed. There is the possibility that schools not in conjunction with OFSSGN have existing garden programs and infrastructure. Similarly, many OFSSGN schools have existing gardens on site. Therefore, these toolkit pieces could be retrofitted in, or placed on other parts of school property.

A main question of any garden, especially edible, is the issue of maintenance. Successful community gardens have been those whose passion and leadership are carried throughout the generations of coordinators and gardeners; a system established in the first five or so years of its beginning. As main hubs are positioned on school campuses, the proximity for garden based education and interaction creates an immediate and potentially long term partnerships; this mutually benefits the children in the depth of their educational experience and creation of environmental leadership skills (as well as the aforementioned physical and mental benefits) and the school in offering outdoor classrooms, additional healthy snacks and a degree of maintenance.

Produce grown on site could either be incorporated in student cooking courses or in the cafeteria menu. Another possibility is following in the footsteps of the UO Urban Farm and allow students to take home whatever they harvested that day, and donating the rest to neighborhood food banks. Either way, children have the priority access to fresh produce, and the rest will be dispersed throughout the community like a public food forest.

Similarly, as seen in the Neighborhood Analysis in Chapter 3, Eugene is home to numerous agricultural, horticultural and community service organizations that would thrive internally and in outreach through these opportunities. Maintenance of these public spaces would provide numerous avenues for education and volunteer opportunities. Tribal representatives, arborists, OSU and UO leadership programs could offer workshops in relevant and community driven topics. This model has been proven successful with the Beacon Food Forest, a similarly spirited project, as well as many others. Designing a community engagement process for a *School Garden Advisory Board* will be discussed in Ch. 6: Implementation.

Determining an Experimental Typology

Ease of implementation calls for the tools in this design's kit to be legible across scales, sites, school and social cultures. The essence of this design features component parts that are easily identifiable and flexible in their positioning and usage. Together their composition will create this experimental typology of combination agriculture and therapeutic gardens. Of course, if this project were to be physically implemented, designers and schools would not be bound by this "toolkit by parts" design framework.

Network Synergies: Creating a Child's "Food & Wellness Walkshed"

*Figure 5.1: As previously mentioned, an underlying goal of this project is to increase a Eugene child's accessibility to fresh produce and exposure to natural therapy opportunities. Catering the distances to children, ½ mile radius from schools are overlaid on the map of Eugene. This distance was chosen to facilitate an easier commute for a child. Grocery stores also share a ½ mile radius. Therefore, based upon the resource and community group mapping seen in the previous chapter, these "Food & Wellness Walksheds" begin to take shape. This grants **17,550 students** and over **1,000 staff** members in the combined Eugene 4J and Bethel school districts priority access to fresh produce and healing gardens.*

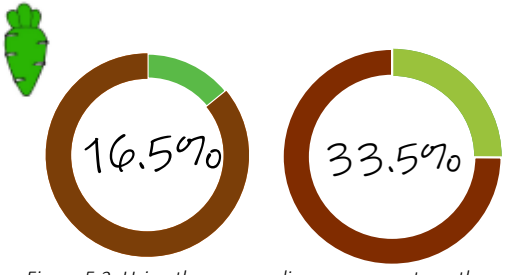
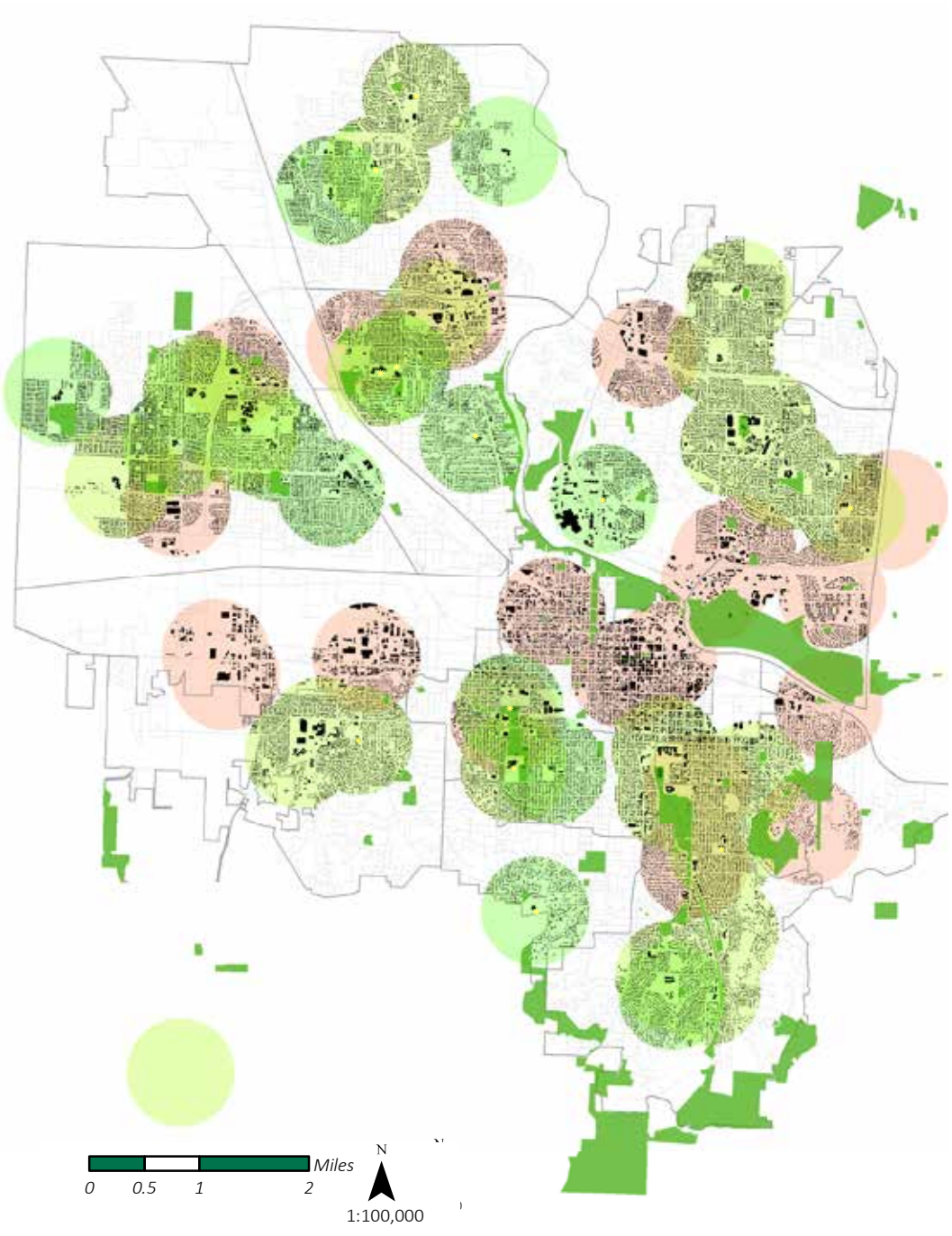


Figure 5.2: Using the same radi as a grocery store, the location of schools would double access to fresh produce.



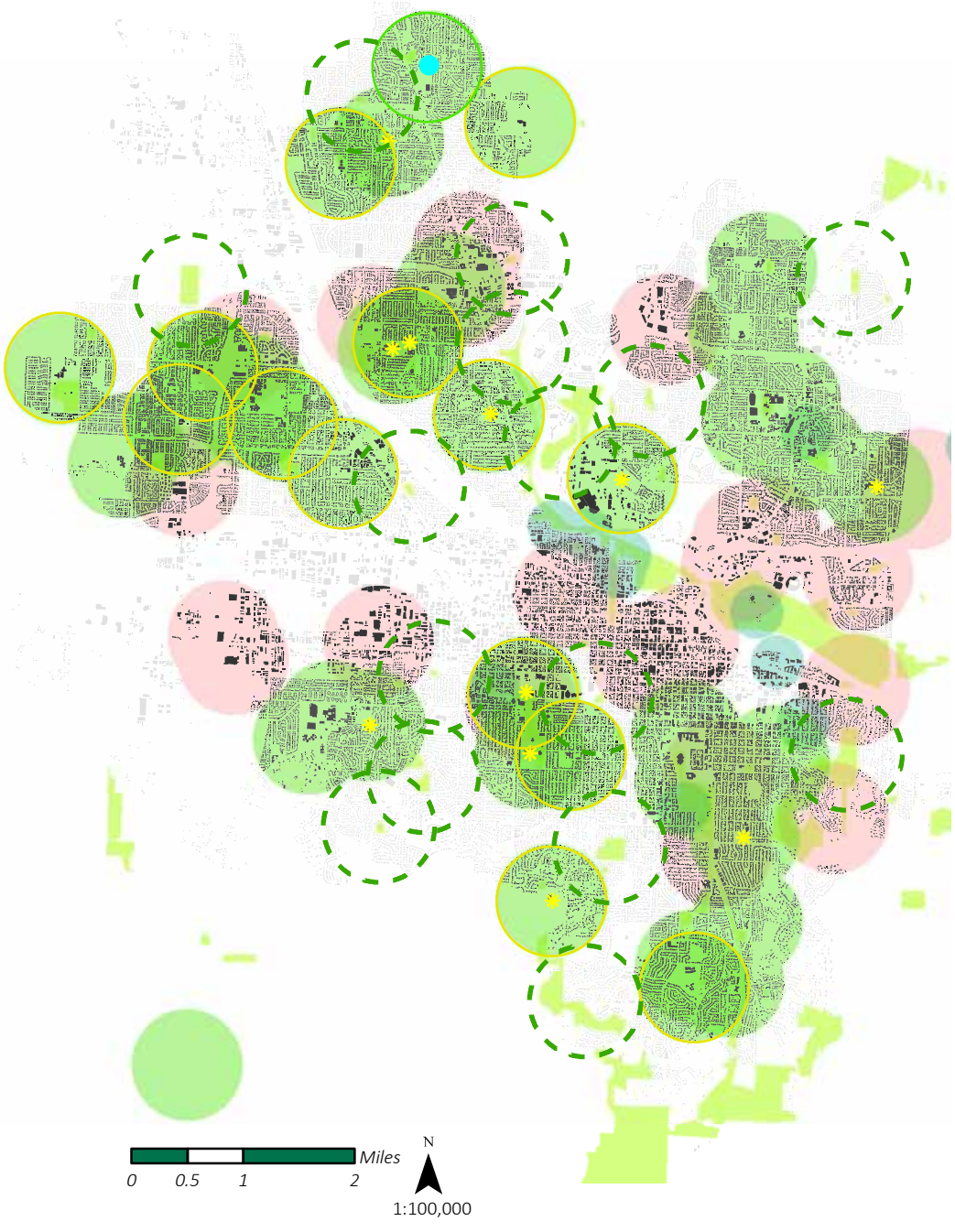


Figure 5.3: The addition of school gardens as holistic wellness hubs for kids and the community greatly increases food availability throughout Eugene. It is interesting to note that where there are gaps in connection, a park is present. In line with habitat restoration practices, the addition of more "stepping stones" increases the likelihood of connection.

Circulation: Balancing Opposing Patterns & Uses

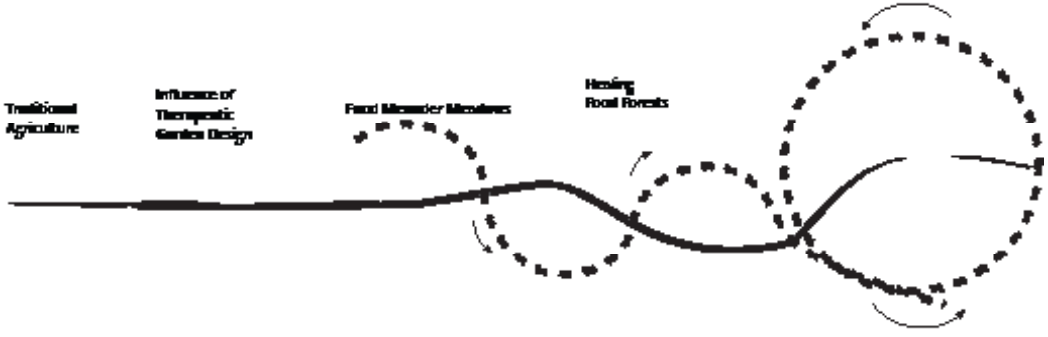
Traditional agriculture utilizes straight lines and rows for ease in transporting wheelbarrows full of soil, compost and produce. Linear shapes are also useful for organizing crops by variety and need. Very contrary to this, therapeutic gardens, in their many varieties, feature sweeping curves and walkable loops. Walking these loops have been shown to relieve symptoms of stress, as well as give a sense of completion, as the user returns to their origin point. While the symbolism might be lost on elementary aged children, loops offer an easy to navigate contemplative opportunity with surprise continually around the bend.

(Image 5.2)

(Image 5.3)

(Image 5.4)

(Image 5.5)



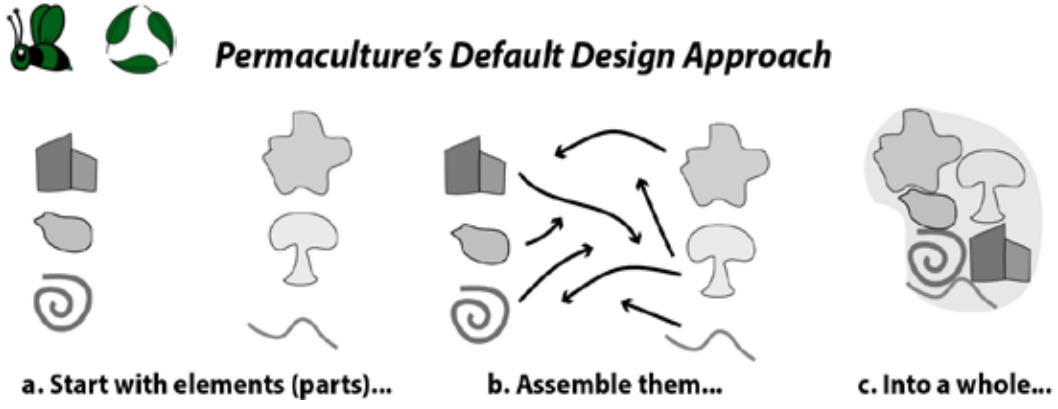
(Image 5.1) Experimenting with opposing patterns. The influence of curving paths intersect with linear agriculture to create main pathways with a gentle bend. Auxillery foraging trails allow deeper access to plants and a more reflective experience. Circular components allow the opportunity to create loops. In concert with each other, paths interconnect to create longer walking circuits, as the user desire.

The sequence on the left (Images 5.2- 5.5) illustrates a basic logistical struggle to practically combine opposite functions. Agricultural pockets surrounded by sweeping curved paths, and unpaved forage paths began to emerge. From there, transferability of the design added another layer to the puzzle. A desired outcome was for schools to have the agency to act as their own designers. This led to another round of experimental drawing. Entire sequences were experimentally reflected both horizontally and vertically in hopes to create a functional and reproducible template.

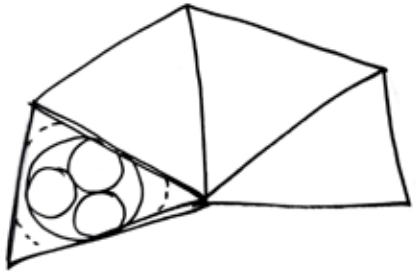
Toolkit by Parts:

This inquiry led to a simplification of shapes and "lego pieces" into pieces with unique personalities, as opposed to one shape containing every desired element. This progression is shown in Images 5.6- 5.8. Ecological variations, like meadow and forest typologies, were added to increase the spectrum of growing conditions. The pieces utilize ecological shapes (spirals, meanders, and hierarchical branching) described in Ch 1: Lessons from Nature. Also, following the agrarian example, relational learning is an important part of community wellbeing, as well as a byproduct of experiential therapy and outdoor education. Together, they create relational systems of both diversity and redundancy; trademarks of resilient design.

Instead of proposing one design for every site and to meet every site condition, creating a toolkit increases adaptability, while maintaining the essence of the experimental typology. Permaculture also designs with lego pieces. This is done through extensive site analysis and piecing together component parts according to the characteristics of the site. That adaptable process is replicated in this proposed toolkit of parts for edible therapeutic school gardens. This flexibility allows for creativity and flexibility by school, with shapes that are easily translatable across a large spectrum of need. As pieces, there are numerous potential combinations of shapes and patterns available.

