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*“THE GEOGRAPHY OF HOME:
Systems Awareness in a Changing World”*

A Graphic Novel Thesis

Eleanor B. Connolly

A senior thesis
submitted in partial fulfillment
of the requirements for the degree of
Bachelor of Arts

Environmental Program

College of Arts and Sciences

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Abstract

*Climate change is one of the most pressing issues of our times, yet it continues to be a topic that is not addressed with the urgency and action that it fully deserves. This lack of understanding is largely due to discrepancies in the ways that climate science is communicated and taught to the general public. The recent declaration of the Anthropocene, a new geologic epoch named for the influence of humans on Earth, warrants new ways of communicating about climate change. Art allows for novel ways of understanding these issues and contrasts the typically elitist methods of climate communication that tend to remain in the hands of scientists and academics. Over the course of the last year, I have begun the process of writing a book that deconstructs the dichotomous fields of art and science. Through merging personal narratives and drawings with information about climate science, the Anthropocene, sense of place, and systems theory, I hope to form a cohesive narrative about what it is like to be a young person exploring these topics while on the precipice of the Anthropocene; the questions that have arisen, the concerns, the fear, the chaos, and the hope. The intended audience for the *Geography of Home* is anyone who is searching for a new type of climate communication, one that centers around personal experience and relationships between natural and social systems. By combining art and words into a graphic novel, *The Geography of Home* becomes a launching point for a new type of discourse and understanding of the rapidly evolving issues of the Anthropocene.*



Figure 1: Systemic Awakening. Source: Lena Connolly

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Introduction

Human-caused climate change has influenced the timely and necessary declaration of the Anthropocene, a new geologic epoch characterized by the impact that humans have had on Earth (Crutzen, 2006). While the Anthropocene is primarily a scientific and geologic concept, its existence is largely a result of human actions (Braje, 2015). Many view the Anthropocene with fear and concern, but could the Anthropocene be a turning point for the world? (Macy, 2019, p. 1; Maibach et al., 2016; Meadows, 2009). Perhaps it holds an opportunity for humans to re-evaluate the systems they created that are now causing harm to the Earth. The Anthropocene is not a concept that has a solution; it is simply the next phase of geologic evolution, however, it does warrant new ways of communicating and understanding environmental issues, as well as humans' relationship with the natural world.

There is mounting data that suggests that a sense of place, formed through human interactions with a biophysical environment, informs attachment to natural systems and ecological ways of thinking (Tuan, 1977). Place attachment studies also inform research on humans' capacity to experience climate-related disturbance and still maintain resilience, since place attachment also influences adaptive capacity (Masterson et al. 2017). One of the methods of developing ones' sense of place includes acting and existing within a bioregion, which refers to a geographic area in which humans are at the interplay of natural systems through land and resource use (Ewert, 2002). Bioregions can be formed through a deep and continuous relationship with a place, which is a reason why acting within a biosphere is one of the modern challenges of the United States, as a country with a complex history of colonization; (McGinnis, 2000; Sarkar & Behura, 2018). Sense of place and bioregionalism are just some of the pathways that inform resilience moving forward into the Anthropocene.

Another critical way of understanding the scale and implications of the Anthropocene is framing it through systems theory. Systems theory can mean many different things, but in this context, it refers to the language and metaphor used to unite and understand ecological and social systems as one (Lappe, 2014; Wahl, 2017). Furthermore, systems theory allows one to understand the chaos that fuels natural systems as an ever evolving and uncontrollable entity, as well as something with which humans have forever intertwined. There are many different ways one can contextualize large-scale social or environmental issues through systems thinking. Some researchers suggest applying fundamental ecological principles, others suggest "dancing with systems" as a way to understand their spontaneity, and some use systems theory to describe how the world works holistically and relationally (Stone, 2012; Meadows, 2009; Capra & Luisi, 2012). For many, systems theory is an essential tool for communicating and understanding resilience on a social and ecological scale.

Two essential philosophies in systems theory that are especially relevant to the current state of the Anthropocene are *emergence* and *panarchy* (Brown, 2017; Holling, 2001; Holman, 2010). Both describe the understanding of order arising out of chaos, and that novel systems may coalesce out of systemic disruption, forcing a system to adapt and define a new baseline for its function. Emergence and Panarchy both recognize the role of chaos and collapse as an inherent function of all systems. Since the Big Bang, our universe has functioned off of growth emerging from collapse. If the Anthropocene presents a collapse of systems, what may emerge on the other side?

The goal of this thesis is to explore these topics as they relate to my own experience with environmental change. I do so through beginning the process of writing a graphic novel that

ponders these concepts, and many more, through personal scholarly narrative and comic-style drawings. The novel, titled “*Geography of Home*,” is based on research that I comprised while writing the literature review for this thesis. The title is a play on words from Wallace Stegner’s *Wilderness Letter*: “We simply need that wild country available to us, even if we never do more than drive to its edge and look in. For it can be a means of reassuring ourselves of our sanity as creatures, a part of the geography of hope” (Stegner, 1960). This thesis serves as a stepping stone for turning my manuscript into a published work. Writing and illustrating a 200-page graphic novel was not in my realm of ability for a year-long capstone project; however, my hope moving forward is to eventually complete and publish this book. The contents of this thesis include a literature review, a book proposal, the finished manuscript, an illustrated sample chapter, and examples of my process; all of which can be found in the appendices.

Communication remains an essential tool in any movement. Especially within a global issue such as climate change, communication must be made as accessible as possible. It is an issue that reaches far beyond the limits of scientific communication and requires new ways of knowing and explaining. In this way, art can be used not only as a communicative tool, but it can also lead to feelings of unity, empowerment, and hope. As Lehtonen, Salonen, & Cantell state: “arts can transform apathy and grief into joy and empowerment and bridge the gap between theory and practice” (Lehtonen et al., 2019). Graphic novels, specifically, serve at the interplay of artistic and scientific communication by combining personal experience, data-based research, and ways of describing both through narrative images. Graphic novels allow one to transcend the limits of written communication and serve as a platform to tell a holistic story. In topics related to climate change, graphic novels serve as an ideal tool for communicating because they provide new information and depth in a more understandable format than a standard research text; allowing a language for new pathways of discourse and points of understanding to form.

LITERATURE REVIEW

Human Responses to Climate Change

Contextualizing Climate Change

Human actions have impacted the planet for the last 10,000 years (Braje, 2015, p. 371) however, since the Industrial Revolution in 1800 the impact of this singular species has caused permanent lasting damage on the planet and the systems within it. This period of human influence is known as *The Anthropocene* which represents a rapid shift in environmental conditions, mainly caused by the human-induced spike in global cumulative carbon dioxide emissions, which cause a Green House Gas (GHG) effect in which global heat is captured and retained by the earth's atmosphere, leading to record breaking emission levels and global temperatures. While GHG emissions do contribute significantly to climate change, some authors suggest that "biogeophysical feedback processes within the Earth System coupled with direct human degradation of the biosphere may play a more important role than normally assumed, limiting the range of potential future trajectories and potentially eliminating the possibility of the intermediate trajectories. (Arguing) that there is a significant risk that these internal dynamics, especially strong nonlinearities in feedback processes, could become an important or perhaps, even dominant factor in steering the trajectory that the Earth System actually follows over coming centuries" (Steffen et al., 2018, p. 2). In Figure. 2 (Steffen, 2018 et al, p.2), we can visually see where Earth lies on a climate-related timeline, with noted shifts in global temperature through the epochs of The Holocene and the Anthropocene. In this image, it is clear that the earth is on the precipice of massive systemic change, due to a rise in global temperatures that influences the functioning of earth's intrinsic systems.

Implications and Approaches to the Anthropocene

The term *Anthropocene* was coined in 2000 by Crutzen and Stoermer (Crutzen, 2006) as a new geologic epoch. Some may say that it is still an epoch in formation (Moore, 2015) because there is much debate about when it actually began. Most debates suggest that the Anthropocene began around 1800 AD, the same time as the beginning of the Industrial Revolution. However, some scientists suggest that it began in the early Holocene, around 10,000 years ago. Some scientists even suggest it is an invention "centered on a political rather than scientific debate" (Visconti, 2014). Despite debates in nomenclature, it is clear through mounting scientific evidence that humans have had a profound and permanent impact on the earth's natural systems, it merely remains a question of *when* human progress began to impact geological processes, which is still a question many have yet to answer.

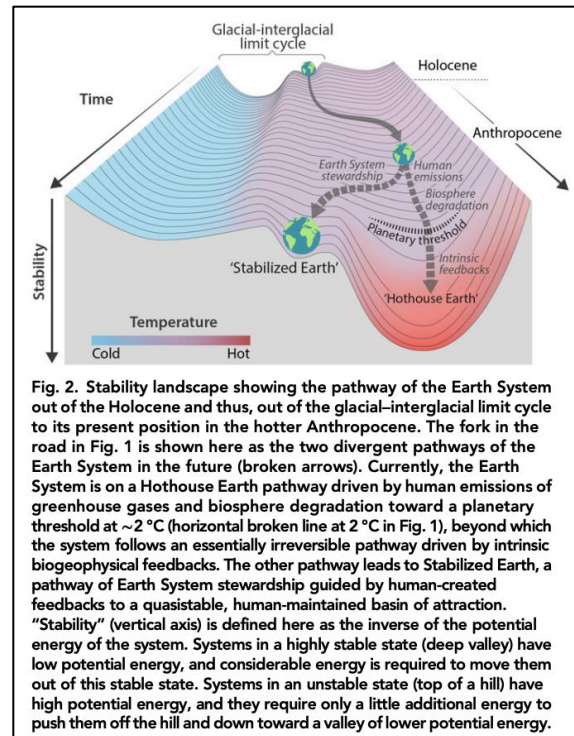


Figure 2: Stability Landscape of the Anthropocene (Steffen, 2018)

Beyond scientific data, the Anthropocene is distinct in its implications to human systems. (Moore, 2015) states that the Anthropocene “represents another way to have a conversation about the breakdown of the division between Nature and Culture that has historically shaped the Western worldview...From the social role of political responsibility to the refashioning of American education to the negotiation of planetary boundaries, this issue leaves us with multiple Anthropocenes to grapple with” (Moore, 2015 p. 1). What does a declaration of the Anthropocene mean for humans? What does it mean for the human relationship with nature? How do we approach this new epoch?

Joanna Macy suggests that the Anthropocene is an opportunity for a societal shift, naming it *The Great Turning*. Macy proposes *the great turning* as a title for the shift from the Industrial Growth Society to a life-sustaining civilization (Macy, 2019, p. 1). She suggests that “a revolution is under way because people are realizing that our needs can be met without destroying our world. We have the technical knowledge, the communication tools, and material resources to grow enough food, ensure clean air and water, and meet rational energy needs civilization” (Macy, 2019, p. 1). She provides the three dimensions of the great turning: 1. Actions to slow the damage to Earth and its beings, which includes all political, legislative, legal work, and civil disobedience to reduce destruction. 2. Analysis of structural causes and the creation of structural alternatives. This step includes understanding earth’s systemic dynamics as well the functioning of human systems that lead to destruction, mainly capitalism and the industrial growth society. Part of this step also includes introducing structural alternatives to destructive systems. 3. The final step is a shift in consciousness. We must deeply ingrain the previously stated values for earth stewardship, in both cognitive revolution and spiritual awakening. A few key parts of this step include general living systems theory, deep ecology, ecopsychology, and ecofeminism.

The precipice of the Anthropocene is an opportunity for adaptation. In natural systems, an ecotone, the edge of a system, or a threshold, is where adaptation occurs. It is on the edges of an ecosystem where members are forced to adapt to variant conditions, and the earth, as a complex adaptive system (CAS) will likely experience adaptation on the edge of the Anthropocene. Malanson (1999) states that “ecotones exhibit a relationship between process and pattern at the edge of chaos”(Malanson, 1999). The precipice of the Anthropocene is an opportunity to form societal resilience and is a challenge of the modern human, to limit industrial and capital expansion in the hope of remediating human impact on earth to promote longevity and systemic wellbeing. Perhaps the Anthropocene is an opportunity for revolution, as Donella Meadows (Meadows, 2009) states, it is a leverage point, a place where change occurs in a system. The declaration of the Anthropocene is a call for systemic awakening.

Environmental Psychology, Concern, and Behavior

As global climate change intensifies, the dichotomous rift between humans and nature becomes more apparent. In our development as a species, we have separated ourselves from the roots of our existence. However, there has been growing research that proves how necessary a deep and continuous relationship with nature is for human wellbeing. Nisbet, et al. (Nisbet, Zelenski, & Murphy, 2011) state that “human psychological health is related to the state of the environment and time spent in nature, and that people’s subjective sense of connection with nature may contribute to well-being” (Nisbet et al., 2011, p. 304) and that “along with physical health, mental health is interwoven with the state of the planet and that a fragmented human–nature

relationship negatively affects psychological health” (Nisbet et al., 2011, p. 303). They further state that humans possess an innate need to affiliate with other things, the appreciation for nature’s values is embedded in our biology, this relationship with nature is often referred to as an ecological identity, which “encompasses the self, the human and non-human community, and the planet’s ecosystems so that damage to the planet is seen as damage to the self” (Nisbet et al., 2011, p. 304). This approach within ecopsychology suggests that a deep connection with nature promotes systemic wellbeing for human mental and physical health, as well as the health of the planet’s natural systems (Nisbet et al., 2011, p. 305).

Responses to Climate Change

Despite the pressing concern for environmental action in response to global climate change and the mounting evidence that humans need the environment to survive, there are still many mixed reactions and responses to climate change.

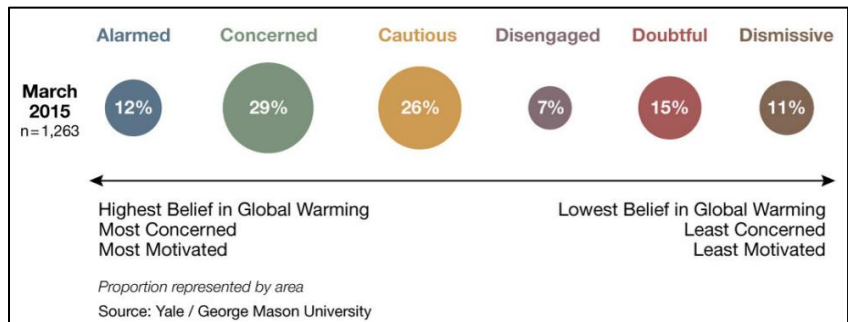


Figure 3: Responses to Climate Change (Maibach et al. 2016, p. 6)

The Center for Climate Change Communication released a study in 2016 that measured America’s responses to climate change (figure 3), calling this concept *Global Warming’s six Americas* (Maibach, Leiserowitz, Feinberg, Rosenthal, & Roser-Renouf, 2016); categorizing responses to climate change in these six categories: “Alarmed (12%), Concerned (29%), Cautious (26%), Disengaged (7%), Doubtful (15%), and dismissive (11%)” (Maibach et al., 2016, p. 6).

On this scale, “alarmed” is at one end, denoting the group that is certain that “global warming is happening, understand that it is human-caused and harmful, and strongly support societal action to reduce the threat. They discuss the issue more often, seek more information about it, and are more likely to act as global warming opinion leaders than the other segments. They are the most likely of the six groups to have engaged in political activism on the issue” (Maibach et al., 2016, p. 6). While the largest response segment is the Concerned (29%), who are “moderately certain that global warming is happening, harmful and human-caused; they tend to view global warming as a threat to other nations and future generations, but not as a personal threat or a threat to their own community. They support societal action on climate change but are unlikely to have engaged in political activism. In 10 of 12 national surveys tracking the Six Americas since 2008, the Concerned have been the largest of the six segments” (Maibach et al., 2016, p. 6). The Cautious (26%) is the second-largest group and are “likely to believe that climate change is real, but they aren’t certain, and many are uncertain about the cause. They are less worried than the Concerned, and view global warming as a distant threat, if any (Maibach et al., 2016, p. 6). The Disengaged (7%) are the smallest response group of the U.S. population and have given the issue of global warming little to no thought with no strongly held beliefs about global warming, know little about it, and do not view it as having any personal relevance. They tend to have the lowest education and income levels of the six groups” (Maibach et al., 2016, p. 6). The Doubtful (15%) are “uncertain whether global warming is occurring or not, but believe

that if it is happening, it is attributable to natural causes, not human activities. They tend to be politically conservative and to regard global warming as having little to no personal relevance” (Maibach et al., 2016, p. 6). The Dismissive (11%) are “certain that global warming is not happening. Many regard the issue as a hoax and are strongly opposed to action to reduce the threat. About one in nine have contacted an elected representative to argue against action on global warming. Together, the three segments on the left side of the continuum – the Alarmed, Concerned and Cautious – comprised two-thirds of the American public (67%) in the spring of 2015. Although they range in certainty about the reality and dangers of climate change, they are similarly inclined to believe it is a real threat that should be addressed. Thus, some level of support for action is the predominant view among the majority of Americans” (Maibach et al., 2016, p. 6).

Dichotomies of Western Thought and Climate Change Education:

As we progress into a more climate-intense anthropogenic future, the need for education about climate change becomes more pressing. How do we frame coping strategies and actions in the context of hope, rather than extinction? Most climate-related information is presented through fear tactics, which taps into a fight or flight animal instinct, in which the general public will deny the changes happening, leading to apathy and inaction. (Lehtonen et al., 2019) states that “positive feelings and emotions activate us while negative, challenging emotions can stop us or prevent action” (Lehtonen et al., 2019, p. 351).

Lehtonen et al., (2018) present a revolutionary approach to climate change education through the idea that today’s prevailing modern thinking centers around dichotomies (figure 4). These dichotomies become more deeply ingrained in our society the further that the human species advances, becoming increasingly problematic over time. These dichotomies hold roots in the colonization of North America, and “guide our problem-solving strategies and management of life, how we relate with the world and how we perceive relationships between things” (Lehtonen et al., 2019, p. 345). This type of thinking results in separating systems that function relationally and viewing the world through an individualist lens, resulting in “linear, atomistic, fragmented thinking, ignorance of holistic relations and the exclusion of opposites from mental frames” (Lehtonen et al., 2019, p. 345). These authors suggest that this way of thinking has led to the current geologic epoch of the Anthropocene in which humans see themselves separately from nature (Lehtonen et al., 2019, p. 345). Dichotomous thinking leads to a mindset that is ambivalent to the systems that make the world function, which is concerning as we move into an era and a global environment crisis that demands solutions that function systemically.

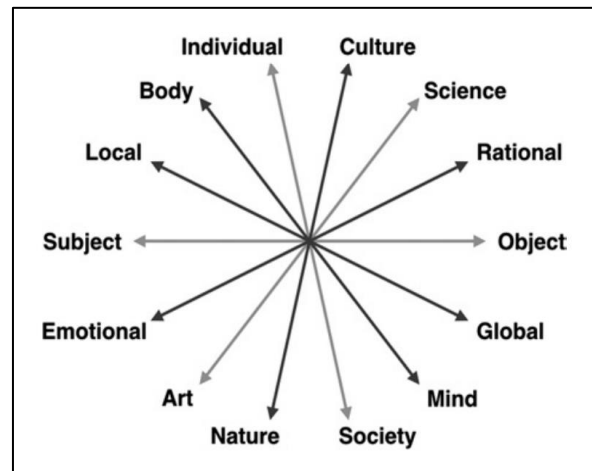


Figure 4: Problematic Dichotomies of Western Thought (Lehtonen et al., 2019)

The Conquering Narrative of the West and its Implications to Environmental Attitudes

The illusionary belief that humans exist separately from nature has led to a mindset of species supremacy and the innate human capacity to destroy and dominate other species and ecosystems. When colonizing North America, settlers invented the concept of wilderness to describe that which is not man made (Cronon, 1996). Wilderness was something that was tremendous and terrifying, to many, “wilderness, in short, was a place to which one came only against one’s will, and always in fear and trembling. Whatever value it might have arose solely from the possibility that it might be ‘reclaimed’ and turned toward human ends...In its raw state, it had little or nothing to offer civilized men and women” (Cronon, 1996, p.39). When European settlers came to North America, they were met with rugged wilderness and felt that in order to inhabit the land, it was necessary to conquer the wilderness and the beings living within it; they saw Indigenous people as part of nature, thus they felt the need to conquer them.

