ASSESSING ENVIRONMENTALLY RESPONSIBLE DESIGN IN ECOLOGICAL INTENTIONAL COMMUNITIES: EXAMPLES FROM TEXAS, USA

by

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DEDICATION

For River and Jon,

Your continuous love and support have made this journey not only possible, but worthwhile.

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LIST OF ABBREVIATIONS

Abbreviation	Description
EIC(s)	Ecological Intentional Community (ies)
SERD	Spectrum of Environmentally Responsible Design
BEST	Built Environment Sustainability Tool
LENSES	Living Environments in Natural, Social, and Economic Systems

ABSTRACT

This thesis builds a new model for assessing ecological intentional communities' environmentally responsible design, with a geographical perspective, by amalgamating concepts from the Built Environment Sustainability Tool and Living Environments in Natural, Social, and Economic Systems frameworks. Goals of the research were to 1) identify ecological intentional communities in the state of Texas, 2) determine if a relationship exists between their location in the physical environment and proximity to the built environment with their abilities to implement environmental-enhancing practices, and 3) to assess these capabilities and categorize the communities on a spectrum of environmentally responsible design. The overall objective was to determine if ecological intentional communities provided a framework for future development on a larger scale to generate a more sustainable society. The study found 11 functioning communities in Texas, identified advantages and disadvantages to location and proximity, but no clear relationship between the factors. Ecological intentional communities were categorized as either regenerative, sustainable, or green on the spectrum of environmentally responsible design. This model, and study, serves as a foundation for assessing communities' capabilities of design through a geographic lens.

I. INTRODUCTION

Intentional communities are a cultural phenomenon that have been studied by various academics such as geographers, sociologists, and anthropologists. Known as being insulated socially, the level of exclusivity at any given site is determined by the intent of the community. In contrast to traditional communities, wherein participation in society is based on geographic proximity, an intentional community is the purposeful creation of a group of people, in a particular place, with specific ideals. "Intentionality signifies that people are choosing to orient their lives and livelihoods around particular goals or values and that these goals or values differ from those prevalent in the dominant society" (Lockyer 2007, 10). The community created is one based on both familial and nonfamilial bonds and produces a sense of belonging among the members. Intentional communities strive to displace themselves geographically and/or psychologically from the mainstream society for a defined goal in which every participant of the community strives to obtain the collective goal(s). An intentional community is, as simply defined by Shenker (1986), "a relatively small group of people who have created a whole way of life for the attainment of a certain set of goals" (Shenker 1986, 6).

These common goals are the *raison d'être* behind the intent in an intentional community. Typically arising from the members' discontent of the current culture (Choi 2008), intentional community members attempt to "construct alternative social, political and economic institutions" (Lockyer 2007, 27) as well as a shared identity (Brown 2002). As noted by Miller (1999), an intentional community is also defined by its geographic proximity to others in the community who have voluntarily chosen to live together

(Miller 1999). A more comprehensive definition of an intentional community is provided by the Fellowship for Intentional Community (2005, 4) and is key to this study's purpose:

> An intentional community is a group of people who have chosen to live or work together in pursuit of a common ideal or vision. Most, though not all, share land or housing. Intentional communities come in all shapes and sizes and display amazing diversity in their common values, which may be social, economic, spiritual, political and/or ecological. Some are rural; some urban. Some live all in a single residence; some in separate households. Some raise children; some don't. Some are secular, some are spiritually based and others both. For all their variety though, these communities … hold a common commitment to living cooperatively, to solve problems nonviolently and to sharing their experiences with others.

As such, intentional communities have an impressive breadth and long history. Recently scholarly interest has turned to an innovative type of intentional community. Described with varying terminology – ecological, eco-village, green intentional communities, sustainable community, utopian communities, etc. – scholars are investigating whether particular kinds of intentional communities can serve as viable examples of environmentally responsible design by including elements that coincide with nature that enhance the environment, rather than harm it. These intentional communities could conceivably offer a model that can be applied on a larger, more mainstream scale. This would allow the replication of their ongoing environmentally responsible design to become the standard for living for society at large by means of incorporating housing, food and energy production, and social cohesion in a sustainable manner. Intentional

communities are “attempting to facilitate a national dialogue on how we live by modeling an alternative to urban sprawl” (Chitewere 2006, v), combat the breakdown of social institutions (Putnamm 2000), and address environmental degradation. Thus, intentional communities can provide examples and experiences that would aid in adjusting urban planning and public policy to solve issues relating to sustainability and regeneration, which is now at the forefront of the global environmental movement (Trainer 1997).

II. BACKGROUND

Intentional communities (ICs) have an extensive history of existence, fluxes, and reasons for formation and disintegration. For the purposes of this research proposal, the initial intentional communities known to the literature will be discussed briefly, followed by a more comprehensive background in the literature review chapter. The types of intentional communities found in the United States, and specifically Texas, will be presented and evaluated as the state of Texas serves as the study site boundary. Texas was selected because of the diverse physical geography, climate, and cultural population in the state, with the aim of providing more accurate results of the ecological intentional communities' limitations as well as advantages based on geographic location. West Texas is a place of harsh, desert climate with challenges associated not only with the scarcity of resources but also political and cultural tension along the Mexican border. Central Texas is characterized by semi-arid climates which encounter water scarcity and the problematic occurrence of sudden water-abundance, deeming central Texas the "flashflood alley".

Lastly, the gulf plains and extensive pine forests compose the eastern portion of the state and can offer a more livable climate for all living systems. While there is still considerable variety within the state, these are the major geographic regions in which all of the ecological intentional communities can be found.

Early Intentional Communities

The first recorded intentional community, formed in southern Italy, is Homakoeion and was created by Pythagoras in 525 BC. This community held several hundred

members who conformed to vegetarian diets, lived with little contact with outsiders, and formed a unique ideology of which little information is known (Metcalf 2012). Around this same time, it has been acknowledged that Buddhists followers formed intentional communities, termed ashrams. These "sangha" or communities were intentionally designed to create a systematic and productive spiritual life for the residents. The concept of community is one of Buddhism's founding principles, and, therefore, they represent the longest form of intentional community in the literature (Kozeny 2002). The majority of these first intentional communities were designed under ideological or spiritual circumstances. Before discussing the more modern intentional communities, it is interesting to note that the Essenes communities in 2nd century BC were most likely the authors of the Dead Sea Scrolls and had direct contact with Jesus Christ; he was considered to be the savior in the major world religion of Christianity (Kozeny 2002). Moving to more modern times, the history of intentional communities in the United States is older than the nation itself (Brown 2002). Scholars Kanter (1972) and Zablocki (1980) have both described different fluxes of communalism and causation for these periods of communalism and will be presented in the literature review. According to Shenker, "there has hardly been a period in western history when some group or another has not invoked communalism as an answer to their needs and beliefs, indeed as the answer to the crisis of the times" (Shenker 1986).

Types of Intentional Communities

Using the Fellowship for Intentional Community, the most comprehensive directory of intentional communities, preliminary research showed 75 intentional communities in Texas (Fellowship for Intentional Community 2016). The intentional communities were

categorized into 4 basic types for research purposes: ideological, ecological, communal, and practical. The typology of communities has been modified from the existing literature (Choi 2008, 93; Meijering, Huigen, and Van Hoven 2007, 42-52; Sanguinetti 2012, 5-25) to better fit the types of intentional communities found in Texas. The communities have self-identified as either rural, suburban, or urban. Because of this self-identification, the location is not included as a factor in the categorization. All typologies of intentional communities can be located in any type of environment: urban, suburban, or rural. The 4 categories, which may sometimes overlap, can be generally described and characterized as the following.

Ideological intentional communities can be described as intentional communities with a specific belief system that is practiced and prioritized above all else. This can include religion, spiritual practices, or other types of core beliefs. Participants must be fully invested in their ideology and use it to form a lifestyle. Therefore, this type of intentional community generally attempts to remove itself from society and/or others who do not share the same ideology. It is typically rituals, services, shared meals, and work that are the basis for the community. An example is Christ's Covenant Baptists Church, location undisclosed, "a Reformed Baptist, family integrated, Christ centered church and community." They claim, "God's word is our standard for how we live in the world and with one another. Everyone who lives in our community is a member of Christ Covenant Baptist Church" (Fellowship for Intentional Community 2016).

Ecological intentional communities are those that strive to be self-sufficient, sustainable, and have a low impact on the Earth through implementing environmentally responsible design. The participants may choose to work on the land or limit other

economic activities such as consumerism and salaried jobs in the business and finance sector. These communities strive to produce their own food and energy, usually through alternative means and renewable energies: solar, wind, and water. Other types of practices to reduce energy consumption may include alternative housing with natural or recycled materials. An example of an ecological intentional community, Roughcraft Ecovillage, located in San Antonio, Texas, has a mission statement asserting: “We want to follow permaculture principles to support a sustainable community that can generate income through on-site entrepreneurial ventures” (Fellowship for Intentional Community 2016).

Communal intentional communities are formed through the desire for personal relationships, creating a sense of home, and emotional fulfillment by sharing one’s life experiences with others that may or may not be relatives. These communities usually share housing, expenses, and meals together. There may or may not be other ideologies and ecological practices involved. Golden Girls on the Hill, in Smithville, Texas, describes themselves in their mission statement: “As our name suggests we tend to be mature females who are living and drawn together to support and be there in our golden years” (Fellowship for Intentional Community 2016). These women serve as an example of those living together to find a sense of fulfillment through simply sharing life with others.

Practical intentional communities can be viewed as a type of social capital in which people benefit, usually financially, through living with others to lower the cost of living (co-housing). They may share a house with private quarters that are rentable at a reduced rate and offer some shared space like kitchens and common areas. They also may offer

communal meals. These intentional communities do not have a shared ideology among members and typically do not require much interaction with other members. College Houses, a co-housing intentional community established in 1965, describes themselves as, “a student-housing cooperative in Austin, Texas. We provide affordable housing to 532 members and operate based on the Cooperative Principles. We are student-owned and student-run” (Fellowship for Intentional Community 2016).

In the initial research through the website of the Fellowship for Intentional Communities’ directory, ecological intentional communities (EICs) composed 31 (41%) of all intentional communities found in Texas. The EICs self-identify as either rural, suburban, or urban and established or forming in the directory. This dimension, that the EICs can register within the directory while still in the forming stage, is an important aspect of this research. Contacting the EICs to decipher those which are actively functioning versus purely conceptual is a part of the study protocol. As demonstrated in Table 1, the majority of the EICs are rural and still forming.

Table 1: Ecological Intentional Communities in Texas. Categorized by the self-described location of rural or suburban-urban and their statuses: forming or established.