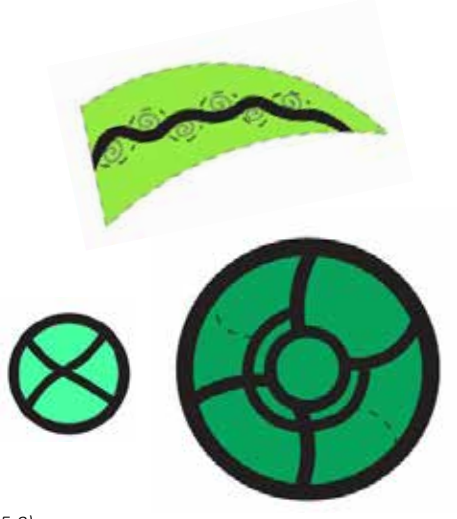


(Image 5.9) After careful site analysis, a permaculture designer inventories what ecological resources are available and the design goals they are wanting to achieve. This requires a deep understanding of topography, soil, stormwater drainage and other growing conditions. However, the benefit is a designed edible ecosystem that is resilient and requires less human input than traditional agriculture.
Source: Permaculturеinstatute.org



(Image 5.6)

(Image 5.7)



(Image 5.8)

All Together Now

What emerges from the design process are three interrelated yet unique pieces of combined accessible civic agriculture and inclusive therapeutic garden design elements. When working as a whole, gravel paths create outer loops, with opportunities for foraging through internal circulation and wood chipped forage trails. Opportunities for stormwater retention via bioswales, soil amendments by compost, vermaculture and nitrogen fixing plants, are a few ecological relationships that are featured. Additionally, due to the round pieces, connecting areas can be utilized as "Bonus Space" for additional compost, tool storage or outdoor play. For student safety, the Community Learning Circles will be gated. Similarly, to preserve crops from critters, like nutria, a gated fence around the desired pieces is recommended.

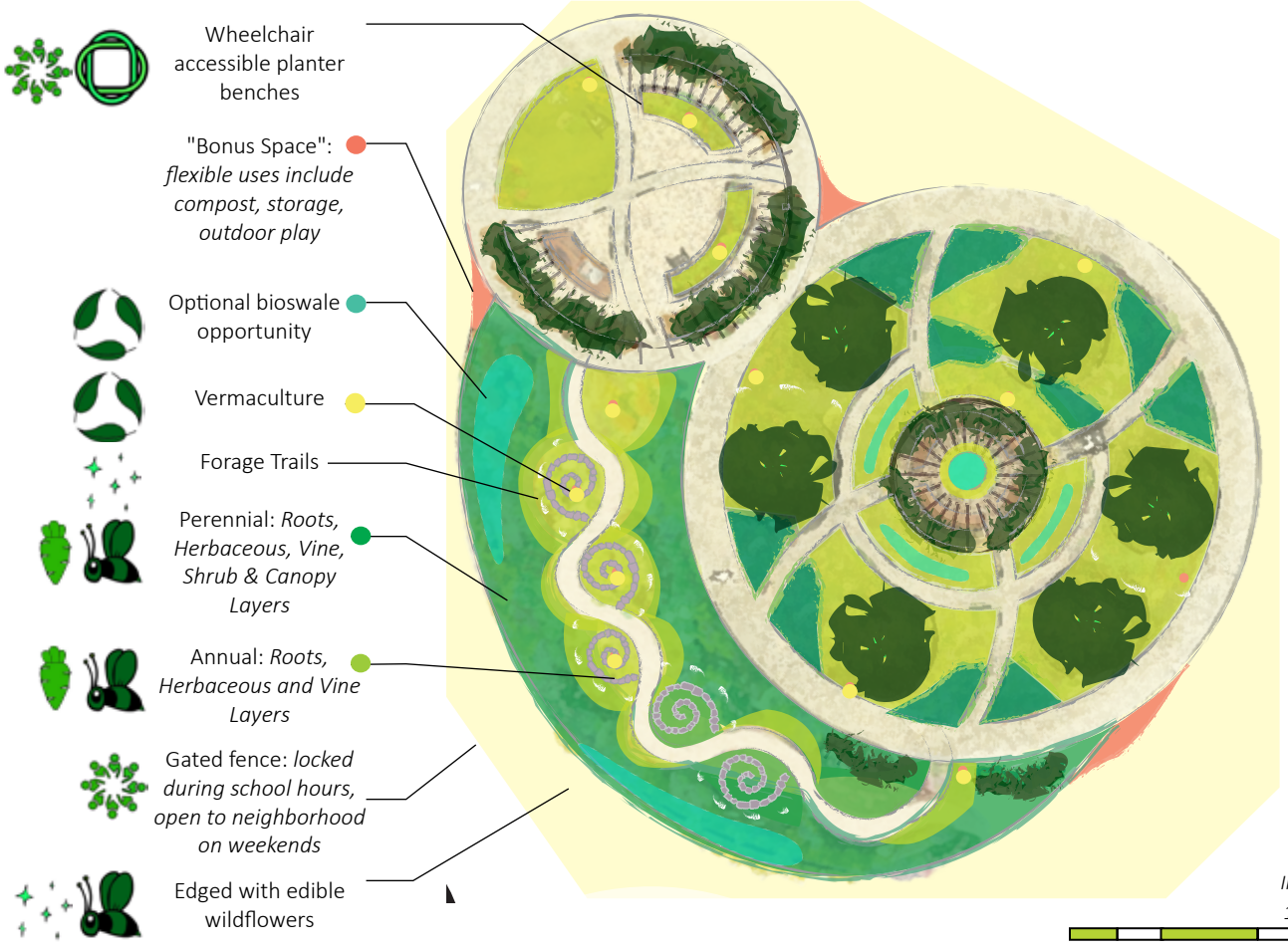


Image 5.10
1"=20'

Designing an Edible Plant Palette

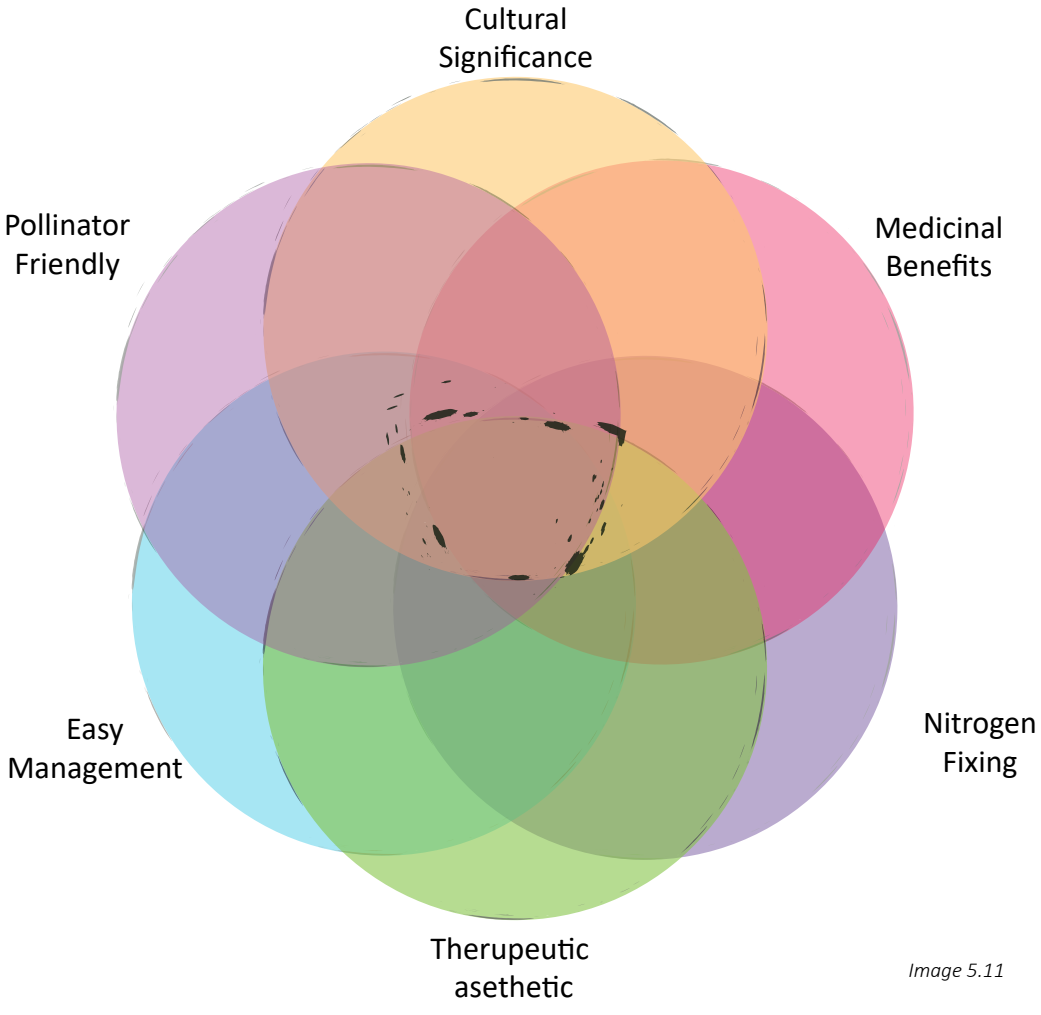


Image 5.11

The following recommended plant palettes for meadows and forests feature mostly recognizable produce crops. The select medicinal herbs on are separated into sections by symptom. A working list of these plants is found in the appendices.

Traditional Produce Crops

Agricultural scientists from Rutgers University conclude that in community garden settings, "...yields ranging from a low of approximately 0.25 lb/ft² to a high of approximately 1.25 lb/ft² may be expected. As a general guideline, when factoring in yield expectations for mixed stand small-scale agriculture ventures, 0.5 lb/ft² is an acceptable and realistic value" (Rabin et al, p2).

Native & Medicinal Plants

Edible plants featured in this list are mostly pollinators native to the Pacific Northwest. Medicinal uses were cross-checked with indiginous plant uses.

According to the identies of the community, plant palettes can celebrate culturally significant plants.

Drip lines are recommended to establish plants through the dry season.

"As a general guideline, when factoring in yield expectations for mixed stand small-scale agriculture ventures, 0.5 lb/ft2 is an acceptable and realistic value"

Community Learning Circle

You couldn't hear the squeak of the gate for all of the laughter inside. Last winter, Rachel's grandmother volunteered to teach a workshop making traditional Mexican salsa. They picked the crops carefully, and now months later can finally taste the fruits of their care and friend's culture. Spirits are light as skills are taught and learned.

Lawn: *gather, relax, play*

Pergola: *shelter, comfort, trellis*

Raised growing benches: *Accessible, practical*

Image 5.12
1"=5'

0' 2.5' 5' 10'

Outdoor classrooms have become prized educational environments. Experiential learning in nature can increase empathetic and relational tendancies in a child's development. The strength of interconnected relationships are a hallmark of social resiliency. The Community Learning Circles can serve multifunctional roles as community gathering spaces on weekends or after school hours.

Functionally, CLC's are 30' in diameter, and include wheelchair accessible garden beds, a lawn for play. If accessible to water, a sink for processing harvested produce is recommended.

Image 5.13

The Medicinal Food Meadow

Native Plants beneficial sources of food and shelter for local insect & bird populations. These habitats encourage ecological and TEK centered teaching.

"Wet" & "Dry" habitats tailored to site specific soil and drainage conditions.

Approximately 700 ft² of food production potential; by the Rutger's calculator of 0.5 lb/ ft² = 350 lb/ ft²

Encourages deeper connections in the school community during the week, and doubles as a community foraging and open space.

ADA compliant gravel paths meander through the meadow. Plants were chosen to engage the senses without being overwhelming. Spiral planter beds allow easier access for children and adults in wheelchairs.

A diverse and sensory filled environment offers many moments to engage in soft fascination.

As you leave the learning circle, you pluck a grape from its trellised fence. Knee high wildflowers and cucumber plants welcome you to a whimsical meadow as you meander around lush spiral planters. Its a warm summer day, and the meadow is overflowing with tomatoes and squash; the soil is happily offering armfuls of carrots and radishes. The air is alive with butterflies and bees, bopping from lavender to poppy to goldenrod. You hear children laughing as they explore and play along the foraging trails. They snack on snap peas and kiwis that climb up a trellis on the meadow's edge.

Valleys, reclassified here as open meadows, generally encouraged feelings of connectedness, serenity, freedom and refreshment (Hinds & Sparks, 2011). Considering growing conditions, Wet and Dry Medicinal Food Meadows also feature the most known and beloved vegetables. These are organized by a primary gently rhythmic and waving path, and secondary wood chip foraging trails. These simple patterns are winding enough to slow users into soft fascination, but straight enough for easy wheelchair and wheel barrow accessibility. Lastly, their combination is easily reproducible.

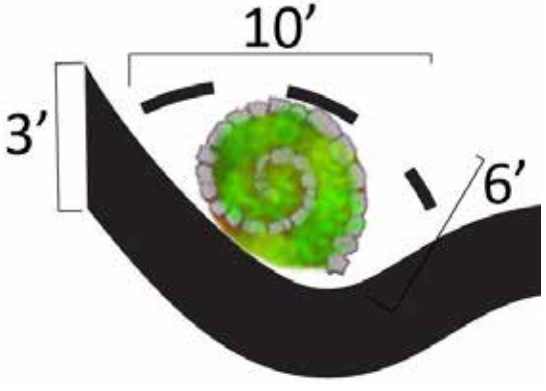


Image 5.14

1"=10'

0' 2.5' 5' 10' 20'