In many parts of western society, this narrative of domination is rooted in western spirituality: “Their religion is firmly grounded in their escape from a fallen nature, and it is highly unlikely to suppose at this late date that they can find a reconciliation with nature while maintaining the remainder of their theological understanding of salvation” (Deloria, 1994, p. 90). Western religions are based on historical events and scriptures. Their beliefs are typically rigid and unchanging. They place value on that which is tangible, technical, quantifiable, and rational—much like the dichotomous mindset that Lehtonen, et al. (2018) presents. Western beliefs tend to alienate nature and places value on that which is man-made while Native American belief systems are typically place-based and are an alive spirituality versus one that is based on historical events, like western religions. Their beliefs are based on the idea that humans are one with nature and are constantly in pursuit of harmony and equilibrium within natural systems. Native American spiritualities remind people where they come from and tend to cultivate a multi-generational connection between land and people. In these beliefs, the individual is one part of a whole and their Self is defined in their relations to others in both human and natural worlds. (Deloria, 1994)

Climate Change Education as an Anti-Dichotomous Solution for Systemic Revolution

To overcome this disconnect and rebuild a relationship with nature, it is essential for climate change education to be framed in the context of hope and collaboration. Lehtonen, et al. (2018) go on to state that “Climate change presents a peculiar problem for our emotions. In order to cope with shock, uncertainty, change and then adapt to a new situation, individuals need social support and should not be left alone when facing crises. However, there is a real danger of emotional manipulation or transference when teaching about climate change. Becoming worried about cynical and careless attitudes toward the environment can threaten an individual’s sense of security and frighten them with visions of an apocalyptic future. However, it is important that an emotional response to climate change should not be forced or coerced. The emotional response must have time and space for expression and critical reflection either individually or collectively” (Lehtonen, et al. 2018 351). They go on to argue for an educational strategy that highlights systems thinking and collaborative processes: as humans, “we care for the things to which we are personally connected. We need to experience this connection with other people and nature in order to become motivated to take care of them. Empathy promotes understanding about external realities and, therefore, enables the possibility of greater connectivity. Global awareness and

collective solutions for climate change require empathic understanding of people’s need in different localities and caring for people especially vulnerable to climate change” (Lehtonen, et al. 2018, 352).

Through this information, it is clear that collaboration and empathy are essential tools for survival and whole systems healing. They present the concept of *constructive* hope, as “the ability to see something meaningful and promising after encountering a challenging situation” and that it is the duty of educators and leaders to promote constructive hope as source of resilience in the climate crisis (Lehtonen and Välimäki 2013; Pihkala 2017, p. 352). Lehtonen, et al. conclude that climate change education applies systems thinking in order to understand how the world works, and that “according to a rational systems view, it is clear that humans are part of natural systems first, living things second, human beings third, members of society and culture fourth, and particular individuals fifth. Nature and culture should be considered as one, interrelated system. The eco-social perspective helps to understand this interconnectedness and could be applied as the basic principle for all learning and educational practices.” (Lehtonen, et al. 2018, 352).

Systems theory is a way to simplify and contextualize complex issues, especially ones that integrate social and ecological systems as one, such as climate change. It is suggested that climate change education and mindset should seek to be anti-dichotomous. Lehtonen, et al propose reframing the dichotomous mindset so that it functions as an interconnected system, which includes contrasting beliefs that set a systemic equilibrium (see figure 5). In this format, education is fueled by transdisciplinary thinking and the introduction of new pathways of dialogue. Climate change is a planetary issue, and it is essential that everyone, no matter their social identity, be educated equally in order to ensure global collaboration.

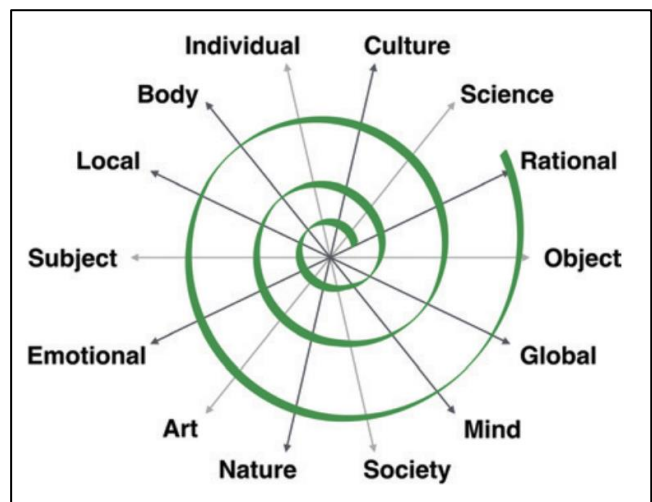


Figure 5: The Aim of Climate Change Education (Lehtonen, et al. 2019)

Sense of Place and Bioregionalism:

Sense of Place

Another strategy for fostering resilience to climate change is developing a sense of place. There is emerging research that people’s attachment to places can unlock a greater capacity to better cope with change. *Sense of place* is defined by Tuan (1977) as “the meanings and attachment to a setting held by an individual or group. As such, it is often viewed as the most encompassing core construct within associated research. Crucially, our approach to sense of place analysis emphasizes both attachment and meanings, although these concepts are sometimes conflated and greater analytical emphasis is given to place attachment than to place meanings” (Masterson et al., 2017, p. 2). Masterson et al. goes on to describe the categories of sense of place. The first is *place attachment* which is a (typically) positive emotional bond between individuals or groups and their environment. Second, there is *place dependence* which is the instrumental bond

between people and place to fulfill basic human needs, e.g. food, water, and shelter. There is also *place identity* which are the dimensions of self that define one's identity in relation to their environment. Masterson et al. continues to describe the four main qualities and factors of sense of place:

1. *Sense of place forms through experience, although this experience is not solely individualistic, but also social.*
2. *Sense of place emerges from human interactions with the biophysical environment.*
3. *Place meanings and attachment are subjective, but they vary systematically.*
4. *Patterned relationships with place help to predict specific types of behavior*

Sense of place research allows scientists to contextualize climate-related issues within social dimensions and helps researchers understand humans' ability to cope with climate change. (Marshall, Park, Adger, Brown, & Howden, 2012) describe how sense of place can inform resilience strategies for environmental problems and that place attachment may support adaptation when livelihoods are threatened by. Through adapting to climate-related changes, community structure and character of place can be retained, which may foster social resilience (Marshall et al. 2012; Masterson et al. 2017). Masterson continues to suggest that place attachment enhances adaptive capacity, proposing that social capital, local knowledge, and reciprocal networks facilitate adaptation to incremental social-ecological change.

Defining Bioregionalism

As the world becomes increasingly globalized, the necessity for *place dependence* (Masterson et al. 2017) becomes seemingly less crucial. The modern world relies on global resources and a complex interconnected capitalist-based system. Many researchers suggest that living and acting locally is a method for handling global issues such as climate change because it reduces centralizes one's impact on a local scale, supporting a local economy and members of a community.

The practice of living and acting locally is often referred to as *Bioregionalism*, a concept that was popularized in the early 1970s, coined by Peter Berg as "a geographic area defined by natural characteristics, including watersheds, landforms, soils, geological qualities, native plants and animals, climate, and weather...[which] includes human beings as a species in the interplay of these natural characteristics" (Ewert, 2002). Author, Ipsita Sarkar also brings up a holistic definition: "A bioregion is defined by both ecological and cultural factors. The ecosystems and social institutions on which one directly depends for survival and wellbeing may be understood as one's bioregion...Usually a region is defined politically, ethnically, economically or through some other man-made dimension. A bioregion is in contrast, marked out in terms of its natural features like biotic communities, watersheds, terrain etc. The boundary of a bioregion is culturally determined by the people living inside rather than any scientist, expert or political leader from the outside. Although the boundary is culturally defined, it is done so on the basis of the natural features of the region, especially the ones which are most important for the local way of life" (Sarkar & Behura, 2018).

Most bioregional knowledge of places across the United States is based on the traditional ecological knowledge of various Indigenous groups. However, it has been estimated that nearly 90% of Indigenous bioregional knowledge would be lost by 2020 (McGinnis, 2000); (Sarkar & Behura, 2018). With it would be lost the stories of places and the culture and knowledge of plants and animals. Modern bioregionalism aims to not only protect this knowledge of ecological

systems but keep alive these traditions that hold a wealth of place-based history and ideas. (Sarkar & Behura, 2018).

There have been a number of bioregionalists throughout the history and development of the United States who sought to develop the nation based on watersheds and other natural systems using ecologically based Bioregional ideas. For example, the New Deal proposal in the 1930s sought to separate the United States into major watershed basins for management of water and other resources (Berg, 1994). For a number of reasons, mainly, the rapid expansion that came with Manifest Destiny, the eradication of Indigenous groups and knowledge, the lack of colonial knowledge of North American geography, and the lack of efficiency in developing Bioregionalized infrastructure and human systems, Bioregionalism was not fully considered or implemented in the development and expansion of the United States (Ewert, 2002). Currently, the way that most human communities are designed is not based on natural systems, but rather, efficiency. Bioregional design and community development seeks to bring humans to a more harmonious existence with nature (Young, 2000). As human society advances into a more climate-intense and anthropocentric future, Bioregionalism offers an additional way to understand and analyze human systems, as well as a set of guidelines to inform developmental, political, economic, and environmental decisions (Ewert, 2002).

Taylor presents the concept of countercultural bioregionalism with two central ideas: 1). People within an ecological region can better care for and build sustainable lifeways, due to knowledge of ecological concepts and systems of that place, than those who are not familiar with that region. 2). For people to get to that level of understanding, modern human society needs to restructure and reorient its value system in relation to land. (Taylor, 2000)

Light presents two distinct concepts within bioregionalism: liberal bioregionalism and communitarian bioregionalism. Communitarian bioregionalism (CB) argues that bioregionalism is a personal commitment to a particular bioregion, CB individuals are committed to that place, its values, and the project of making it better. Liberal bioregionalists embody bioregionalism as a set of principles for living. Rather than committing to one specific place. Liberal bioregionalists embody bioregionalism in their everyday actions, no matter where they live or their degree of attachment to a place (Light, 1998). Sarkar also presents two key terms central to the concept of bioregionalism: reinhabitation and identification. Reinhabitation refers to the process of becoming native to a life place, a key component of which is “applying for membership in a biotic community and ceasing to be its exploiter” (Sarkar & Behura, 2018, p. 179). This means forming relationships within an ecological community Identification means being able to identify one’s self in a landscape and treat the ecosystem with such respect (Sarkar & Behura, 2019).

Sarkar states that one of the likely causes of environmental degradation is the increasing distance between humans and nature. Changes in labor, farming techniques, the industrial revolution, and technological advancements all contributed towards this shift. This distance led to a psychological dissociation, in which human beings regard themselves as separate from and superior to nature (Sarkar & Behura, 2019). Ecocentric identity approaches, such as bioregionalism, invite humans to understand that they are not only a part of these systems but more so, are an integral component within the interlinked web of nature (Bretherton, 2001).

Pragmatic Bioregionalism in Socio-Ecological Systems

A bioregion, or a Sense of Place, is a transdisciplinary concept that is formed through both environmental and social experiences, meaning it is an aspect of a socio-ecological system (Masterson et al., 2017). There are a number of ways to foster a sense of place and develop a socio-ecological community that is based on bioregionalism. McGinnis states that globalization is one of the main factors in inhibiting participation in bioregions: “Community-based relationships and partnerships are reconfigured during global industrialization. The ideals of growth and mobility support globalization at the expense of a relational mode of being” (McGinnis, 2000, P. 84). Bioregionalism is important for re-establishing connections between humans, communities, ecosystems, and landscapes; to achieve this, McGinnis states that “bioregionalists have to create or invent their own ways of connecting, unifying, and participating in a community of place” (McGinnis, 2000, p. 84). This can be done in a number of ways.

A major aspect of bioregionalism is ecology. As Berg highlights: the borders of bioregions are not as hard-set as geopolitical boundaries. They follow watersheds, animal migration paths, ecosystems, and a number of other naturally based systems (Berg, 1994, p. 59). They do not follow the borders of towns, counties, states, or even countries that were arbitrarily imposed on much of North America during colonization. Salazar brings up the role of bioregionalism in border politics, by stating that “Bioregionalists challenge us to think outside of existing political borders, to link jurisdiction to cohesive cultural and ecological places, and to employ democratic means to define those places” (Salazar & Hewitt, 2001, p. 303). Many border laws, especially the ongoing controversy of the US/Mexico border, which she states is problematic from a bioregional perspective. She then goes into immigration politics and colonization from a bioregional viewpoint; stating both are historically and presently controversial.

One of the main aspects of a socio-ecological bioregional system is food systems. A bioregionalized food system is one that relies on the local and environmentally conscious production of food. The Community Supported Agriculture (CSA) model, is an example of a bioregionally-minded low impact food system. This model allows consumers to participate in local agriculture by purchasing a share of one season of a farms produce (Hvitsand, 2016). CSAs not only provide opportunity for access to local foods, they also support consumers in developing a bioregional food system and provide a sense of community grounded in a connection based on land (Macias, 2008).

Bioregionalism can also be implemented in government because “cities are fast approaching an era when limits on consumption of bioregional resources will play a primary role in deciding municipal policies and practices” (Berg, 1994, p. 60). Garmestani introduces the concept of resilience-based governance of socio-ecological systems. The author states that fostering an environmentally-conscious political system based on the stewardship of ecosystems is more likely to be resilient in the face of climate change, and that “environmental management is more likely to succeed when governance is tuned to the social-ecological systems it manages” (Garmestani & Benson, 2013). Resilience-based governance is based on panarchy, adaptive management, adaptive governance, and reflexive law (Garmestani & Benson, 2013).

The practice of Bioregionalism can also be implemented in the economy by focusing on localism. Currently, “the global economy is driven by growth, and the consumption ethic that matches this is one of expansion in range and quantity” thus, the market is driven to produce a

wide range of globally sourced goods (Cato, 2011). In opposition to this, “the bioregional approach challenges every aspect of that value system. It seeks a new ethic of consumption that prioritizes locality, accountability and conviviality in the place of efficiency, expansion and profit. Bioregional production and exchange should take place within a co-operative framework, more akin to community-based food initiatives” (Cato, 2011). However, localism within the economy is a neoliberal approach to systemic reform. Lethtonen et al. (2018) state that “Capitalism necessitates and provokes competition between individuals. Our current mode of capitalism, neoliberalism, drives for maximum profit above all other considerations, which leads to ever greater individualism and competitiveness. A competitive global culture that works toward economic efficiency and productivity works against pursuit of the common good. Individuals are driven to compete for power and ownership and are expected to sell everything, even their thinking and identity. When valuing things mainly instrumentally or with money, even meaningful things such as relationships become meaningless; joy becomes diluted as nothing is sufficient” (Lehtonen, et al. 2018, p. 354). Capitalism is one of the key factors fueling human growth and industrialization, and, ultimately, has sparked the turning of a new epoch in which humans are considered dominant. Moving into the Anthropocene, it is essential to foster steady-state, anti-growth, small-scale alternatives based on localized actions and economies.

Neoliberalism and Exclusivity of Bioregional Living: Critiques of the Movement

While Bioregionalism offers many helpful solutions and ideologies to assuage the impacts of climate change, it also has a great capacity to exclude due to the fact that many environmental choices are not on a systemic scale and are based on individual choices that are often grounded in privilege; this concept is called Neoliberalism. Neoliberalism urges consumers to choose locally based economic alternatives rather than invite citizens to reform or even transform the system itself (Mares & Alkon, 2011).

Crouch presents the two fundamental arguments that Neoliberalism and free market theory, are based on: “markets are the most efficient mechanisms for achieving human ends and that states and markets need to be kept separate from each other”(Crouch, 2012). Neoliberalism tries to prove that the government is inefficient at meeting the needs of citizens, and that we should depend on corporations for systemic change(Crouch, 2012).

There are aspects of the bioregional movement that do not have neoliberal qualities, for example its implementation in government and policy, as Garmestani touches on when introducing resilience-based governance (Garmestani & Benson, 2013). However, most other aspects of bioregionalism rely on consumer and market-based actions such as encouraging local food consumption and production (Hvitsand, 2016; Macias, 2008), fostering environmentally-based communities (McGinnis, 2000), and shifting the economy so it is more focused on localism (Cato, 2011).

Schroeder presents further critiques of the bioregional movement: “Critics of bioregionalism claim that it is uncritically grounded in a rudimentary or pretechnological romanticism, coupled with the unsupported thesis of a natural homeostasis, and naïve in its desire, hope, and even expectation that people, especially in technologically developed countries, will relocate from urban to rural areas, practice low-tech sustainable agriculture, and eschew global travel” and that “the bioregional proposal is often subject to the criticism that it is nothing more than a simplistic version of social anarchy or chaos that blinds itself to the concrete social, economic, and political realities” ” (Schroeder, 2000). While some may argue that

Bioregionalism is an unrealistic and idealistic concept, many others state that it has immense value in restructuring society to be more resilient to climate change.

Bioregionalism as a Climate Change Solution

Despite its challenges, many believe that bioregionalism and sense of place refer to the necessary systemic change to increase adaptability while moving into a more climate-intense future. Masterson states that “sense of place is considered as a motivation for stewardship and actions to care for the environment; it is also presented as a cognitive and emotional variable that mediates how people respond to social-ecological change”(Masterson et al., 2017). Andrew states that “an overwhelming body of scientific evidence points to considerable changes in earth’s atmosphere, surface materials and processes, and species distributions (including extinctions) associated with human activities and their unintended consequences in the last two hundred years and particularly since the first atomic bomb explosion in 1945”(Andrew, 2016). This climate-intense future can be categorized as the *Anthropocene*. The Anthropocene is a term introduced by Andrew as “a division in the geological periodization of earth’s history that separates the current time of global human impacts on the planet’s environmental systems from the Holocene, the most recent geological epoch that spans approximately the last ten thousand years” (Andrew, 2016). This shift in epochs signifies the irreversible and systemic impact of humans on the planet. It is a term that warrants new relationships between how humans relate to the planet and indicates the domination of the human species on natural systems.

There are many ways to address and cope with the consequences of the Anthropocene. Resilience is the capacity of a complex system to absorb shocks and remain within a regime in the face of external disturbance and change (Garmestani & Benson, 2013). Kuecker and Hall state that the key to surviving systemic collapse is to mitigate the severity cyclical disturbance by enhancing system resilience, “the more complex systems become, especially in the conservation phase, the less resilient they are” (Kuecker & Hall, 2011). Meaning that the hyper-globalized modern world, an intricate and complex system, is not in fact resilient. In a globalized world, small communities hold resilience as well as the power to engender systemic reformation (Kuecker & Hall, 2011). Kuecker and Hall state that there are three major paths to a more resilient society: “The first offers a continuation in our faith in modernity and its conservation phase, especially its paradigm of science and technology. The second path of non-capitalist, autonomous, small-scale, subsistence communities has demonstrated amazing resilience in a harsh world, one to a world that the conservation phase has often attempted to eliminate. The third path generated in semi-peripheral areas has two possible outcomes. First, we have shown that its informality is a remarkable emergent property that offers potential for resilience in collapse. As the system comes apart, humanity will increasingly rely on informality for survival. Yet, we have shown that informality is a significant factor in sustaining the overshoot of the conservation phase and may not be a sustainable solution to the problems we face. We also question if a release phase informality will bear resemblance to the community social scientists now theorize, and if the terms of its existence are even possible in a post-conservation phase world” (Kuecker & Hall, 2011). Reyers, et.al (2018) conclude that there is a deep need for diverse values and beliefs that align with the dynamic connections between social and ecological systems (Reyers, Folke, Moore, Biggs, & Galaz, 2018). This will contribute to the overall resilience of a socio-ecological system and its abilities to absorb disturbance in the Anthropocene. While bioregionalism may be one solution for handling the impact of the

Anthropocene, strategies for sustainability have no “one size fits all” approach. Complex systems are diverse and intricate, meaning it may take many different methods to develop systemic adaptability and resilience (Reyers et al., 2018).

Systems Theory

The power of holistic thinking:

Based on the previously presented research, it is clear that climate change is a social and environmental issue because Earth’s environment is one of the most interconnected system within our realm of understanding. In order to understand and mitigate human impact on the natural world, it is essential to understand the systems that make it function. Daniel Christian Wahl (2002) states that “the only way is to start thinking about the universe is as a conversation, as a community of beings in interaction with each other, so each organism is acting and existing within the context set by all other organisms. ... This is why we need the metaphor of organism. An organism is both relationable and it has a certain integrity and identity” (Wahl, 2017). Other scholars in systems theory, such as Frances Moore Lappé (2014) describe the importance of contextualizing and understanding social issues by funneling through an ecosystems lens: “Since ecology is all about interconnection and unending change, creating patterns of causation that shape every organism and phenomenon, “thinking like an ecosystem” for me means living in the perpetual “why.” It’s keeping alive the two-year-old mind that accepts nothing simply as “the way it is” but craves to know how something came to be. It’s understanding that all organisms emerge with specific potential, including the human organism, but its expression is enormously shaped by context” (Lappe, 2014). At its core, the human social system holds foundations in ecosystemic processes, it functions just as any other system, in loops and cycles of disturbance that cause shifts in its basic function.

Systems Theory: a launching point

Systems theory is a crucial method of understanding the way the world functions. It is the language that merges ecological and social systems into socioecological systems. Systems theory is also a way to simplify complex ideas into a more understandable framework.