Ecological Intentional Communities in Texas 31 (41%)			
Rural	Suburban-Urban	Forming	Established
25 (81%)	6 (19%)	27 (87%)	4 (13%)

III. PURPOSE OF RESEARCH

Purpose Statement

The aim of this research was to answer three questions, and, in doing so, to identify a framework for an environmentally responsible and ecologically viable living design that can be applied and successfully replicated on a larger, mainstream scale. The three research questions were:

1) What ecological intentional communities exists in Texas?
2) How does the geographic location in relation to physical environment and proximity to the built environment affect the implementation of environmentally responsible practices?
3) Where can EICs be objectively placed on a spectrum of environmentally responsible design?

To address these research questions, I have identified the ecological intentional communities (EICs) in Texas, reviewed their practices through qualitative methods, and then placed the EICs on a descriptive scale: the Spectrum of Environmentally Responsible Design (SERD) in relation to their regenerative capacity.

The SERD (Figure 1) ranges from degenerative to regenerative systems/designs. Degenerative is considered harmful to all living systems. The opposing end is regenerative, in which humans participate in nature, resulting in no harm to any living systems. Conventional practices are essentially limited to following environmental law and nothing more. Green design is considered slightly more environmentally responsible than conventional practices with attempts at making systems energy efficient. Next on the SERD is sustainable design. Sustainable design is reflective of a lifestyle that attempts to

ensure resources for future (typically seven) generations. Restorative approaches to design are located directly below regenerative design. Restorative strives beyond sustainability to rebuild natural environments to a higher quality rather than to solely sustain them. Finally, a regenerative system is a closed system, in which no waste is produced. This can be considered as "closing the loop" wherein humans participate as nature.

The SERD was created by modifying the Trajectory of Environmentally Responsible Design (Reed 2007) and the methods of two existing frameworks to evaluate environmentally and ecologically sensitive living practices: the Built Environment Sustainability Tool (BEST) (Gibberd 2014) and the Living Environments in Natural, Social, and Economics Systems (LENSES) framework (Plaut et al. 2011). Five categories – food, energy, shelter, water, and waste – evaluated the EICs' practices. Bearing in mind all EICs claim to be at the very least "sustainable" based on their mission statements in the directory, the implementation of a "sustainability" goal has been evaluated through the five categories with the subsequent placement on the SERD in order to further assess how well EICs applied sustainability principles.

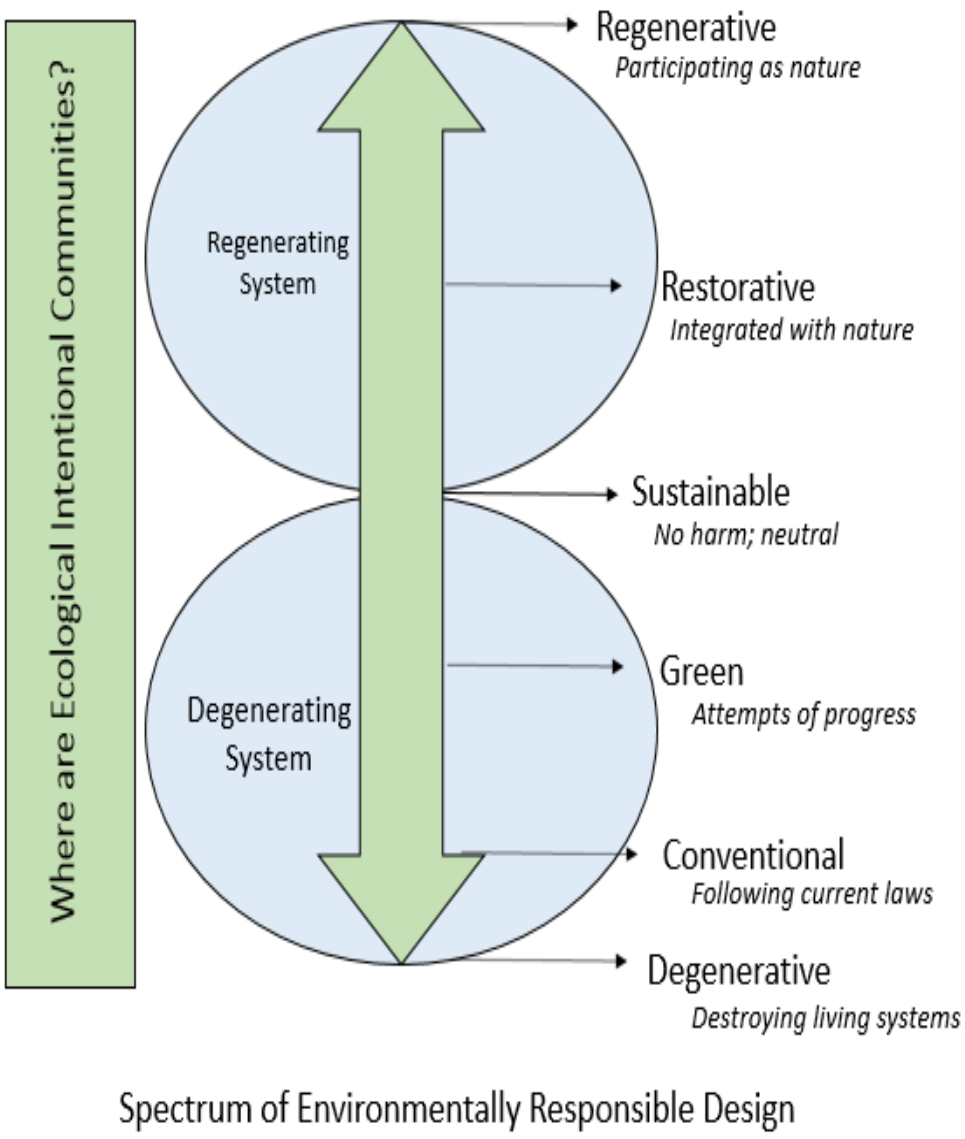


Figure 1: Spectrum of Environmentally Responsible Design. Used for classifying ecological intentional communities.

IV. LITERATURE REVIEW

The definition of an intentional community is consistent throughout the literature, however, the criteria for an intentional community slightly differs. Meijering et al. (2006) describes the seven most prevalent criteria used to characterize intentional communities: 1) no bonds by family only, 2) at least 3-5 adult members; Miller (1999) states there must be at least five adult members (Miller 1999); Choi (2008) states that intentional communities need to have less than 20 residents (Choi 2008), 3) all members join voluntarily, 4) psychological and geographical separation from mainstream society, 5) a shared ideology, 6) sharing full or portions of one's property, and 7) the interest of the community prevails over the individual's interest (Sargisson 2009; Meijering, Huigen, and Van Hoven 2007, 42-52). Shenker's (1986) criteria for an intentional community is more specific and numerous than the previously described characteristics. The ten conditions are summarized as follows:

1) Founded as a conscious act.
2) Membership is voluntary and based on a conscious act (including members birthed into the community).
3) The community perceives itself as separate and different to its environment and relates or withdrawals to the environment as a unified group.
4) The community is self-contained and can support a member throughout their lifetime.
5) Sharing is part of the ideology of the community.
6) Collective goals are prioritized within the community.

7) The ideology of the community states that its goals can only be accomplished through a collective framework and do not include an individual's personal benefit.
8) The source of authority is derived from the community itself or people appointed by the community, not the individual.
9) In general, the lifestyle of the community is inherently good and valuable for its members.
10) The existence of the community has a purpose and a moral value that transcends the time-span of individual membership (Shenker 1986).

The history of intentional communities in the United States, as described throughout the literature, is essential to understanding their fluctuating existence. Zablocki (1980) characterized the various surges of intentional communities in the United States in a temporal manner which will be described below. The reasons behind the rise and decline of communalism, in not only the United States but in an any location, can be attributed to change, which is "a major social or cultural innovation which fragmented prevailing systems of meaning and value" (Brown 2002). These changes in social structure or cultural norms create "three types of critical impulses that are associated with different surges of intentional community building" (Kanter 1972).

Religious, politico-economic, and psychosocial are identified as the primary catalysts for change in the United States. In 1620-1776, the colonial period, the initial intentional communities in the United States began, even before the nation was established. This period of intentional community forming can be attributed to a desire

for religious freedom, as this was the cause for the migration from Europe. These communities include the Plymouth Colony, the Labadists, the Shakers, and the Amish just to name a few. Through 1790-1805, the Shaker influx is described as a swell in the amount of Shaker communities in the United States. The Shakers, formally named The United Society of Believers in Christ's Second Coming, had about 4,000 to 5,000 communities (not members) at their peak in the 19th century; some still exist today (Hancock Shaker Village 2016). The ability to categorize them as an intentional community stems from their unique religious ideology which included communal living, gender equality, celibacy, pacifism, and rituals with dancing and shaking (National Park Service 2016). Both of the previous periods would be characterized as religious in nature according to Kanter (1972).

The next period of communalism, from 1824-1848, is described as the utopian socialists' communalism movement that formed in response to the Industrial Revolution and the subsequent increase of development and urbanization. This caused the loss of agricultural land and rural ways of life in which these founders strived to regain. These utopian communities such as New Harmony, Oneida, and Brook Farm (visited by preservationists Ralph Waldo Emerson), focused on alternative models of living that strayed quite far from mainstream society. In addition, they held varying religious ideals but also attempted to create a different social and political ideologies that encompassed their political stance (Zablocki 1980).

The 1890-1915 socialist and anarchist intentional community-forming period was a response to an exponential increase in the amount of urbanization in the United States, a high rate of immigration from Europe, as well as labor issues. The sudden emergence of a

diverse society attracted like-minded, homogenous people together who formed intentional communities in both urban and rural locations. The Amana Colonies, composed of German Protestants, emerged with seven colonies during this time and disbanded after 90 years of communal life (Kozeny 2002). Throughout the literature, this period is the first known time in which an urban intentional community formed.

Kanter (1972) characterized the previous two communal periods as a "politico-economic critical impulse of change" (Kanter 1972), and intentional communities are still forming today. The United States experienced an increase in intentional community creation in the early 2000s and in 2008 after the economic crash. However, the literature suggests in 1965-1970s, the communitarianism movement involved the most recent and largest influx of intentional community building of all the other periods combined (Brown 2002). This critical impulse of psychosocial change developed from the reconsideration of values of the baby boomer generation that sprung from the end of World War II. In a time of social change that encompassed war paranoia, racism, and civil disobedience, people with an immense amount of new ideologies established a counterculture. Most of these intentional communities did not last more than five years (Kozeny 2002), and are therefore difficult to detect in the literature. The Findhorn Foundation, established in 1962, is still currently functioning. This intentional community focuses largely on sustainability. It has become a center for education and is recognized by the United Nations as a nonprofit organization.

On the opposite side of the spectrum, as an example of a more extreme type of intentional community is the Source Family. Jim Baker, also known as Father Yod, an infamous war veteran and bank robber, established the Source Family in 1971. Initially,

the Source Family focused on mediation and natural food as they operated the nation's first natural food restaurant in Los Angeles, California. As the following grew to about a hundred members, Father Yod took the family in a darker direction, experimenting with magic and sexual acts. Baker married and impregnated 13 wives. The majority of the family left when the ideology was continually shifted as to what Father Yod suggested from week to week. The Source Family almost survived a decade but disbanded after the mysterious death of their leader, Father Yod (Aquarian 2016). While this 'flowering' of intentional communities is typically attributed to the hippie communes of the time, it served as an important gateway to the 4 major types of intentional communities including the 2nd largest type of intentional communities, and the one in which this proposal is concerned, ecological intentional communities.