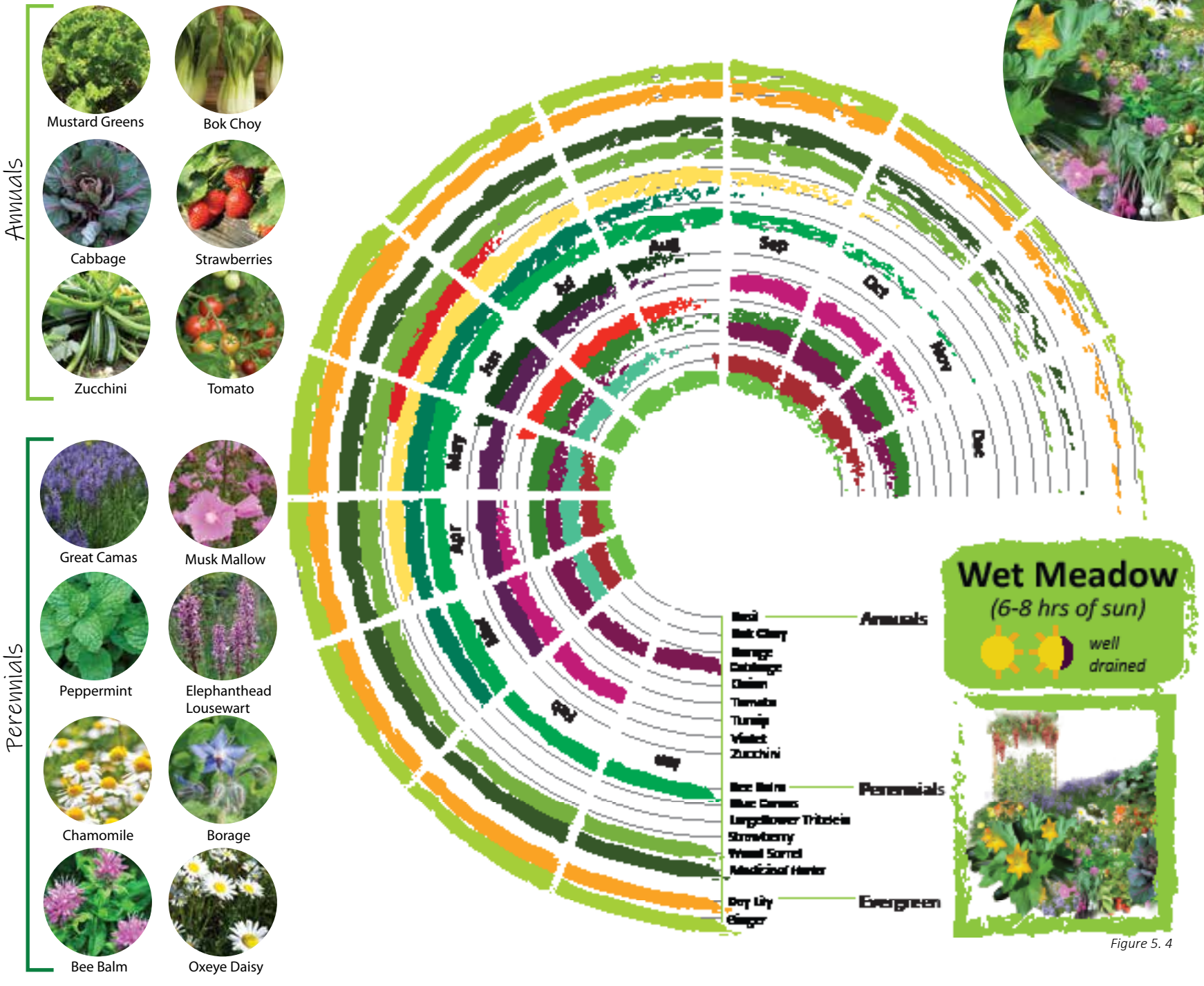
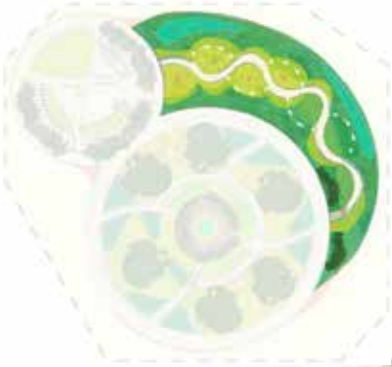
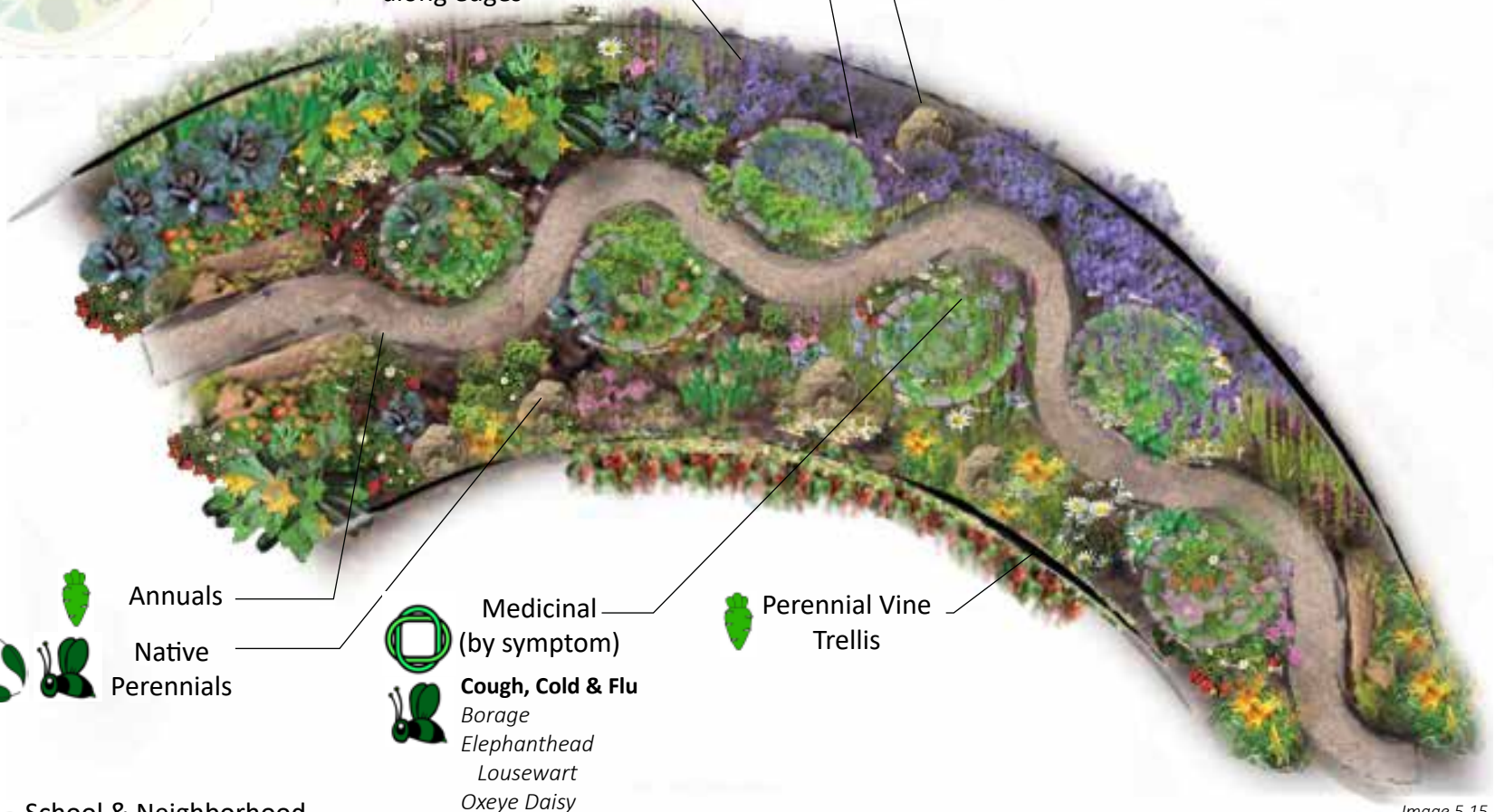

Annuals
Mustard Greens
Bok Choy
Cabbage
Strawberries
Zucchini
Tomato
Perennials
Great Camas
Musk Mallow
Peppermint
Elephanthead Lousewart
Chamomile
Borage
Bee Balm
Oxeye Daisy
Wet Meadow
(6-8 hrs of sun)
well drained
Annuals
Perennials
Evergreen
Basil
Bok Choy
Cabbage
Chives
Tomato
Turnip
Violet
Zucchini
Bee Balm
Blue Camas
Largeflower Triteleia
Strawberry
Wood Sorrel
Day Lily
Ginger
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

Figure 5. 4



"Resting Rocks"
Forage Trails

Bioswale
opportunities
along edges



Annuals

Native
Perennials

Medicinal
(by symptom)

Cough, Cold & Flu
Borage
Elephanthead
Lousewart
Oxeye Daisy
Speedwell
White Clover

Headache & Anxiety
Peppermint
Chamomile

Upset Stomach
Musk Mallow

Perennial Vine
Trellis

School & Neighborhood
harvest, forage and gleaning

Image 5.15
1"=10'

0' 2.5' 5' 10' 20'

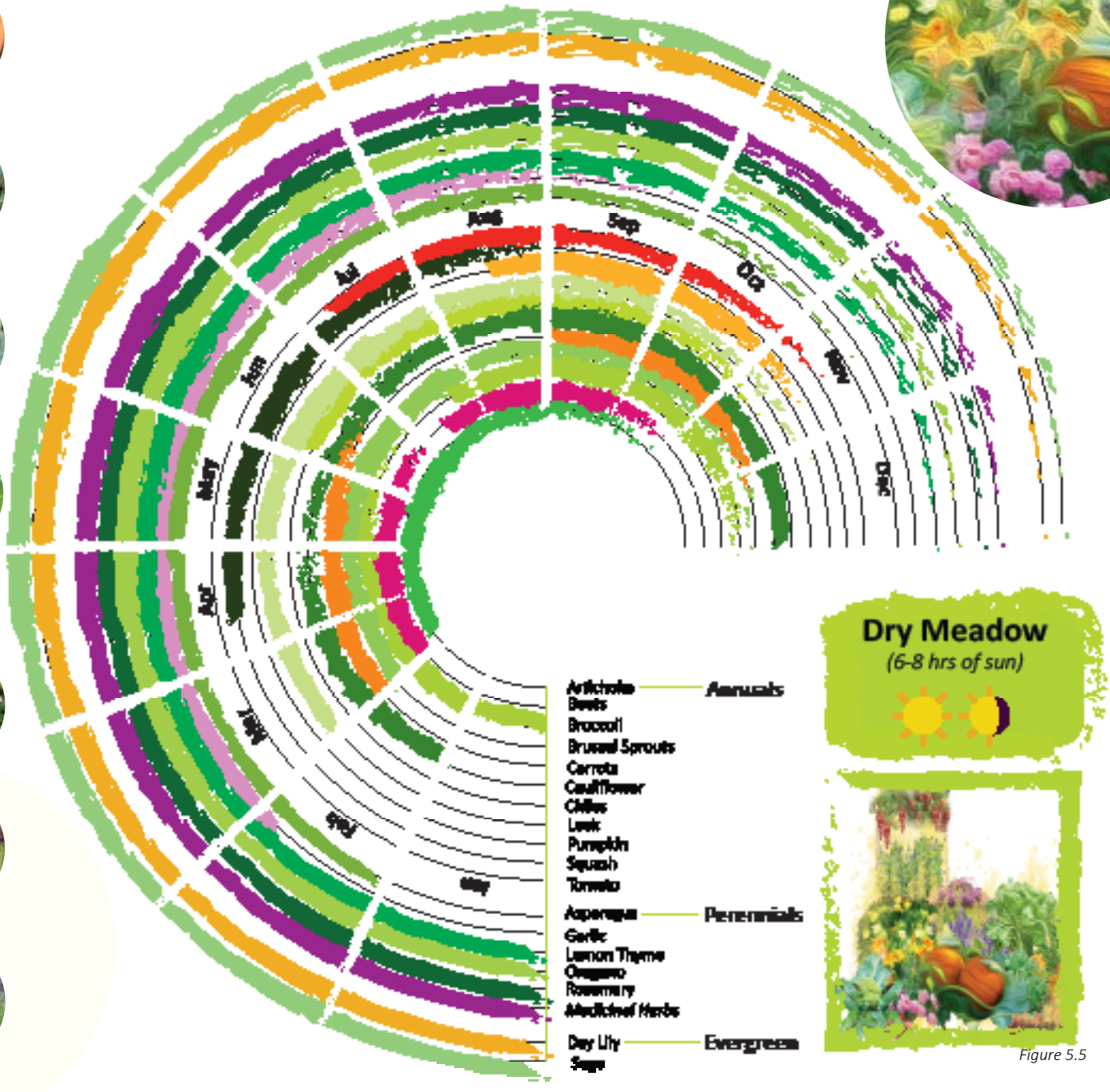
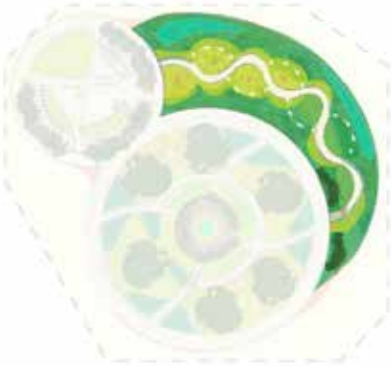
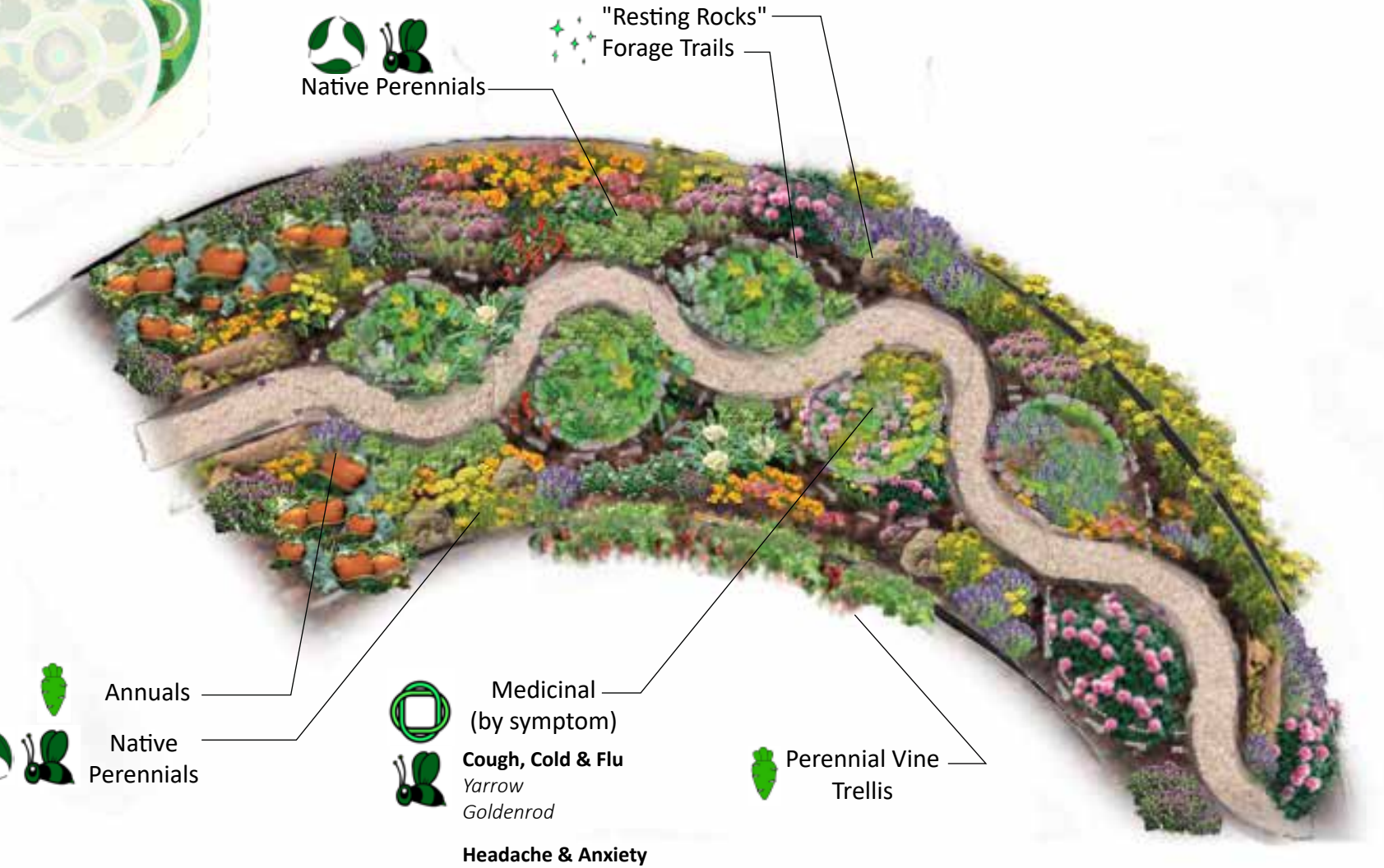

Annuals
Beets
Carrots
Cauliflower
Broccoli
Onion
Pumpkin
Chile
Brussel Sprouts
Perennials
Day-Lily
Herbs
Goldenrod
Garlic
Heal-All
Lavender
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Artichoke
Beets
Broccoli
Brussel Sprouts
Carrots
Cauliflower
Chiles
Leek
Pumpkin
Squash
Tomato
Annuals
Asparagus
Garlic
Lemon Thyme
Oregano
Rosemary
Medicinal Herbs
Perennials
Day Lily
Sage
Evergreens
Dry Meadow
(6-8 hrs of sun)

Figure 5.5





Cough, Cold & Flu
Yarrow
Goldenrod

Headache & Anxiety
Poppy
Lavender

Wounds & Sores
Milkweed
Heal-All

Image 5.16
1"=10'

The Healing Food Forest

Native Plants beneficial sources of food and shelter for local insect & bird populations. These habitats encourage ecological and TEK centered teaching.

"Wet" & "Dry" habitats tailored to site specific soil and drainage conditions. Potential for bioswales in internal ring.

Approximately 2,826 ft² of food production potential; by the Rutger's calculator of 0.5 lb/ ft² = 1,413 lb/ ft²

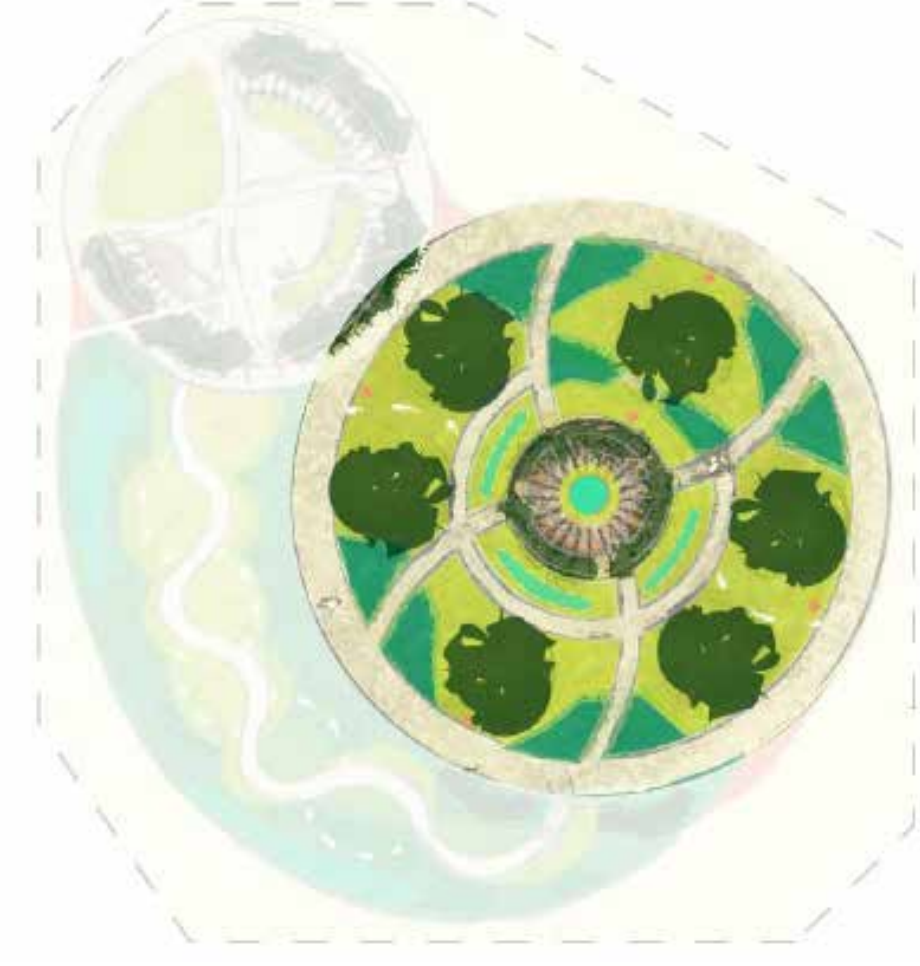
Encourages deeper connections in the school community during the week, and doubles as a community foraging and small group meeting space.