Donella Meadows (Meadows, 2009) states that “Systems thinking leads to another conclusion—however, waiting, shining, obvious as soon as we stop being blinded by the illusion of control. It says that there is plenty to do, of a different sort of “doing.” The future can’t be predicted, but it can be envisioned and brought lovingly into being. Systems can’t be controlled, but they can be designed and redesigned. We can’t surge forward with certainty into a world of no surprises, but we can expect surprises and learn from them and even profit from them. We can’t impose our will upon a system. We can listen to what the system tells us, and discover how its properties and our values can work together to bring forth something much better than could ever be produced by our will alone” (Meadows, 2009). Systems are inherently unpredictable and ever evolving, they are not something that humans should have control over, which is why the shift to the Anthropocene provokes concern. Rather than trying to control systems, Meadows suggests the concept of “dancing with systems” in order to flow with them:

1. *Get the beat.*
2. *Listen to the wisdom of the system.*
3. *Expose your mental models to the open air.*
4. *Stay humble. Stay a learner.*
5. *Honor and protect information.*
6. *Locate responsibility in the system.*
7. *Make feedback policies for feedback systems.*
8. *Pay attention to what is important, not just what is quantifiable.*
9. *Go for the good of the whole.*
10. *Expand time horizons.*
11. *Expand thought horizons.*
12. *Expand the boundary of caring.*
13. *Celebrate complexity.*
14. *Hold fast to the goal of goodness.*

Contextualizing systemic functions in the lens of ecosystems is an important way of viewing life on earth and understanding the innerworkings of both human and environmental communities. Michael K. Stone (Stone, 2012) brings to light how one might frame all systems within ecological principles.

These principles include:

- *Networks*
 - *All living things in an ecosystem are interconnected through networks of relationship. They depend on this web of life to survive. For example: In a garden, a network of pollinators promotes genetic diversity; plants, in turn, provide nectar and pollen to the pollinators.*
- *Nested Systems*
 - *Nature is made up of systems that are nested within systems. Each individual system is an integrated whole and—at the same time — part of larger systems. Changes within a system can affect the sustainability of the systems that are nested within it as well as the larger systems in which it exists. For example: Cells are nested within organs within organisms within ecosystems.*
- *Cycles*
 - *Members of an ecological community depend on the exchange of resources in continual cycles. Cycles within an ecosystem intersect with larger regional and global cycles. For example: Water cycles through a garden and is also part of the global water cycle.*
- *Flows*
 - *Each organism needs a continual flow of energy to stay alive. The constant flow of energy from the sun to Earth sustains life and drives most ecological cycles. For example: Energy flows through a food web when a plant converts the sun's energy through photosynthesis, a mouse eats the plant, a snake eats the mouse, and a hawk eats the snake. In each transfer, some energy is lost as heat, requiring an ongoing energy flow into the system.*
- *Development*

- *All life — from individual organisms to species to ecosystems — changes over time. Individuals develop and learn, species adapt and evolve, and organisms in ecosystems coevolve. For example: Hummingbirds and honeysuckle flowers have developed in ways that benefit each other; the hummingbird's color vision and slender bill coincide with the colors and shapes of the flowers.*
- *Dynamic Balance*
 - *Ecological communities act as feedback loops, so that the community maintains a relatively steady state that also has continual fluctuations. This dynamic balance provides resiliency in the face of ecosystem change. For example: Ladybugs in a garden eat aphids. When the aphid population falls, some ladybugs die off, which permits the aphid population to rise again, which supports more ladybugs. The populations of the individual species rise and fall, but balance within the system allows them to thrive together.*

These ecological principles that Stone introduces provide an understanding and a launching point as to how systems theory may inform understanding and action. Other systems thinkers, such as the renowned Fritjof Capra (Capra & Luisi, 2012), provides other ways of understanding the way systems function:

- *From parts to the whole*
 - *With any system, the whole is different from the sum of the individual parts. By shifting focus from the parts to the whole, we can better grasp the connections between the different elements*
- *From objects to relationships*
 - *In systems, the relationships between individual parts may be more important than the parts. An ecosystem is not just a collection of species but includes living things interacting with each other and their nonliving environment. In the systems view, the "objects" of study are networks of relationships*
- *From objective knowledge to contextual knowledge*
 - *Shifting focus from the parts to the whole implies shifting from analytical thinking to contextual thinking.*
- *From quantity to quality*
 - *Western science has often focused on things that can be measured and quantified. It has sometimes been implied that phenomena that can be measured and quantified are more important—and perhaps even that what cannot be measured and quantified doesn't exist at all.*
 - *Some aspects of systems, however, like the relationships in a food web, cannot be measured. Rather, they must be mapped.*
- *From structure to process*
 - *Living systems develop and evolve. Understanding these systems requires a shift in focus from structure to processes such as evolution, renewal, and change.*
- *From contents to patterns*
 - *Within systems, certain configurations of relationship appear again and again in patterns such as cycles and feedback loops. Understanding how a pattern works in one natural or social system helps us to understand other systems that manifest the same pattern. For instance, understanding how flows of energy affect a natural ecosystem may illuminate how flows of information affect a social system.*

Systems theory can also be used and explained using visual metaphors. In the book *Resilience Thinking* Walker and Salt (2006) present the *ball in the basin* (figure 6) to explain the concept of system thresholds. Crossing a threshold is an important part of any system and its development. It is a point of no return. Crossing points that have the potential to alter the future of many of the systems we depend upon and we often are not aware of them until they have been crossed. The ball in the basin metaphor can describe crossing a threshold. The ball represents the combination of the amounts of each of the variables the system currently has, or, the current state of the system. The ball is always striving for equilibrium; however, the state of equilibrium is constantly shifting, or in ecological terms, the external conditions impacting an ecosystem are constantly shifting. Resilience is the capacity of the ball to not shift into a new basin, or regime. The question is: how much change can occur without the system leaving the basin.

When the system enters a new regime, it has crossed a threshold and experienced a shift in its intrinsic function. Complex adaptive systems are able to remain in a regime longer because they are able to adapt to variant conditions, however, every system has a threshold that holds its leverage point. Thresholds and regime shifts can be positive or negative for a system, however, they are uncontrollable, unpredictable, and necessary for systems to evolve. (Walker, Salt, & Reid, 2006, p. 53)

The ball in the basin metaphor can be used to explain changes in any system, but it is especially relevant when referencing the shifts in Earth's epochs. The Earth moves through different regimes as time progresses, each regime, or epoch, being distinctly different and characterized by shifts in its basic function, the members of the system, and the environmental influences that impact the system. Each regime is neither bad nor good, it is merely different and has different implications for the future of the Earth. Moving back to the stability landscape that was presented in the first section (see figure 7) this metaphor of the ball in the basin becomes especially relevant. The

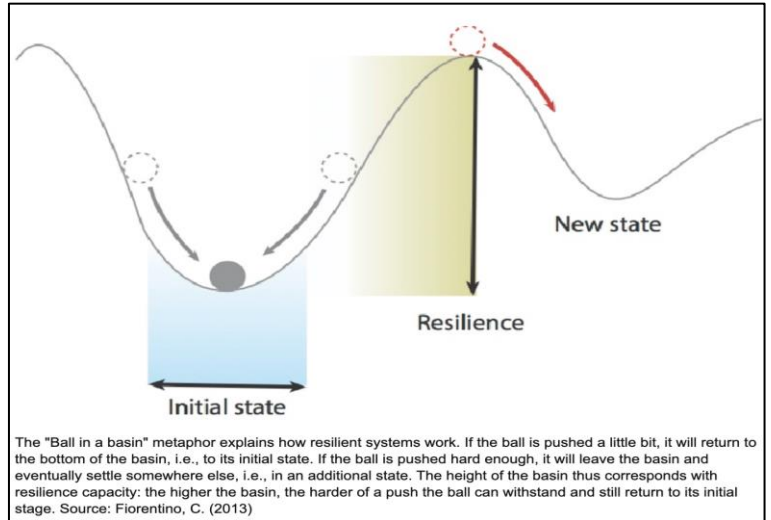


Figure 6: The Ball in the Basin (Fiorentino, 2013)

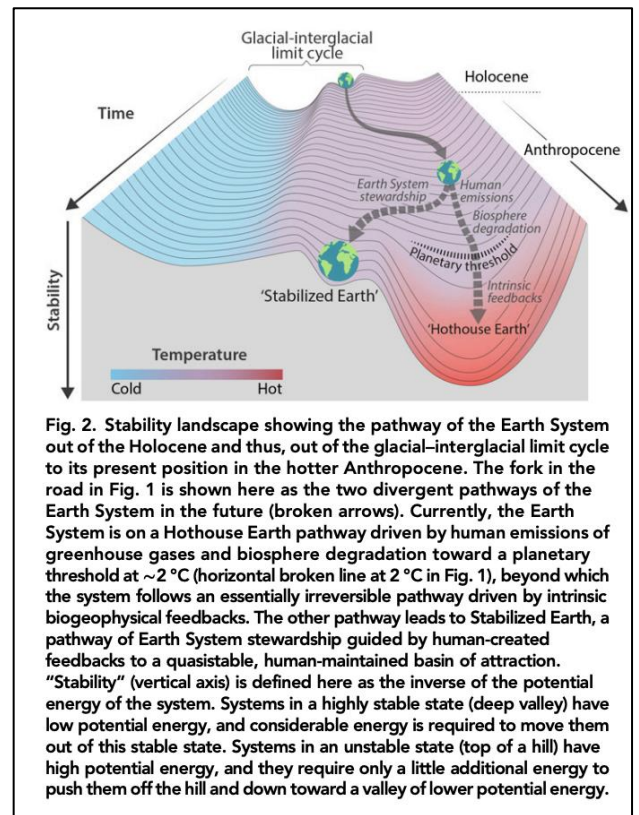


Figure 7: Stability Landscape of the Anthropocene (Steffen, 2018)

Earth is the ball and the shifts in regimes are the transitions of epochs. Currently, the Earth is exiting the threshold between the Anthropocene and the Holocene.

We are at the point where systemic resilience occurs, and the human species is asked to redefine its basic function in order to not slip into a regime shift that will continue to cause extinction and harm to the Earth.

Emergent Strategy and Panarchy

The concept of emergent strategy applies hope to systems theory. Emergent strategy is defined by Peggy Holman (2010) as “order arising out of chaos” or, to go more in-depth, “higher-order complexity arising out of chaos in which novel, coherent structures coalesce through interactions among the diverse entities of a system.

Emergence occurs when these interactions disrupt, causing the system to differentiate and ultimately coalesce into something novel” (Holman, 2010). Emergence is the reaction and capacity of chaos to create a novel system with redefined values and functions. Adrienne Marie Brown (2017) states that “emergent strategy is a way that all of us can begin to see the world in life-code—awakening us to the sacred systems of life all around us” (Brown, 2017, p. 2) she further states that “emergence notices the way small actions and connections create complex systems, patterns that become ecosystems and societies” (Brown, 2017, p. 3). Emergence is where we come from and emergence is where we are going; we are a world defined by emergence. The path to emergence necessitates a systemic awakening to the reality of climate change. It will force the human race to abandon the current mindset of industrial growth, capitalism, and individualism, for these are the values that led to the state of the Anthropocene.

An approach to this transition embodies the philosophy of *panarchy*. Panarchy theory is “a systems-thinking adaptation of ecological and complexity theories that is used to explain “the evolving nature of complex adaptive systems” (Holling, 2001). It is a cycle that has an emergent function, continuously emitting novel systems as it evolves. Figure 8 shows the basic cycle of a system, involving potential and connectedness to describe the cycle of exploitation, conservation, release, and reorganization. Figure 9 shows the

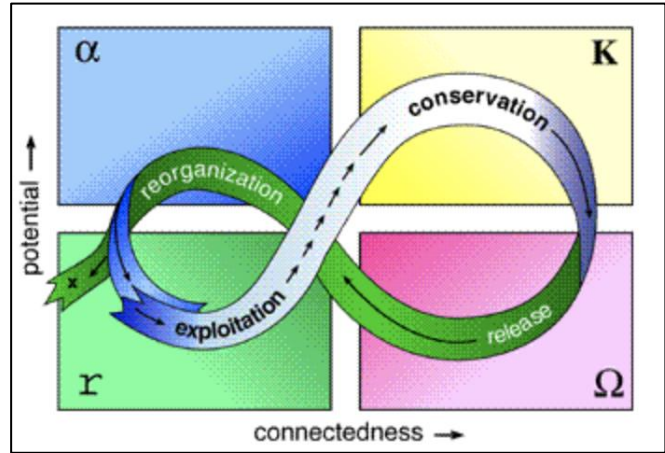


Figure 8: *The Functioning of a System: Gunderson, Lance and C. S. Holding. Panarchy: Understanding Transformations in Human and Natural Systems. Washington: Island Press, 2002.*

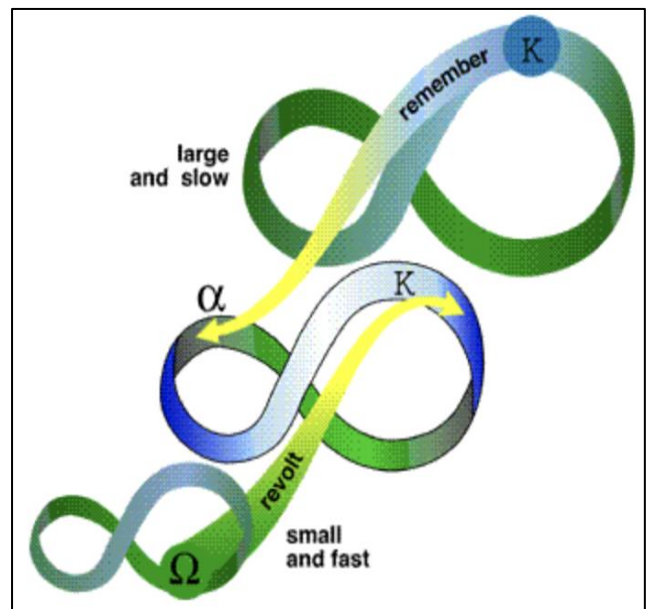


Figure 9: *Levels of a System Gunderson, Lance and C. S. Holding. Panarchy: Understanding Transformations in Human and Natural Systems. Washington: Island Press, 2002.*

evolving and ongoing structure of panarchy, in which (similarly to the ball in the basin metaphor) contains different regimes that build off of one another but are distinct in their differences.

Emergence and Panarchy are essential tools for transitioning to the Anthropocene. They provide context for understanding large scale problems, and for formulating large scale solutions. They provide an additional tool for communicating complex information about climate change, ecology, and society. Climate change is an issue that impacts every living thing on the planet, in order to form resilience in this transition, holding an in-depth knowledge grounded in systems and in place-based connection will guide the world through this regime shift, in an inclusive and equitable way.

Art in the Anthropocene

A key component in the transition to the Anthropocene is a clear, multi-level, anti-dichotomous method of communication. Lehtonen et al (2019). state that “for combatting climate change, there is an urgent need to unleash the artistry, creative potential and emotionally engage every human-being in visualizing and acting out a vision of sustainable well-being. Arts can transform apathy and grief into joy and empowerment and bridge the gap between theory and practice. The concepts of sustainable development or a sustainable future can be re-embedded into the world and the practice of living by art-based learning. Arts can offer a space and provide means for the critical issues of climate change education through emotional involvement, personal meaning making, critical thinking, active agency and creative visioning. Arts widen the traditional ways of knowing as the rational, intuitive and embodied knowing are naturally co-operating and integrated in arts-based learning processes. Rational thinking can be enriched with imaginative, un- and preconscious material and, vice versa, scientific knowledge can serve as inspiration for artistic learning and investigative processes. Different artistic approaches and art-based methods can play an essential role in enabling education to support the cultural transformation necessary to achieve sustainability.” (Lehtonen et al, 2019, p. 358). In the Anthropocene, a problem unlike any other we have faced as a society, having this type of novel discourse remains essential.

Objectives:

The central question, grounding my research and ideas is: How I can I translate complex information about systems theory, climate change, and sense of place so that they are easier for the general public to understand and use as a tool for coping with climate change?

The objective of this thesis is to explore complex ideas related to the environmental crisis, systems theory, resilience thinking, sense of place, history, climate change, bioregionalism, emergent strategy, panarchy, deep time, and communication to better understand the rapidly evolving issues of the Anthropocene. A central goal of this project is to foster new pathways of dialogue about environmental topics through art-based communication.

This thesis takes the form of a book proposal for a graphic novel that addresses these topics. A central objective of this project was to challenge myself to start a long-term creative project that combines my academic and artistic interests with my personal experiences. The end goal of this thesis was to have a prepared book proposal and manuscript that can be sent to publishers. Once printed, the book may be used as an educational tool to communicate topics about the environment through research-based writing and personal scholarly narrative.

Methods:

Methods for Initial Phases of the Project

My project first began in March 2019 when I submitted a proposal for the Ian A. Worley Award through the University of Vermont Environmental Program (Appendix D). In this proposal, I outlined what would eventually become this thesis, with the singular goal of starting a graphic novel. I was relatively unsure of the topics I would address; however, I knew the project would develop significantly over the course of the year.

Around the same time that I completed the proposal for this project, I began doing research through reading primary and secondary sources that included content such as systems theory, resilience thinking, ecological perception, eco-pragmatism, eco art, bioregionalism, and the Anthropocene. These books, some of which I only read sections of, include: *Emergent Strategy* by Adrienne Maree Brown, *Resilience Thinking: Sustaining Ecosystems and People in a Changing World* by Brian Walker and David Salt, and *Radical Ecology: The Search for a Livable World* by Carolyn Merchant. I also read literature-based texts that center around the concept of sense of place and human-nature relationships. These books included *The Overstory* by Richard Powers, *Braiding Sweetgrass* by Robin Wall Kimmerer, *When Women Were Birds: 54 Variations on Voice*, *Refuge: An Unnatural History of Family and Place*, *Red: Passion and Patience in the Desert*, and *Erosion: Essays of Undoing*, all by Terry Tempest Williams. Also included in my reading list were sources that speak to artistic discipline, specifically within comic arts. These texts include *Asterios Polyp* by David Mazzucchelli, *Unflattening* by Nick Sousanis, *You and a Bike and a Road* by Eleanor Davis, and *Autobiographical Comics: Life Writing in Pictures* by Elisabeth El Refaie. My research has also included articles from The Center for Ecoliteracy and Transformative Inquiry. I have also been inspired by audiobooks, podcasts, and videos which include: *For the Wild Podcast*, videos from the *Stockholm Resilience Center*, as well as Anna Tsing & Donna Haraway's: *Tunneling in the Chthulucene*. The completion of this research took course over the last year and has been the primary influences and sources of information from which I gleaned.

Faculty Assistance and Methods for Developing Academic Content

In the fall of 2019, I took the course, *ENVS 201: Research Methods* which helped me solidify the bulk of the academic content for this project. In this course, I learned the elements that go into writing a thesis, I completed several drafts of proposals, I learned how to properly cite, and I wrote the first draft of the literature review that is now in this thesis.

Throughout this project, I also met weekly with one of my advisors, Cameron (Cami) Davis, who helped develop my project's content, direction, and visual language. Although Cami is a visual artist, her primary aid was in helping me dissect and dig deeper into these topics by suggesting additional readings, scholars to research, videos to watch, and artists to search for. We met nearly every week and maintained consistent communication from October 2019 to February 2020. This phase was recorded via note taking and making mind maps that included topics and visuals (Appendix H & I).

Working with Cami and taking *Research Methods* helped me define the three main topics I wanted to address: The Anthropocene, Sense of Place, and Systems Thinking. These sections arose from many drafts of proposals and conversations with various people. My original idea was a graphic novel titled "Coming of Age in a Changing Climate" (Appendix D) which would touch on my experiences as a young person only knowing a world impacted by human-caused climate change. The drafts between then and now have included writing about farming cooperatives, indigenous studies and post-colonialism in Vermont, and the broad concept of resilience. These drafts have all helped me form my current vision, a project that touches on many of these themes. My work with Cami and in my course also helped me define the central goal of this project: making discourse surrounding climate change more accessible, interesting, personal, relatable, and easily communicated.

Methods for Drafting Manuscript

The creative phase of my project kicked into gear in early March 2020. This is largely due to the combination of two experiences: taking a ten-day trip to America's Southwest and experiencing the beginning of the COVID-19 Pandemic. Before this time, I was feeling relatively uninspired and unsure of the direction of this project. My travels in the Southwest allowed me to tap into a well of inspiration that I first experienced while traveling there for two months during the Spring of 2019. During this time, I traveled with the Wild Rockies Field Institute, which is where I first learned about resilience thinking, systems theory, and many of the other topics I discuss in my project. This experience is also where I first interacted with desert landscapes which is where I feel one of my deepest senses of place. Because of my recent travels, I was able to once again access this inspiration which truly fueled the creative phase of my project.

The COVID-19 Pandemic was also a major source of inspiration for writing my manuscript. In my lifetime, I have been fortunate to have never seen or lived in times of chaos and collapse. However, much of my project discusses the idea of collapse in relation to climate change and the Anthropocene as a turning point of human action. The pandemic, although unrelated to climate change, has helped me understand these topics in a new way and has provided the lived experience of systemic collapse, allowing me to better understand the potential course of the Anthropocene as well as societal reactions to systemic collapse. The

pandemic has impacted every level of human systems and truly shown us how fragile we are. It has also shown us that change is possible.

I returned to Vermont the same day that the pandemic was declared by the World Health Organization and mandatory shelter in place laws were enforced. This gave me ample time to immerse myself in writing my manuscript (Appendix B) and begin to map out my images. I based my manuscript off of my literature review, using the same outline, but simplifying sections that were too dense. I also inserted personal vignettes that I either wrote for the project or pulled from previous journals or writing assignments. I reflected deeply on how I truly feel about these theories and how they directly apply to the personal and collective issues of the Anthropocene. Working on my manuscript throughout the two months of social distancing was incredibly cathartic and helped me process what was happening in the world.