Definition of Ecological Intentional Community

Ecological intentional communities emerged in the United States in the 1980s (Kozeny 2002), experienced a dramatic increase in the 2000s, and now comprise 75% of all intentional communities in Europe, Canada, Australia, and the United States (Choi 2008). An ecovillage or ecological intentional community can be defined as: "a human-scale, full-featured settlement in which human activities are harmlessly integrated into the natural world in a way that is supportive of a healthy human development and can be successfully continued into the indefinite future" (Dawson 2006, 36; Choi 2008; Christian 2003; Lockyer 2007). Ecological intentional communities are typically less than 500 people and can be located in either rural or urban landscapes. Members of these communities strive to use low-impact living principles such as permaculture, green construction with recyclable or renewable resources, alternative energy, cohousing, and

social cohesion through cooperative living; thus creating islands of sustainability in urban or rural areas (Lockyer 2007; Gilman and Gilman 1991; Sargisson 2009). A crucial impact of ecological intentional communities to the sustainable movement is the impulse to move beyond protest and talks of reform to creating actual models of working, socially just, sustainable lifestyles (Dawson 2006).

Researching and studying intentional communities, especially ecological communities focused on sustainability, can be beneficial not only to academia but also to society at large. Ecological intentional communities, as social and environmental experiments taking place at the juncture between the real and ideal, present unique opportunities for academics to study the challenge of sustainability (Lockyer 2007). Trainer (1997) straightforwardly states: "those who are concerned for the fate of the planet and for the building of a sustainable world should focus their energies on the establishment of example alternative communities that will illustrate the new values, arrangements, technologies, and economics that must eventually become the norm in rich and poor countries" (Trainer 1997, 1219). Shenker (1986) described 4 reasons for studying intentional communities from an anthropological perspective. These reasons can be applicable to this study, and the use of intentional communities as valued academic research in general.

First, they can be considered micro-versions of larger societies with distinctive social qualities. Because intentional communities typically have a defined beginning and end (Brown 2002), they demonstrate trends over time and in specific places. For example, they usually form in response to a change in the mainstream social structure and can therefore help historians delineate social phenomena. In addition, the alternative

economic and governance structure formed by intentional communities is evidence of the survival of the non-conformists. Finally, the non-communards reactions and perceptions to intentional communities can be just as intellectually stimulating as the community members themselves (Shenker 1986). Lastly, these communities are "essentially testing grounds for new ideas about how to live better, more satisfying lives … lives that actualize our untapped human potential in a way that's environmentally and socially sustainable" (Kozeny 2002,10).

Contemporary literature suggest that rural ecological intentional communities are more numerous than urban ecological communities (Meijering, Huigen, and Van Hoven 2007, 42-52; Choi 2008, 93). The preliminary research for this study suggests similar findings, with about 19% of ecological intentional communities classified as suburban-urban in Texas (see chapter 2). One aspect of this research is investigating how geographic location, in relation to physical environment and proximity to the built environment along the rural-urban interface has affected the implementation of practices.

The obtainable literature describes issues for environmentally responsible design within rural ecological intentional communities. Chitewere (2006) advocated the possible irony within ecological intentional communities that attempt to facilitate a national dialogue on how we should live by demonstrating an alternative to suburban sprawl. However, in forming these new and different living models, it has thus created another sprawl, just of a different nature. Therefore, communities living inside established cities, in the already built environment with existing infrastructure, is a key concept of sustainability (Chitewere 2006; Ikerd 2005).

As an example, Chitewere (2006) describes the circumstance of one resident who had to purchase his first vehicle upon moving to the community because the rural ecovillage lacked public transportation to urban jobs. In addition, the resident said the mailboxes were half a mile away from his residence, which posed a problem for those with limited mobility (Chitewere 2006). Concerns of EICs that are located substantially far distances from societal resources (such as opportunities for monetary income or proximity to goods and services) are mentioned in fragments throughout the literature. In contrast, urban EICs face the "difficulty of finding affordable and appropriate land in the inner urban areas, inflexible building codes, and unsympathetic regulatory bodies and financing institutions" (Cooper 2013, 7), including "legal barriers to sustainable development (e.g. prohibitions on natural building, water catchment, and composting toilets), neighbor issues, and financial options" (Van Schyndel Kasper 2008, 20). As a result of these findings, a comprehensive examination of the role of geographic location is absent from the literature and needs to be addressed. The study strived to provide evidence of this relationship through analyzing the relationship of geographic location and the applicability of environmentally responsible design.

V. METHODOLOGY

Frameworks

To achieve a geographical perspective of assessing EICs, two methods for evaluating sustainability and regenerative design were modified and combined. The first framework is The Built Environment Sustainability Tool (BEST). BEST is a combination of the Ecological Footprint measurement and the Human Development Index. It derives criteria directly from the sub-criteria of the Human Development Index (HDI) and Ecological Footprint (EF) (Gibberd 2014). Assessments of the existing situation and the identification of areas with weak or strong sustainability capabilities are used to provide a framework for developing and redefining designs. The criteria are:

- Shelter
- Food
- Mobility
- Waste
- Bio-capacity
- Products
- Services
- Education
- Health
- Employment

A six-point scale (0-5) is then used to rate the built environments on their sustainability; zero as no capability and five as full capabilities (these correspond from degenerative systems to regenerative systems). BEST applications have been used in: architectural and urban design evolution, community involvement, and municipal urban planning processes. The EICs already include the aspects relating to HDI and were removed because this research focused solely on the EIC's implementation of practices in relation to the physical and built environment. Shelter, food, mobility, and waste are the themes derived from this framework to create the five categories food, energy, shelter, water, and waste, that were used in the modified model for this study. Mobility was

measured through the energy category in which transportation is a subcategory. Products were measured in the waste category to be described as waste avoidance. This measured the consumption of commercial products within the EICs. Bio-capacity is related to the implementation of environmentally responsible design and hence was not necessary to include as it was the overall objective.

The second framework, The Living Environments in Natural, Social, and Economic Systems (LENSES) was helpful for identifying regenerative design and living systems (Plaut et al. 2011). Regenerative can be described a system or design that gives new life and strength (Plaut et al. 2001) and has eleven key capabilities as seen in Table 2 (Cole et al. 2012).

Table 2: Key capabilities of regenerative design (Cole et al. 2012).

1	Restores and enhances local ecosystem function capacity
2	Creates positive synergistic connections between resource cycles and local ecological systems
3	Improves the effectiveness of life cycle resource use
4	Builds resiliency to undesirable natural and human stresses
5	Connects inhabitants to ecological systems and processes
6	Enhances the health, comfort and well-being of building inhabitants
7	Improves the health and well-being of local community inhabitants
8	Generates opportunities for social engagement and education
9	Generates opportunities for cultural development
10	Generates economic wealth within the local community
11	Acts as a catalyst to generate positive change beyond the site boundary

The LENSES framework was very beneficial for this research because the broad theme of the model is to "replace linear processes with cyclical ones, and allow for continuous replacement, renewal, and rebirth" (Plaut et al. 2011, 113). These include: interdependence of human and nature, cyclical processes, net-positive impacts on not only human but also environmental health, and the constant revising of design to improve systems. The LENSES framework is "intended to be applied across project types" (Plaut et al. 2011, 114) extending from single buildings to neighborhoods and uses. The use of descriptive metrics over prescriptive metrics allows the framework to be flexible to span across space and time. The LENSES framework is produced as a wheel with a center-pivot. This is composed of three lenses: flows, aspects of the land, and foundations (from inner to outer order).

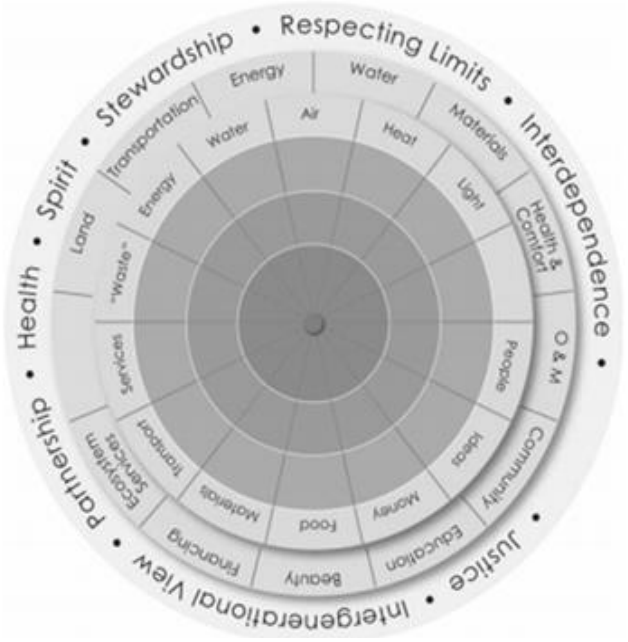


Figure 2: The LENSES Framework (Plaut et al. 2011).

As EICs already exemplify some of the human aspects covered in LENSES, this study reshaped the framework to better serve the purposes of this research. The EICs inherently focused on the majority of the foundation portion of the wheel. It was established that the EIC's collective goals are to be sustainable at a minimum through the preliminary research. The concepts from the aspects of the land portion of the wheel, i.e. their physical and built environment, in addition to the innermost flows (with the exception of people, money, ideals), are most valuable for this purpose. It should be noted the blank spaces on the innermost portions are intentionally left blank. This is because the framework is flexible and open for revision as new practices develop. This was an important component of assessing the EIC's placement on the SERD, because through surveying, new practices were discovered. With reshaping and solidifying these two frameworks (BEST and LENSES), a new model materialized producing five categories with subcategories of inquiry about food, shelter, energy, water, and waste.

Table 3: The five categories for assessing EICs.

Categories for Assessing EICs			
1. Food	Agriculture	Livestock	Permaculture
2. Energy	Consumption	Production	Transportation
3. Water	Reclamation	Usage	Source(s)
4. Shelter	Energy Efficiency	Natural	Recycled
5. Waste	Avoidance	Recycling	Composing

The categories, measured through the survey questions, allowed the EICs to be placed on the SERD. This serves as a modified form of Reed's (2007) trajectory of environmentally responsible design. The purpose of this methodology was to simplify the model to generate an understanding of where the EICs could be placed.

Finally, the study attempted to conduct site visits with a participatory observation of a sample of EICs. The visitations were to be based on the survey responses and anticipated to obtain micro-case studies from 2 sustainable to regenerative, if applicable, and 2 green to degenerative EICs. This would serve as an additional effort to highlight the limitations and advantages of geographic location to the implementation of ecological and environmentally responsible design practices. Although the study attempted to conduct micro-case studies, the unsuccessful outcome of these will be further discussed in the results chapter.