ADA compliant gravel paths create a complete external loop, as well as offer internal access. Plants were chosen to engage the senses without being overwhelming. A central gathering space can feature an above ground fountain.

Dwarf trees with larger fruits were chosen for child accessibility and bird watching. Trellised vines around the meeting area offers eye-level interaction with the plants.

As you make your way to the end of the Food Meadow, you are met with lush canopies of fruit trees. White plums dangling from the branches grow sweeter and sweeter with the summer sun. You now hear the whispered songs of leaves dancing in the wind, which smells of sweet bedstraw and earth. As you wander further inward, you feel your shoulders relax to the bubbling of a gentle fountain, surrounded by wapato flowers. Entranced, everything else melts away, as you sit on a bench shaded by a climbing grape vine.

The Healing Food Forest is a new take on an established typology. The thoughtful integration of therapeutic circulation patterns and medicinal plant palette have not been seen in a school garden context. This area is 60' in diameter.



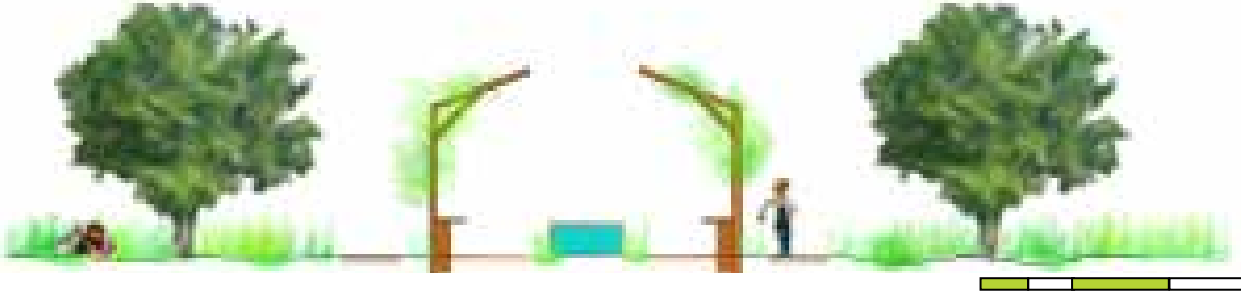


Image 5.17

1"=10'

0' 2.5' 5' 10' 20'

Annuals

Arugula

Kale

Perennials

Arrowhead Balsomroot

Sweet-scented Bedstraw

Blueberry

Dwarf Plum

Current

Dwarf Pear

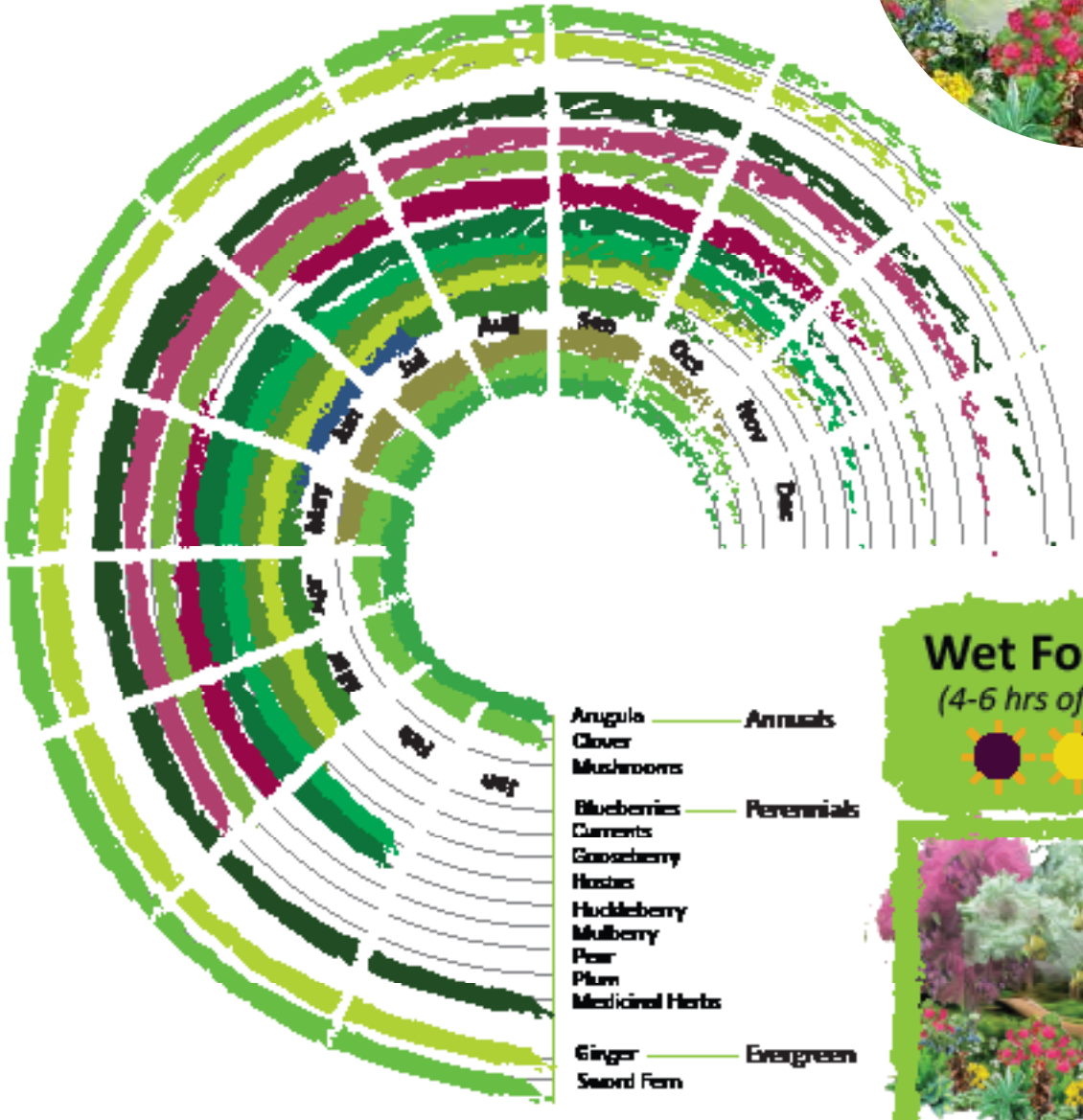
Ginger

Hosta

Gooseberry

Miner's Lettuce

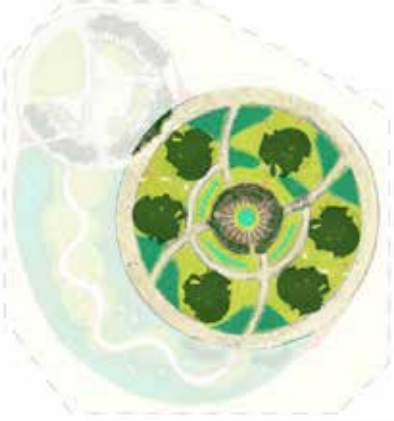
Sword Fern



Wet Forest

(4-6 hrs of sun)

Figure 5.6



Annuals

Native Perennials

Bioswale opportunity

Opportunity for loops

School & Neighborhood harvest, forage and gleaning

School & Neighborhood harvest, forage and gleaning

Medicinal (by symptom)

Cough, Cold & Flu
W. Sword Fern

Headache & Anxiety
Sweet-scented Bedstraw

Upset Stomach
Wild Mint

Vitamin C
Miner's Lettuce
Arrowhead Balsamroot

Above ground reflecting pool

Central covered area: trellised pergola or yurt

Image 5.18

1"=10'

0' 2.5' 5' 10' 20'

Annuals


Arugula


Kale


Lettuce


Swiss Chard


Spinach


Snap Peas

Perennials


Salal


Anise Hyssop


Valerian


Dwarf Apple


Meadowsweet


Wood Sorrel


Grapes

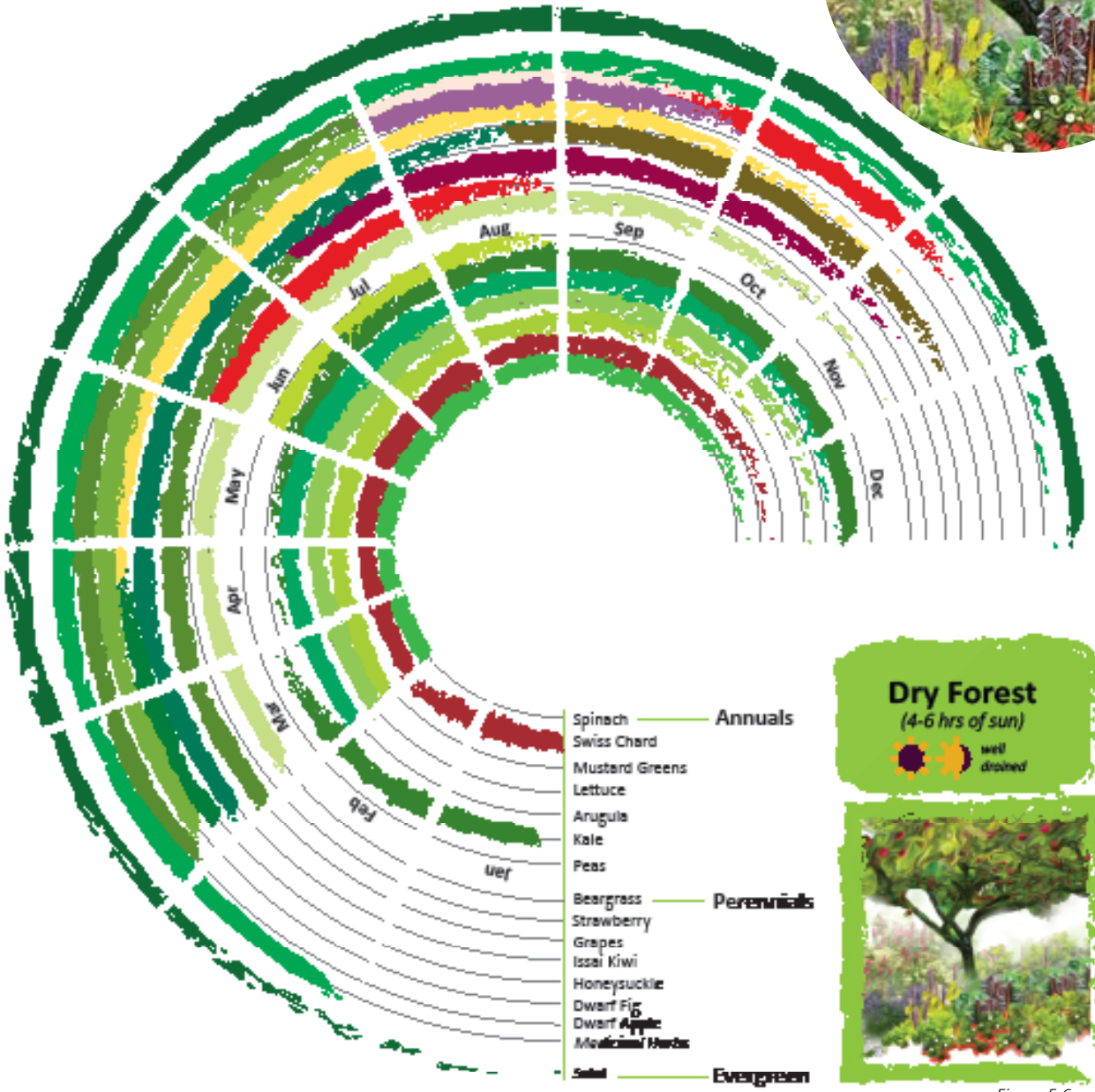


Figure 5.6

Annuals

Native Perennials

Bioswale opportunity

Opportunity for loops

School & Neighborhood harvest, forage and gleaning

School & Neighborhood harvest, forage and gleaning

Medicinal (by symptom)

Cough, Cold & Flu
W. Sword Fern

Headache & Anxiety
Sweet-scented Bedstraw

Upset Stomach
Wild Mint

Vitamin C
Miner's Lettuce
Arrowhead Balsamroot

Above ground reflecting pool

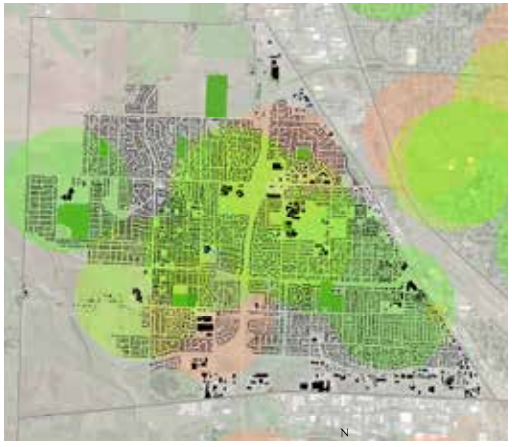
Central covered area: trellised pergola or yurt

Image 5.19
1"=10'

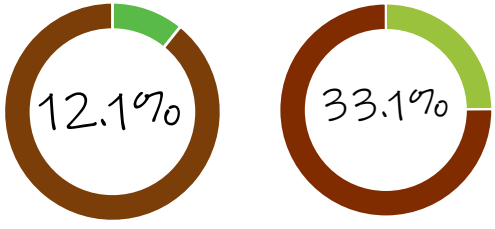
0' 2.5' 5' 10' 20'

Parts Pieced Together

As a spatial experiment, 8 schools were chosen from 4 Eugene neighborhoods to visualize the adaptability of this Toolkit of Parts. These schools were chosen due to either their standing as a Title 1 school, the disparity of income gaps surrounding the school, and/or the density of schools within a few mile diameter. These combinations protect other important school infrastructure, such as playgrounds and ball fields.