Methods for Image Making

Once I finished the manuscript and my advisors reviewed it, around April 1, I began the process of story boarding. I printed out my manuscript and read through it. Any time an image or idea popped into my mind, I sketched it in the margins of the page (Appendix E). After this, I made a grid in my notebook, numbered the pages, and made a thumbnail sketch of the layout of each page to form a story board of the first chapter (Appendix F). I also compiled a vast array of images from which I drew inspiration (Appendix K).

Before transitioning to my iPad to begin drawing, I designed two fonts that I could use for typing my manuscript into my drawing documents. For this, I used a website called *Calligraphr* which allowed me to design two full alphabets and number sets that I then imported into my drawing application, ProCreate.

Once I moved to working on my iPad, I took a photo of each thumbnail, imported it into my drawing app, typed the font that belonged on that page, roughly traced the photo of my thumbnail sketch, and then began building up my images (Appendix G). Each page would take anywhere from twenty minutes to seven hours to complete, depending on the complexity of the image. I spent a total of 51 hours and 9 minutes drawing the 20-page sample chapter (Appendix C), averaging 3.2 hours per page.

Methods for Finalizing Work

After finishing the first chapter, I drafted a book proposal (Appendix A) to send to publishers that includes an introduction to the book, the premise, a unique proposition, a manuscript overview, status, market, comparables, information about myself as the author, my writing history, my personal marketing strategy, a book outline, and chapter synopsis. The goal of this step was to solidify a plan to move the project forward after submitting it as a thesis. Writing a book proposal will allow me to follow a trajectory if I end up wanting to get *The Geography of Home* published. After completing my book proposal, I compiled all of my materials into this document, wrote an abstract, introduction, table of contents, acknowledgements, methods, results. Finally, I organized the appendices and inserted the finished drawings.

Results:

The final results of this process include a literature review, a manuscript, a book proposal, and an illustrated sample chapter. The literature review covers all academic material addressed throughout the project. Any idea that I wanted to have in my manuscript was thoroughly researched and analyzed in the literature review section, which then informed writing the manuscript, and provided academic support to my ideas. The manuscript introduces and explores personal narratives as they relate to the academic topics introduced from the literature review. The book proposal summarizes the manuscript and outlines a strategy moving forward for publishing the book once the illustrations are complete. The 20-page illustrated sample chapter shows what the drawings will look like once the book is finished.

Takeaways:

Completing this thesis over the course of the last year has undoubtedly been my most significant and challenging learning experience. More than anything, I believe this thesis was about discovering a process and allowing space for my project to grow and shift over time.

When I first began this process one year ago by applying for a grant, I expected myself to come out of this project with a long form, printed graphic novel. Many people told me that this goal might be too ambitious for a project that was only meant to span one academic year. It took me a long time to realize that it was more important and attainable to have a solidified, research-based understanding of these topics in order to produce quality writing that would then inform my final drawings. This process would then allow me to formulate a cohesive structure moving forward. Because of this, I generated far fewer images than I expected and mainly focused on the research and writing elements of this thesis. I still wish I was able to create more images, but I am excited to move forward with this project after I graduate when I will have enough time to contemplate and produce high-quality artwork.

Through this process, I also learned how important it is to start projects with flexibility and openness to change, as well as a central message and goal. I initially wrote a proposal that described the process of writing a graphic novel, but I had not yet defined *why* I wanted to write a graphic novel, the purpose it serves as a thesis, and the central message I wanted the project to have. I did not know what I wanted to research or include in the book, or the final form that I wanted it to take. Figuring these things out took a long time, which pushed the process of writing my manuscript and generating images towards the tail end of my project. If I were to complete this project again, I would start with clearly defined topics to address rather than trying to start by creating images (Appendix J); I quickly realized I could not make images for this project without writing to support them. However, once I figured out the order that made most sense moving forward, I was able to define my goals more effectively and begin working through the project.

As I complete this phase of this project, I feel that I've gained substantial knowledge not only in the topics I have addressed, but also in my process as an academic and creator. A year ago, when I began the initial phases of this project, I did not know very much about many of these topics. Through personal experiences, reflection, and a lot of time spent researching; I feel that I now hold a holistic understanding of climate issues as well as how to communicate the complex and emergent aspects of the Anthropocene. As a writer, I feel that my voice has grown louder as I've exercised both my academic and creative writing skills. I feel that I've clearly

connected these topics with my experiences, and I ask the readers intriguing questions that encourage them to reflect on their relationship with climate change.

Most centrally, I have learned about the immense importance of communication when talking about these issues. The more writing and research that I did, it became more apparent that many of these topics tended only to be communicated within academic and scientific communities. As my project evolved, its central goal changed to focus more heavily on why a variety of discourse surrounding climate change is so important. By writing a graphic novel, I feel that I'm introducing another voice to the climate movement and using art to bring in a new perspective. I hope for my work to be a catalyst for other people to understand and ponder their own relationship with climate change and how it falls within the historical, cultural, and environmental context of the Anthropocene.

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APPENDIX A : BOOK PROPOSAL

THE GEOGRAPHY OF HOME

Systems Awareness in a Changing World

By Eleanor B. Connolly

Book Proposal

May 1, 2020

Introduction:

I grew up watching the world change around me. I was only sixteen when I learned about the Anthropocene, a new geologic epoch solely dedicated to the long-lasting impact that the human species has had, and will, have on the world. It was then that I realized that climate change will be the defining narrative of my generation and many to come.

I have been fortunate to grow up and learn in settings that encouraged dialogue surrounding climate change. I've spent my entire higher education learning about the warming world and its intertwinement with human systems. Not everyone has had this experience; many still view climate change as a distant reality. I believe that a large part of this disinterest and poor education is due to the lack of accessible communication and information relating to climate science. Through this book, I hope to provide another form of communication for climate-related issues and complex topics such as the Anthropocene and systems thinking.

Images, paired with words, have the remarkable power to tell a holistic story. For me, the place where art and words most meaningfully collide is in graphic novels. Throughout my life, I have always been intrigued by comic arts, most specifically, graphic memoirs. This genre has the capacity to explore experience, insight, and identity in the context of a personal narrative. Within this genre, I believe there are countless tools for visual communication and opportunities for layered storytelling that simply are not possible in solely written language. Graphic memoirs give the author the agency and ability to illustrate their own viewpoint in a distinctive way. It is my dream, as an artist and writer, to produce a piece of work as profound and impactful as the graphic novels that I have spent my life reading.

When I realized I wanted to complete a thesis, I knew I wanted to create something that combined my interests in the arts and environmental studies. I realized a graphic novel was the perfect format because it is so accessible. I found that most climate-related information was presented in complex scientific jargon that is relatively inaccessible to the general public. By simplifying this language, introducing personal experiences with climate change, paired with the additional layers of storytelling that art introduces, I felt a graphic novel would serve as the perfect medium for presenting the complex topics that I wanted to dig into.

An additional goal of this project is to combine the contrasting fields of science and art. In my writing, I introduce the concept of binary patterns of thought that have shaped the Western narrative and mindset. A central binary thought pattern is that which contrasts science and art; viewing them as separate fields that do not support or assist one another. I find this to be deeply

untrue and wanted to create a project uniting the arts and sciences, through writing, drawing, and research, to demonstrate how beneficial and powerful they can be when paired together.

Through this book, I hope to introduce a new type of literature in the academic field. One that incorporates personal experience, systems thinking, climate science, and environmental humanities in order to introduce new pathways of dialogue and points of understanding for the rapidly evolving issues of the Anthropocene.

BOOK PROPOSAL

I. Premise

Climate change has been one of the primary concerns of my generation, yet it continues to be a topic that is not fully understood or broadly discussed as an immediate threat. Through this book, I hope to introduce climate-related information in an accessible and interesting format. *The Geography of Home* is primarily a presentation of my experiences, feelings, and concerns as a young person entering the world in a new epoch: the Anthropocene. Throughout the book, I break down several different concepts that I consider essential for fostering an understanding of resilience in this changing world. The illustrations present an additional narrative arc to provide further context, as well as to add a level of humanity and intimacy to climate communication.

II. Unique Proposition

When people read *The Geography of Home*, they will:

- Understand the history, science, context, implications, and significance of the Anthropocene.
- Recognize the importance of a sense of place in fostering a relationship with the natural world to better handle climate-related stress.
- Comprehend part of the complex history of colonization in the United States and how it impacts modern ways of thinking and acting in relation to the environment.
- Gain the ability to view the world, and complex issues, in a systems-based mindset.
- Be able to recognize their place within deep time, as well as the scale of human impact within a geologic context.
- Formulate new methods of communication about climate issues in the context of systems thinking, place relations, colonization, deep time, and creative expression.

Because *The Geography of Home* will:

- Introduce personal experiences and ruminations on the Anthropocene, sense of place, bioregionalism, as well as other climate-related topics, in order to provide a first-person account of climate issues in different environments and contexts.
- Through questions and stories, provide opportunities for readers to place themselves within climate change, the environment, natural and social systems, the Anthropocene, and deep time.
- Deconstruct the jargon of climate science and systems theory through writing and art in order to make it more interesting, easily understood, and accessible to the general public.

III. Manuscript: Overview

The Geography of Home will comprise three main chapters with four to six subsections per chapter. The chapters are 1,687, 6,791, and 3,372 words in length, with a forward and conclusion on either end, 1,277 and 726 words, respectively.

The Geography of Home will also include full-page illustrations, which are currently underway. Based on initial storyboarding and rough illustrations, one page of 12-point single-spaced writing is equivalent to approximately 9.3 pages of drawing. Based on these numbers, the final book is estimated to be around 200 pages.

Breakdown of Manuscript:

Forward: 2 pages

Part I, Part II, Part III (illustrated): around 190 pages

Conclusion: 1.5 pages

Bibliography: 2.5 pages

The three sections of *The Geography of Home* gradually introduce readers to a number of topics related to the Anthropocene. The first section, *The Anthropocene*, introduces this new epoch through several lenses: definitions, science, social implications, and theories of change. This section addresses the questions: What is the Anthropocene? Why is it a heavily debated topic? What led us to its declaration? What mindset and actions brought us here? Is the Anthropocene good? Bad? How do we approach a new epoch? What turning points and opportunities for societal change does the Anthropocene hold?

The second section, *Place*, brings in a more personal narrative to the book. In this section, I introduce why a sense of place is crucial for fostering not only a connection to the environment, but also, resilience to change. In my writing, I actualize the research on place-based connections through presenting my own experiences and connections I've had with natural places throughout my life, as well as the lessons I have learned from them. This section asks questions such as: Who would we be without the natural places that shaped us? In what ways are ecology and identity intertwined? What does climate change look like in the places you love? What does environmental protection look like in this context? How can we work with nature? How can we alter human systems to accommodate, listen to, and support natural systems? What does an anticolonial climate future—one in which we accept our past as colonizers and shape the future differently—look like? How can we celebrate and grieve the places that shaped us in the reality of the Anthropocene?

The third section, *Systems*, offers a more theoretical approach to the Anthropocene. This section explores how systems thinking can be used as a tool to better cope with change. It also introduces several different philosophies of prominent systems theorists and how they can be applied to the Anthropocene. Finally, this section introduces the concept of deep time, bringing scale into the conversation of climate change and tracing back to the permanent impact of humans introduced at the beginning of the book. Questions that this section addresses include: What is systems thinking? How can we use systems thinking to place ourselves within the context of disaster? How can systems thinking and deep time liberate us? What arises from chaos and collapse? What actions can we take towards a social revolution that, similarly to the natural revolution taking place, centers around the concept of emergence? If the Anthropocene presents an inevitable collapse of social systems, what may arise on the other end?

Throughout the book, I draw from personal experiences and how they relate to the topics I am addressing. This is in an attempt to provide lived examples and perspectives on the issues I am speaking to. This is also to allow the reader to think of how their own experiences may intersect with mine and with others, hopefully providing context for how climate change impacts every person in the world in some capacity.

IV. *Manuscript: Status, Market, and Comparables*

A. *Status*

The manuscript has already been completed as of April 1, 2020. The illustrations, though underway, are yet to be completed, however, the first chapter will be done by May 1st, 2020 along with a partially completed storyboard which includes rough sketches of each page of drawings/writing and will be the framework from which the final images are drawn. Meaning that drawing the final images is the only stage of the process that has yet to be completed aside from editing and publishing.

B. *Market*

The audience for *The Geography of Home* is anyone who is searching for a new type of climate communication, one that centers around personal experience and relationships between natural and social systems, through creative communication using words and images. I would hope any age range would benefit from reading it, whether that is younger people looking for someone with a shared experience or older folks who are searching for the perspective of a young person at this time.

Groups for whom it may especially resonate:

- Environmentalists or people who are looking to deepen their knowledge of environmental topics.
- Younger people (aged 17-30) who are searching for a story that presents the shared experience of growing up in the reality of climate change.
- Older people who are looking for the perspective of a younger generation.
- Readers of writers such as Terry Tempest Williams, Barbara Kingsolver, Naomi Klein, and Robin Wall Kimmerer.
- Fans of illustrators such as Eleanor Davis, Phoebe Wahl, Liana Fink, Alison Bechdel, and Yumi Sakugawa.
- Readers of magazines such as Taproot, Emergence, and Orion.
- People who are looking for hope in the face of the climate crisis.

C. *Comparables*

There have been a number of books that address similar topics, but none that bring them all into one piece of writing, let alone in a graphic novel format. In terms of writing style and content, my writing mirrors much of Terry Tempest Williams' work, such as *When Women Were Birds, Red: Passion and Patience in the Desert*, and *Erosion: Essays of Undoing*. Her work similarly unites personal experience with the collective issue of climate change and examines history, identity, community, and place within an environmental context.

In the graphic novel field, I do not know of any published pieces that address these topics. However, the graphic novel with the most similar format is *Unflattening* by Nick Sousanis. Similarly to my book, *Unflattening* started as Sousanis' thesis project at Columbia University. In his book, he unites philosophy, literary theory, and ways of knowing; addressing

and simplifying deeply complex topics through uniting words and images. In my research, I only found one graphic novel about personal accounts of climate change, *Climate Changed: A Personal Journey Through the Science* by French author, Philippe Squarzoni. Although this book does address climate science, it is from the perspective of a middle-aged French man rather than a 20-year-old American woman. I believe my book will be the first to present this perspective on climate issues and what it is like to be a younger person at this time. Having a variety of perspectives on climate change is crucial for communicating how and why it affects everyone on Earth.

V. Author

I recently graduated from the University of Vermont (UVM) with a Bachelor's degree in Environmental Studies and Studio Art. These are the two topics much of my education has centered on while focusing specifically on human ecology, food systems, environmental justice, land and food movements, geography, printmaking, painting, and illustration.

Since I have just graduated, I mostly hold personal, rather than professional, experience in the environmental field. I grew up in Burlington, Vermont after my family moved here from Atlanta, GA for health reasons to escape the pollution and rising temperatures of the city. Growing up in Vermont allowed for unlimited outdoor play and exploration, leading me to spend most of my upbringing outdoors, hiking, backpacking, and spending time in Vermont's beautiful green mountains and blue waters. When I was in high school, I attended two semester-long boarding schools which were crucial in piquing and captivating my interests in environmental studies and social justice, as well as the areas in which they intersect. During my freshman year of college, I was immersed in a degree of study specifically centering on human ecology: the way that humans intertwine with the natural world. During my time at UVM, I have continued on this course of study, while specifically delving into the study of food systems. I have had several jobs on farms and working for food-based non-profits which have allowed me to fully understand farming and land use as the nexus of human relation to the natural world.

Art has also always been a constant in my life. From a young age, I began drawing and showed a keen interest in telling stories through my artwork. Art has recently taken center stage in my life, as I have transformed my practice into doing freelance design work. I currently serve two clients, one I have worked with for the last nine months, consistently creating illustrations for their website, social media accounts, and newsletters. The other, I am working for this summer as a seasonal illustrator for a theater festival. Both of the experiences can attest that I meet artistic deadlines with high-quality results and am consistently able to generate creative content. Furthermore, I have sold my own work for the last four years, taking independent commissions, and selling prints as well as other products.

I enjoy working in many different mediums including ink, colored pencil, watercolor, acrylic paint, silkscreen, collage, animation, and digital work. I love using art as a communicative tool, whether that is through self-expression, helping clients' ideas come to life, or communicating dense topics and feelings in a visual format. I do not yet know what the future holds for me, but I am interested in pursuing a career in which I can join my knowledge and interest in the environment with my design skills.

VI. Writing History

I have taken many writing courses as an undergraduate and worked as a writing tutor for one year. I feel that I have a solid knowledge of composition, syntax, and voice in my writing. I have

been published in the independent newspaper, VT Digger, and have had blogs published for the Agroecology and Livelihoods Collaborative as well as the Wild Rockies Field Institute. I have always enjoyed and been complimented on my writing, whether for school or for personal projects.

VII. Personal Marketing & Strategy

The Geography of Home has the potential to play a role in a number of settings. Whether as an educational tool in classrooms, environmental advocacy movements, or for the everyday reader, I hope for this book to be a part of many peoples' lives and generate constructive dialogue surrounding pressing environmental issues.

I am specifically interested in marketing this book to collegiate environmental programs as a method of introducing alternative literature to environmental syllabi. I believe it will help people think outside the box when formulating environmental solutions and conversations.

I believe the audience for this book will be quite broad, but see it especially resonating with younger women who have an interest in the environment. I would also hope for this book to serve as a learning tool for other demographics who may not have as much knowledge or experience with environmentalism.

I believe that readers of writers such as Terry Tempest Williams, Barbara Kingsolver, Naomi Klein, and Robin Wall Kimmerer and fans of illustrators such as Eleanor Davis, Phoebe Wahl, Liana Fink, Alison Bechdel, and Yumi Sakugawa will have a special appreciation for this book.

Finally, I wish for this book to be marketed to anyone who may be looking for hope within this crisis. I firmly believe that generating diverse dialogue will help with the climate crisis and in formulating strategies moving forward. The more people involved in the conversation, the better.

Book Outline & Chapter Synopsis

Forward

I start by introducing myself and the context from which I am writing this book as well as the history of my relationship with these topics. I introduce readers to some of the material I will be addressing and the reason why I think these issues are important.

Section One: The Anthropocene

Introduction to the Anthropocene

The Anthropocene is a complicated and largely debated topic. Its declaration can be viewed in many different ways, whether as the end of the world or an opportunity for societal change. In this chapter, I ask: what is the Anthropocene and why is it significant?

The Science of the Anthropocene

While the Anthropocene presents a variety of topics, it is primarily grounded in science. In this section, I break down what epochs are and why the declaration of a new epoch is so significant. I also explain part of the history of human impact that led to the declaration of the Anthropocene. Additionally, I introduce some basic information about global warming and its relation to human actions.

Social Implications of the Anthropocene

The Anthropocene is a notable epoch specifically because it is caused by humans. In this section, I introduce some social constructs and mindsets that may be related to the development of the Anthropocene.

The Anthropocene as an opportunity for change

The Anthropocene may sound daunting, but could it also hold potential for good? In this section, I introduce the ways in which the Anthropocene could be a turning point for our world, one in which we reinstate our actions and intentions moving forward to cultivate a society that works in conjunction with natural systems.

Section Two: Place

Introduction to Sense of Place

There is emerging research that people's attachment to places can unlock a greater capacity to better cope with change. Not only does sense of place influence human well-being, but it also aids the natural world. Humans are more likely to protect the environment if they care about it and, by developing a relationship with their environment, people are able to notice changes that may have been caused by climate change.

The Places that Shaped Me

A number of places have influenced my capacity to care for, love, and better understand the natural world. In this chapter, I bring readers through my relationships with different places throughout my life and the lessons I have learned from them.

Wilderness

Wilderness is a defining feature of the American landscape, yet it's fraught with complicated politics, history, and meaning. Why is wilderness so important for the American character? Why is its history so complicated? How does America relate to land differently than other countries because of its history of colonization? Why is wilderness so essential, both for our spirits and for the environment?

Lessons in Patience

What can nature teach us about slowing down? In this chapter, I account for a time when I walked the course of a river in Utah, sloshing through quicksand and slot canyons over the course of two weeks. Despite the physical challenges this experience presented, it also taught me lifelong lessons about moving at the speed of the natural world. I contrast my experience with the deeply rooted and ever-evolving issue of oil extraction in Utah; a fast-paced industry that ravages the delicate desert landscapes.

Bioregionalism

What do these theories I've presented so far look like when acted upon? Bioregionalism offers a tangible way of living in a more environmentally conscious way. One that not only incorporates acting locally, but also depends on place-based connection, developing community roots, and understanding the natural and cultural histories of the landscapes in which we dwell. Why is

bioregional living important as we move into the Anthropocene? In what ways is it beneficial? In what ways is it problematic? How can bioregionalism be incorporated in everyday life?

The New Family Farm

One of the most central examples of resilience and bioregionalism in my life is my relationship with the Intervale Community Farm, a semi-urban organic farm in Burlington, Vermont. The Intervale taught me community, ecology, and is where I feel a deep sense of place. In this section, I reflect on my experiences at the Intervale Community Farm.

Section Three: Systems

The Power of Holistic Thinking

In order to understand and mitigate human impact on the natural world, it is essential to understand the systems that make it function. Not only does systems thinking help us comprehend what is happening, but it also allows us to trace problems, locate our role in a system, and formulate tangible actions.