Anticipated Results

With the study area evaluated and the locations of communities mapped (Figure 3), this study expected to reveal that most of the established EICs are functioning communities, while some of the "forming" communities may not be operational and merely conceptual. To qualify as a "forming" community, they must have land and members constructing their community vision. The preliminary findings suggested that most of the EICs consider themselves to be in a rural environment. Because the literature suggested that the distance from the built environment may pose problems to practices of environmentally responsible design, the results expected to find a positive relationship between the EICs location near the built environment and their capabilities to implement

more environmentally responsible design by living within the existing infrastructure rather than continuing the sprawl.

Lastly, the EICs were expected to be placed on the SERD in the ranges from green to restorative. Because regenerative systems are highly interconnected, complex, and involve understanding of whole systems within a circular cycle, the study expected a low chance of finding more than one or two EICs that achieve environmentally responsible design practices beyond sustainability, or "neutral", i.e. no harm. The sustainable category on the spectrum was also expected to potentially overcrowd. This would then necessitate the subdivision of EICs ranking at this level on the Spectrum of Environmentally Responsible Design.

Study Area

The state of Texas was selected as the study site for multiple reasons. Texas is home to many geographical regions including: the coastal plains reaching the Gulf of Mexico on the east, great (higher) plains towards the north, and mountains and basins in the western region, with many microclimates throughout. Texas is the second largest state with an area of 695,621 sq. km, and an estimated population of 27,469,114 (United States Census Bureau 2015). As mentioned, the geography of Texas varies greatly, creating differing climates. The west is often described as an arid desert, which then transitions into semi-arid towards central Texas. East Texas is one of pine forest, coastal plains and includes an extensive shoreline.

Texas's location in the United States plays a large factor in its demographics; with its proximity to the border of Mexico, and being home to active ports in Houston and

Beaumont, the border of Texas is active with both legal and illegal migration. A largely Hispanic influence lends Texas to have a culture rich in Spanish language and art. Texas is also different from other states in that it is primarily (95%) owned by private land owners, and the undeveloped land is being lost at a higher rate than any other state (Texas Land Conservancy 2015). Because of the unique culture of private land ownership, the idea of community housing and shared land is not a common notion.

Moreover, the state of Texas was selected for the study site because of accessibility to the communities. The majority of the communities were within reasonable driving distances for the author. Site visits were a key factor for collecting valid data in this study.

Exploratory research showed that Ecological Intentional Communities were distributed throughout the state. The EIC's proximity to the built environment is also evident in their placement throughout the state. These factors were important for achieving the research objectives. As seen in figure 3, the initial findings of EICs were located across the state, with the majority of the EICs situated on the eastern portion which offers a more hospitable climate for food production and water resources.

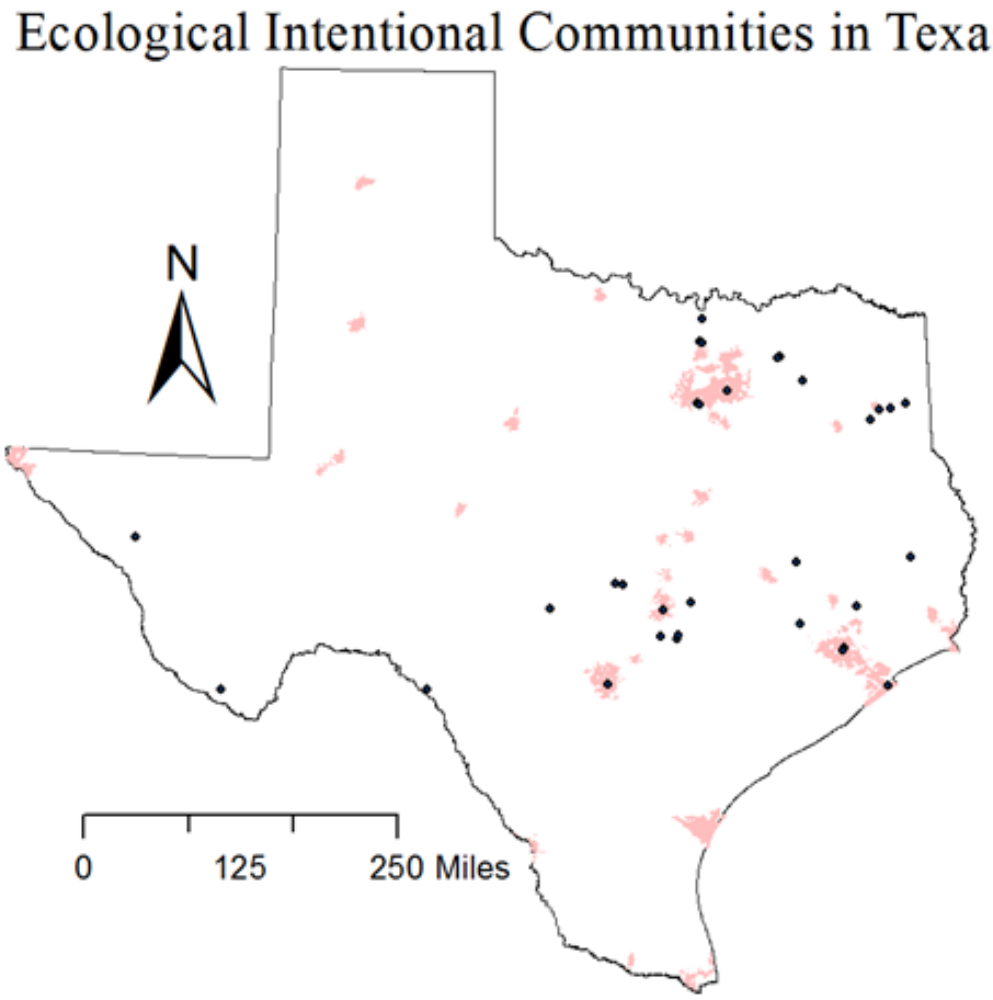


Figure 3: The state of Texas with the initial findings of EICs. The EICs are shown in approximate location to the built environmental with the 25 largest metropolitan areas shown in pink. Note that most of the EICs are located close to the built environment although the majority of them claim to be rural.

The map illustrates the general location of the EICs because the bulk of the directory entries lack the physical address. The pink portion of Texas represents the 25 largest metropolitan areas. The EICs were primarily positioned in close proximity to these areas, excluding the EICs in the western and central regions of Texas. The spatial

distribution and the self-identified descriptions of the EICs differ in that 81% claimed to be rural. The initial research also suggested that most EICs (27, or 87%) were forming rather than established. In the results, Figure 4 shows the EICs whose actual existence was verified.

Data

The data were acquired from May – August 2016 through a survey composed of both closed and open response questions. The purpose for the closed responses questions were to determine if the EICs are implementing practices in that specific category. Open responses were included, as they could be practicing methods that are unknown to the literature or the author, and as such provide opportunity to revise the design as suggested by the LENSES framework (Plaut et al. 2011). The survey was created using Google Forms and was accessible online (https://goo.gl/forms/OTC3b6gTn0Uvr6Gs1). The communities were first contacted through the directory on the website Fellowship for Intentional Communities (http://www.ic.org/) with an online message. Other information provided on the directory, such as: alternative email addresses, phone numbers, and mailing addresses, were then retrieved if there was no response to the initial contact. The directory provided 9 mailing addresses, hard copies were mailed to those. All communities that responded were asked if they knew of any other functioning communities similar to themselves, as a way to be more inclusive in the study.

Responses

Preliminary research denoted 33 EICs in Texas. At the time the study commenced, some of the communities were removed from the directory, while new EICs

appeared. In total, the survey was sent (through various methods) to 38 apparent EICs in Texas. The response rate was 34% (13 responses) for the overall inquires. This means the EICs responded to the study's inquiry about the community. However, because of the nature of the responses, the response rate for the completion of the survey was 23.7% (9 surveys completed). Out of the 9 completed surveys, 5 were completed online through the community members. Site visits with in-person responses accounted for 3, and 1 response was returned in the mail.

The inquires found that postings on the directory were extremely dated, spanning many years. Upon calling the listed phone numbers, most were out of service, or were answered by someone with no knowledge of the community. In addition, three people replied by stating the community no longer existed or never formed. These responses were not included in the response rate. The lack of existing communities was anticipated, because of the self-promotion of the directory, and was expressed in the limitations of the study.

Furthermore, the EICs that were discovered by asking responsive communities about any other communities with a similar purpose to theirs had a lower response rate. As an example, EIC 13 suggested EIC 7 because they were not associated with the registry. It can be assumed that because they do not promote their community online or through social media, they are not interested in sharing their lifestyle. Whereas, EIC 6 has a strong internet and social media presence because one of their principles is sharing their lifestyle with others. Social media (Facebook) was a useful tool in contacting the communities. Overall, only 3 communities responded to the message sent via the directory on the Fellowship for Intentional Community website.

VI. RESULTS

The results are presented in the order the research questions were posed. First, identify the physical locations of the EICs and their distribution across the state of Texas. Second, determine whether proximity to the built environment is related to physical environment through community members' comments. Third and finally, place EICs on the SERD. Through the data collection, limitations arose and will be discoursed in greater length in the conclusion. Here, the data are presented and will be further discussed in the following chapter.

Identified Locations of EICs

To fulfil the first objective in this research, the locations of the EICs, both exact and approximate, have been identified. From the 38 original inquires, the study discovered 13 communities with statuses that can be described as the following:

- Conceptual: the community has members but is still in the processes of obtaining land.
- Forming: the community has land and are applying their vision. This category also includes re-forming. For example, an EIC in this study had nearly disbanded because of a severe illness that led to a financial hardship.
- Established: the community is functioning at a physical location with active members.

Table 4: The status and setting of EICs found in Texas. Contradicting the initial findings, the majority (61.5%) are established, with 23% forming, and 15% conceptual.