Active Bethel



Malabon Elementary

350 lbs of food from one food meadow

4,239 lbs of food from 3 food forests

One Community Learning Circle

Figure 5.7

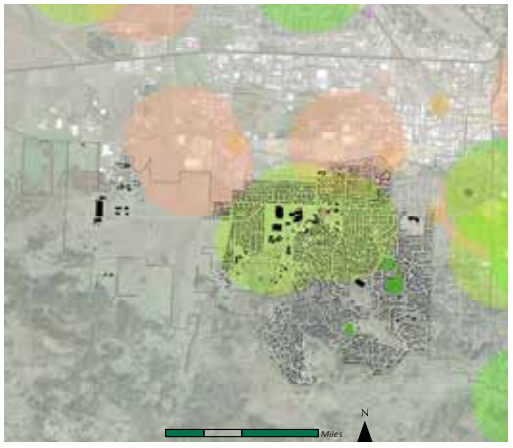
Danebo Middle School

2,800 lbs of food from 8 food meadows

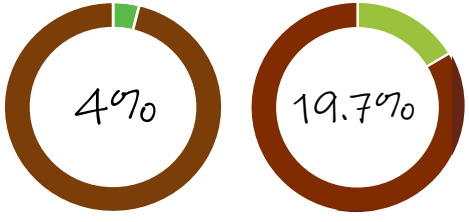
5,652 lbs of food from 4 food forests

5 Community Learning Circles

Figure 5.8



Churchill



McCornack Elementary

2,100 lbs of food from 6 food meadows

5,652 lbs of food from 4 food forests

4 Community Learning Circles

Figure 5.9

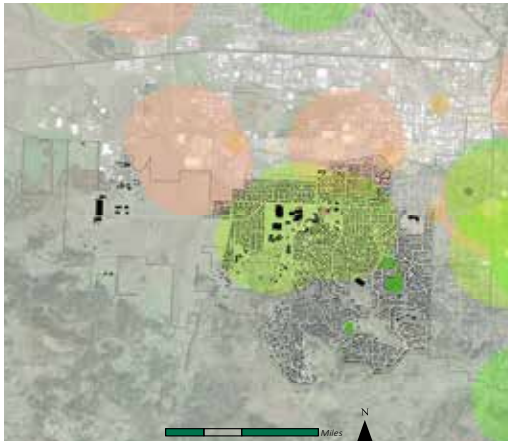
Fairfield Elementary

700 lbs of food from 2 food meadows

7,065 lbs of food from 5 food forests

4 Community Learning Circles

Figure 5.10



Churchill (cont'd)

Cascade Middle

1,050 lbs of food from 3 food meadows

4,239 lbs of food from 3 food forests

3 Community Learning Circles

Figure 5.11

Cesar Chavez Elementary

1,050 lbs of food from 3 food meadows

7,065 lbs of food from 5 food forests

4 Community Learning Circles

Jefferson Westside

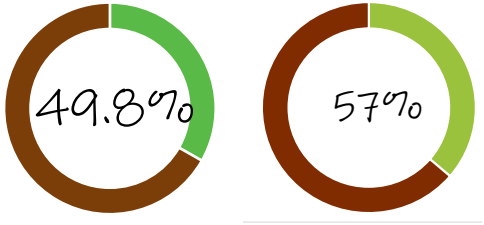
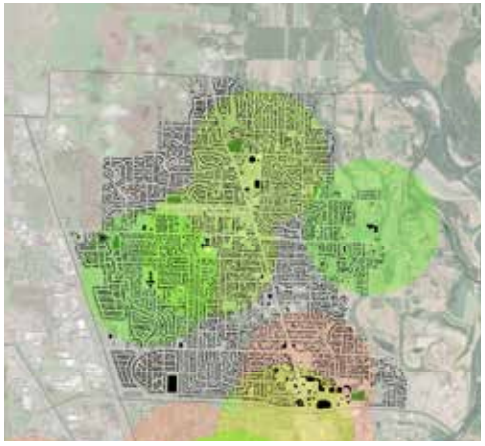
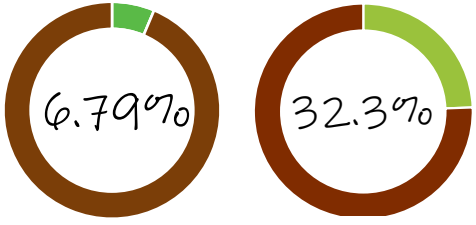


Figure 5.12



Santa Clara



Spring Creek Elementary

1,050 lbs of food from 3 food meadows

2,826 lbs of food from 2 food forests

2 Community Learning Circles

Figure 5.13

Awbrey Park Elementary

1,400 lbs of food from 4 food meadows

2,826 lbs of food from 2 food forests

2 Community Learning Circles

Figure 5.14

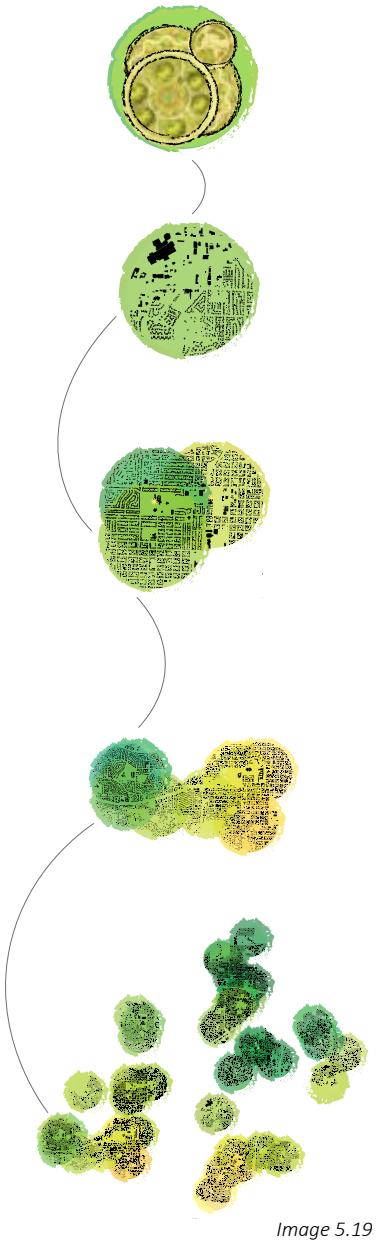


Image 5.19

Image 5.20

Mirroring ecological stepping stones, piecing together habitats for holistic wellness for children and community members is possible. Even protecting existing playscapes and ball fields, the previous examples illustrate the immense impact this toolkit of parts can have on a child, a neighborhood and a city as a whole. Featuring native pollinating plants, the toolkit also acts as habitat for insects, birds and animals. The density of schools in the Eugene area naturally create walkable clusters of human life and activity. By integrating edible therupeutic school gardens, accessibility to fresh produce and restorative garden elements doubles the amount of taxlots included. Utilizing retrofititing key parks as well only extends the area of influence.

Image 5.21

6 Implementation

Key Takeaways

1. Intentional inclusion of marginalized community members
2. Oregon has many scales of support systems
3. Take advantage of every opportunity

"Whatever you do, or dream you can, begin it.
Boldness has genius and power and magic in it."
-Johann Wolfgang von Goethe

Engaging A Diverse Community

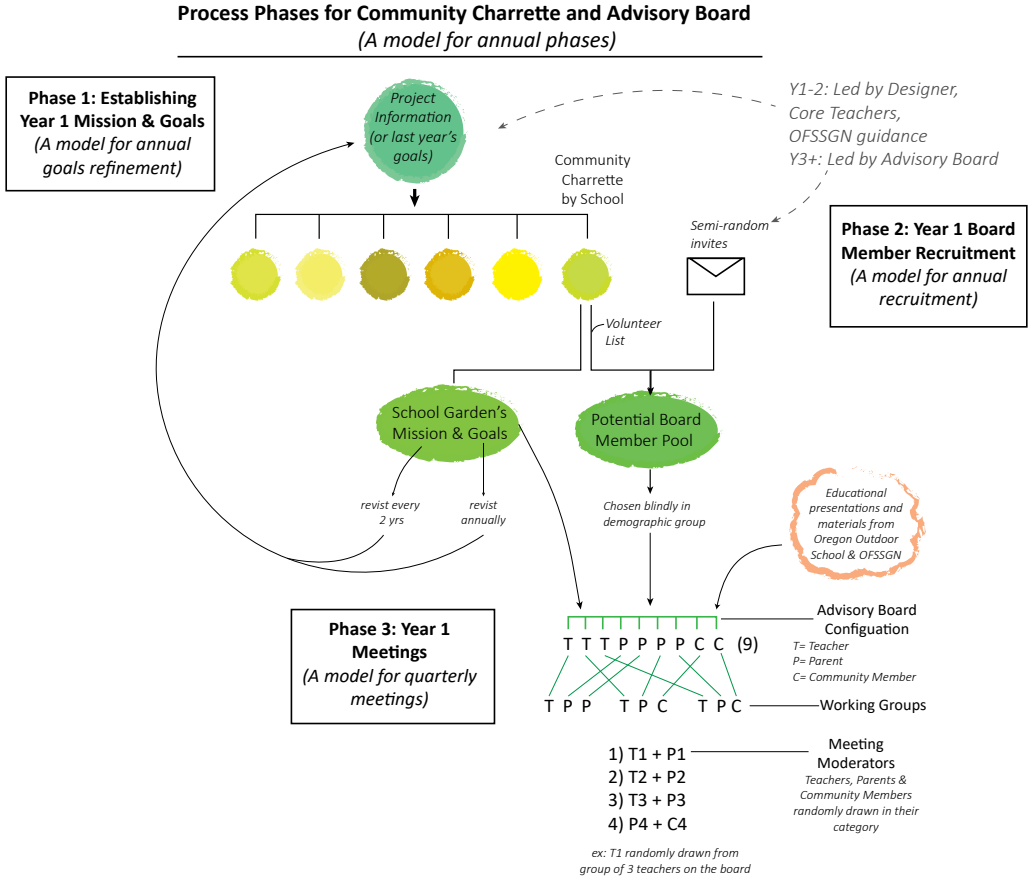
Due to time constraints of this project, no community members or organizations, including school faculty or OFSSGN, were consulted as to the genuine needs of these school communities. Therefore, at this stage the project is both low in involving the community in terms of feedback and decision making. If the project were to move forward, the community should be dynamically engaged in the design processes in culturally sensitive ways. OFSSGN and Oregon Outdoor School offer guidelines to activate the community in the design and decision making processes.

Students and families from traditionally marginalized communities should be given the opportunity to have their voices amplified in the design process if they choose. Whether they do or not, there needs to be a school by school "advisory board" type organization that maintains and encourages connection between culturally, financially, educationally, gender diverse communities and the Toolkit pieces. Under the principle of Universal design, by designing to meet the greatest needs of the population, the needs of the majority are met as well. Potential sensitivities include a greater emphasis on sensory gardens for youth with special needs; immersion schools or those with a higher percentage of “emerging bilingual” students tailoring their plant palette to reflect the diverse heritages of their students. Similarly, following the guidelines for wheelchair accessibility enables physically handicapped children the ability to participate. Lastly, prioritizing tribal ecological knowledge through the invitation of tribal members, “Kalapuya speaking stones” or other language identifiers throughout the garden, ensures student awareness of the Willamette Valley’s rich cultural heritage.

Designing a Community Engagement Process: School Garden Advisery Board

An inclusive public engagement process can seek to manage resources equitably in times of uncertainty, such as the current food insecurity issues in Eugene, and the compounded stressors and scarcity from the COVID-19 pandemic. Additionally, such processes can create and nourish a community’s capacity for adaptation and resilience to current and future hardships. The strength of the physical design revolves around its “Toolkit of Parts'' approach. As a series of connectable parts, the toolkit is adaptable to growth, corresponding to the growth of specific needs and desires of each school community. Therefore, it is important to design a dynamic community engagement process that genuinely reflects these

needs from the beginning. Due to the time limitations of the master's project, I as the landscape designer was not able to engage with community opinion through design charrettes for the spatial components, but relied on precedent and ecological studies to determine their shape. The life-giving breath of these gardens will come through the collective ownership and character of each unique school community. My hope is that the following framework is intentional in encouraging minority presence and voice on the School Garden Advisory Board, to ensure the physical and emotional needs of every student are met.



(Figure 6.1) Illustrates a potential process for designing a school garden advisory board. Combined, the three phases would take a year to complete, corresponding to board member term length.

Phase 1: Inquiry into Community Needs (The Design Charrette)

A design charrette is a dynamic environment that has the capacity to engage a diverse range of participants. In this case, to thoroughly understand the unique dreams, identity and resources, each school will individually carry out a community design charrette. Starting with the school directory, informational flyers (in Spanish and English) about the project and charrette details will be made, emailed and mailed to families. If the school is an immersion school, then informational flyers will be translated in that language in addition to english.

As the project surrounds a school garden, the design charrette will be held in either existing school gardens on site, or in the cafeteria or auditorium. Families will be accustomed to visiting the school, making it an accessible meeting place. Invitations for the charrette and project information will be sent in August, along with semi-random invitations to participate on the advisory board. The selection will be weighted for the inclusion of minorities (black, latino/a/x, asian) and women in the pool of potential applicants. Each annual charrette will record potential interest from parents, high school students, teachers, school staff and community members who attend. School begins the first week of September, therefore informational flyers for the charrette will be posted on school informational boards at that time; these flyers can be drawn from a reusable template. In year 1, this will include printed presentation materials of the initial Toolkit pieces. In following years, it is recommended that the previous years' pictures, goals and produce yields to be included in this information.

There will be two forms of charrette, catering to both families and community members. The first will be included in "Back to School" nights. Project information, graphics, goals and a short survey will be open for community feedback. The project information will be a stand-alone poster; a color coded sticky-note system will serve as a feedback loop. An example of the sticky note system could include: pink sticky notes for areas of improvement or additional ideas, yellow for asking a question or clarifying, and blue for things that work well or they are excited about. Surveys will be collected by a teacher or the designer, and can be drawn from a reusable template. Instructions will be in english and spanish (or other prevalent language in the school), with an invitation to use the language you are most comfortable using. Demographic information will be in the form of yes/ no questions. Open ended questions will ask about experiences, ideas and interests concerning the school garden and the advisory board, missional questions, and lastly a blank space to answer, "Anything else we should think about?" at the end.

This encourages participants to engage as co-designers. In year 1, this information will be distilled into themes, then distilled into corresponding goals and mission statements by the designer and core teachers, with OFSSGN oversight. (Core teachers include all school staff interested after a quick introduction of the project, and who are willing to commit time and energy into its implementation.) In future charrettes, this responsibility will fall to the advisory board in their October meeting. It is recommended that all goals and missional statements will be posted on the website.

A more workshop oriented charrette will be held for the community in addition to families. This process will feature an informational presentation, recommendations for board member responsibilities and a call for interested volunteers; as well as small group discussions and planning for the mission of the advisory board. Butcher paper, markers and copies of the presentation materials will be provided (reserve space in financial budget). Financial consideration should be placed on hiring a American sign language translator for this charrette. Therefore audio, visual and tactile learning methods will be implemented, in an attempt to engage as many types of intelligence as possible. In this way, people who do not identify as academically intelligent still have avenues for understanding and communicating their ideas and opinions. The outcomes of these charrettes include: gathering of interested parties, preliminary education and design process, and creating missional and goal statements for the school garden and advisory board. Mission statements can be amended or augmented by a majority vote from the advisory board.

Phase 2: Process for Board Member Recruitment

Phase 2 board member recruitment process will overlap with Phase 1. Multiple forms of outreach will be used in inviting both potential user groups of school and community gardens. The first outreach tool is informational flyers. The genesis recruitment process will feature the original research, design goals, and recommended plant palettes to introduce the project to the community (as seen in Ch. 3 and 4). These gardens are firstly designed for elementary to high school students' education, access to healthy foods, experiential therapy and play. Therefore the first goal is inviting every family with a student in the school community. Informational invites will be mailed according to the school directory, and will be posted (per permission) in the school for the month of September. Making the language accessible for non-english speakers will be important to

invite marginalized communities to have presence and voice in the decision making process. Therefore, planning for the translation of materials will require time and space in the budget.

Secondarily, these gardens will function as a public food forest, and therefore need to extend outreach to the neighborhood at large. The website will be the primary source of information for people outside of the community.

The recruitment process will overlap with the Community Charrette described in Phase 1. A cursory presentation of potential advisory board activities will be given after the presentation, along with a sign up sheet for people interested. This sign up sheet will also serve as an email list for school garden updates, to keep the community in the know. A reminder about this sign up sheet will be given after the presentation and repeated at the end of the charrette. In year 1, this information will be collected by the designer or core lead teachers involved in the project. In following years, this responsibility falls to the board. For those neighbors and families unable to attend, semi-random invitations to participate on the board will be both mailed and emailed (reserve printing costs in financial budget). These will be weighted in preference of minority populations, and will be in Spanish as well as English.

The School Garden Advisory Board will consist of 9 members. The recommended configuration includes: 3 teachers, 4 parents from separate families, and 2 community members. If operating at a high school, include 2-3 additional places for interested students (recruitment process for students is per advisory board discretion). The first year of operation, members will be chosen by the designer and core group of teachers (most likely from the 'core group') with oversight from the Outdoor School and OFSSGN. Membership criteria involve a background check; reserve $25/ non-teacher in the financial budget for this purpose (it is assumed that teachers on active school payroll have passed a background test). Paying for additional costs lowers financial barriers for participation, and seeks to ensure access for every interested party. Additional membership criteria include involvement in work days (at least 2/ year), and availability for meetings (4/ year). In the age of zoom, meetings will be recorded. This allows flexibility for board members who, in the event of an emergency, cannot attend meetings to asynchronisly participate. Audio recordings will also be posted on the website for future use and record keeping.

To ensure inclusion in voice and participation, board members can serve 2 terms (2 consecutive years), but each year 5 of the 9 members must be new. This

Possible Advisory Board Meeting Framework:

Meeting 1- October
(Fall Harvest & Preparation for Over-wintering)

-Distill annual umbrella goals from community charrette into attainable goals
-Collaborate working through a Cultural Responsiveness Evaluation provided by the Outdoor School and/or
-Presentation and educational materials from the Outdoor School and OFSSGN (Oregon Farm to School, School Garden Network)
-Determine workshop interests from community charrette
-Research potential partner organizations
-Brainstorm work party needs, preliminary days and participation incentives (at least 3 members of Advisory Board Present at each work party)
-(alternative: coordinate with surrounding schools for guest lecturer event, collaborative goals)

Meeting 2- January
(Beginning of indoor growing season):

-Determine yield goals, plant palette and planting schedule
-Acquire seeds, starts, cuttings as needed (financial budget)
-Propagation workshop with families' kitchen cuttings
-Schedule and communicate winter work party days and activities

Meeting 3- March
(Spring sowing season):

-Establishing harvest/ forage/ gleaning guidelines and schedule
-Schedule and communicate spring and summer work party days and activities
-Organize community service opportunities for high schoolers

Meeting 4- August:

-Summarize the year's goals and if they are met
- Review the efficiency of the board, places to improve or clarify
-Choose new members from volunteer list and semi-random mailers
-Prepare into presentation materials for 'Back to School' night and Sept charrette
-Publish information on the website

diffuses the power of "insider culture" between new and old members. Similarly, it is recommended that at least 5 of the board members are from a minority demographic, and 4 are women. Also, as a main audience of school gardens are children, it is imperative their needs are represented. Coordinating for child participation is an interesting challenge for a later date. In this instance, the first few years of the advisory board, teachers will act as the representatives for the students. They are the most familiar with the greatest number of child needs in the school community at large. Finally, there should be a portion of the budget reserved for financial compensation for the board members.