Systems Theory: A Launching Point

Systems theory is a crucial method of understanding the way the world functions. It is the language that merges ecological and social systems into socioecological systems. Systems theory is also a way to simplify complex ideas into a more understandable framework. What exactly is systems thinking? In this section, I introduce several foundational systems theorists and their thinking on how the world functions as a holistic system.

Emergence and Panarchy

Two central philosophies within systems thinking in relation to systemic change are Emergence and Panarchy. They are both theories that recognize the scale and patterns of systems. Emergence is the process of small, simple interactions creating larger systems; it is the reaction and capacity of chaos to create a novel system with redefined values and functions. Panarchy Theory highlights the concept that growth emerges from collapse and allows systems to strengthen their adaptive capacity.

Deep Time

At its core, the Anthropocene represents a largely geologic concept imbued with philosophical and cultural meaning. Deep time is a geologic concept used to describe the incomprehensibly vast existence of the universe. Humans especially have trouble understanding exactly how much time came before us. Deep time allows us to frame ourselves in the vast narrative of Earth's history, placing meaning on our long-lasting actions and allowing us to fully understand our role on Earth.

Conclusion

What are you left wondering at the end of this book? Has your mindset or interest in these topics shifted? How do you feel? I end *The Geography of Home* reviewing what I've introduced and asking questions. I want the ending to feel like a launching point into a greater conversation about how we can approach the Anthropocene with novel actions and ways of thinking.

APPENDIX B: MANUSCRIPT

THE GEOGRAPHY OF HOME

Systems Awareness in a Changing World

Manuscript

Forward:

I am writing this from quarantine in the heart of the COVID-19 pandemic. In the last weeks I have watched the world change in ways that are highly reflective of the topics I am speaking to in this project. In many ways, I feel that this pandemic has inspired much of my work and motivation to tell this story. In months of chaos and uncertainty, this project has offered a resource for processing and coping with the tragedy at hand. It took me a long time to get to where I am now. For months, I struggled to find words and images suitable to describe the topics I am addressing. A significant element of this creative block was that I thought I must know all the answers; I saw a project like this, a capstone, as evidence of what I have learned while studying human ecology, food systems, environmental studies, and studio art over the last four years as an undergraduate student at College of the Atlantic and the University of Vermont. In many ways, that is what a thesis is about, but I've learned that most centrally, it is about asking questions. When I began to dive into my research, I was left with more and more questions, and instead of letting myself ponder these ideas, I grew daunted by the task of finding all the answers.

It was not until I read *Emergent Strategy* by Adrienne Maree Brown that I opened myself to unknowing. In the introduction of her book, she details that a key element of emergence is seeing “that there is no such thing as a blank canvas, an empty land or a new idea—but everywhere there is complex, ancient, fertile ground full of potential” (Brown, 2017). Instead of seeing this project as a blank page, I shifted to seeing it as a garden at the beginning of spring. I had a bed of fertile soil, I merely needed to plant seeds, nourish them, and let them grow; giving way to a cycle that honors and perpetuates the emergent process of questioning.

The first seeds of this project were planted almost one year ago and since then, it has shifted shape time after time. Much of this work is inspired by my time in America's Southwest on a 60-day field course with the Wild Rockies Field Institute. The desert landscapes, along with the topics I learned on my course, were deeply influential in my learning about systems theory, deep ecology, indigenous history, and sense of place. This project is also largely influenced by my time at College of the Atlantic, where I spent my freshman year studying human ecology and food systems, providing me with a foundational knowledge of the way that land and humans interrelate as well as a baseline understanding of systems thinking. Many of my courses at the University of Vermont have also provided a deeper understanding of these topics, primarily *Environmental Art: Field and Studio*, *Environmental Justice*, *Ecofeminism*, and my one-on-one work with Cameron (Cami) Davis, an artist and teacher who merges ecological philosophies and theories with her studio practice as a painter. Our conversations surrounding this project have significantly influenced its meaning and direction; quite simply, it would not be what it is now without Cami's thoughtful and patient guidance.

At its core, I want this book, graphic novel, memoir (whatever I choose to call it) to be about interconnection. I want to talk about the systems, both natural and human-made, that make the world function. I want to talk about collapse, chaos, resilience, revolution, rebirth, and emergent processes. I want to address climate change through these themes because I see that to be the biggest problem of all. Climate Change has been one of the most pressing issues of my generation. I learned of it from a very young age and have devoted my education and career to it; it has been a central narrative in my upbringing.

A pivotal point in my environmental education was when I learned about intersectionality, a concept brought to life by black feminist, Kimberlé Crenshaw. Intersectionality refers specifically to the combination of identities, socially and politically, that give way to differing levels of privilege and inequality. Merriam Webster's dictionary defines intersectionality as *"the complex, cumulative way in which the effects of multiple forms of discrimination (such as racism, sexism, and classism) combine, overlap, or intersect especially in the experiences of marginalized individuals or groups."* After learning about this concept, I realized how intertwined social and environmental justice truly are. We will not have a climate revolution unless we have a feminist revolution, unless we have a decolonial revolution, unless we have a racial revolution, unless we have an anti-capitalist revolution, unless we have an anti-corporate revolution. This realization gave way to a new understanding of the world, pushing me to place holistic systems thinking as a central concept in my education.

Since starting this project, I have floated between topics, advisors, and formats. I never quite landed on one; in some ways, I still feel adrift, uncomfortable with not knowing. Since quarantine began, three weeks ago, I have had trouble fathoming how I would even focus on this project when my mind cannot peel itself away from the forever churning news cycle, full of dystopian titles about the pandemic sweeping the world.

I have marinated in these thoughts, in this chaos, in this fear and I have realized that the current events of the world are precisely what my project is about. The COVID-19 pandemic has shown me a changed world. The pandemic has taught me many things; it has taught the world many things. It has put the fragility of human systems to test. It has proved that a capitalist system does not hold well in the face of crisis. The pandemic has shown us tangible examples of resilience, emergence, panarchy, and chaos. We are at a profound turning point; on this threshold of collapse, perhaps some good may come. During this time, there has been a resurgence of community in so many different forms. People are taking care of each other. Conservative politicians are proposing socialist ideas. The air is cleaner. This crisis has shown us that we aren't invincible. In a time when the world has never felt more divided, the pandemic has provided some level of unification. We are seeing what it means to survive for the first time in many generations. As we move into a new epoch named after the impact of humans, the Anthropocene, the hubris of the human race is being tested.

This project is an attempt to address what the world feels like at this moment in time, while also addressing the severity of climate change and perhaps provide an example of what the elements of a systemic revolution might look like. I hope to provide the perspective as a young person right now: what it is like to be entering the world with so much fear, uncertainty, and hope. I want to introduce coping mechanisms for these circumstances and to illuminate pathways to help navigate crisis. I hope to share what I have learned and to communicate in two languages, through writing and visuals. I want to make an intriguing piece of art that can be built upon and learned from for years to come. I hope to ask and leave readers with questions. I want to generate

dialogue. I hope for this to be a bookmark in my life, a reminder of what it was like in the year 2020 when I was 22 and it felt like the world was ending, but it was only just the beginning.

The Anthropocene

Introduction to the Anthropocene

Human-caused climate change has influenced the necessary and timely proposal of the Anthropocene, a new geologic epoch characterized by the influence that the human species has had on Earth's natural systems. The Anthropocene describes a critical time for the planet, for its definition implies that humans have caused an unnatural shift in Earth's basic functions, mainly through mass-industrialization, globalization, and a significant increase in population. Many describe the Anthropocene as a turning point for the world, and a time for the human species to reinstate and evaluate the systems they created that are now causing harm to the Earth.

The Anthropocene is a term introduced as “a division in the geological periodization of Earth's history that separates the current time of global human impacts on the planet's environmental systems from the Holocene, the most recent geological epoch that spans approximately the last ten thousand years” (Andrew, 2016). This shift in epochs signifies the irreversible and systemic impact of humans on the planet. It is a term that warrants new relationships between how humans relate to the planet and indicates the domination of the human species on natural systems.

I first learned of the Anthropocene when I was sixteen. It was presented to me as a drastic change that would inevitably alter life as we know it, whether positively or negatively. As a teenager whose upbringing centered around a future of climate change, I assumed it meant the rise of humans and the fall of nature. I imagined a future I had only seen in dystopian films, one in which the air was thick and grey, where humans lived in bubbles, sealed off from toxins in the atmosphere. Where fresh produce was hard to come by and corporations pumped the Earth full of poisons so volatile that they eradicated any trace of life. This was an interesting contradiction in which to find myself: sixteen, on the verge of life. The Anthropocene: an inevitable collapse. I cannot help but think my identity was altered by this realization.

Since then, I have learned that the Anthropocene is not the end of the world, it is a declaration of human influence. The Anthropocene can mean many different things, but most centrally, it dictates a turning point of human impact. One that proves how long-lasting our presence will be. The Anthropocene is a rich concept, bursting with science, philosophies, theories, creativity, and life. It is full of potential. Perhaps, I hope, it will bring realizations. Realizations of how detrimental our capitalist, colonial, domination-based lifestyle is for the planet. Perhaps we will realize that we are part of the nature we've spent so long distancing ourselves from. Perhaps we will learn from the past in order to shape our future, recognizing the patterns of thought that have led us to where we are today.

The Science of the Anthropocene

At its core, the Anthropocene is a geologic concept. It is the declaration of a new epoch, indicated by notable shifts in Earth's sedimentary layers. Epochs tell Earth's history, noting major events, shifts in climate, and the presence of different species. The declaration of a new epoch only happens when there is a significant and noticeable change in the makeup of

sediments; the Anthropocene is indicated by increases in toxins, pollutants, and plastics in the soil and atmosphere.

There is much debate amongst the scientific community about when—or if—the Anthropocene actually began. The question of officially declaring the Anthropocene is still a largely debated topic, with many arguing that humans have simply not existed long enough for an entire epoch to be dedicated to them. Most scientific groups continue to argue against the declaration of the Anthropocene, stating that the expansion of human civilization could be considered an event, but not an epoch. While those outside of hard science fields argue that, despite the short time that humans have existed, their impact on the planet and natural forces is enormous and deserves some level of acknowledgment.

Human actions have impacted the planet for the last 10,000 years, however, since the Industrial Revolution in 1800, the impact of this singular species has caused permanent lasting damage on the planet and the systems within it. This period of human influence represents a rapid shift in environmental conditions, mainly caused by the human-induced spike in global cumulative carbon dioxide emissions, which cause a Greenhouse Gas effect in which heat is captured and retained by the Earth's atmosphere, leading to record-breaking emission levels and global temperatures. Greenhouse Gases are mainly produced through the combustion of fossil fuels, which is a central part of many industrial processes as well as daily life. We have created a system that is overly dependent on fossil fuels, which are detrimental to the Earth, both in their extractive and combusive processes.

This rise in temperatures impacts every level of natural and human systems. Even the slightest rise in temperature can have catastrophic effects on fragile natural systems such as migration patterns and natural growth cycles of plants and animals. Changes to these cycles will inevitably impact humans. This is the complexity of the Anthropocene: it is a result of social issues—such as capitalism, consumerism, and industry—with scientific implications. Therefore, it is not something that can be addressed or solved using only the language of science. It must be discussed in relation to the industry, the economy, politics, consumers, race, class, gender, and identity. It is a multi-level systemic concept that deserves a multi-level systemic approach.

Social Implications of the Anthropocene

Beyond scientific data, the Anthropocene is distinct in its implications to human systems. Moore (2015) states that the Anthropocene “represents another way to have a conversation about the breakdown of the division between Nature and Culture that has historically shaped the Western worldview...From the social role of political responsibility to the refashioning of American education to the negotiation of planetary boundaries, this issue leaves us with multiple Anthropocenes to grapple with” (Moore, 2015 p. 1). What does a declaration of the Anthropocene mean for humans? What does it mean for the human relationship with nature? How do we approach this new epoch?

The Anthropocene is also evidence of the fragility of human patterns of thought and the systems that we have created. Lehtonen et al., (2018) present a revolutionary approach to climate change education through the idea that today's prevailing modern thinking centers around dichotomies. These dichotomies become more deeply ingrained in our society the further that the human species advances, becoming increasingly problematic over time. These dichotomies hold roots in the colonization of North America, and “guide our problem-solving strategies and management of life, how we relate with the world and how we perceive relationships between

things” (Lehtonen et al., 2019, p. 345). This type of thinking results in separating systems that function relationally and viewing the world through an individualist lens, resulting in “linear, atomistic, fragmented thinking, ignorance of holistic relations and the exclusion of opposites from mental frames” (Lehtonen et al., 2019, p. 345). These authors suggest that this way of thinking has led to the current geologic epoch of the Anthropocene in which humans see themselves separately from nature (Lehtonen et al., 2019, p. 345). Dichotomous thinking leads to a mindset that is ambivalent to the systems that make the world function, which is concerning as we move into an era and a global environmental crisis that demands solutions that function systemically.

The Anthropocene as an opportunity for change

Author, Joanna Macy, suggests that the Anthropocene is an opportunity for a societal shift, naming it *The Great Turning*. Macy proposes *The Great Turning* as a title for the shift from the Industrial Growth Society to a life-sustaining civilization (Macy, 2019, p. 1). She suggests that “a revolution is underway because people are realizing that our needs can be met without destroying our world. We have the technical knowledge, the communication tools, and material resources to grow enough food, ensure clean air and water, and meet rational energy needs for civilization” (Macy, 2019, p. 1). She provides the three dimensions of the great turning:

1. Actions to slow the damage to Earth and its beings, which includes all political, legislative, legal work, and civil disobedience to reduce destruction.
2. Analysis of structural causes and the creation of structural alternatives. This step includes understanding Earth’s systemic dynamics as well the functioning of human systems that lead to destruction, mainly capitalism and the industrial growth society. Part of this step also includes introducing structural alternatives to destructive systems.
3. The final step is a shift in consciousness. We must deeply ingrain the previously stated values for Earth stewardship, in both cognitive revolution and spiritual awakening. A few key parts of this step include general living systems theory, deep ecology, ecopsychology, and ecofeminism.

The precipice of the Anthropocene is an opportunity for adaptation. In natural systems, an ecotone, the edge of a system, or a threshold, is where adaptation occurs. It is on the edges of an ecosystem where members are forced to adapt to variant conditions, and the Earth, as a complex adaptive system (CAS) will likely experience adaptation on the edge of the Anthropocene. Malanson (1999) states that “ecotones exhibit a relationship between process and pattern at the edge of chaos”(Malanson, 1999). The precipice of the Anthropocene is an opportunity to form societal resilience. Resilience is the capacity of a system to absorb shocks and disturbances while maintaining the same basic function (Garmestani & Benson, 2013). This is the challenge of the modern human—to limit industrial and capital expansion in the hopes of remediating human impact on Earth to promote longevity and systemic wellbeing. Perhaps the Anthropocene is an opportunity for revolution, as Donella Meadows (2009) states, it is an opportunity for a leverage point, “a place within a complex system (a corporation, an economy, a living body, a city, an ecosystem) where a small shift in one thing can produce big changes in everything” (Meadows, 2009). What are the leverage points of the Anthropocene? Or is the leverage point merely in its acknowledgment? The declaration of the Anthropocene is a call for systemic awakening.

Place

Introduction to Sense of Place

In a less theory-based realm, another tangible action for fostering resilience to climate change is developing a connection to the natural world. There is emerging research that people's attachment to places can unlock a greater capacity to better cope with change. *Sense of place* is defined by Tuan (1977) as "the meanings and attachment to a setting held by an individual or group. As such, it is often viewed as the most encompassing core construct within associated research. Crucially, our approach to sense of place analysis emphasizes both attachment and meanings, although these concepts are sometimes conflated and greater analytical emphasis is given to place attachment than to place meanings" (Masterson et al., 2017, p. 2).

Masterson et al. goes on to describe the categories of sense of place. The first is *place attachment* which is a (typically) positive emotional bond between individuals or groups and their environment. Second, there is *place dependence* which is the instrumental bond between people and place to fulfill basic human needs, e.g. food, water, and shelter. There is also *place identity* which are the dimensions of self that define one's identity in relation to their environment. Masterson et al. continues to describe the four main qualities and factors of sense of place:

1. *Sense of place forms through experience, although this experience is not solely individualistic, but also social.*
2. *Sense of place emerges from human interactions with the biophysical environment.*
3. *Place meanings and attachment are subjective, but they vary systematically.*
4. *Patterned relationships with place help to predict specific types of behavior*

Sense of place research allows scientists to contextualize climate-related issues within social dimensions and helps researchers understand humans' ability to cope with climate change. Marshall, Park, Adger, Brown, & Howden (2012) describe how sense of place can inform resilience strategies for environmental problems and that place attachment may support adaptation when livelihoods are threatened. Through adapting to climate-related changes, community structure and character of place can be retained, which may foster social resilience (Marshall et al. 2012; Masterson et al. 2017). Masterson continues to suggest that place attachment enhances adaptive capacity, proposing that social capital, local knowledge, and reciprocal networks facilitate adaptation to incremental social-ecological change.

A sense of place can mean different things to different people, but at its core, it represents a place, whether natural or community-based, where one feels grounded, safe, and secure. It is a place where one is able to relate to nature and find some type of solace. Not only does sense of place influence human well-being, but it also aids the natural world. Humans are more likely to protect the environment if they care about it and, by developing a relationship with their environment, people are able to notice changes that may have been caused by climate change.

The places that shaped me

As I learn more about the importance of sense of place in developing attitudes and actions towards climate change, I am left reflecting on my own relationships with different places and how they have developed throughout my life.

I was only a baby when my family moved to Vermont. My mother was diagnosed with a chronic neurological condition and was told to move somewhere with clean air and a cold climate, unlike our current home of Atlanta, Georgia. Within months, we moved to Vermont, starting a new life nestled on the shores of Lake Champlain, with the green mountains to our back and the Adirondacks to our belly.

Vermont offered things we had only dreamed of: four seasons of outdoor play, a robust and thriving community filled with art, music, good food, and friends. Most of all, it offered healing in the aftermath of Atlanta. My mother got better as my sister and I grew older. I can't imagine who I would be in Atlanta. Who I would be without green hills, vibrant summers, and a frozen lake? Who would I be without winter?

I was seven years old when my father told me that one day, Vermont would be as warm as Atlanta. Because of how rapidly the Earth's temperature was rising, Vermont's four seasons would stop coming, and winter would be nothing but a whisper of cold on a temperate day. This was one of the first times I remember hearing about climate change, but at that point, the consistency of winter made me believe it would never go away. As I have grown older, I have watched it happen. Some years the lake freezes, but others, fall stretches until mid-December, the leaves turn brown instead of orange, buds start bursting in mid-March. The seasons swirl together, undistinguished from each other. The plants and animals get mixed signals from the weather, confused and restless at the wrong times.

This is the extent of my experience with climate change. Most of my life, it has been some distant concept, not affecting me aside from small shifts in places I've loved. But even that small glimmer, of something I loved being taken away made me want to fight it. This was one of the first lessons I ever learned about climate change, that in order to motivate people to protect the earth, they must first love it.

For me, it was first with winter. When I was child, nothing offered more wonder than the expansive white surfaces of snowbanks. I loved swaddling up in my snowsuit and running outside to play with my sister for hours. Our cheeks rosy, with cold air in our lungs, noses running as fast as our hearts raced. The exuberance of winter followed me throughout my life and as I grew older, it offered a calmness that the other seasons simply could not provide. The seasons never lie, but winter is especially honest. The landscape, at one-point bursting with vivid life, stripped down to its bones. I am humbled by its ability to tell the truth and encouraged to turn inward and incubate in my own honesty.

My second love was the woods of Northern Wisconsin. I found myself there in high school to attend a semester-long boarding school. It was the type of love for a place one experiences only when they first move away from home. I loved it because it was mine. I could spend hours exploring the miles of trails on bikes or skis. I could hop from lake to lake, sitting by the cattails on the shore with spring peepers serenading me. The roll of the fog in the early morning cradled me as I would awake from slumber. I felt safe here.

Then I fell in love with the hills of Northern California. There again for school. I remember flying into Sacramento questioning how I could ever find beauty in the brown farmlands and the sprawl of the suburbs. But here, I was nestled away in the hills an hour south of Tahoe. I would spend hours walking through the woods, the shadows of Blue Oaks cooling me down. The lightning bolt branches would pierce the sky, draped in wizards moss. I remember I would run my hands through the tall amber grasses, plucking a stem and peeling the seeds away, scattering them through the trails. We'd spend hours at the Yuba River, a body of water

snaking through the foothills of the Sierra Nevada, shocking and blue. The water moved massive boulders, creating granite tunnels and water falls to dip in and out of.

Next, I went to the coast of Maine, where I learned to love a place no matter what it threw at me. I was starting college across the street from Acadia National Park. I would wake up each morning to the waves of the ocean 100 feet from my doorstep. The islands through the bay curved like the backs of whales. At night we would go swimming off the dock with the bioluminescent algae and full moon. The carriage roads in the park offered solace and space, giving me miles to wander by myself. I'd often walk the shore path on long winter days, when I needed time to think. Still, it was hard for me to live there. The air felt thick and heavy, the winter stretched out, long and lonely. I did not feel so expansive, living on an island, just far away enough from home. I felt alone.