Name	Location	Setting	Status	Year Formed
EIC 1	Bedias	Rural	Forming	2015
EIC 2	Bastrop	Rural	Established	1969
EIC 3	Campbell	Rural	Forming	2011
EIC 4	Sanger	Rural	Established	1978
EIC 5	Dale	Rural	Established	2006
EIC 6	Arlington	Suburban	Established	2007
EIC 7	Cedar Park	Rural	Established	2013
EIC 8	Houston	Urban	Established	2011
EIC 9	Austin	Urban	Established	2012
EIC 10	Dallas	Urban	Conceptual	N/A
EIC 11	Gaines	Rural	Conceptual	N/A
EIC 12	Waco	Rural	Established	1980
EIC 13	Austin	Suburban	Forming	2014

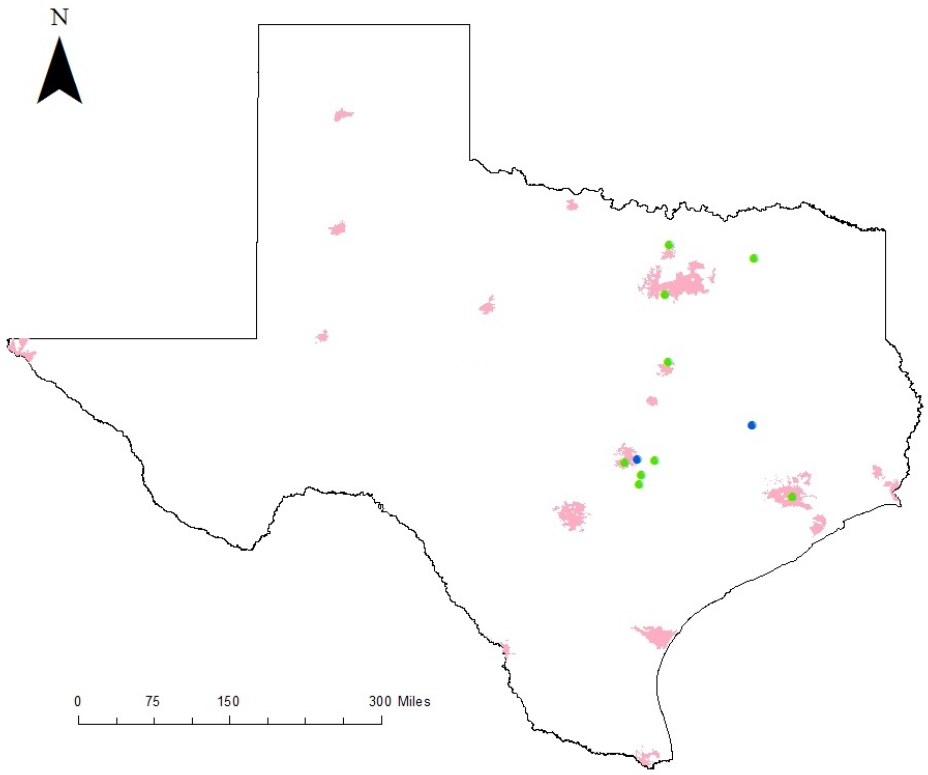


Figure 4: The approximate locations and distribution of EICs identified in Texas. Green dots are established communities while blue dots are forming. The pink regions represent the 25 largest metropolitan areas in the state. Map authored by Camille Cotsakis.

Reason for Locations

EICs surveyed were asked about the reasoning behind the community's location. Communities were able to select as many of the following reasons as appropriate: financially feasible, hospitable climate, easily accessible, unrestricted development, or other. Overall, the two most common reasons were "financially feasible" (8 selections), followed by "easily accessible" (7 selections). The "other" category was the third most

frequent choice (4 selections) with write-in explanations such as a "low carbon lifestyle" and "the land was already owned by community members or family members." Hospitable climate and unrestricted development were both only selected by two communities.

Proximity and Place

The second objective of this study attempted to form a relationship between the proximity to the built environment and the capabilities of environmentally responsible design. As the literature suggested, there can be problems with rural communities attempting to be sustainable, but lacking in environmentally-friendly transportation methods. Urban EICs struggle with zoning and housing codes that negatively interfere with their design. In response to the question, "what makes the community rural, urban, or suburban?", the study received the responses presented in Table 5. In relation to the EICs setting and proximity to the built environment, the question of any negative interactions was also enquired. Some of the responses are highlighted in Table 6, and then discussed in the following chapter. Quotations are direct responses from members and other entries have been paraphrased by the author.

Table 5: Survey responses about the rural/urban/suburban settings of the communities.

Name	Setting	Response
EIC 1	Rural	"Conveniently located in the middle of nowhere."
EIC 2	Rural	"The place was started as a school and we wanted city children to get exposure to the 'natural' world."
EIC 3	Rural	"It's out in the country."
EIC 4	Rural	"Outside Sanger city limits. [The] suburbs are creeping closer."
EIC 5	Rural	"40 Miles from Austin, rural with livestock."
EIC 6	Suburban	Located in the city with single family homes, codes, and zoning.
EIC 7	Rural	About 30 minutes from anything, land is still private ranching land on a private road.
EIC 8	Urban	"Access to transit, density of people, jobs, opportunities, etc."
EIC 9	Urban	Near a major highway, zoned for commercial use, was previously a scrap metal/junk yard.

Table 6: EICs responses regarding negative experiences.

Name	Setting	Response
EIC 1	Rural	"No, one reason to live here, no permits required."
EIC 5	Rural	"None so far."
EIC 6	Suburban	Many negative experiences, constant violations, and SWAT raid of 2013.
EIC 7	Rural	No, deed restrictions recently expired.
EIC 8	Urban	"Couldn't do all we wanted with greywater, chickens, and still unsure if [the] city will allow density of residents."
EIC 9	Urban	"Millions!"

Accessibility

The communities were also asked to rank their accessibility to jobs (if needed), healthcare, and additional resources. "Accessibility" refers to the methods in which community members travel to and from the community. As an example, a community 30 miles away from the nearest grocery store would most likely have low accessibility, while a community within walking distance to resources would be considered highly accessible. Ranging from 1 to 5; 1 being not accessible and 5 being highly accessible, the results are shown below in Figure 5.

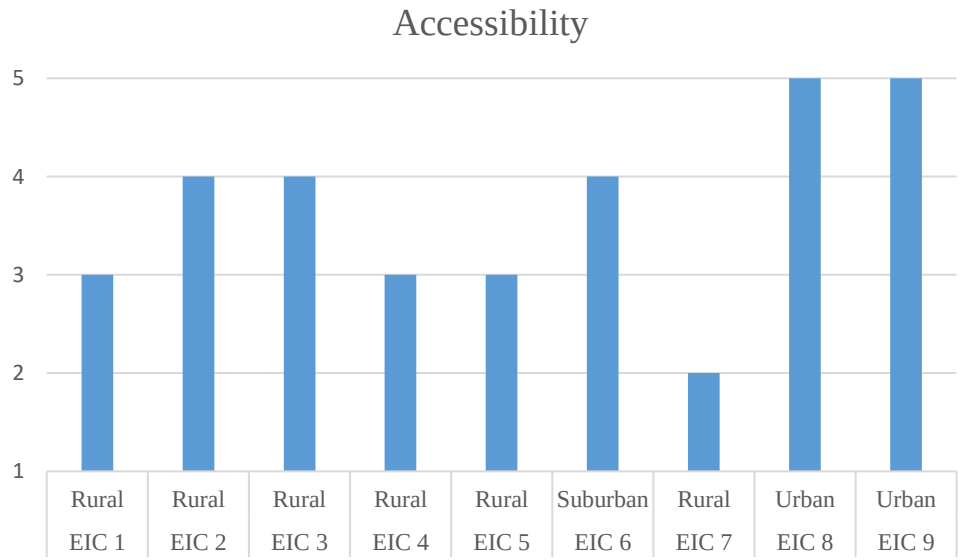


Figure 5: EICs Accessibility rankings.

Placement on SERD

Using modified methodology from the BEST framework, the survey data assigned a binary number of 1 or 0 to measure the EICs implementation of environmentally responsible design. The assessment framework is only able to capture positive practices and cannot detract from negative or harmful practices (such as burning plastic instead of recycling). The LENSES framework allowed unknown practices to be obtain, assessed, then assigned a numerical value to express the EICs distinctive designs. The numerical points are assigned as follows:

Table 7: Total points of EICs and their settings.

Location	Name	Total Points
Rural	EIC 1	29
Rural	EIC 2	20
Rural	EIC 3	30
Rural	EIC 4	22
Rural	EIC 5	21
Suburban	EIC 6	33
Rural	EIC 7	24
Urban	EIC 8	23
Urban	EIC 9	16

SERD (Figure 1) consists of categories ranging from degenerative to regenerative systems. The points awarded, being ordinal numbers, are relative and only show how the EICs compare to each other. In placing the EICs on the SERD, they are grouped into broad categories: Restorative, Sustainable, and Green. Each category includes the practices that all EICs were able to implement, site descriptions, if possible, supplementary information that led to the assigned category, and the manner in which the survey was completed. Because of the close scoring, i.e. some EICs are within 1 point of

others, further information from the survey was examined, including self-sufficiency (trips necessary outside of the community per week) and accessibility of the community, year formed, and number of members (to determine community stability), which leads to community sustainability. All the extra criteria are presented and discussed in the following chapter.

Table 8: SERD categories communities and their scores.

Category	Communities	Scores
Restorative	6, 3, 1	33, 30, 29
Sustainable	7, 8, 5, 4	24, 23, 22, 21
Green	2, 9	20, 16

Restorative

Restorative design practices strive to go beyond sustainability. It intends to rebuild natural environments to a higher quality rather than to solely sustain them. Communities placed in this category demonstrated use of environmentally responsible design in the assessment, as well as described previously unknown practices. Community members' sourced at least half of their food intake from their own production, all organically grown through various Permaculture designs, and incorporated various methods of soil care. Livestock was exclusively used for eggs and dairy and fed organically. All three communities' had members whose gasoline consumption was less than the average American (36 gallons per month) (U.S. Energy Information Administration 2015). The housing was designed and built by community members to include natural light, cooling, and heating sources. In addition, the structures were built

with natural, renewable, and salvaged materials. Greywater is in use and the majority of their toilets are composting, waterless toilets. Thus, EICs found in this category were actively trying to close as many loops as possible, within their capabilities. The three communities in this category are described below: 6 (suburban), 3 (rural), and 1 (rural).

EIC 6

EIC 6 is located in the suburbs of Arlington, and is a community of approximately 12 people that formed in 2007. Their community center is as a single family home turned into communal housing. Other structures on the property include a cob house, geodesic dome, a partially buried vehicle, as well as temporary structures such as recreational vehicles and tents. Their community is outspoken about their existence and vision. They offer people to join in their lifestyle practices on both permanent (living in the community) and temporary (event-based) basis. Most members do not need to leave the community often, as they are self-sustaining.

Figure 6: Buried Vehicle. A partially buried vehicle with tires and vegetation as insulation, a model of sustainable housing. **Figure 7: Sustainable housing.** Pictured on right is a small cob cottage with a salvaged door. Images obtained with permission from The Garden of Eden (http://www.intothegardenofeden.com).

EIC 6 scored highest because of the waste category. They are the only EIC that does not produce landfill waste with a strict “no purchase” policy. Junk mail is delivered from neighbors and used as mulch. They also receive “green” trash from lawn service and construction companies, providing mulch and wood for the garden and any projects they can imagine. Their ability to divert a large amount of landfill waste, while not creating any of their own, is noteworthy. EIC 6 also partakes in different practices that were not included in the survey and were discovered with the open responses: dumpster diving, cordwood floors, and use of biomass to cook with rocket stoves (a wood-burning stove made from cob). Another significant practice of EIC 6 is the restricted use of electricity. Instead of using solar or wind power that requires technology, the community prefers to live without. The community stated their electricity bill is around $40 per month for the entire property. The accessibility is ranked as a 4 with trips outside of the community 1-3 times per week.