Phase 3: Meetings and the Collective Learning Environment

The decision making in this phase will be limited to the School Advisory Board. However, to build community trust in the workings of the board, transparency of process is important. Therefore, meetings will be open to public attendance, with a time for questions reserved at the end. Additionally, all key points of the previous meeting will be restated at the start of each meeting, as well as posted on the website. This temporal openness is an intentional strategy to encourage access and the sharing of communal knowledge.

The missional statements distilled from the community charrette will guide the focus of the meeting. In addition, establishing a meeting culture of respect and unity of cause will be reiterated at the beginning of every meeting. These internal regulations will cover appropriate ways to approach dissenting opinions, resolve conflict justly, and make sure every member feels respected. Utilizing the plural "we" in these statements underscores this sense of unity (Arnold, 2012). An example could include, "As members of the ___ School Garden Advisory Board, we are committed to learning how to best serve our school community."

In the first year, moderation will depend rather heavily on the teachers modeling appropriate behavior. A new pair of board members will moderate each meeting; each pair will include a teacher. As a profession, teachers are trained moderators and have experience sensitively leading conversations to ensure all voices are heard. Additional teacher training resources in this topic, as well as cultural responsiveness, are provided by the Outdoor School website. Therefore, the parent or community member co-moderating with their partner teacher has an opportunity to learn these skills. These pairings will be randomly selected by group (ex: teachers will be selected from the pool of three teachers on the advisory board).

After the reiteration of cultural and behavioural guidelines, the pair moderating the meeting will give a short educational presentation concerning that meeting's activities (ex: propagation techniques, etc). Inviting a stakeholder, such as from Food for Lane County or a higher education institution, are also viable presentation alternatives.

To ensure a diversity of perspective in each working group, these groups of three will include a teacher, parent and community member (or teacher and 2 parents). Smaller working groups within the meeting will encourage vocalization, as well as new and deep connections between board members (Guo & Musso, 2007, Smith 2009). In these ways, each meeting will seek to deepen the understanding of the needs of the community and of the garden by creating new connections and leadership opportunities.

Website

Having information readily accessible is important for community learning and building trust with an organization (Lee-Gellier & Lee, 2019). The Oregon Outdoor School's website offers numerous resources, like educational, inclusive and culturally responsive teaching and evaluation tools; this site offers a model to follow. As the most accessible public interface and learning environment, the school garden can be featured as a tab on the existing school or school district's website. If the latter, each school should have space for meeting key notes, activities and personal stories. Parents are already accustomed to checking these websites for other school related news, and therefore would not pose a new barrier for these resources. During COVID-19, many school websites have posted educational activities to help parents teach from home. Continuing this tradition after the quarantine encourages continued learning. Additionally, pictures and short biographies for each board member would increase feelings of accessibility to those on the board. Having these elements as clearly defined and easily accessible website components gives users a sense of satisfaction, competence and confidence in the program. Funds should be allocated for website maintenance.

Equity, Access & Power

There are inherent and multi-faceted power dynamics at play in designing for a community-centered School Garden Advisory Board. Differences in race, gender, knowledge, experience and language were all factors differentiating the dominant majority culture to an often overlooked minority. In beginning the

community engagement process as highly inclusive and participatory, the goal of inclusion meant attempting to diffuse these imbalances through the invitation and equitable response to minority presences (Madden 2015, Smith 2009, Quick & Feldman, 2011). Specifically, cultures with historically harsh (and often traumatic) experiences towards outdoor and agricultural settings (black, latino/a/x, women identities) are the priority. Reclaiming these narratives from one of oppression to freedom of expression for these communities demands their perspectives to be heard. "In this sense, participation as freedom is not only the right to participate effectively in a given space, but the right to define and to shape that space" (Gaventa, p12). While beginning as invited spaces, created by the designer for user participation, a main design goal is the transferral of power inherent to the designer into engagement spaces claimed by community through charrettes and the advisory board. After a year or so establishing the process, the transferral of power will produce the democratic goods of popular control and considered judgement. As charrettes become more ingrained in communal knowledge, the cyclical design approach will allow changes in goals, mission and board members, further legitimizing the impact of an individual's role and the representation of board members.

Similarly, this process seeks to be mindful of language as a barrier to communal knowledge and participation. Reserving financial support for in-person translators and the translation materials invites Spanish-speaking, and other non-english community members. Therefore having the knowledge of english does not automatically create an unequal power dynamic that prevents the presence and agency of those without that particular knowledge.

Additionally, creating accessibility for persons and families in low income brackets means providing financial compensation that is worth their time. Finally, the methods of initial outreach also seek to invite more diversity than what would typically be self-selected. Semi-random mail invitations weighted towards priority demographics hope to empower potential minority board members. Similarly, iInternal regulations for board composition will ensure critical mass for minority, women and new members. This will prevent tokenism and ensure a diversity of minority perspectives and experiences to be shared, further enriching the shared knowledge of the board. This allows the intersectionality of an individual' s identity to be fully expressed and actualized, creating new perceptions and connections.

Lastly, asking teachers to model moderation techniques vocally and experientially establishes a certain standard of collective learning in the internal culture of the

board (Buse 2016, Smith 2009). Not only so, the teacher is also modelling effective and gracious listening skills, as they gain experiential and professional knowledge from stakeholders and other board members. The fruition of this process comes through a parent and community member leading the fourth and final meeting in August. As board memberships either carry over or rotate out, having these experiences modelled creates a trajectory of learning that is passed on to successive board members. In future meetings, it may be parents or community members that model these practices to teachers.

Through these and other practices, this community engagement design seeks to break current patterns of community garden participation of the white middle class majority, and establish a new community of learners dedicated to the inclusion and health of the entire community.

Scales & Networks of Support

In addition to inclusivity, another hurdle in the implementation of an edible therapeutic school garden is food literacy. Students, and possibly their families, often lack the knowledge for safe foraging, propagation and preparation of many of these vegetables and native plants.

In terms of state financial and educational support, Oregon Harvest for Schools is an agency backed by both the Oregon Department of Agriculture and the Department of Education. This organization offers free printed newsletters and recipes to Oregon with featured fruits and vegetables (also available in Spanish). Similarly, OFSSGN supplies teaching tools, curriculum, educator training and seed access through their website. From personal experience, this program is incredibly responsive and passionate about integrating garden based education in Oregon schools. The Willamette Valley Farm and Food Coalition is already involved with the Eugene 4J district, and is an additional local resource.

There is no doubt that a wealth of formal and informal experiences can be found within the community itself. Therefore, following the precedent set by Beacon Food Forest, these edible therapeutic gardens have the potential to create a community of agrarian learners. This can take many forms, and again has the potential to elevate many marginalized voices and experiences. Beacon Food Forest partners with high education institutions, which can also be found in Eugene through the UO and LCC. Foraging, cooking and canning workshops can be led by professors, professionals, and community members. Pruning techniques taught by arborists, or pollinator awareness led by environmental groups taps into

the city's passion and expertise on these matters, while also providing a valuable maintenance regime.

Opportunity Knocks

To reiterate, the strength of the "toolkit approach" lies in its flexibility. Each school can utilize the tool kit parts, such as design elements and plant palettes, to best fit their needs. This includes both retrofitting as well as envisioning and building a garden from the soil up.

While budgetary concerns always play a part in the implementation of projects like these, with the right planning there are many practical resources available. In terms of plants, acquiring such an array seems daunting and expensive. However, many common vegetables can be grown from cuttings, and all from seeds. Onions, lettuce, kale, potatoes, etc are all suited for propagation via cutting. Imagine each class from the Active Bethel schools takes on a type of propagated vegetable: 1st grade brings in potatoes, 2nd lettuce, etc. If cuttings are propagated in winter, they will be ready to plant by the spring. Schools could participate in the equivalent of "seed swaps", or have community planting days. Perhaps a group of Active Bethel schools agrees to buy fruit trees and native edibles in bulk from nurseries for a percentage off. Together the plants needed would be pieced together relatively cheaply and ready to grow!

Additionally, the process of envisioning, designing and implementing an edible therapeutic school garden will take time. Utilizing these planning periods, not only to propagate, but to research and invest nutrients back into the soil will pay dividends whether or not a garden comes to fruition. This "staging period" can be used to nourish the soil with nitrogen fixers, compost and annual vegetation to add organic matter into soil on proposed sites. Compost can be made with everyday materials: cardboard, leaf litter, and food scraps. A potential partnership can be established with the eugene compost network or local nurseries. Similarly, in planning stages identifying potential fruit trees is an important preliminary step in creating a plant palette, as fruit trees absorb and process soil toxins.

Schools across the country are seeking to enrich student experiences through contact with nature. In the same way some schools are able to adopt 1:1 technology (one electronic device for every student), schools could become 1:1 plant schools. Perhaps it begins with each class befriending and adopting a tree on campus. Kindergartener classes could choose from areas closer to the building, while older kids could venture further on campus. This approach bolsters Ore-

NATIONAL FARM to SCHOOL NETWORK

Oregon State University Extension Service

OREGON Farm to School & School Garden NETWORK

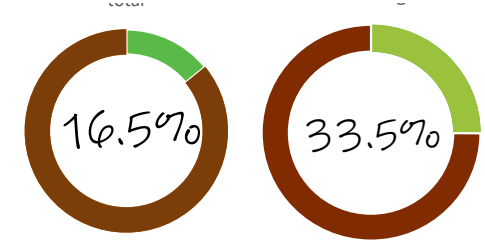
OREGON DEPARTMENT OF AGRICULTURE

gon's statewide goal of environmental stewardship in its youth and leaders of tomorrow. A dynamic range of interdisciplinary lessons can be situated around their plant, or around a certain quadrant of the toolkit pieces. As the child grows, they can experience the interconnected relationships their plant has with its neighbors. Building off of the lessons in the environmental education section of this paper, prolonged and consistant exposure to nature encourages a sense of agency and ownership as a critical member of the community. Nourishing that kind of reciprocal relationship with nature opens many opportunities for a child's overall health and wellness.

(Image by T. Hackett, Aug 2020) Designed before the creation of toolkit pieces, the school farm at Elmira Elementary is implementing staging periods as they gather resources. Plants that take longer to fruit, such as dwarf apple and pear trees, blueberries and raspberries were the first planted in March, 2021.

(Image by K. Parr) High school and community volunteers have been instrumental in installing the hard infrastructure. To further interest and community involvement, festivals are planned throughout the year. In the initial construction phase this summer seasonal favorites, such as strawberries, will be a delicious showcase of the school farm's potential.

Conclusion



Current food accessibility

Access if schools became community wellness hubs

1,763 lbs/ft2
produce grown
annually
&
1 community learning
circle
from 1 Community
Learning Center,
Food Forest and
Food Meadow

In summary, both elements of an edible city and therapeutic gardens create empathetic connections, dually based on science and relationship. Nature, especially gardens, have been a source of healing, connection and sustenance for humanity across the globe. In the past few centuries, a growing disconnect of industrialization and urbanization has all but severed this intrinsic connection. Today, the social and educational isolation brought about by COVID-19 widen the gulf between youth and a relationship with nature that nourishes physical and emotional health. Students, as young children, are increasingly unaware of the invaluable worth of ecosystem processes, while simultaneously witnessing their destruction. Designing opportunities for a child to uniquely experience the benefits of nature offers hope. As a child develops, this relationship empowers agency, overflowing in stewardship actions. Hope is foundational in creating identities passionate about positively impacting the world. On the other end of this relationship, the child's mental, emotional and physical needs are being addressed by connecting to co-evolutionary processes with the environment around them. These effects have been seen both individually as well as communally.

However, Sobel's Beyond Ecophobia argues for proper association of geographic scale and sensitivity to environmental issues according to stages of childhood development. Exposing children to global catastrophes too soon creates hopelessness and disassociation. "But those images [of far off environmental catastrophes] can have an insidious, nightmarish effect on young children whose sense of time, place and self are still forming" (Sobel, p10). This is true of environmental, as well as social catastrophes that includes the current global pandemic. Therefore the importance of laying a local foundational knowledge is again important in allowing children the safety to establish unshakable empathetic connections. "What is important is that children have an opportunity to bond with the natural world, to learn to love it, before being asked to heal its wounds" (Sobel, p9). Numerous case studies provide evidence and insight into the reliability of this claim. Community gardens and the concept of the edible city have been well established as having the potential to offer assistance to food insecure communities; allowing nature to provide for local populations. Similarly, therapeutic and healing gardens have shown beneficial and restorative properties on human mental health. The combination of edible and therapeutic gardens, built upon agrarian frameworks of community, has the capacity to rekindle a relationship with the natural world that, in turn, holistically nourishes well-being. Exposing children to combined edible and therapeutic gardens is hypothesized to nourish affection by establishing

a mutual relationship based on care.

While this concept has been found briefly in the concept of “care farms” in rural settings, an urban design framework combining agriculture and therapeutic gardens has not been thoroughly researched at all or for a child audience. This paper merely proposed the tools. The impacts wait upon implementation and time. Nordahl describes an encounter with a man who used his yard to plant fruit trees for the community. He witnessed the transformative effects his garden has had on the neighborhood. "To change the community, you have to change the composition of the soil,’ Finley says. ‘And we are the soil. You’d be surprised how kids are affected by this. Gardening is the most therapeutic and defiant act you can do, especially in the inner city. Plus, you get strawberries” (Nordahl, p3). This toolkit of experimental garden design pieces envisions a change in the composition of the soil, beginning and partnering with children at school.

Assumptions

This project operates under the following assumptions. Firstly, every school has an admistrator, staff and teachers willing to engage with such a involved process. While researching potential partners in like-minded community groups yielded a relatively large number, having community participation for maintaence and harvest was also assumed. A sort of "If you build it, they will come" type approach. As previously mentioned, if this project were to actualize, these conversations with schools and potential partner organizations (OFSSGN, Outdoor School) would need to take place. Similarly, while potential avenues were briefly explored, availbility of funding was assumed. Finally, the very function of the Toolkit pieces was built as an experimental hypothesis. The productivity of plants and therapeutic aspects were drawn from previous study, not personal experience. Physical implementation, time and behavioral research are all necessary to test the legitimacy of the Toolkit pieces. While personal, communal and environmental resiliency were core themes of this project, the implementation of these Toolkit pieces would not guarantee a painless aftermath in the face of systemic failures.

Reimagining School Gardens

Given the radii of accessibility discussed in the Site Analysis chapter, currently only 16.5% of Eugene’s tax-lots are within walking distance of grocery stores, fast food and convenience stores; many of these overlap within low-income areas with numerous schools. Therefore food insecurity for children and their families,

and its corresponding mental stresses, are a valid concern. However, when analyzing the placement of schools and utilizing a 0.5 mile buffer, 33.5% of Eugene's taxlots would be blanketed with accessibility. Combined with strategically connecting satellite park gardens the vision of holistic wellness corridors can be a reality. It is possible to combine therapeutic and agricultural circulation patterns, plant palettes and design goals through ecological mimicry and permaculture practices. Practically, if every school were to adopt one of each part, each school would be expected to produce 1,763 lbs/ft² of food per year and have an outdoor classroom where a teacher and 13 students can learn while practicing social distancing. Imagine children in low-income families not having to go to sleep hungry; who have the energy to play and be inspired by the world around them. Imagine them seeing what has been a harsh world, now open up to a place of beauty. A place for that can take care of them. Imagine the friendships between neighbors as they spend Saturday mornings foraging shoulder to shoulder. Imagine the graciousness of these relationships carrying someone through tragedy. Imagine the resiliency.

For some children, edible therapeutic school gardens have the potential to be a wonder-filled formative experience, and will immediately enjoy eating fresh strawberries in the summer sun. Yet, there will always be the child who chooses to rip leaves off a tree rather than water it. Even still, that child should have the opportunity to be exposed to gracious landscapes that offer support of food, activity, serenity and beauty.