Finally, I fell in love with the desert. It was around this time last year that I found myself there on a 60-day field course on the Colorado Plateau. When I first came to this landscape, I was met with bountiful questions. It was a landscape of unending mystery. I learned that much like winter, the desert canyons encourage my own honesty. The landscape, unmasked by vegetation, shows every wrinkle of its history, bearing its own vulnerability and strength. This land taught me resilience. Entire ecosystems wiped out in seconds by a flash flood. Slot canyons stripped for oil by the boom-bust mining industry. Indigenous peoples displaced by colonizers; bloodlines erased by invasions. It is a delicate landscape, vulnerable to systemic shifts and changes, contradictory and resilient, beautiful and honest. Holding deep history over millions of years, a place whose future is still in formation. It is a landscape that holds stories that continue to unfold with time. The desert is time.

I long for this landscape unlike any other place. In Vermont, how far I feel I have come from the prophetic whispers of the red rock desert: juniper trees, rubber rabbitbrush, tumbleweed, sagebrush, globe mallow, pinion pines, petrified redwoods, chert shards, the stones of ancestral Rocky Mountains. Old friends whose voices I'd long forgotten, but whose names beckon me from miles away. The desert lets me read a landscape of time, showing me how small this life is. The sky breaks me open. In the east, I am nestled away; my tunnel vision making me unable to see beyond the walls of myself. In the desert, I feel I am in the presence of all that makes me human, all that gives me standing. The open land. The open sky. The layers beneath my legs that hold me up and ground me. The cumulus clouds that reflect the vast redness of the landscape.

I love this land for how it makes me feel. I love this land for the stories I have learned. I love this land for exposing its skin, holding its skeleton so close to its surface that I can see every groove of its bone every pore on its skin. I know this landscape intimately, more than my own home. Its ebbs and flows and patterns. The colors that striate its surface. The desert is home. Our relationship of contention and honesty, taut and unending. A delicate balance from which I navigate and learn. Landscape of refuge. Landscape of vulnerability. Landscape of honesty. Landscape of contradictions.

I am made of these places. Through each of my interactions with them, I feel driven to protect them in their unbridled beauty. I feel called to tell their story. I encourage others to think about their love of place, how does home make you feel? What landscapes shaped you? Change is an inevitable component of the Anthropocene and wild places will be some of the most heavily impacted by these first waves of environmental change. What does climate change look like in the places you love? For me, this means the disappearance of winter due to rising temperatures; this means the development of rural landscapes and communities; this means the rampant spread

of wildfires in California's arid grasslands and stands of blue oak; this means the ocean rising from melting ice, turning mountains to islands and drowning coastal communities; this means the layers of the desert being stripped to their core for tar sands and oil, polluting the precious waters that nourish and shape the landscape and erasing the ancient stories of stone. How can we celebrate and grieve the places that shaped us in the reality of the Anthropocene? What does protection look like in this context?

Wilderness

"I believe we need wilderness in order to be more complete human beings, to not be fearful of the animals that we are, an animal who bows to the incomparable power of natural forces when standing on the north rim of the Grand Canyon, an animal who understands a sense of humility when watching a grizzly overturn a stump with its front paw to forage for grubs in the lodgepole pines of the northern Rockies, an animal who weeps over the sheer beauty of migrating cranes above the Bosque del Apache in November, an animal who is not afraid to cry with delight in the middle of a midnight swim in a phosphorescent tide, an animal who has not forgotten what it means to pray before the unfurled blossom of the sacred datura, remembering the source of all true visions.

As we step over the threshold of the twenty-first century, let us acknowledge that the preservation of wilderness is not so much a political process as a spiritual one, that the language of law and science used so successfully to define and defend what wilderness has been in the past century must now be fully joined with the language of the heart to illuminate what these lands mean to the future."

— Terry Tempest Williams, 2001

The illusionary and dichotomous belief that humans exist separately from nature has led to a mindset of species supremacy and the innate human capacity to destroy and dominate other species and ecosystems. When colonizing North America, settlers invented the concept of wilderness to describe that which is not man made (Cronon, 1996). Wilderness was something that was tremendous and terrifying, to many, "wilderness, in short, was a place to which one came only against one's will, and always in fear and trembling. Whatever value it might have arose solely from the possibility that it might be 'reclaimed' and turned toward human ends...In its raw state, it had little or nothing to offer civilized men and women" (Cronon, 1996).

When European settlers came to North America, they were met with rugged landscapes and felt that in order to inhabit the land, it was necessary to conquer the wilderness and the beings living within it. This pervasive colonial mindset continues to influence modern thinking about the natural world. Particularly in America, we have no limit to the extent we will go to gain access to natural resources that we will then turn to economic endeavors. Because Americans colonized what is now known as North America and do not have an ancestral bioregion, they truly do not know what it means to have a home in relation to land. The way we interact with landscape differs drastically from that of many indigenous cultures. In this mindset, land and natural resources are exploited, privatized, traded, and commodified. Americans are willing to invade other lands, ones that do not belong to the United States or that fall on Indigenous territory, in the effort to exploit and profit from them. The colonial history and mindset of the United States prevents us from truly understanding the deep and continuous relationship that many cultures have with landscapes, meaning we see no wrong in exploiting

and utilizing land for economic and industrial benefit. In many ways, this has led to America being the wealthiest country in the world, however this title comes with the cost of being one of the largest polluters in the world and may have only been possible because of a willingness to exploit other places and cultures.

In many parts of western society, this narrative of domination is rooted in western spirituality: “Their religion is firmly grounded in their escape from a fallen nature, and it is highly unlikely to suppose at this late date that they can find a reconciliation with nature while maintaining the remainder of their theological understanding of salvation” (Deloria, 1994, p. 90). Western religions are based on historical events and scriptures. Their beliefs are typically rigid and unchanging. They place value on that which is tangible, technical, quantifiable, and rational—much like the dichotomous mindset that Lehtonen, et al. (2018) presents. Western beliefs tend to alienate nature and place value on that which is man-made while Native American belief systems are typically place-based and are an alive spirituality versus one that is based on historical events, like western religions. Their beliefs are based on the idea that humans are one with nature and are constantly in pursuit of harmony and equilibrium within natural systems. Native American spiritualities remind people where they come from and tend to cultivate a multi-generational connection between land and people. In these beliefs, the individual is one part of a whole and their Self is defined in their relations to others, in both human and natural worlds. (Deloria, 1994)

Presently, many American colonial descendants view humans and nature as a binary, two things at odds with each other. Because of this history, our country is unable to see the true, non-commodifiable value in nature and natural systems. We want to control every facet of nature, and thus, suppress the role of nature in everyday life, limiting it to a romanticized and idealized concept, represented now by the modern National Parks System and federally operated public lands. In this context, nature is reduced to a singular experience, one that involves lines of tourists, epic cathedral-esque landscapes, and, most notably, a profit-based system that inherently excludes a vast majority of the public from public lands. The National Park System is, by no means, a negative endeavor, however, there have been numerous projects performed on other parts of America’s public lands. These projects largely center around extractive processes for fossil fuels, but are often masked by the distracting romanization of the National Parks as the sole representation of American Wilderness.

Seeing nature and wilderness as a *singular other* in relation to the human experience forces us to not see how the human species impact nature’s fragile systems with our own. In this mindset, climate change becomes distant. It seems as though it is something that will not impact humans, when it already is. The Anthropocene is an opportunity to reimagine this relationship with a mindset of harmony rather than hierarchy. How can we work with nature? How can we alter human systems to accommodate, listen to, and support natural systems? What does an anticolonial climate future—one in which we accept our past as colonizers and shape the future differently—look like?

Wallace Stegner writes in his renowned *Wilderness Letter*: “If the abstract dream of human liberty and human dignity became, in America, something more than an abstract dream, mark it down at least partially to the fact that we were in subdued ways subdued by what we conquered” (Stegner, 1960). In many ways, wilderness offers the idea of potential, perhaps the potential for conquering and controlling, which is central to the American idea. Stegner later states that future visitors can “take pleasure in the fact that such a timeless and uncontrolled part of the earth is still there” (Stegner, 1960). I wonder if the presence of wilderness areas, although

important for ecological reasons, cultivates or perpetuates a certain notion of human control and dominance. It's almost as though we have the egotistical capacity to grant wilderness permission to exist, we have the power to destroy it, but instead we are exercising using our power for good and saving these places. This also brings up the questions of who decides what type of land should be valued and protected. Does this creation of wilderness only create more divisions between humans and nature?

As author, Terry Tempest Williams states: "Wilderness holds an original presence giving expression to that which we lack, the losses we long to recover, the absences we seek to fill. Wilderness revives the memory of unity. Through its protection we can find faith in our humanity" (Williams, 2001). The public lands of the United States present one of the most contentious arguments in our nation. Much of America's wealth lies in its vast landscapes, whether that be the potential for development, the reservation of fossil fuels buried deep below ground, or, most importantly, some of the last undeveloped lands in the world. The presence of these wild spaces are crucial in preserving the American spirit, in cultivating a population of environmentalists who are capable of connecting with the natural world. Despite my troubles with the National Park System and with the sneakiness of developers seeking to extract from public lands, I believe America's public lands deserve to be public, free to use, and not privatized. It is crucial for our spirit as a country that these lands remain untouched. As Wallace Stegner writes, "Something will have gone out of us as a people if we ever let the remaining wilderness be destroyed ... We simply need that wild country available to us, even if we never do more than drive to its edge and look in. For it can be a means of reassuring ourselves of our sanity as creatures, a part of the geography of hope" (Stegner, 1960). Wilderness breaks down the binary, it allows us to acknowledge that humans are not the only beings that dwell on American land. Wilderness will forever be essential.

Lessons in Patience from the Dirty Devil River

During my time in Utah, I was able to travel through some of America's expansive public lands. I often think of one particular canyon I hiked through, the Dirty Devil Canyon, a 61,000-acre section of wilderness which falls under operation of the Bureau of Land Management, meaning it is a land of multiple uses. It can be used for grazing, mining, recreation, and many other things. These lands were originally offered to farmers and ranchers, but were unwanted, so then fell into the public's hands. I experienced this landscape by backpacking through it for two weeks. The Dirty Devil Canyon is also a potential mining sight for fossil fuels, meaning the government can introduce mining operations at any point since mining falls within the lands vast array of uses. The Dirty Devil is just one of many examples of the complex role wilderness and public lands play in the United States. Below is a reflection that I wrote during my time in the Dirty Devil, contemplating the use of this land and the connections I felt to it.

My foot slips below the surface, only to be enveloped completely by the thick, slow moving quicksand. I take a deep breath and begin to extract myself. The weight of my backpack, along with my body weight rest on one leg, pushing against the soft ground as I move at a snail's pace to pull my other leg out. The faster I move, the tighter the sand grasps onto my leg, so each move I make is deliberate and delicate. Every step in the Dirty Devil, an 80-mile tributary of the Colorado River, goes like this. The river takes its toll: sandals full of stones, steeped in mud; calves sore from pulling feet from quicksand over and over again. However, I have noticed the river takes its greatest toll when you move too fast. The quicksand only deepens, unless you slow

down. The current will knock you over if you don't take the time to stabilize yourself. The landscape will go unnoticed if you rush through it. The miles are long, and our pace is languid. Like a river, I must also meander.

With the ever-growing speed of society, it feels rare and special to move at this pace, to take the time to notice. I have felt these changes in pace particularly in my heightened sense of beauty in this landscape and my urge to encapsulate it in my artwork. The canyon begs to be captured, from its sweeping sandstone walls to the blossoming asters. I find myself in awe of the sea of complimentary colors: the deep purple shadows, next to tangerine Navajo Sandstone cliffs, below cloudless lapis blue skies. The landscape radiates with a vibrancy unlike any other I've seen and the leisurely pace of life in the backcountry has given me ample time to develop my connection and sense of place within this landscape; forming an intimate relationship with the land in this way has filled me with a deep urgency to protect the beauty I have been immersed in over the last month.

On the second-to-last day of our journey in the Dirty Devil, we took a day hike to Happy Canyon, a side canyon of the Dirty Devil. Here, at the end of our journey, I had the opportunity to practice the slow pace of life that the river has taught me. It was as though we were entering a museum. The group grew silent as we were enveloped by the steep walls of the slot canyon. The delicate White Rim Sandstone walls folded and bended tenderly; the sliver of blue sky one can see from the sandy canyon floor illuminates the tall vertical walls, creating a striation of subtle lavenders, buttery yellows, indigo shadows, and persimmon orange. We walked, layers below the earth's surface in silent awe, following the gentle curves of the canyon. The textures ebb and flow as we move through the walls: from the side, gentle stripes moving with the flow of an ancient river. From below, layers stacked upon each other like a topographic map. In our silence, we wander breathing in the cool air and feeling channeled wind on our faces. The sounds of the canyon reverberate through its hallowed walls: the wind whispering from far above, the whistles of a classmate singing through the ripple marks. Deep within the earth, one feels a reverent presence and heightened intimacy with the land.

I am almost brought to tears as I remember a recent reading we had for class. The very layer I find so stunning, White Rim Sandstone, also holds one of the most valuable substances known to modern man: tar sands. This unconventional source of oil demands intense extraction methods, primarily strip mining, which would remove the many layers of the Dirty Devil that I have spent the last two weeks getting to know and understand. The canyon I stand in, the canyon I am so moved by; the most beautiful place I have ever been, now, teeming with juniper trees, asters, and many small creatures could be destroyed in order to fuel the world's ferocious demand for oil.

Utah's public lands, such as Happy Canyon, have a deep and complex history of extraction. The rapid boom and bust of the oil industry intertwines the state of Utah, the American government, and, most significantly, the people living in the rural towns of Utah. The development of the oil industry in this region will provide short-term jobs and long-term destruction of both the land and the people of the Colorado Plateau. As our lessons on WRFI have taught us about the resilience of both the people and land on the Colorado Plateau, I wonder what would happen if the fast-paced oil economy could understand the slow pace of the very canyon it is exploiting.

It is crucial, not only for the land, but also for the people of the Colorado Plateau, to establish resilience. As a place with massive untapped potential for exploitation, Utah stands in a

vulnerable position. With people making political and economic decisions about its lands that I worry do not come from a respect or understanding of these wild places.

Perhaps, if developers took a walk down the Dirty Devil River and Happy Canyon; if they knew each layer of the earth they saw; if they could name each flower under their foot and bird that flew overhead; if they saw the canyon for the teacher that it is and took the time to learn from it, in its slow, resilient beauty. If they took the time to notice; maybe, then they couldn't bring themselves to break its skin.

Bioregionalism

As the world becomes increasingly globalized, the necessity for *place dependence* (Masterson et al. 2017) becomes seemingly less crucial. The modern world relies on global resources and a complex interconnected capitalist-based system. Many researchers suggest that living and acting locally is a method for handling global issues such as climate change because it reduces and centralizes one's impact on a local scale; supporting a local economy and members of a community.

The practice of living and acting locally is often referred to as *Bioregionalism*, a concept that was popularized in the early 1970s, coined by Peter Berg as "a geographic area defined by natural characteristics, including watersheds, landforms, soils, geological qualities, native plants and animals, climate, and weather...[which] includes human beings as a species in the interplay of these natural characteristics" (Ewert, 2002). Author, Ipsita Sarkar also brings up a holistic definition: "A bioregion is defined by both ecological and cultural factors. The ecosystems and social institutions on which one directly depends for survival and wellbeing may be understood as one's bioregion...Usually a region is defined politically, ethnically, economically or through some other man-made dimension. A bioregion is in contrast, marked out in terms of its natural features like biotic communities, watersheds, terrain etc. The boundary of a bioregion is culturally determined by the people living inside rather than any scientist, expert or political leader from the outside. Although the boundary is culturally defined, it is done so on the basis of the natural features of the region, especially the ones which are most important for the local way of life" (Sarkar & Behura, 2018).

Most bioregional knowledge of places across the United States is based on the traditional ecological knowledge of various Indigenous groups. However, it has been estimated that nearly 90% of Indigenous bioregional knowledge will be lost by 2020 (McGinnis, 2000); (Sarkar & Behura, 2018). With it would be lost the stories of places and the culture and knowledge of plants and animals. Modern bioregionalism aims to not only protect this knowledge of ecological systems but keep alive these traditions that hold a wealth of place-based history and ideas. (Sarkar & Behura, 2018).

There have been a number of bioregionalists throughout the history and development of the United States who sought to develop the nation based on watersheds and other natural systems using ecologically based Bioregional ideas. For example, the New Deal proposal in the 1930s sought to separate the United States into major watershed basins for management of water and other resources (Berg, 1994). For a number of reasons, mainly, the rapid expansion that came with Manifest Destiny, the eradication of Indigenous groups and knowledge, the lack of colonial knowledge of North American geography, and the lack of efficiency in developing bioregionalized infrastructure and human systems, Bioregionalism was not fully considered or implemented in the development and expansion of the United States (Ewert, 2002). Currently,

the way that most human communities are designed is not based on natural systems, but rather, efficiency. Bioregional design and community development seek to bring humans to a more harmonious existence with nature (Young, 2000). As human society advances into a more climate-intense and anthropocentric future, bioregionalism offers an additional way to understand and analyze human systems, as well as a set of guidelines to inform developmental, political, economic, and environmental decisions (Ewert, 2002).

Sarkar presents two key terms central to the concept of bioregionalism: reinhabitation and identification. Reinhabitation refers to the process of becoming native to a life place, a key component of which is “applying for membership in a biotic community and ceasing to be its exploiter” (Sarkar & Behura, 2018, p. 179). This means forming relationships within an ecological community. Identification means being able to identify one’s self in a landscape and treat the ecosystem with such respect (Sarkar & Behura, 2019). Sarkar states that one of the likely causes of environmental degradation is the increasing distance between humans and nature. Changes in labor, farming techniques, the industrial revolution, and technological advancements all contributed towards this shift. This distance led to a psychological dissociation, in which human beings regard themselves as separate from and superior to nature (Sarkar & Behura, 2019). Ecocentric identity approaches, such as bioregionalism, invite humans to understand that they are not only a part of these systems but more so, are an integral component within the interlinked web of nature (Bretherton, 2001).

Despite its challenges, many believe that bioregionalism and sense of place refer to the necessary systemic change to increase adaptability while moving into a more climate-intense future. Masterson states that “sense of place is considered as a motivation for stewardship and actions to care for the environment; it is also presented as a cognitive and emotional variable that mediates how people respond to social-ecological change”(Masterson et al., 2017).

There are many ways to address and cope with the reality of the Anthropocene. Kuecker and Hall state that the key to surviving systemic collapse is to mitigate the severity of cyclical disturbance by enhancing system resilience, “the more complex systems become, especially in the conservation phase, the less resilient they are” (Kuecker & Hall, 2011). Meaning that the hyper-globalized modern world, an intricate and complex system, is not in fact resilient. In a globalized world, small communities hold resilience as well as the power to engender systemic reformation (Kuecker & Hall, 2011).

Kuecker and Hall state that there are three major paths to a more resilient society: “The first offers a continuation in our faith in modernity and its conservation phase, especially its paradigm of science and technology. The second path of non-capitalist, autonomous, small-scale, subsistence communities has demonstrated amazing resilience in a harsh world, one to a world that the conservation phase has often attempted to eliminate. The third path generated in semi-peripheral areas has two possible outcomes. First, we have shown that its informality is a remarkable emergent property that offers potential for resilience in collapse. As the system comes apart, humanity will increasingly rely on informality for survival. Yet, we have shown that informality is a significant factor in sustaining the overshoot of the conservation phase and may not be a sustainable solution to the problems we face. We also question if a release phase informality will bear resemblance to the community social scientists now theorize, and if the terms of its existence are even possible in a post-conservation phase world” (Kuecker & Hall, 2011).

A pressing and relevant example of bioregionalism is what has arisen as a result of the COVID-19 Pandemic. The world has been forced to radically localize in the past few months, as

leaving home becomes increasingly dangerous due to risk of exposure. As a result, many businesses have closed, resulting in the highest unemployment rate the country has ever seen. The pandemic is putting many systems to test, most notably, the economy and the health care system. Social systems are also struggling, as people are finding new ways to connect without entering physical proximity. In this time of uncertainty and chaos, we are called to lean on each other and the natural world in unprecedented ways. We are in the midst of collapse, but we are also establishing our values as people and working towards fostering resilience to this novel virus. We are fighting back for what we care about. We are redefining care, community, and collaboration. We are deciding what we want this new reality to look like.

Reyers, et.al (2018) conclude that there is a deep need for diverse values and beliefs that align with the dynamic connections between social and ecological systems (Reyers, Folke, Moore, Biggs, & Galaz, 2018). This will contribute to the overall resilience of a socio-ecological system and its abilities to absorb disturbance in the Anthropocene. While bioregionalism may be one solution for handling the impact of the Anthropocene, strategies for sustainability have no “one size fits all” approach. Complex systems are diverse and intricate, meaning it may take many different methods to develop systemic adaptability and resilience (Reyers et al., 2018).

The New Family Farm:

One of the most central examples of resilience and bioregionalism in my life is my relationship with the Intervale Community Farm.