Figure 8: Rocket stove. This was created by community members, and used in cooking the majority of meals. Images obtained with permission from The Garden of Eden (http://www.intothegardenofeden.com/).

While EIC 6 might seem capable of an abundance environmentally responsible designs, the suburban setting offers many challenges. Members of EIC 6 expressed an ongoing, extremely negative situation with the city. They have received more notifications from the city regarding compliance than they can count. Most citations are for having uncut lawns, improperly stacked wood, a couch in the yard, and too many residents on their single-family home property. More severely, though, in 2013 the police raided the community, allegedly looking for marijuana plants, and confiscated native sunflowers, tomatillo, blackberries, and okra plants from their garden. According to a community member, the police did not find what they were looking for, and the incident has actually benefited them by highlighting their main goal: demonstrating how a suburban home and lifestyle can be adjusted to be more sustainable.

The concept of geographic location, in relation to climate and proximity to the built environment, as a factor in EIC's abilities to implement environmentally responsible design is tested at this location. The climate, at this location, enhances their practices through sufficient rainfall and long growing seasons for the garden. Yet, their location has laden them with legal troubles. This model pushes the boundaries of societal standards, enabling them to change "the system" rather than avoiding zoning and city codes in a rural, unrestricted setting. The survey for EIC 6 was completed on site by the author.

EIC 3

EIC 3 is located in rural Campbell and has been forming since 2011 with 3 members. They are using rainwater harvesting for agricultural irrigation and have built structures from compressed earth blocks (similar to adobe). Energy is generated on site

through solar and wind; this is the only EIC that uses both renewable energies. Furthermore, they are also the only EIC to barter as a means of waste reduction and avoidance. When questioned about negative experiences about the location, community members said they are forced to have a septic system in place, as the county requires. The accessibility was deemed a 4, with trips out of the community 3-6 times per week. This survey was some completed online by a community member.

EIC 1

EIC 1 is located in Bedias, a rural setting, and formed in 2015. According to a community member, they are actually reforming after a financial hardship temporarily disbanded the community. Because of this distress, they presently have 2 members. EIC 1 has strengths in the shelter category. Here, they used papercrete (re-pulped paper with clay or concrete) for construction of structures, earthen floors, and mulch pits for cooling and heating their homes. All houses and other buildings were constructed and designed by community members to harness natural light and energy. While the accessibility is ranked at a 3, the community members take no more than 1 trip per week out of the community. This survey was completed online by a community member.

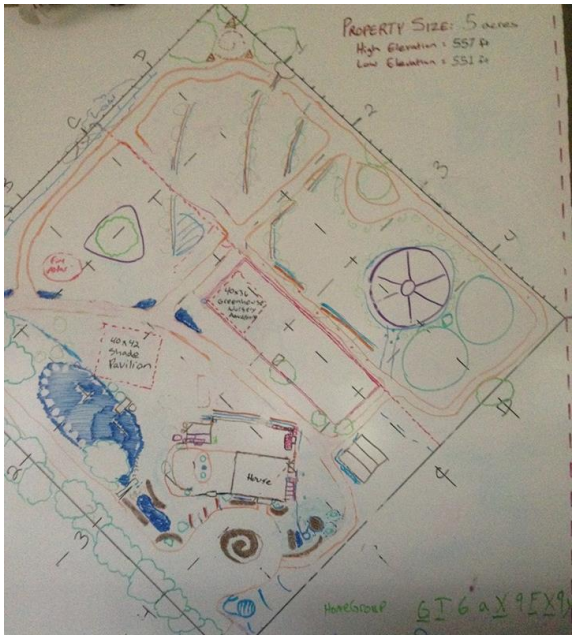
Sustainable

Sustainable, also termed neutral on the SERD, is an equal point at which no harm or benefit is occurring. The communities that are placed into the sustainable portion are attempting to break-even with "man versus nature." This category encapsulates most of the EICs in the study, and they have varying (but close) scores from 24-21. All communities produce food organically, without the use of chemicals or pesticides, and

use techniques for soil care. Recycled, natural, renewable, and salvaged materials were used in constructing shelter and structures. Lastly, food was either composted or fed to the animals. This category includes EICs: 7 (rural), 8 (urban), 5 (rural), and 4 (rural).

EIC 7

EIC 7 is located in Cedar Park, in a rural area that was under contract for a housing development. The developers went bankrupt, and the development ceased in the initial phases. The land is now privately owned and largely used for ranching. Because of the failed development, the deed restrictions on the 5 acres have expired. EIC 7 formed in 2013 and currently has 7 members. They practice aquaponics, garden through Permaculture designs, and use livestock (chickens and goats) for dairy products and pest control. The community members car-pool and ride share as often as possible to reduce



Figures 9: Master plan for EIC 7 (on left). **Figure 10: The community's chicken coop** (crafted with salvaged pallets)**.** Photographs by the author.

their gasoline consumption. Other than the single-family home that serves as the community center, structures on the property that have been built by the community members were designed to harness natural light for heating and cooling. Materials were sourced from a nearby landfill or were gifted to the community. A voluntary reduction of water-usage, in the form of no dishwasher use, and an outdoor shower, have been adopted by the community. They currently have one member living in his own tiny house and plan to build more. Also, upcoming construction plans include a greenhouse and a pavilion by the pond, providing shade and a place for a workshop. They have ranked their accessibility as a 2 because they require travel daily for jobs and additional resources. The survey was completed on site by the author.

Figure 11: A tiny house at EIC 7. Pictured on the left is a side view of a community member's tiny home. **Figure 12: Interior view.** On the right, the interior of the tiny home is shown with a bed, dresser, desk, and composting toilet in the back right. Photographs by Matthew Gilliland.

EIC 8

EIC 8 is an urban community, located in the state's largest city, Houston. Established in 2011, they have 25 members. They produce some food organically, and use rainwater or greywater for garden irrigation. EIC 8 is 1 of 2 communities able to use bicycles and public transportation as methods of transit. Solar power is used for water heaters and their electricity is produced from solar and wind energy (as an option through

their electricity provider, not produced by the community). The community members were able to design their house, in an energy efficient manner, with the use of natural light for heating and cooling. Because they are living in a single structure, the community has mini, spilt air-conditioning units and greater than average insulation for maximum cooling and retention. In view of the fact that the city does not allow livestock, this community was not able to obtain points for environmentally responsible design in the livestock portion of the assessment. Again, EIC 8 is 1 of 2 urban communities with a 5 for accessibility. Easy access allows many trips outside of the community daily. This survey was completed online by a community member.

EIC 5

EIC 5 is situated in the rural setting of Dale, about 40 miles outside of the large city of Austin. Formed in 2006, the community currently has 5 members. As well as the practices implemented in the sustainable category, EIC 5 uses wicking beds (raised beds that draw up water only when needed) along with other types of Permaculture designs for food production. Their livestock (chickens, turkeys, goats, and a cow) are fed organically, free range, and are used for eggs and dairy only. The houses and structures were designed by the community members with recycled or salvaged materials, and were built to include natural light. Energy is produced by the community, for battery power, through solar panels. EIC 5 is collecting rainwater and using greywater. They also have composting toilets to reduce water usage. Further survey data shows the members travel outside the community on a daily basis for income and other resources not provided. They rank their accessibility as a 3 and use personal vehicles as their primary method of transportation. The survey was completed online by a community member.

EIC 4

EIC 4 was established in 1978 and is located in rural Sanger. The community currently has 14 members and is part of a 76-acre tract of the Texas Land Conservatory. A community member said they became part of the conservation program in 2005, as a way to reduce property taxes through the conservation easement. As part of their conservation efforts, they only have native, free-range wildlife and do not house livestock for their own use. Thus, they were not able to obtain points in this portion of the assessment. The community produces their own solar, wind, and biomass energy on site. EIC 4 is the only community whose major source of energy is solar power produced on site. Their homes were designed sustainably by members using Ferro-cement Earth-bermed domes that are partially buried in the ground, and have Junipers to serve as windbreaks from cold northern winter winds.

Further, greywater and composting toilets are implemented for reduced water consumption. As a newly discovered practice, EIC 4 salvages old tires and uses them to build roads. They rank their accessibility as a 3, and travel outside the community 3-6 times per week. This survey was completed by a community member through the mail.

Green

The SERD places the green category just below sustainable and above conventional (see figure 1). Green design can be considered as implementing environmentally responsible practices that attempt to progress somewhat past conventional living standards in the United States. These practices comprise: organic food production, soil care, recycling of waste, repair of items, purchasing new instead of

used, and composting food waste or feeding it to animals. The communities in this category are EIC 2 (rural) and EIC 9 (urban).

EIC 2

EIC 2 is a rural community positioned outside of Bastrop. It was established in 1969 and has approximately 30 members. The community is centralized around a school for children, and their focus is to provide a natural setting for education. The schoolhouse also functions as their community center. They have an assortment of housing styles on the property: trailers, vans, buses, tents, wooden yurts, and single family homes. Their livestock (chickens and peacocks) is free-range, organically fed, and used for egg collection only. Although personal vehicles are their main method of transportation, they are able to reduce gasoline consumption for transporting children to school as it is in walking distance from every home. EIC 2 is the only community that has a schoolhouse for children. The majority of homes were constructed by community members and were designed to capture natural light for heating and cooling methods. Greywater use and composting toilets are part of their efforts to minimize water consumption. Their accessibility is self-described as a 4 and travel outside of the community occurs 3-6 times per week. This survey was completed online by a community member.

Figure 13: A wood yurt constructed by community members. Note it is connected to the electric grid on the left side. Photograph by author.

Figure 14. EIC 2's schoolhouse off an unpaved road. The schoolhouse does not use electricity for light; the large windows allow natural light**.** Photograph by the author.

EIC 9

EIC 9 is the second urban community and is found in Austin. It was established in 2012 and has 9 members. Being zoned primarily as commercial, the site was previously a scrap metal yard and was purchased for a reduced price by the founding community members in agreement to remove the remaining materials. A single family home was constructed with an efficiency (small one room house with a kitchenette) in the back yard. Other housing structures on the property include a recreational vehicle as well as a van. On account of their urban setting, they obtain a large percentage of food from dumpster diving. Also, they are not allowed to have any livestock, and therefore, were not able to obtain points from the livestock section of the assessment. Their community is in a walkable, bicycle friendly area, with access to public transportation. Average gasoline consumption of community members is less the average American's (36 gallons a month). Thus, their accessibility is ranked as a 5 and travel to and from the community is easy and frequent. The survey was completed on site by the author.

Figure 15: Three housing styles at EIC 9. From left to right, a recreational vehicle parked in the driveway, an efficiency in the backyard, and a single family home. Photograph by author.