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Native, Edible & Medicinal Working Plant Palette

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OSU Plant Profile	https://oregonstate.edu/dept/nursery-weeds/weedspeciespage/chicory/chicory_page.htm				
USDA Plant Profiles	https://plants.usda.gov/core/profile?symbol=AGAU2 USDA Plant profiles				
Natural Medicinal Herbs	http://www.naturalmedicinalherbs.net/				
Native Tech	http://nativetech.org/plantgath/bracken.htm				
BOTANICAL NAME	**COMMON NAME**	**Growing Notes**	**Edible**	**Medicinal**	**Appearance**
UNDERSTORY TREES					
Ficus carica 'Italian Honey'	Italian Honey Fig	possible 2 crops/yr, drought tol, moist well drained, full to part shade, 8'tall	fruit		10-20'/10-20'
Malus domestica 'Enterprise'	Dwarf Enterprise Apple		fruit		10-20'/10-20'
Malus domestica 'Gravenstein'	Dwarf Gravenstein Apple	full sun, 10-17', midspring white flowers, pollinator	fruit		
Quince			fruit		
Pyrus domestica 'Comice'	Comice European Pear		fruit		
Pyrus domestica 'Shipova'	Shipova Pear	somewhat self-fruiting	2-3" fruit in Aug		
	Elephant Heart Japanese Plum	self-fertile or with Beauty or Santa Rosa, semi-dwarf, well-drained, full sun	fruit sweet juicy and rich flavor, harvest sept-oct		
Punica granatum	Pomegranate	15-30' tall	fruit	Vitamin C, antioxident	
Myrica californica	CA Bay Myrtle	evergreen	Leaves as herb		
Morus alba	Mulberry	10-30' tall, short lived	fruit	Iron, Vitamin C, lower cholesterol, lower blood sugar	sweet, tart taste, aromatic, syrupy
SHRUBS					
Lonicera caerulea	Honeyberry	4-6', April-June bloom, yellow white flowers, full to part sun, hedge	fruit		
Gaultheria shallon/ procumbens	Salal	Northwest Native, shade	berries jul-sept		evergreen, low-growing, bloom April to May
Holodiscus discolor	Oceanspray	Northwest Native, understory shrub	flower and seeds		soft cream colored pannicle flowers
Oemleria cerasiformis	Indian Plum	Northwest Native	fruit		
Ribes rubrum	Red Currant	Northwest Native	berries		
Rubus spectabilis	Salmonberry	Northwest Native	summer berries		
Sambucus nigra cerulea	Blue Elderberry	Northwest Native	berries		

Vaccinium ovatum	Evergreeen Huckleberry	Northwest Native, pollinators, bloom april-may, evergreen	berries, fruit ripens aug-sept		
	Jahns Prairie Gooseberry	easy to grow, disease resistant	mid summer ripe, big yields		
Elaeagnus multiflora 'Carmine'	Carmine Goumi	15', PNW	somewhat tart, heavy yields		
Vaccinium 'Chandler'	Chandler Blueberry	long ripening season, long seasonal productivity	largest blueberry		
Vaccinium 'Hardyblue'	Hardyblue Blueberry	tol of heavy clay	sweet, heavy yield		
Vaccinium 'Patriot'	Patriot Blueberry	tolerant of wet, resistant to phytophthora	large good flavor		
HERBACEOUS					
Perennials					
Achillea millefolium 'Terra Cotta'	Terra Cotta Yarrow				large orange flowers
Asclepias	Milkweed	well drained, sunny			
Bergenia crassifolia	Bergenia				
Eschscholzia californica	California Poppy	self seeding, sunny, drought tolerant	seed in small doses		orange, spreading
Hemerocallis 'Gentle Sheperd'	Gentle Sheperd Daylily	3.5' tall, early-mid, white flower	young shoots, tubers, petals, buds		white
Hemerocallis 'Golden Zebra'	Golden Zebra Daylily	golden bloom, variegated foliage, 1't x 2'w	young shoots, tubers, petals, buds		
Hemerocallis 'Happy Returns'	Happy Returns Daylily	pale yellow	young shoots, tubers, petals, buds		
Hemerocallis 'Stella D'Oro'	Stella D'Oro Daylily	1' tall, early, bright yellow	young shoots, tubers, petals, buds		reblooming orange
Lupinus albus	Sweet Lupine	alpine meadow, sun			
Monarda	Bee Balm	purple pompom flower	leaves, flowers eaten raw or cooked, minty taste similar to oregano	symptoms of cold and flu	
Papaver orientale	Oriental Poppy	large red petals	seeds		
Stachys byzantina 'Silver Carpet'	Silver Carpet Lamb's Ear				soft white leaves
Pedicularis groenlandica	Elephanthead Lousewort	wet meadow, fire resistant	leaves		beautiful purple spires,
Asparagus officinalis	Asparagus	lilaceae fire resistant	shoots		3-4', lighty flowing foliage
Maianthemum stellatum	False Solomon's Seal	forests, moist open	berry, young shoots, green and rhizome edible when cooked	berry high in VitC, roots "cleanse system"	lush herringbone leaf ladders, white open airy panicle flowers, thickets,
Epilobium angustifolium	Fireweed	tall, fire damaged areas, purple spires	shoots, young leaves, flowers pith edible raw. Bud clusters cooked as veg.	use for pain and swelling (inflammation)	pink/ purple panicle, looks great in bunches,
Erigeron annuus	Fleabane	stringy white petals, yellow center	young edible when boiled	Swollen airways, cough, sore throat	daisy like, white petals and bright yellow innard

Solidago multiradiata	Goldenrod	sunny meadows	seeds, flowers raw, plant can be cooked	reduce pain, inflammation	bright yellow panicle flower, tall
Malva sylvestris	High Mallow	meadow, purple petals	leaves, shoots, seeds, flower buds and flowers all edible raw. Seeds taste like	Sore throat, cough	violet flower
Triteleia grandiflora	Largeflower Triteleia	grasslands, prairies, do not confuse w death camas, NW Native	corms raw, boiled, roasted, young seed pods raw		cluster of light blue trumpet
brassica spp, barbarea spp, descurainia spp, sisymbrium spp)	Mustard		cooked greens		
Leucanthemum vulgare	Oxeye Daisy	meadows	young leaves, spring shoots, roots raw, unopened buds as flavoring		classic white daisy w yellow mid
Anaphalis margaritacea	Pearly Everlasting	rocky, dry, drought tol	leaves and young plants cooked	Treatment of sores, cold symptoms	closed white flowers in umble, delicate like babys breath
Veronica officinalis	Speedwell	meadow	leaves, stems, flowers raw. Taste dull to peppery, used	wounds, skin lesions	periwinkle spires,
Helianthus petiolaris	Sunflower	open and sunny	sprouts, seeds edible raw, kernels ground into meal, shells roasted as coffee		yellow flowers
Stachys palustris	Swamp Hedge Nettle	moist plains	rhizome, flours , seeds edible raw, roots ground for flour	Stop bleeding, antibacterial, can be dried	pink spires
Herbs					
Lavandula x intermedia 'Provence'	Provence Hedge Lavender	best for fragrance, drying	herb, flavorings and tea	smell helpful for symptoms of anxiety	24' tall, lt. violet
Lavandula latifolia	Spike Lavender	36" tallest flower spikes, long bloom cycle-late	herb, flavorings and tea	smell helpful for symptoms of anxiety	
Mentha requienii	Corsican Mint	1/2" tall, rapid growth	herb	smell helpful for symptoms of anxiety	best in part shade
Origanum vulgare	Oregano	agresssive wide-spreading clumps, pink flower	herb		
Origanum vulgare 'Aureum'	Golden Oregano	bright gold spring leaf	herb		varigated, pale yellow and green
Rosmarinus officinalis	Rosemary	evergreen, winter bloom	herb		blue winter flowers, small dark green leaves
Salvia o. 'Berggarten''	Berggarten Sage	sunny meadows, well drained, gets woody as ages	herb		big, soft silvery leaves
Thymus citriodorus	Lemon Thyme	Lemon scented	herb		yellow tinged, small delicate leaves
Thymus serphyllum 'Pink Chintz'	Pink Creeping Thyme	forms dense mat	herb		pink flower
Monarda fistulosa	Wild Bergamot	meadows, pollinator	smells like mint, cooked at pot herb		light purple flowers
Mentha arvensis, ""spicata, ""piperita	Wild Mint	moist areas	raw, flavoring		light blue, aromatic
	Borage	pollinator	flowers		blue flowers
GROUNDCOVERS					
Fragaria chiloensis	Beach Strawberry	Northwest Native, 1', dry, sun/pt shade	berry		white flower
Trifolium pratense (red), "" hybridum (alsike), "" wormskioldii (springbank)	Clover	Nitrogen fixer	dip in saltwater, sprouts best taste, flowerheads	cold and respitory symptoms	2-3", orb flower goups
Montia perfoliata	Miner's Lettuce	moist shade	all parts edible	Vitamin C, antioxident	round leaf w sm white flower in center,
Malva moschata	Musk Mallow	light purple flowers	leaves, shoots, seeds, flower buds and flowers all edible raw. Seeds taste like nuts		1' tall, delicate purple/pink flowers

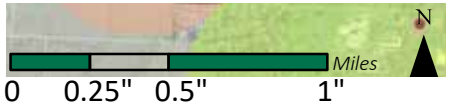
Claytonia sibirica	Siberian Miner's Lettuce	light purple flowers	leaves raw, lemonade type drink	Vitamin C, antioxident	light green and round leaves, small white flower in the center
Viola adunca, "" canadensis, ""tricolor, ""palustris)	Violet	pale purple to yellow	all parts edible, infused oil	bug bites, anti-inflammatory, salve for dry skin	purple flowers, 4-6"
Oxalis acetosella	Wood Sorrel	yellow aster-like	leaves, flowers raw	sore throats, nausea	yellow 5 petaled flowers, leaves turn purple
Grasses					
Xerophyllum tenax	Beargrass	dry slopes/ ridges/ forest clearings	roast or boil rhizomes		2-3" white flower round atop long stalk, wonderful in clusters,
Galium aparine	Bedstraw	forest and meadow edge groundcover	roast or boil rhizomes	stems, flowers, leaves best before fruiting/ dried leaves roasted for coffee substitue	
Galium boreale	Northern Bedstraw	fire wise, naturalizing?, distrurbed soil	stems, flowers, leaves best before fruiting, wild salad green	Vit C, mild laxative when eaten in quanitity	white panicle flowers
Galium triflorum	Sweet Scented bedstraw		stems, flowers, leaves best before fruiting		
CLIMBING VINES					
Lonicera henryi	Evergreen Honeysuckle	pollinator, climbs 10-15'			white and yellow bloom
Vitas 'Candice red'	Candice Red Grapes	very hardy	sweet flavor		
Actinidia arguta	Hardy Kiwi	dry and well drained	fruit		
ROOTS					
Sagittaria latifolia	Arrowhead/ wapato	grows in calm waters,	tubers (eat like potatoes)		white stacked flowers, arrowhead shaped leaf
Balsamorhiza sagittata	Arrow-leaved Balsamroot	1' tall	peeled roots (sweetest when boiled for long periods), young stems, leaf stalks, seeds dried/ roasted/ground into meal	sore throat (chewed root and saliva), ease stomach pains (Infusion of leaves, roots and stems), poultice for blisters and sores (chewed roots)	perennial grouped yellow flowers
Camassia leichtlinii/ Great // Camassia quamash	Blue Camas (Great / Common)	moist plains	bulbs edible raw/ stew, roast, cakes		periwinkle blurple flowers,
Glycyrrhiza lepidota	Wild Licorice	moist near water	rhizome raw, roasted in		white flower

Neighborhood Analysis

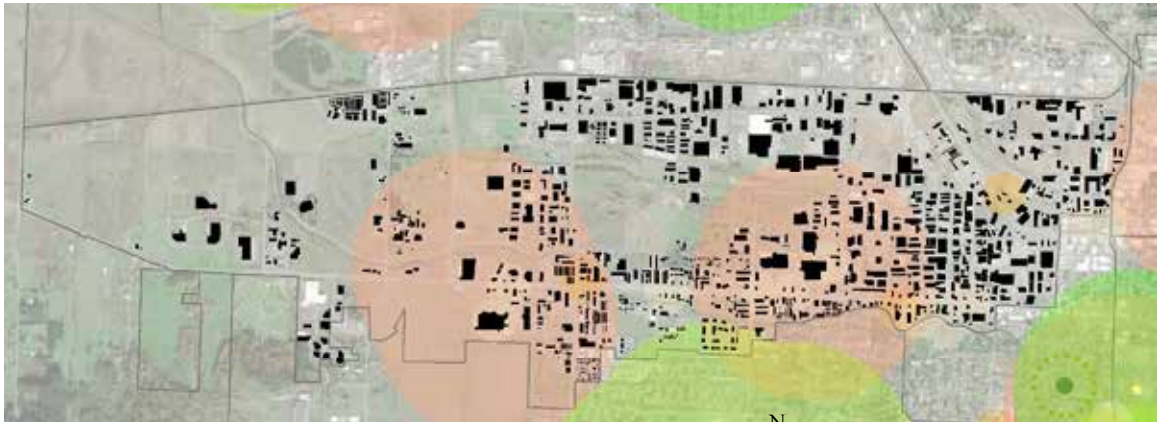
Neighborhoods	Schools/ % Students Under Poverty Line	Parks	Community Food Resources	Community Groups for possible Student/ Garden Support
Active Bethel Citizens	Meadow View Elem (40%), Clear Lake Elem (94%) Malabon Elem (40%) Danebo Elem (94%) Fairfield Elem (94%)	Peterson, Candlelight, Bethel Community, State Street, Irwin, Mangan St,	SVPD Service Station	Glory Bee Foods, Mobility Int'l USA
Amazon Neighbors Association	Roosevelt MS (28%), Camas Ridge MS (42%)	Amazon, Laurelwood Golf Course		
Cal Young Neighborhood	Gilham Elem (31%), Cal Young MS (32%), Sheldon HS (26%), Buena Vista SI (33%), Willagillespie Community School (44%)			
Churchill Area Neighbors	Churchill HS (39%), Kennedy MS (63%), Mc Cornack Elem (84%)	Acorn, Hawkins Heights, Melvin Miller, Skyview		Wellsprings Friends School
Crest Drive Citizens Assoc.	Family School (39%)	Morse Ranch, Lafferty, Crest Heights		
Downtown Neighborhood Association		Park Blocks, Downtown Mall	Lane Co Farmer's Mkt (seasonal), Eugene Satuday Market, Grower's Market, FFLC Dining Room	NW Center for Alternatives to Pesticides, Youth Era Hope Center, Free People!
Fairmount Neighbors Association		Laurelwood Golf Course, Hendricks, Mission, Washburne,	Grove (Common Ground) Garden	
Far West Neighborhood Association		Berkeley, Garfield, MLK	Matthews Commnuity Garden (seasonal)	
Friendly Area Neighbors	Adams Elem (41%), Arts & Tech Academy (80%)	Westmoreland, Washington, Amazon	Amazon Community Garden (seasonal)	SVPD First Family Center
Harlow Neighbors Association	Monroe MS (46%), Holt Elem (69%)	Alton Baker		Nearby Nature
Industrial Corridor Community Organization				
Jefferson Westside Neighbors	Cesar Chavez Elem (94%)	North Westmoreland, Jefferson, Lincoln School, Monroe, Trude Kaufman Senior Center		Willamette Hardy Plant Group, Native Center, Hosea Youth Services, Bridgeway House, Looking Glass Service Center
Laurel Hill Valley Citizens		Moon Mountain, Hendricks, Laurel Hill		NW Youth Corp
River Road Community	Howard Elem (91%), River Road-El Camino Elem (86%) ,N Eug HS (49%)	Walnut Grove, Bramblewood, Emerald,		
Santa Clara Community	Irving Elem (33%), Madison MS (52%), Spring Creek Elem (47%), Awbrey Park Elem (47%)	Arrowhead, (future), Awbrey		

South University Neighborhood Association	Edison Elem (37%)	University		
Southeast Neighbors	Edgewood Elem (29%), Charlemagne FI (14%), Fox Hollow School (57%), Spencer Butte HS (28%)	South Ridge, Spencer's Butte, Hult Ridgeline, Tugman, Dillard/ Skyline, Kincaid, Amazon		Women's Empowerment Partnership Inc
U of O Campus			UO Urban Farm (seasonal)	
Trainsong Neighbors		Trainsong	Liberation Church	
West Eugene Community Org.				
West University Neighbors		West University		

Neighborhood Analysis Maps: Coverage with Schools as Neighborhood Hubs



West Eugene Community Organization

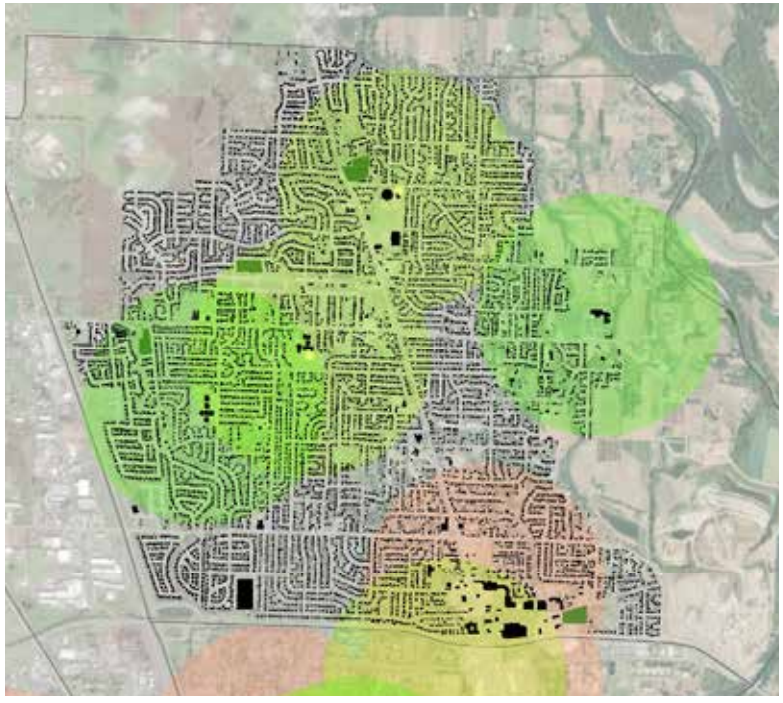


Amazon Neighbors Assc.