After a harrowing first winter in the Northeast, one of the first things my family did when summer came was join a Community Supported Agriculture program (CSA) at the Intervale Community Farm (ICF). This membership provided access to a full season of produce to be picked up weekly from the Intervale’s lush para-urban location, nestled between Burlington and its sister city, Winooski, on the banks of the Onion River. Each week at pick-up, my family would bike, walk, or drive the half-mile commute from our house in the Old North End of Burlington to the vibrant haven of the Intervale. After making our way down a dirt road, dotted with signs stating, “Dusty Road!” and “Drive Slow: Farmers Can’t Breathe!” we would be greeted by the friendly faces of our farmers and the bustling community of ICF. There were tables of beautiful produce, a rainbow of colors. Ripe tomatoes, fresh French bread. There were families of all shapes and sizes. Children were playing on upcycled toys in fields of black-eyed susans and sunflowers. To a freshly transplanted family, this space not only provided locally grown food, just blocks away from our home, but it offered community. Through potlucks, dinners, parties, and playdates during pick up hours, the Intervale quickly became a sanctuary for my family and I; it was the first seed in developing our new home and our place within this community.

As a child growing up in a semi-urban town, the Intervale provided a place where I could get my hands dirty, climb trees, see how carrots grew, and watch bees pollinate flowers. Without knowing it, the Intervale taught me the fundamentals of ecology and agriculture; it taught me how the natural world works. The Intervale provided conversations with friends, fiddle music on a warm summer day. Most of all, it provided the feeling of nourishment through both land and community—something that remains essential in a rapidly industrialized human world. Spaces like this—that remind us how the world works, and that vibrant communities grow from the ground up—are a crucial element of a resilient society as we move into a more climate-intense, anthropocentric future. Throughout the twenty years of my family’s membership at ICF, I have

left pick-up each week feeling grounded, hopeful, and united within my community of people and within my sense of place in Burlington.

In its ecology, ICF is an incredibly adaptable and resilient system, as it lies in the flood plains of the Winooski River and experiences seasonal fluxes of disturbance, meaning farmers have to alter their farming practices in order to accommodate environmental factors. Sometimes farmers are forced to move because of the Intervale's unpredictable flood patterns. The Intervale property as a whole also demonstrates resilience because it has gone from being a natural area, to a public and industrial waste site in the early 20th Century, to then being the largest agricultural area in Burlington City Limits. The Intervale currently exists in a hybrid state of multiple uses, being a natural area, a public recreation site, and farmland. The ICF community also fosters resilience for its members. I have talked with a number of other CSA members who have all reported that ICF gives them hope for the future; that despite the formidable threats of climate change, political frustrations, or tumultuous home lives, the Intervale provides a space of community as well as a calm breath away from the chaos of life. It is a simple reminder of the powerful and grounding effects of community, agriculture, and, most notably, cultivating roots in a place.

As I have grown older, ICF continues to hold great importance in my life. It is my refuge, my place of knowing, it is where I feel connected and whole. Being just a short walk or bike ride from my home, the Intervale acts as a place of refuge when I need to step away from life. The looming hemlocks and snaking riverbed caress endless fields of farmland, with trails weaving in and out of open fields. The Intervale is a breath away from the city. Places like the Intervale are essential for all, especially those in more urban areas. Even the smallest sliver of nature can make a difference, all that matters is that it is there.

Acting within a biosphere is one of the modern challenges of the United States, as a country rooted in colonization. Sense of place and bioregionalism are just some of the pathways that inform resilience moving forward into the Anthropocene.

Systems

The power of holistic thinking:

In order to understand and mitigate human impact on the natural world, it is essential to understand the systems that make it function. Not only does systems thinking help us comprehend what is happening, it also allows us to trace problems, locate our role in a system, and formulate tangible actions. Daniel Christian Wahl (2002) states that "the only way is to start thinking about the universe is as a conversation, as a community of beings in interaction with each other, so each organism is acting and existing within the context set by all other organisms ... This is why we need the metaphor of the organism. An organism is both relationable and it has a certain integrity and identity" (Wahl, 2017). Other scholars in systems theory, such as Frances Moore Lappé (2014) describe the importance of contextualizing and understanding social issues by funneling through an ecosystems lens: "Since ecology is all about interconnection and unending change, creating patterns of causation that shape every organism and phenomenon, "thinking like an ecosystem" for me means living in the perpetual "why." It's keeping alive the two-year-old mind that accepts nothing simply as "the way it is" but craves to know how something came to be. It's understanding that all organisms emerge with specific potential, including the human organism, but its expression is enormously shaped by context" (Lappe,

2014). At its core, the human social system holds foundations in ecosystemic processes, it functions just as any other system, in loops and cycles of disturbance that cause shifts in its basic function.

Systems Theory: a launching point

Systems theory is a crucial method of understanding the way the world functions. It is the language that merges ecological and social systems into socioecological systems. Systems theory is also a way to simplify complex ideas into a more understandable framework. Donella Meadows (Meadows, 2009) states that “Systems thinking leads to another conclusion—however, waiting, shining, obvious as soon as we stop being blinded by the illusion of control. It says that there is plenty to do, of a different sort of “doing.” The future cannot be predicted, but it can be envisioned and brought lovingly into being. Systems can’t be controlled, but they can be designed and redesigned. We can’t surge forward with certainty into a world of no surprises, but we can expect surprises and learn from them and even profit from them. We can’t impose our will upon a system. We can listen to what the system tells us, and discover how its properties and our values can work together to bring forth something much better than could ever be produced by our will alone” (Meadows, 2009). Systems are inherently unpredictable and ever evolving, they are not something that humans *should* have control over, which is why the shift to the Anthropocene provokes concern. Rather than trying to control systems, Meadows suggests the concept of “dancing with systems” in order to flow with them:

1. *Get the beat.*
2. *Listen to the wisdom of the system.*
3. *Expose your mental models to the open air.*
4. *Stay humble. Stay a learner.*
5. *Honor and protect information.*
6. *Locate responsibility in the system.*
7. *Make feedback policies for feedback systems.*
8. *Pay attention to what is important, not just what is quantifiable.*
9. *Go for the good of the whole.*
10. *Expand time horizons.*
11. *Expand thought horizons.*
12. *Expand the boundary of caring.*
13. *Celebrate complexity.*
14. *Hold fast to the goal of goodness.*

In the context of the Anthropocene, and other massive global events, Meadows' approach offers the opportunity to surrender control. A central part of this theory is moving in conjunction with the system, adopting flexibility, and open-mindedness to its potential. Once control is surrendered, it allows for space beyond the anxiety of an unknown future.

Contextualizing systemic functions in the lens of ecosystems is an important way of viewing life on Earth and understanding the inner workings of both human and environmental communities. Michael K. Stone (Stone, 2012) brings to light how one might frame all systems within ecological principles.

These principles include:

Networks

- *All living things in an ecosystem are interconnected through networks of relationships. They depend on this web of life to survive. For example: In a garden, a network of pollinators promotes genetic diversity; plants, in turn, provide nectar and pollen to the pollinators.*

Nested Systems

- *Nature is made up of systems that are nested within systems. Each individual system is an integrated whole and—at the same time — part of larger systems. Changes within a system can affect the sustainability of the systems that are nested within it as well as the larger systems in which it exists. For example: Cells are nested within organs within organisms within ecosystems.*

Cycles

- *Members of an ecological community depend on the exchange of resources in continual cycles. Cycles within an ecosystem intersect with larger regional and global cycles. For example: Water cycles through a garden and is also part of the global water cycle.*

Flows

- *Each organism needs a continual flow of energy to stay alive. The constant flow of energy from the sun to Earth sustains life and drives most ecological cycles. For example: Energy flows through a food web when a plant converts the sun's energy through photosynthesis, a mouse eats the plant, a snake eats the mouse, and a hawk eats the snake. In each transfer, some energy is lost as heat, requiring an ongoing energy flow into the system.*

Development

- *All life — from individual organisms to species to ecosystems — changes over time. Individuals develop and learn, species adapt and evolve, and organisms in ecosystems coevolve. For example: Hummingbirds and honeysuckle flowers have developed in ways that benefit each other; the hummingbird's color vision and slender bill coincide with the colors and shapes of the flowers.*

Dynamic Balance

- *Ecological communities act as feedback loops, so that the community maintains a relatively steady state that also has continual fluctuations. This dynamic balance provides resiliency in the face of ecosystem change. For example: Ladybugs in a garden eat aphids. When the aphid population falls, some ladybugs die off, which permits the aphid population to rise again, which supports more ladybugs. The populations of the individual species rise and fall, but balance within the system allows them to thrive together.*

These ecological principles that Stone introduces provide an understanding and a launching point as to how systems theory may inform understanding and action.

Other systems thinkers, such as the renowned Fritjof Capra (Capra & Luisi, 2012), provides other ways of understanding the way systems function:

From parts to the whole

- *With any system, the whole is different from the sum of the individual parts. By shifting focus from the parts to the whole, we can better grasp the connections between the different elements*

From objects to relationships

- *In systems, the relationships between individual parts may be more important than the parts. An ecosystem is not just a collection of species but includes living things interacting with each other and their nonliving environment. In the systems view, the "objects" of study are networks of relationships*

From objective knowledge to contextual knowledge

- *Shifting focus from the parts to the whole implies shifting from analytical thinking to contextual thinking.*

From quantity to quality

- *Western science has often focused on things that can be measured and quantified. It has sometimes been implied that phenomena that can be measured and quantified are more important—and perhaps even that what cannot be measured and quantified doesn't exist at all.*
- *Some aspects of systems, however, like the relationships in a food web, cannot be measured. Rather, they must be mapped.*

From structure to process

- *Living systems develop and evolve. Understanding these systems requires a shift in focus from structure to processes such as evolution, renewal, and change.*

From contents to patterns

- *Within systems, certain configurations of relationship appear again and again in patterns such as cycles and feedback loops. Understanding how a pattern works in one natural or social system helps us to understand other systems that manifest the same pattern. For instance, understanding how flows of energy affect a natural ecosystem may illuminate how flows of information affect a social system.*

Systems theory can also be used and explained using visual metaphors. In the book *Resilience Thinking*, Walker and Salt (2006) present the *ball in the basin* to explain the concept of system thresholds. Crossing a threshold is an important part of any system and its development. It is a point of no return. Crossing points that have the potential to alter the future of many of the systems we depend upon and we often are not aware of them until they have been crossed. The ball in the basin metaphor can describe crossing a threshold. The ball represents the combination of the amounts of each of the variables the system currently has, or, the current state of the system. The ball is always striving for equilibrium; however, the state of equilibrium is constantly shifting, or in ecological terms, the external conditions impacting an ecosystem are constantly shifting. Resilience is the capacity of the ball to not shift into a new basin, or regime. The question is: how much change can occur without the system leaving the basin. When the

system enters a new regime, it has crossed a threshold and experienced a shift in its intrinsic function. Complex adaptive systems are able to remain in a regime longer because they are able to adapt to variant conditions, however, every system has a threshold that holds its leverage point. Thresholds and regime shifts can be positive or negative for a system, however, they are uncontrollable, unpredictable, and necessary for systems to evolve. (Walker, Salt, & Reid, 2006, p. 53)

The ball in the basin metaphor can be used to explain changes in any system, but it is especially relevant when referencing the shifts in Earth's epochs. The Earth moves through different regimes as time progresses, each regime, or epoch, being distinctly different and characterized by shifts in its basic function, the members of the system, and the environmental influences that impact the system. Each regime is neither bad nor good, it is merely different and has different implications for the future of the Earth. When pondering a stability landscape of the Anthropocene, this metaphor of the ball in the basin becomes especially relevant. The Earth is the ball and the shifts in regimes are the transitions of epochs. Currently, the Earth is exiting the threshold between the Holocene and the Anthropocene. Natural systems have adapted to the climate of the Holocene and are now being forced to adapt to the Anthropocene. A climate with higher temperatures, higher pollution levels, more humans, and less wilderness. We are at the point where systemic resilience occurs, and the human species is asked to redefine its basic function in order to not slip into a regime shift that will continue to force the natural world to change to accommodate human-made conditions.

Emergence and Panarchy

Emergence and Panarchy are both theories that recognize the scale and patterns of systems. Emergence is the process of small, simple interactions creating larger systems and is defined by Peggy Holman (2010) as “order arising out of chaos” or, to go more in-depth, “higher-order complexity arising out of chaos in which novel, coherent structures coalesce through interactions among the diverse entities of a system. Emergence occurs when these interactions disrupt, causing the system to differentiate and ultimately coalesce into something novel” (Holman, 2010). Emergence is the reaction and capacity of chaos to create a novel system with redefined values and functions. Adrienne Marie Brown (2017) states that “emergent strategy is a way that all of us can begin to see the world in life-code—awakening us to the sacred systems of life all around us” (Brown, 2017, p. 2) she further states that “emergence notices the way small actions and connections create complex systems, patterns that become ecosystems and societies” (Brown, 2017, p. 3). Brown proposes emergence as a new way of viewing the world, allowing us to open ourselves to the beauty of uncertainty as well as the cycle of change that is inherent to the Universe's functions.

Tracing all the way back to the beginning of the Universe, the Big Bang offers the most fundamental example of an emergent process. Out of an explosion came all of the elements of life as we know it. Small interactions between elements and forces coalesced to form further reactions, in this explosion, all matter, energy, space and time were created. Over time, these interactions coalesced to form atomic clouds, causing atoms to collect, which then became seedlings of galaxies in which stars began to form, providing heat that then formed all of the elements we now know out of Helium and Hydrogen. The elements became building blocks for planets and life as we know it today. The Universe is still expanding, and we are still products of this emergent process.

Emergence is where we come from and emergence is where we are going; we are a world defined by emergence. This path of emergence necessitates a systemic awakening to the reality of climate change. I wonder, what actions can we take towards a social revolution that, similarly to the natural revolution taking place, centers around emergence? Perhaps these steps start with the individual recognizing their role in the system. As a member, as a consumer, as a producer, and as a change maker. If each individual takes the time to acknowledge where they exist, where they can make change, where they can influence others, the wave of change will start to churn. However, this is not an individualist revolution, it is one that starts with the individual to create a collective that will then pressure the government, the policy makers, the economy, and the industry. The individualist mindset that brought us to where we are today is not the mindset that will lead us out of it. We must function as a system, just like every other ecosystem that exists in the world. We are part of a whole.

An approach to this transition embodies the philosophy of *panarchy*. Panarchy theory is “a systems-thinking adaptation of ecological and complexity theories that is used to explain “the evolving nature of complex adaptive systems” (Holling, 2001). It is a cycle that has an emergent function, continuously emitting novel systems as it evolves. Panarchy Theory highlights the concept that growth emerges from collapse and allows systems to strengthen their adaptive capacity. Within highly functioning systems, there comes a point when it spirals out of control. In this process of destruction, there is inevitable rebirth, there is eventual and probable resurgence, which will then give way to a new system. If the Anthropocene presents an inevitable collapse of social systems, what may arise on the other end? What are the seeds to be planted in the fresh soil of a new epoch?

Systems Theory and Panarchy are essential tools for navigating the transition to the Anthropocene. They provide context for understanding large scale problems, and for formulating large scale solutions. They provide an additional tool for communicating complex information about climate change, ecology, and society. Climate change is an issue that impacts every living thing on the planet, in order to form resilience in this transition, holding an in-depth knowledge grounded in systems and in place-based connection will guide the world through this regime shift, in an inclusive and equitable way.

Deep Time

“Our place is part of what we are. Yet even a “place” has a kind of fluidity; it passes through space and time... A place will have been grasslands, then conifers, then beech and elm. It will have been half riverbed, it will have been scratched and plowed by ice. And then it will be cultivated, paved, sprayed, damned, graded, built up. But each is only for a while, and that will be just another set of lines on the palimpsest. The whole earth is a great tablet holding the multiple overlaid new and ancient traces of the swirl of forces. Each place is its own place, forever (eventually) wild.”

– Gary Snyder 1994.

I was in the canyon country of southern Utah when I learned the word palimpsest. *Palimpsest* has been used to describe work by Leonardo Da Vinci in which he would overlay paintings to save canvases. The dictionary defines it as “something reused or altered but still bearing visible traces of its earlier form.” It is derived from the Greek word *palimpsestos*, from *palin* ‘again’ and *psēstos* ‘rubbed smooth.’ This word is also easily applied to the red rock

landscapes, for they are all palimpsests of use, showing nature and humans in their cycles. The layered landscape shows shifts in climate, the marks of creatures, ancient petrified trees, and the signs of humans who have lived here from thousands of years ago until the modern-day. In the canyons of the Colorado Plateau, history is continually being written and rewritten. The stratigraphic column shows eons of flux; the bones of the Earth show through the soil and represent change within deep time. As the canyons cut further into the Earth, one can see the changes in sedimentary layers, indicating different periods and environments. Tracks of dinosaurs cemented in sandstone next to fresh cougar tracks made that very morning. It makes me wonder what marks of ours will remain.

It was not until I entered the desert landscape that I began to understand the fluidity of rocks and realize just how small I truly am. On the East Coast, the grey stones that I grew up around seem like stagnant giants, frozen in time. In the redrock deserts, the ripples of ancient riverbeds are so clearly cemented in the sandstone, and the landscape, now parched, resembles the patterns and flows of the waters from which they were made.

The desert shows time, deep time. There is nothing more humbling than coming face to face with a rock that has existed since before there was life on earth. Deep time is a geologic concept used to describe the incomprehensibly vast existence of the universe. Humans especially have trouble understanding exactly how much time came before us. 13.8 billion years since the big bang. 4.5 billion years since earth's inception. 3.5 billion years since the first life on earth. 200,000 years since the first Homosapiens. 200 years since the Industrial Revolution. Geology is a way of tracing back Earth's history to understand past events, climates, and creatures. It can even show us the history of the Universe through the analysis of elements and events that have been captured in sedimentary layers.

At its core, the Anthropocene represents a largely geologic concept imbued with philosophical and cultural meaning. Will our marks remain? In millions of years, will the palimpsest of Earth's landscapes hold onto our history? Or, like, many, will it simply fade away? Is the age of human influence worthy of a title in this context? Perhaps the Anthropocene is not notable in a geologic time scale, one where many histories and stories are held, but I do have to say that it is significant in a human timescale. If anything, the Anthropocene matters for humans to take note at precisely how detrimental our actions are, that we may leave marks on Earth that will last for millions of years to come. In such a short time, our actions will leave ripples that radiate far into the future. The Anthropocene is our chance to decide exactly what we want those ripples to look like. How do we want to be recorded on this palimpsest?

Conclusions:

As I complete this project I am still left with many questions, but like I said, I have begun to open myself to the emergent process of wondering. As you finish reading this, I wonder what you are thinking, what you are left wondering. Do we have the same questions?

The Anthropocene is something I am still exploring and trying to find footing in. During my first college-level class when I was 16, seven years ago, I learned about the Anthropocene and I feel like I have been trying to understand it since. As a young person today, I wonder in which ways I can be a geologic force, broadcasting ripples in the hope of creating some type of change. This project is my first attempt at doing that, at providing my perspective and hopefully introducing some new ways of connecting ideas. The Anthropocene as a concept is still coming to fruition, but I do believe it is a crucial time to redefine our intentions as a species and the

impact that we want to have. It is time to reassess our relationship with the environment on all levels, it is time to address systemic issues with multifaceted approaches.

I also believe it is time to address problematic patterns of thought that have led us to where we are today. The problems we are facing will not be solved without thinking in new ways. My introduction of systems thinking, particularly binary patterns of thought, panarchy, and emergence are all concepts that have helped me understand different patterns in my life and ways I can locate myself in a system in order to make change. Through systems thinking, I have been better able to cope with fear, anxiety, and grief, particularly related to climate change.

I also wanted to introduce sense of place as an additional coping strategy for cultivating personal resilience and relationships to the world around you. I firmly believe that if one loves something, they will fight to protect it. I have had the immense privilege of falling in love with many landscapes, which I believe is the main reason why I am so interested in environmental topics. I do recognize that this is a privilege, but I do hope readers are left wanting to acknowledge and bring to fruition their own relationships with the natural world, however big or small.

Deep time is an additional way of thinking that has comforted me when thinking about larger concepts such as the Anthropocene. Deep thinking is not a way I have tried to erase agency from the human experience, but rather, on the personal level, it has freed me to think about how brief our existence truly is, as well as the potential held within the 100 or so years we may be on Earth. Rocks are something that have recently provided me with comfort. They are the most ancient beings on Earth and hold so much wisdom if only we listen.

Finally, I want to discuss the importance of communication. A key component in the transition to the Anthropocene is a clear, multi-level, anti-dichotomous method of communication. Lehtonen et al (2019) state that “for combating climate change, there is an urgent need to unleash the artistry, creative potential and emotionally engage every human-being in visualizing and acting out a vision of sustainable well-being. Arts can transform apathy and grief into joy and empowerment and bridge the gap between theory and practice. The concepts of sustainable development or a sustainable future can be re-embedded into the world and the practice of living by art-based learning. Arts can offer a space and provide means for the critical issues of climate change education through emotional involvement, personal meaning making, critical thinking, active agency and creative visioning. Arts widen the traditional ways of knowing as the rational, intuitive and embodied knowing are naturally co-operating and integrated in arts-based learning processes. Rational thinking can be enriched with imaginative, un- and preconscious material and, vice versa, scientific knowledge can serve as inspiration for artistic learning and investigative processes. Different artistic approaches and art-based methods can play an essential role in enabling education to support the cultural transformation necessary to achieve sustainability.” (Lehtonen et al, 2019, p. 358). In the Anthropocene, a problem unlike any other we have faced as a society, having this type of novel discourse remains essential.