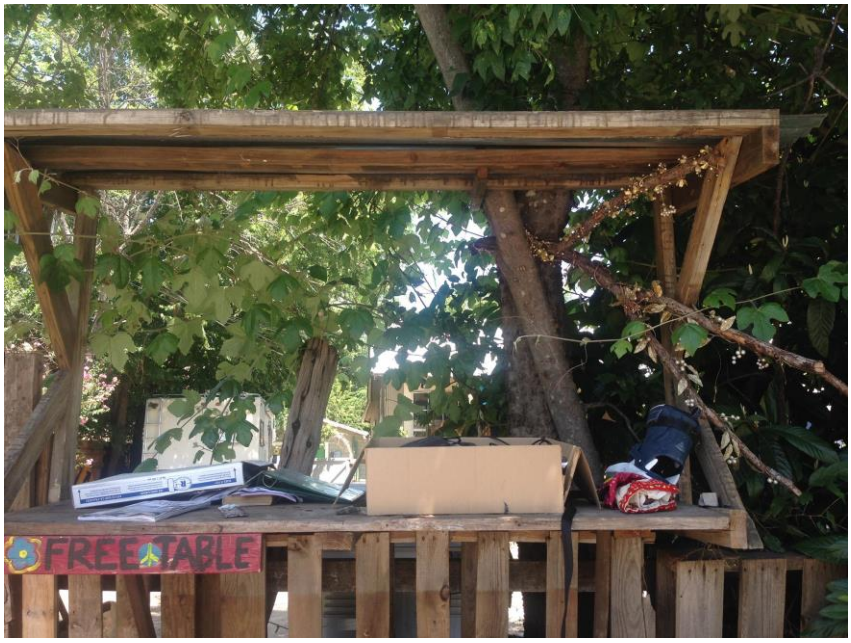


Figure 16: "Free table" at EIC 9. Items placed here are available free to anyone. Photograph by author.

Figure 17: EIC 9's main house. Bicycles outside for easy transportation to jobs, coffee shops, and bars. Photograph by author.

VII. DISCUSSION

Identified Locations of EICs

The EICs that were functioning at physical locations, with statuses of both established and forming, showed a smaller amount of EICs and more centralized distribution pattern across Texas than the exploratory findings. By comparing figures 3 and 4, a few major differences are evident: quantity and distribution. Out of the original 33 locations, 11 were found to exist. Figure 3 shows approximately 7 communities on the western portion of the state, while figure 4 shows them all to be in Central or East Texas. The author expected to find that several of the EICs that were in the forming stage to be nonexistent. Thus, the majority (61.5%) of EICs on Figure 4 are established communities. Because the directory is self-identifying, it can be assumed (because of the low number of existing EICs) that individuals may have been advertising conceptual communities as actually functioning.

As seen in Figure 18, the locations in the central and eastern regions of Texas may be connected with the survey respondents' reasoning behind their sites. Again, the most selected option was that the land was financially feasible to acquire, followed by accessibility. At least 4 communities revealed that the land was already owned by someone in the family or purchased cheaply. Accessibility was a priority for most EICs. In the west, population density and access to major highways, jobs, entertainment, education, and additional resources is limited (see Figure 18). As a result, the EICs need their communities to be closer to these types of amenities and formed along the two largest interstate highways (I-35 in central Texas, and I-45 in the east).

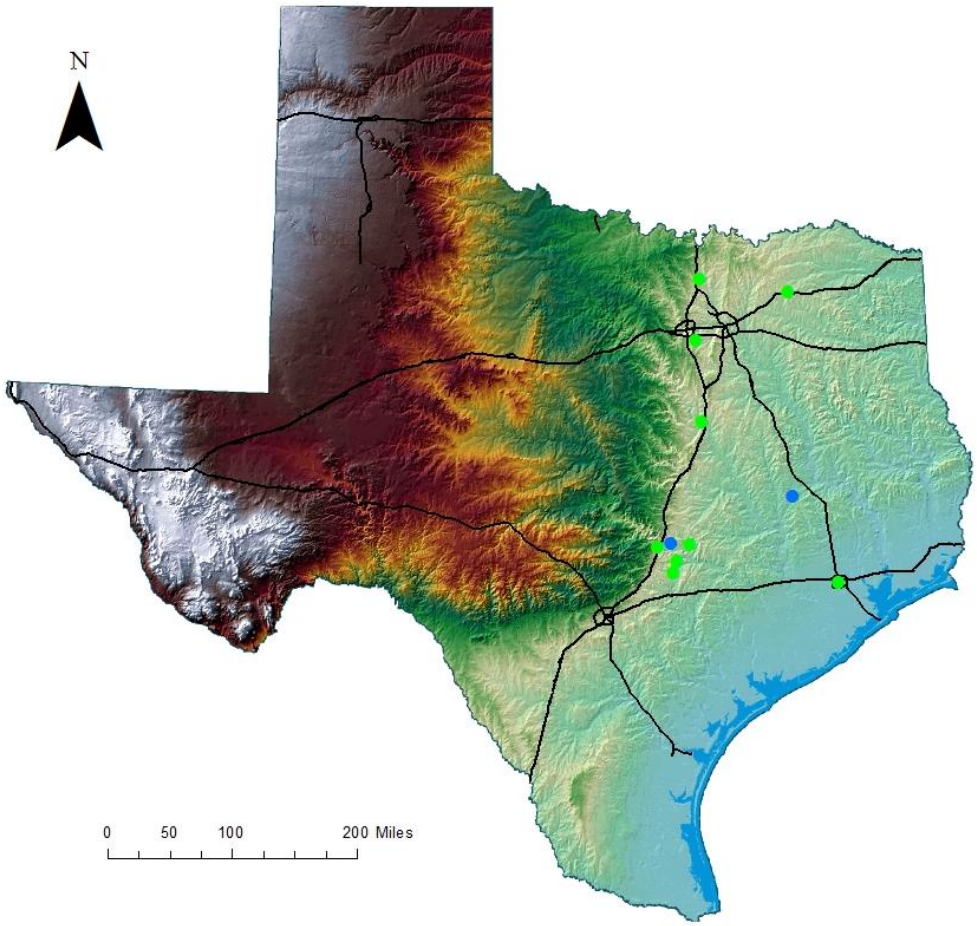


Figure 18: The state of Texas with terrain and major transportation networks and EICs. Map authored by Camille Cotsakis.

Proximity and Place

The intent of this study was to determine a relationship between the location of an EIC and its ability to apply environmentally responsible design. The hypothesis stated that EICs in an urban setting may be better able to implement sustainable to regenerative designs. However, a clear pattern could not be identified as there was a disproportionate amount of rural to suburban or urban communities. Nevertheless, the study was able to denote advantages and disadvantages of the settings. To better understand how these

survey responses relate to the efficiency of the EICs, the 2 EICs with the highest and lowest collection of points will be compared.

EIC 6 (suburban) and 3 (rural) were categorized as Regenerative. Both EICs had very different experiences regarding their location and implementation of design. EIC 3 has not had any type of negative experience that restricted their community vision. They are located in a rural setting with no zoning or codes. The only type of regulations they have in place are by current community members. These members must agree to any construction or modifications to the property prior to their initiation. EIC 6 is the only community situated in a suburban setting. Their experience with the city has been eventful and dramatic. They maintain their position and continue to incorporate designs as they please. By doing so, they would like to see city standards changed to allow a more sustainable lifestyle in a traditional setting. To the author's knowledge, the city has not made any special exemptions for their property, but largely leaves them alone at this time because of the allegedly unlawful actions of the city in a 2013 raid (no warrant to come onto the property). Therefore, the EIC 6 has access to materials and additional resources because of their location. Theoretically, their environmentally responsible design capabilities (composting toilets, outdoor living, etc.) should be restricted by the laws, but the community perceives the regulations as needing to be broken, in order to create real social change.

EICs categorized as Green are 2 (rural) and 9 (urban). EIC 2 has not experienced any negative effects of their location on their design. They are primarily focused on the setting of the "natural world" and therefore may not attempt to modify it too drastically. EIC 9 is in a highly developed location with a small piece of property. They are not

allowed to have any livestock and their soil quality is low because of the previous occupation of the land as a scrap metal yard. A community member expressed that the city's water quality is poor and high in chemicals. These chemicals in the water have actually destroyed their gardens in the past and, as such, community members are attempting to move into rainwater harvesting for irrigation. Also because of their restricted land size and limited access to natural resources, they are forced to retrieve rocks and wood (for stabilizing their sinking driveway) from outside sources. A community member also articulated an undesirable relationship with the city. Numerous citations have been sent to the community regarding the recreational vehicle on the property, the van in disrepair, electrical outlets feeding lines outside of the home, to name a few. Although the location poses issues, a community member said it can be offset by their prime location to access major highways, public transportation, and pedestrian friendly modes of transit. Each community perceives their location as either a help, neutral, or a hindrance to their lifestyle, depending on whether the community prioritizes having either a 'natural space' or being proximate to transit. Nevertheless, they continue their pursuit to bring their ideals to fruition.

Placement on SERD

The EICs fell in the ranges as expected: green, sustainable, and restorative. The sustainable category was also expected to hold the highest number of EICs. The author did not expect to find the lowest ranking EICs to be urban and rural, with the highest being suburban. Placement on the SERD was meant to serve as a general assessment of the community's practices and not to anchor them based on their capabilities, but their

current actions. With time, redesigns, and funding, some of the EICs would be able to gravitate more towards regenerative designs.

Micro-Case Studies

The proposed methodology alluded to the author conducting micro-case studies with participant observation. Unfortunately, this goal was not feasible for several reasons. For example, the author was invited to EICs 2 and 7 for a potluck dinner, but they did not have extra accommodations for an overnight stay. Other EICs (4, 5) were unable to invite nonmembers to the property because of insurance constraints. EIC 6 required legal documentation to enter the property. The author did obtain the documentation and spent a morning volunteering in the garden in exchange for information inquired on the survey. The remaining site visits were conducted only to obtain information for the survey. While not implemented as planned, site visits were helpful in engaging community members in conversation and becoming more broadly aware of their location, accessibility, and design capabilities.

VIII. CONCLUSION

This thesis initiated with three objectives: 1) locate ecological intentional communities in Texas, 2) determine if a relationship exists concerning the physical location and proximity to the built environment with the ability to implement environmentally responsible designs, and 3) evaluate the placement of the ecological intentional communities on a spectrum of environmentally responsible design. The study found that 11 EICs exist in Texas. Their locations in the physical environment and proximity to the built environment, pose an ambiguous relationship. Perhaps the sample size was not large enough and there were not a sufficient number of communities located outside of a rural setting. The placement of the EICs on the SERD found that most of them were at the very least "green" in their efforts. Top ranking communities were considered "restorative" because they applied methods that enhanced the quality of their physical environment and reduced harm.