Crest Drive Citizens Assc.

River Road Community Organization

Santa Clara Community Organization

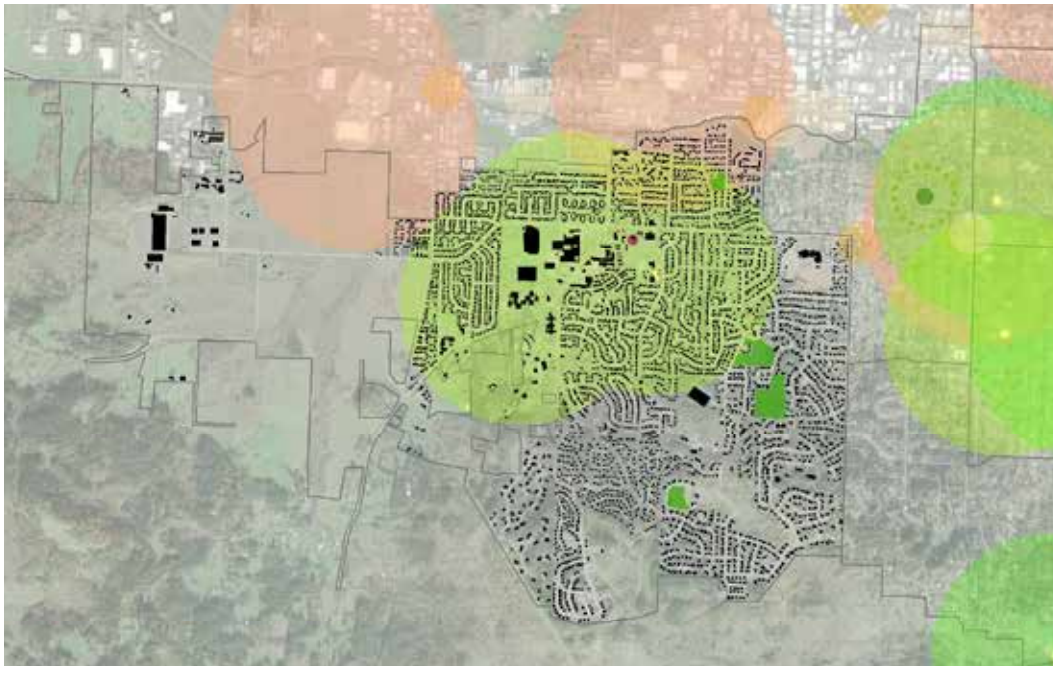


Univeristy of Oregon

South University Neighborhood Assc.

Trainsong Neighbors

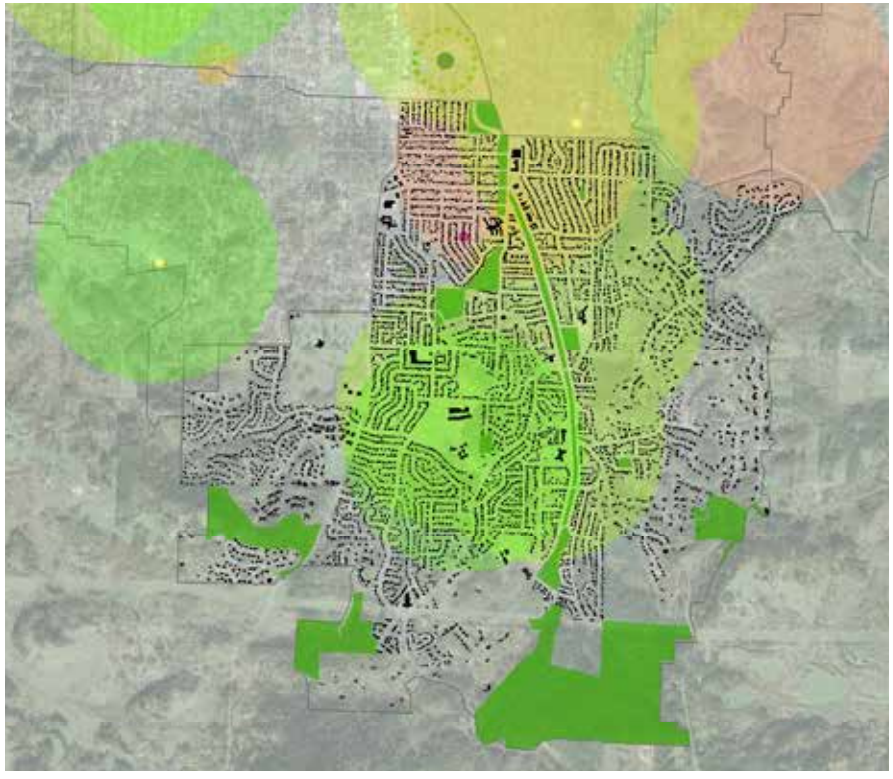
Churchill Area Neighbors



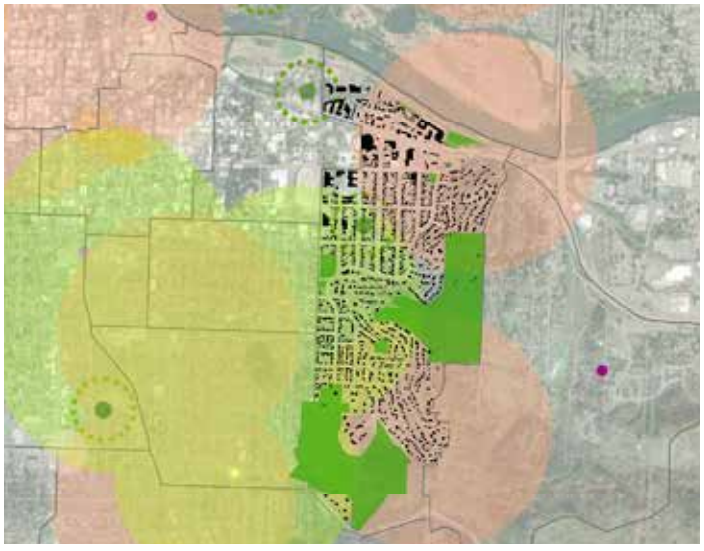
Friendly Area Neighbors

Whiteaker Community Circle

Southeast Neighbors



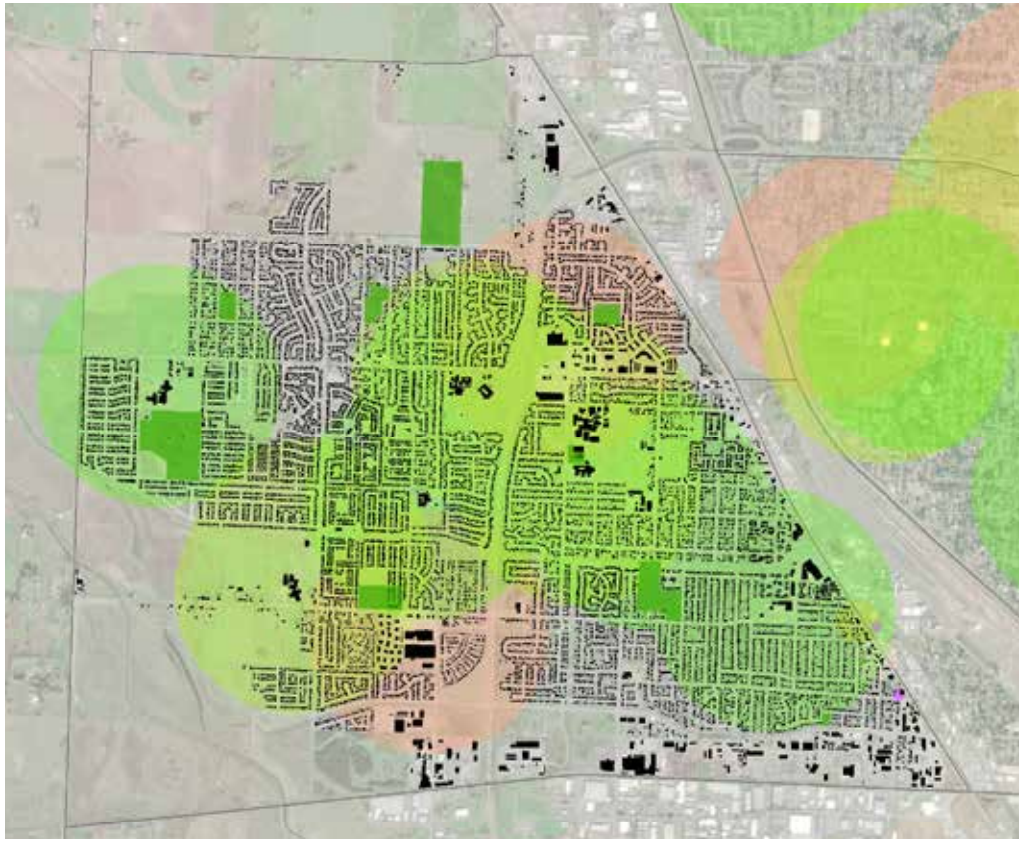
Fairmount Neighbors



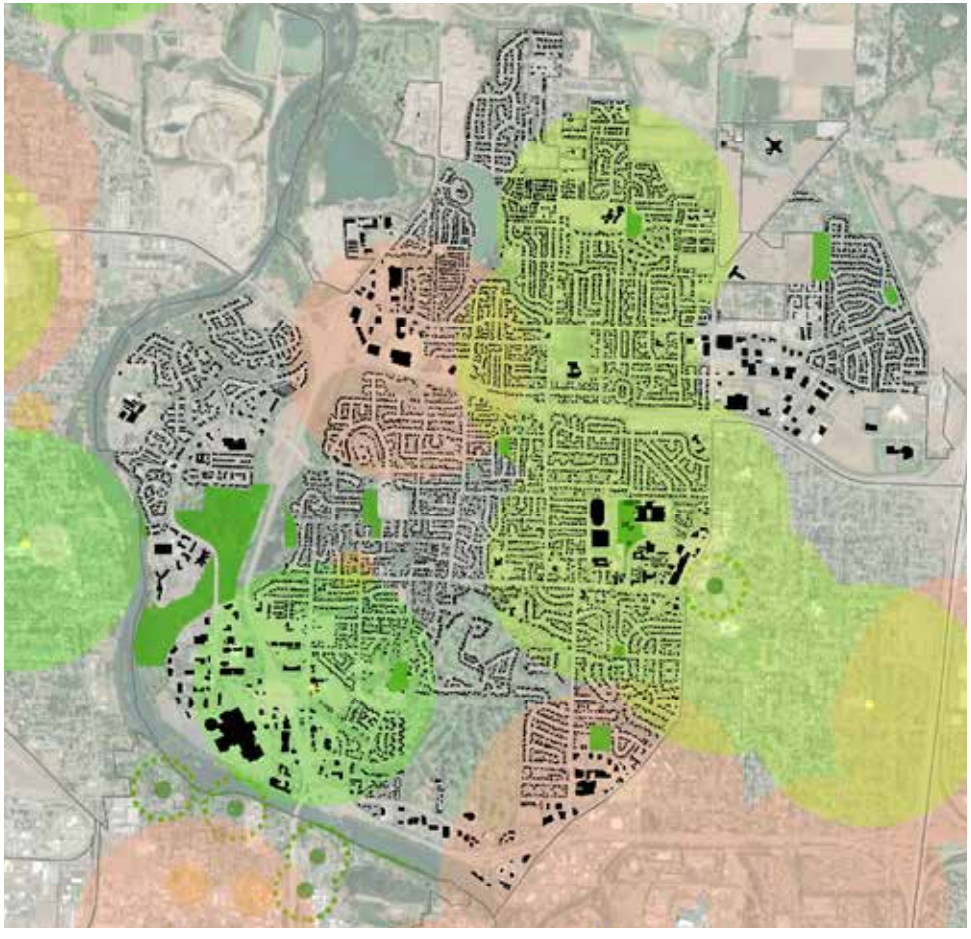
Jefferson Westside Neighbors

Harlow Neighbors

Active Bethel Citizens



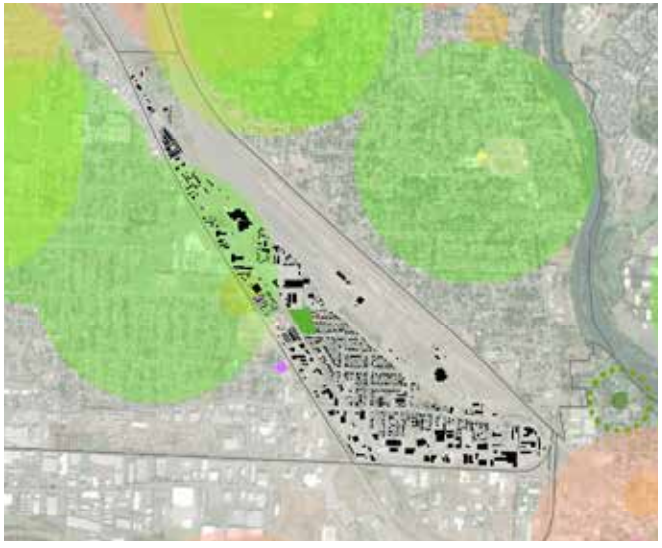
Cal Young Neighborhood Association



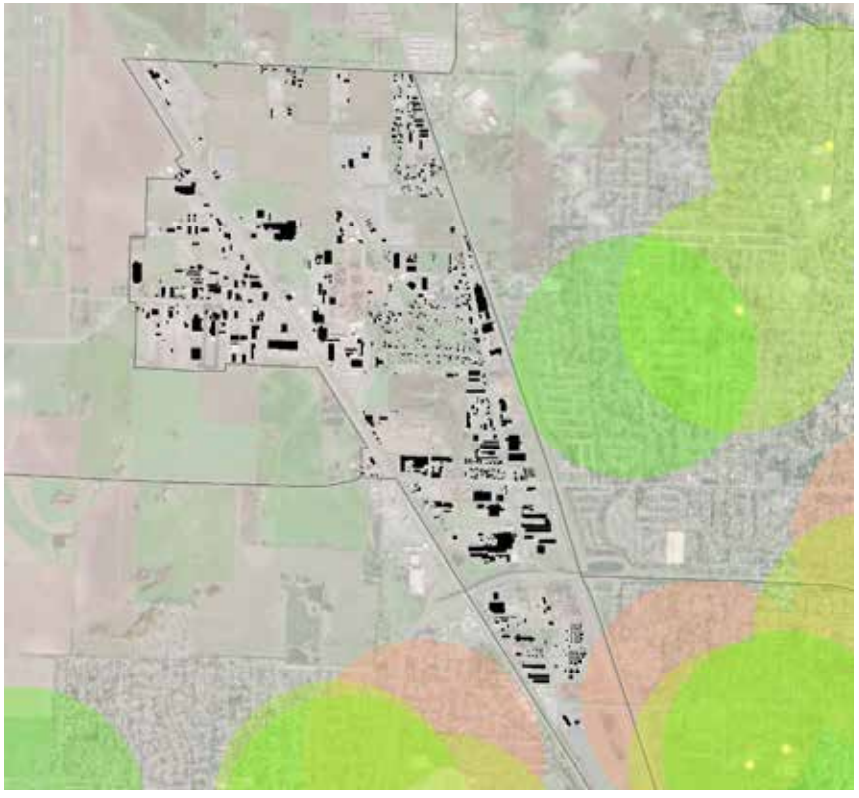
West University Neighbors

Laurel Hill Valley Citizens

Trainsong Neighbors



Industrial Corridor Community Organization



Far West Neighborhood Association