The author endeavored, through this research, to conclude whether these types of communities could be used as a framework for future development on a larger, more mainstream scale. However, it can be concluded that currently the structures of Texas' cities' laws and enforcement tactics are not conducive to a productive, self-sufficient community within its bounds. In addition, rural settings offer difficulties with access to income, additional food, education, entertainment, and miscellaneous resources. Producing enough renewable energy on site to serve an entire community's needs off-the-grid has not yet been achieved by any EIC studied. Therefore, this study was not able to confidently support the conclusion that EICs can be used as a framework for future environmentally responsible design on a larger scale.

Limitations

Data acquisition was limited to those communities that voluntarily responded to the study. There may be additional EICs that are not included in this study because of their disinterest in participating. Moreover, some EICs may exist and may have not been contacted. If they were not represented on the directory website, revealed by EICs that did respond to the inquiry, or appeared by an internet search, their existence was simply unknown. In addition to the lack of entries in the directory, there was also an abundance of entries for conceptual EICs that did not have community members or land.

In addition, assessing communities through a framework with a binary system that does not detract, and is merely capable of measuring "positive" environmental practices by awarding one point per practice, could potentially create a false outcome. For example, the study did not formally inquire about the amount of landfill-bound trash produced; it simply asked how it was handled. Therefore, even if, for example, an EIC produces more landfill trash than is typical, it was undetectable. Similarly, if one community consumed large amounts of water for recreation in a wasteful manner, that would also be undocumented.

The reliability of the self-assessment through the survey responses may also be problematic. Surveys completed online by "assumed" community members may be lacking thorough accuracy depending on that individual's knowledge of the community. Surveys completed in person may be more representative of the community, as there were typically multiple community members discussing the questions, then responding with a consensus.

Further Research

As an extension of this thesis and its intentions, a study with a larger sample size would be beneficial for the second and third objectives. A potential future study could include (only) established communities in the United States. This would provide not only a larger sample size, but also a better understanding of the motives behind the communities' locations. Some states may contain cities with greater flexibility than in Texas, as well as a better climate for farming, sustainable housing, and production of renewable resources. Once a comparative site or set of sites was established elsewhere, it would be fascinating to compare 2 different sites (perhaps 1 rural and 1 urban) with an in-depth case study, especially focusing on the regenerative portion of the spectrum of environmentally responsible design. This kind of comparison would be beneficial in identifying factors that enhance or limit communities' ability to apply environmentally responsible design in differing locations (throughout the nation) on a larger scale.

APPENDIX SECTION

Ecological Intentional Communities Research Survey

This survey is composed of five sections: Food, Energy, Shelter, Water, and Waste. Thank you for taking the time to complete this survey. Please answer all questions to the best of your ability.
Institutional Review Board Exemption: EXP2016A693592H

General Questions

Basic Questions about the Community

Name of the community and location:

Is the community currently operating at a physical location?

Mark only one oval.

- Yes
- No
- Other:

If the community is not currently functioning at a physical location, please do not complete the remainder of the survey and thank you for your participation.

What is the reasoning behind the location?

Check all that apply.

- Financially feasible
- Hospitable Climate
- Easily Accessible
- Unrestricted Development

- ☐ Other: _____

How would you classify the community's location?

Mark only one oval.

- ◯ Rural
- ◯ Suburban
- ◯ Urban
- ◯ Other: _____

Why is (or what makes) the community rural/suburban/urban or other?

_____

How many residents are currently in the community?

_____

When was your community formed?

_____

1. FOOD

Agriculture and Livestock

Is agricultural production a part of the community? (if no please continue to Livestock.)

Mark only one oval.

- ◯ Yes
- ◯ No

If yes, how much of the food consumed by community members is produced by the community?

Mark only one oval.

0	1	2	3	4	5	6	7	8	9	10
	○	○	○	○	○	○	○	○	○	○	◉	

What changes, if any, are made to the soil composition to foster agricultural growth?

.....

.....

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.....

.....

How much of the food is organically grown?

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
0%	○	○	○	○	○	○	○	○	○	◉	100%

What, if any, specific methods are implemented?

Check all that apply.

- ☐ Raised beds
- ☐ Hanging plants
- ☐ Permaculture
- ☐ Crop rotation
- ☐ Double-digging (digging a trench two spades deep and bringing the bottom layer of soil to the top)
- ☐ Sowing straight into the soil
- ☐ Mulching

- [ ] Vertical gardens
- [ ] Rooftop gardens
- [ ] Other:

Livestock

Is there any livestock on site? (if no, please continue to Energy)

Mark only one oval.

- Yes
- No

If yes, what kind of livestock and how many?

What is their main purpose in the community?

Mark only one oval.

- Education
- Food - Meat
- Food - Eggs, Dairy, etc.
- Breeding
- Other:

What type of feed do they receive? Is it organic?

What, if any, specific types of management practices are used in housing the livestock?

Check all that apply.

- [ ] Free range

- ☐ Cages
- ☐ Other: _____

2. ENERGY

Transportation, Consumption, and Production

Transportation

What are the two primary methods of transportation for community members?

Check all that apply.

- ☐ Personal Vehicles
- ☐ Public Transportation
- ☐ Bicycles
- ☐ Walking
- ☐ Car-pooling / Ride share
- ☐ Other: _____

If children are a part of the community, what is their primary method of transportation to school?

Mark only one oval.

- ◯ Public school bus
- ◯ Private vehicle
- ◯ Bike or Walk
- ◯ Children attend school within the community (walking distance)
- ◯ Other: _____

If personal vehicles are the primary method of transportation, about how much gasoline is consumed by each community member per month?

Mark only one oval.

- Less than 10 gallons per month
- Less than 20 gallons per month
- Less than 30 gallons per month
- About 36 gallons per month (The average American driver's consumption)
- More than 36 gallons per month
- More than 50 gallons per month
- Other:

If the community is located in a rural setting, how often are trips outside the community necessary per week for the average community member?

Mark only one oval.

- No more than once a week
- 1-3 times per week
- 3-6 times per week
- On a daily basis
- Other:

How accessible is the community to jobs (if needed), healthcare, entertainment, and/or additional resources?

Mark only one oval.

1 2 3 4 5

Not Accessible						Highly Accessible

Is the community attempting to improve transportation methods?

Mark only one oval.

- Yes
- No
- Other:

Consumption and Production

What type(s) of energy does the community consume that is produced outside the community?

Check all that apply.

- Electricity
- Gasoline
- Natural Gas
- Propane
- Coal
- Biomass
- Geothermal
- Other:

Referring to the previous question, which energy type is the community's primary source? What is the monthly average usage?

What energies, if any, are produced by the community?

Check all that apply.

- [ ] Solar
- [ ] Wind
- [ ] Hydroelectric
- [ ] Biomass
- [ ] Geothermal
- [ ] Other: _____

If any of the previously mentioned energies are produced by the community, please describe the types and the methods by which they are obtained.

Are the types of energies consumed changing to implement the use of more renewable resources?

Mark only one oval.

- ◯ Yes - work in progress
- ◯ No - additional resources needed
- ◯ N/A - no use of nonrenewable resources
- ◯ Other: _____

3. SHELTER

Housing styles and Construction materials

What housing structures are in the community?

Check all that apply.

- ☐ Single family homes
- ☐ Apartments
- ☐ Duplexes
- ☐ Communal housing
- ☐ Other: _____

What description best fits the community's housing?

Check all that apply.

- ☐ Conventional
- ☐ Mobile (mobile homes, RVs, etc.)
- ☐ Yurts
- ☐ Geodesic Domes
- ☐ Sustainably developed
- ☐ Other: _____

If the community has implemented sustainably developed housing, what materials were used?

Check all that apply.

- ☐ Adobe
- ☐ Recycled/salvaged materials
- ☐ Natural/ renewable materials
- ☐ Other: _____

Who built the homes/structures?

Check all that apply.

- [ ] Unknown
- [ ] The community members
- [ ] Contractors

If the community did use sustainable materials for development, please describe how these materials were sourced and then designed?

Were the homes built to include natural light?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Other: _____

What, if any, design practices were used to minimize energy needs, such as allowing natural air flows for heating and cooling?

Are there any upcoming construction plans? If so, please describe.

Did the community experience problems with any zoning/housing codes that effected the design in a negative manner? If so, please describe.

4. WATER

Consumption and Sources

From where is the community's water sourced?

Check all that apply.

- ☐ Well
- ☐ Rainwater catchment
- ☐ Spring/subterranean natural water system
- ☐ City / Municipal
- ☐ Scarce, distance source
- ☐ Other:

The water obtained is then:

Check all that apply.

- ☐ Cleaned naturally
- ☐ Chemically treated
- ☐ Treated with environmentally responsible additives
- ☐ Unknown
- ☐ Other:

Is irrigation used for agriculture?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ N/A
- ◯ Rainwater Harvesting
- ◯ Other: _____

If yes, what is the monthly average (in gallons) of water used for agriculture?

_____

How often is greywater reused?

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
0% (Never)	◯	◯	◉	◯	◯	◯	◯	◯	◯	◯	100%

What percentage of toilets in the community are composting toilets?

Mark only one oval.

1	2	3	4	5	6	7	8	9	10
◯	◯	◯	◯	◯	◯	◯	◯	◯	◯

What steps are taken, if any, in the community to reduce the use of household water (Showers, dishes, etc.)?

5. WASTE

Avoidance, Composing, and Recycling

What percentage of community members employ voluntarily simplicity of natural resources and reduction of solid waste, i.e. personal consumption is minimal?

Mark only one oval.

1	2	3	4	5	6	7	8	9	10
◯	◯	◯	◯	◯	◯	◯	◯	◯	◯

What percentage of community members share resources such as equipment and tools?

Mark only one oval.

1	2	3	4	5	6	7	8	9	10
◯	◯	◯	◯	◯	◯	◯	◯	◯	

What percent of community members share facilities such as offices, kitchens, and storage space?

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
0% of Members	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	100% of Members

Are there any methods the community uses to reduce consumption of materials that would lead to solid waste? If yes, please describe.

.....

.....

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.....

.....

What methods are used in waste avoidance?

Check all that apply.

- ☐ Recyling: plastic, tin, glass, aluminum, etc.
- ☐ Reuse
- ☐ Repair items instead of purchasing new
- ☐ Buying used items instead of purchasing new
- ☐ Other: _____

Are there any commodities (other than food) produced within the community? Clothing, household goods, etc.

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Other: _____

Food garbage is:

Mark only one oval.

- ◯ Donated
- ◯ Fed to animals
- ◯ Composted
- ◯ Thrown in the trash
- ◯ Other: _____

How is the landfill trash managed?

Check all that apply.

- ☐ By the city
- ☐ Burned on site

- ☐ Private trash collection company
- ☐ There is not any landfill trash.
- ☐ Other:

Thank you!

Your participation is appreciated.

Would the community be open to further questions through an interview and possible site visit by the researcher?

Check all that apply.

- ☐ Yes
- ☐ No
- ☐ Other:

If there is interest to further participate in the study, please provide contact information:

Submit

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