APPENDIX C: SAMPLE CHAPTER

PAGES 1-20

THE GEOGRAPHY OF HOME
Systems Awareness In A Changing World

Eleanor B. Connolly

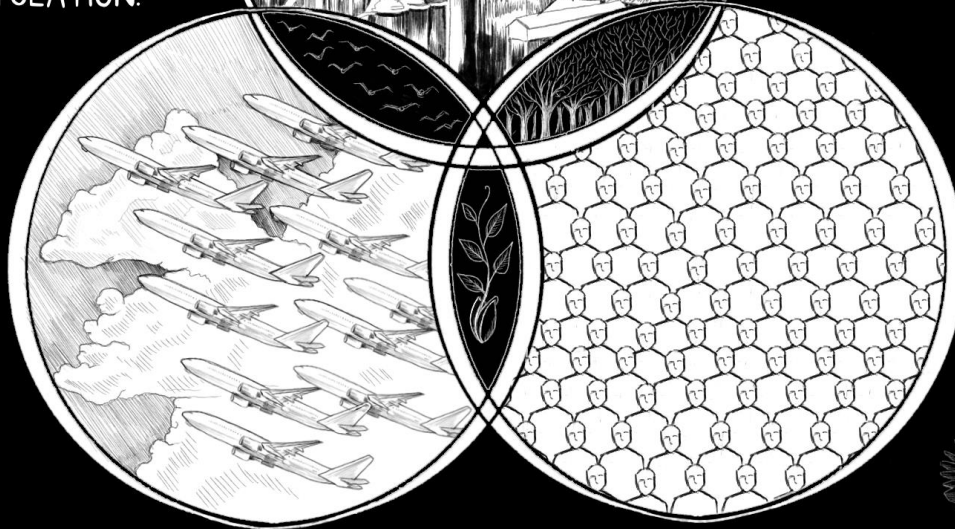
HUMAN-CAUSED
CLIMATE CHANGE HAS
INFLUENCED THE
NECESSARY AND
TIMELY DECLARATION
OF A NEW GEOLOGIC
EPOCH, THE
ANTHROPOCENE



MAINLY THROUGH
MASS-
INDUSTRIALIZATION,
GLOBALIZATION,
AND A SIGNIFICANT
INCREASE IN
POPULATION.



THE ANTHROPOCENE
DESCRIBES A CRITICAL
TIME FOR THE PLANET,
FOR ITS DEFINITION
IMPLIES THAT HUMANS
HAVE CAUSED AN
UNNATURAL SHIFT IN
EARTH'S BASIC
FUNCTIONS

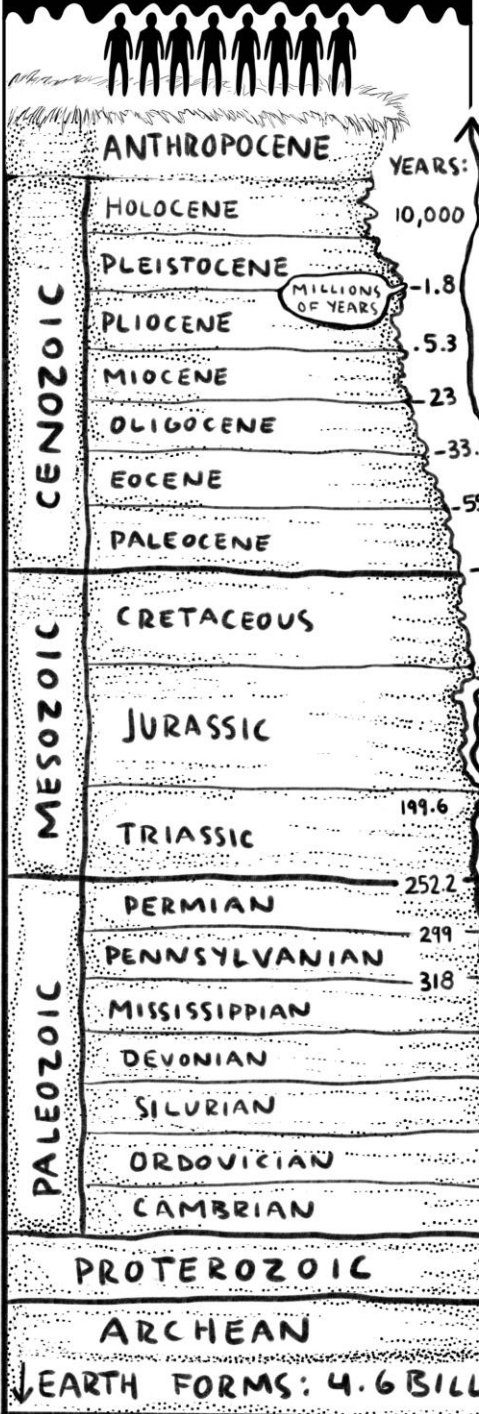


MANY DESCRIBE THE ANTHROPOCENE AS A
TURNING POINT FOR THE WORLD, AND A TIME
FOR THE HUMAN SPECIES TO REINSTATE AND
REEVALUATE THE SYSTEMS THEY CREATED
THAT ARE NOW CAUSING HARM TO THE EARTH.

THE ANTHROPOCENE IS A TERM INTRODUCED AS "A DIVISION IN THE GEOLOGICAL PERIODIZATION OF EARTH'S HISTORY..."

THAT SEPERATES THE CURRENT TIME OF GLOBAL HUMAN IMPACTS

FROM THE MOST RECENT GEOLOGICAL EPOCH, THE HOLOCENE,

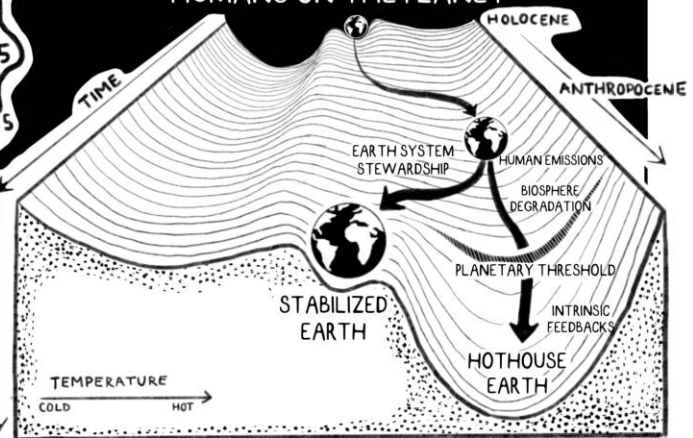


WHICH SPANS APPROXIMATELY THE LAST TEN THOUSAND YEARS.*

*(ANDREW, 2016)

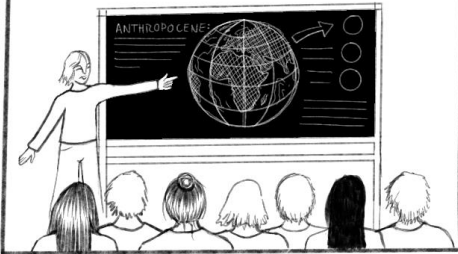
*(STEFFEN, 2018) ↓

THIS SHIFT IN EPOCHS SIGNIFIES THE IRREVERSIBLE AND SYSTEMIC IMPACT OF HUMANS ON THE PLANET



THE ANTHROPOCENE WARRANTS NEW WAYS FOR HOW HUMANS RELATE TO AND INTERACT WITH THE EARTH

I FIRST LEARNED
OF THE
ANTHROPOCENE
WHEN I WAS
SIXTEEN.



IT WAS PRESENTED TO ME
AS SOMETHING THAT
WOULD INEVITABLY
ALTER LIFE AS WE KNOW
IT



AS A TEENAGER WHOSE
UPBRINGING CENTERED AROUND
THE REALITY OF CLIMATE
CHANGE, I ASSUMED IT MEANT
THE RISE OF HUMANS AND THE
FALL OF NATURE



THIS WAS AN
INTERESTING
CONTRADICTION
IN WHICH TO
FIND MYSELF...

SIXTEEN: ON
THE VERGE OF
LIFE

THE
ANTHROPOCENE:
AN INEVITABLE
COLLAPSE

4

SINCE THEN, I
HAVE LEARNED
THAT THE
ANTHROPOCENE
DOES NOT EQUATE
TO THE END OF
THE WORLD,

MOST
CENTRALLY, IT
DICATES A
TURNING POINT
OF HUMAN
IMPACT.

THE ANTHROPOCENE IS A RICH CONCEPT,
BURSTING WITH SCIENCE, PHILOSOPHIES,
THEORIES, CREATIVITY, AND LIFE.

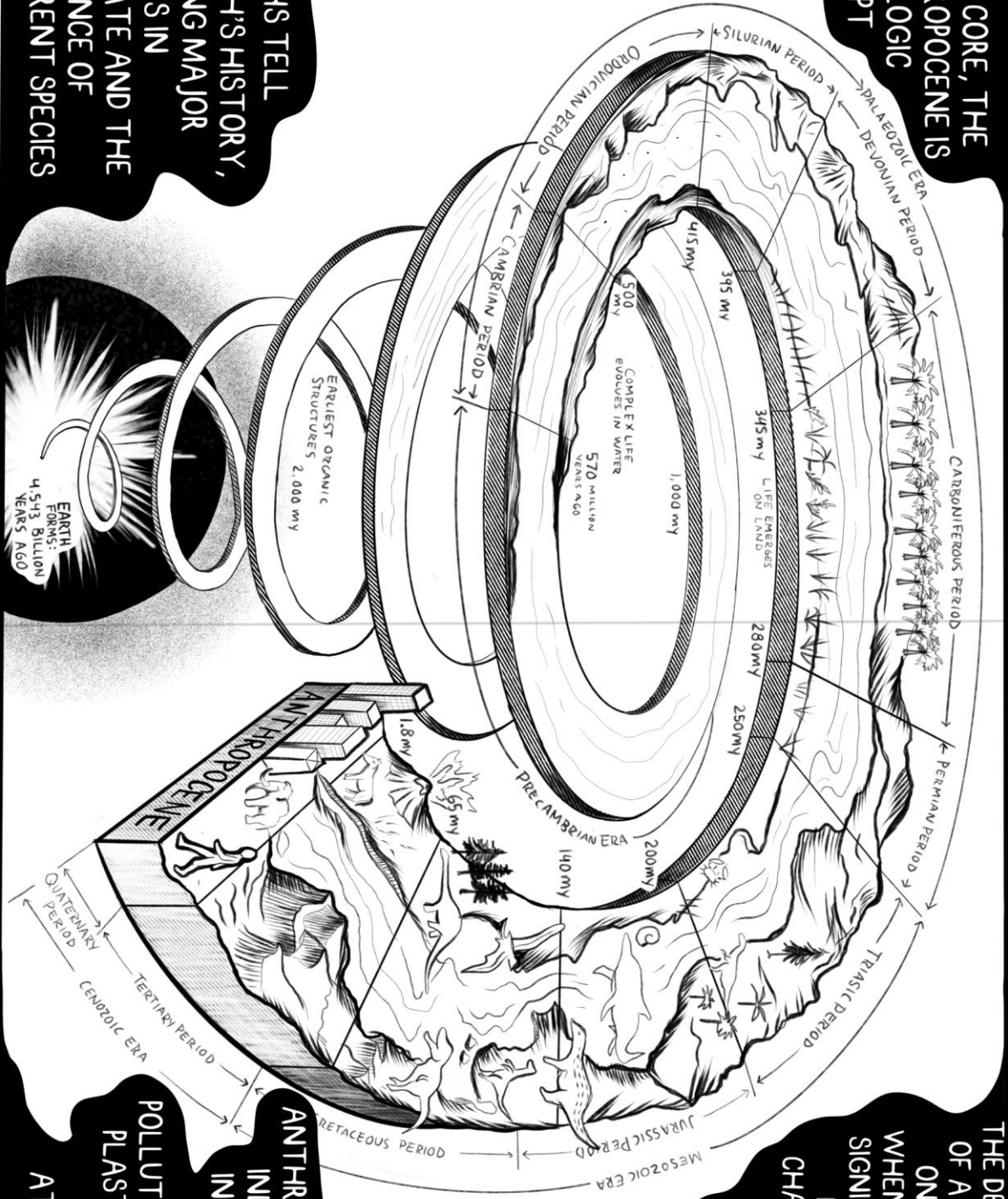


IT IS FULL OF POTENTIAL

PERHAPS, I HOPE, IT WILL BRING REALIZATIONS

AT ITS CORE, THE ANTHROPOCENE IS A GEOLOGIC CONCEPT

EPOCHS TELL EARTH'S HISTORY, NOTING MAJOR SHIFTS IN CLIMATE AND THE PRESENCE OF DIFFERENT SPECIES



THE DECLARATION OF A NEW EPOCH ONLY HAPPENS WHEN THERE IS A SIGNIFICANT AND NOTICEABLE CHANGE IN THE MAKEUP OF SEDIMENTS

THE ANTHROPOCENE IS INDICATED BY INCREASES IN TOXINS, POLLUTANTS, AND PLASTICS IN THE SOIL AND ATMOSPHERE



THE QUESTION OF OFFICIALLY DECLARING THE ANTHROPOCENE IS STILL A LARGELY DEBATED TOPIC,

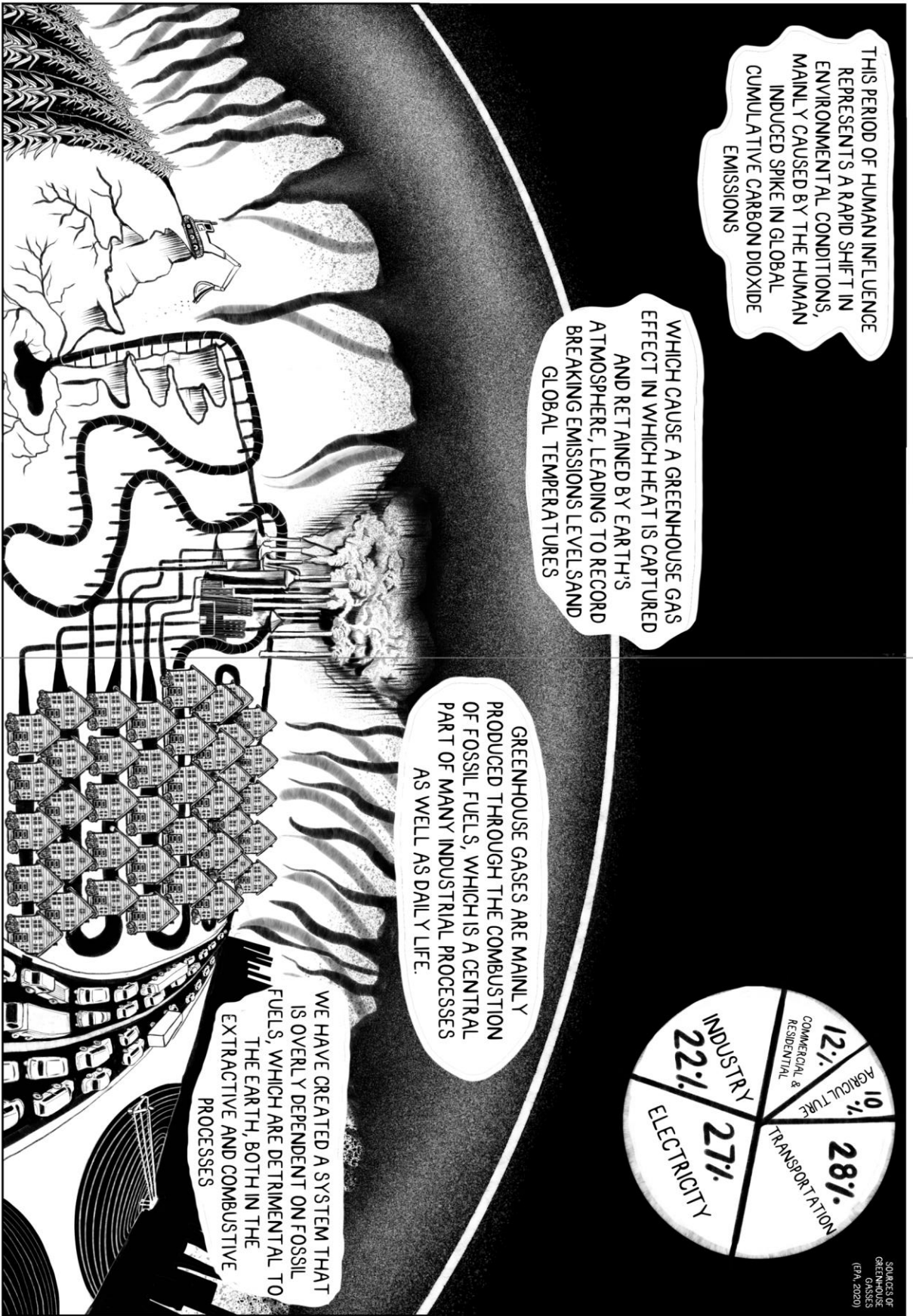
WITH MANY ARGUING THAT HUMANS HAVE SIMPLY NOT EXISTED LONG ENOUGH FOR AN ENTIRE EPOCH TO BE DEDICATED TO THEM.

MOST SCIENTIFIC GROUPS CONTINUE TO ARGUE AGAINST THE DECLARATION OF THE ANTHROPOCENE,

STATING THAT THE EXPANSION OF HUMAN CIVILIZATION COULD BE CONSIDERED AN EVENT, BUT NOT AN EPOCH.

WHILE THOSE OUTSIDE OF HARD SCIENCE FIELDS ARGUE THAT, DESPITE THE SHORT TIME THAT HUMANS HAVE EXISTED,

THEIR IMPACT ON THE PLANET AND NATURAL FORCES IS ENORMOUS AND DESERVES SOME LEVEL OF ACKNOWLEDGMENT.

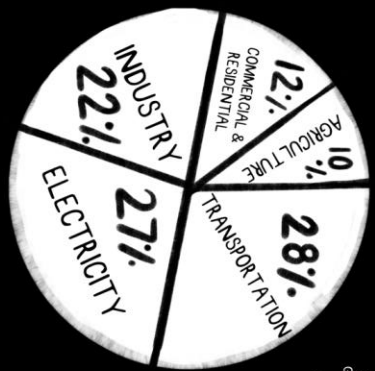


THIS PERIOD OF HUMAN INFLUENCE REPRESENTS A RAPID SHIFT IN ENVIRONMENTAL CONDITIONS, MAINLY CAUSED BY THE HUMAN INDUCED SPIKE IN GLOBAL CUMULATIVE CARBON DIOXIDE EMISSIONS

WHICH CAUSE A GREENHOUSE GAS EFFECT IN WHICH HEAT IS CAPTURED AND RETAINED BY EARTH'S ATMOSPHERE, LEADING TO RECORD BREAKING EMISSIONS LEVELS AND GLOBAL TEMPERATURES

GREENHOUSE GASES ARE MAINLY PRODUCED THROUGH THE COMBUSTION OF FOSSIL FUELS, WHICH IS A CENTRAL PART OF MANY INDUSTRIAL PROCESSES AS WELL AS DAILY LIFE.

WE HAVE CREATED A SYSTEM THAT IS OVERLY DEPENDENT ON FOSSIL FUELS, WHICH ARE DETRIMENTAL TO THE EARTH, BOTH IN THE EXTRACTIVE AND COMBUSTIVE PROCESSES



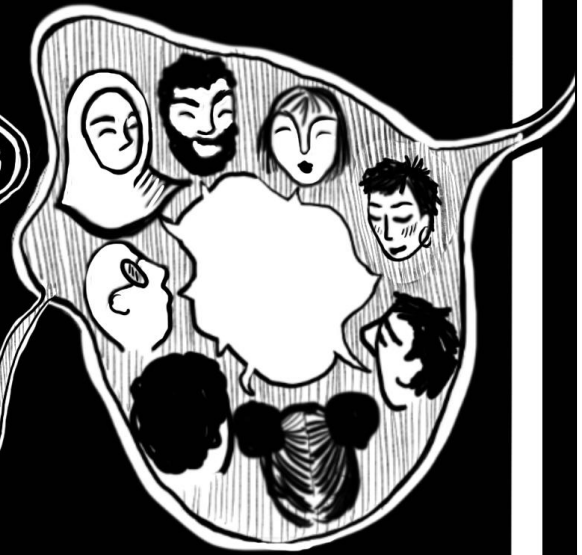
SOURCES OF GREENHOUSE GASES (EPA, 2020)



THIS RISE IN
TEMPERATURES
IMPACTS EVERY
LEVEL OF HUMAN
AND NATURAL
SYSTEMS

THIS IS THE COMPLEXITY
OF THE ANTHROPOCENE.
IT IS A RESULT OF SOCIAL
ISSUES WITH SCIENTIFIC
IMPLICATIONS.

THEREFORE, IT IS NOT SOMETHING THAT CAN BE ADDRESSED OR SOLVED USING ONLY THE LANGUAGE OF SCIENCE



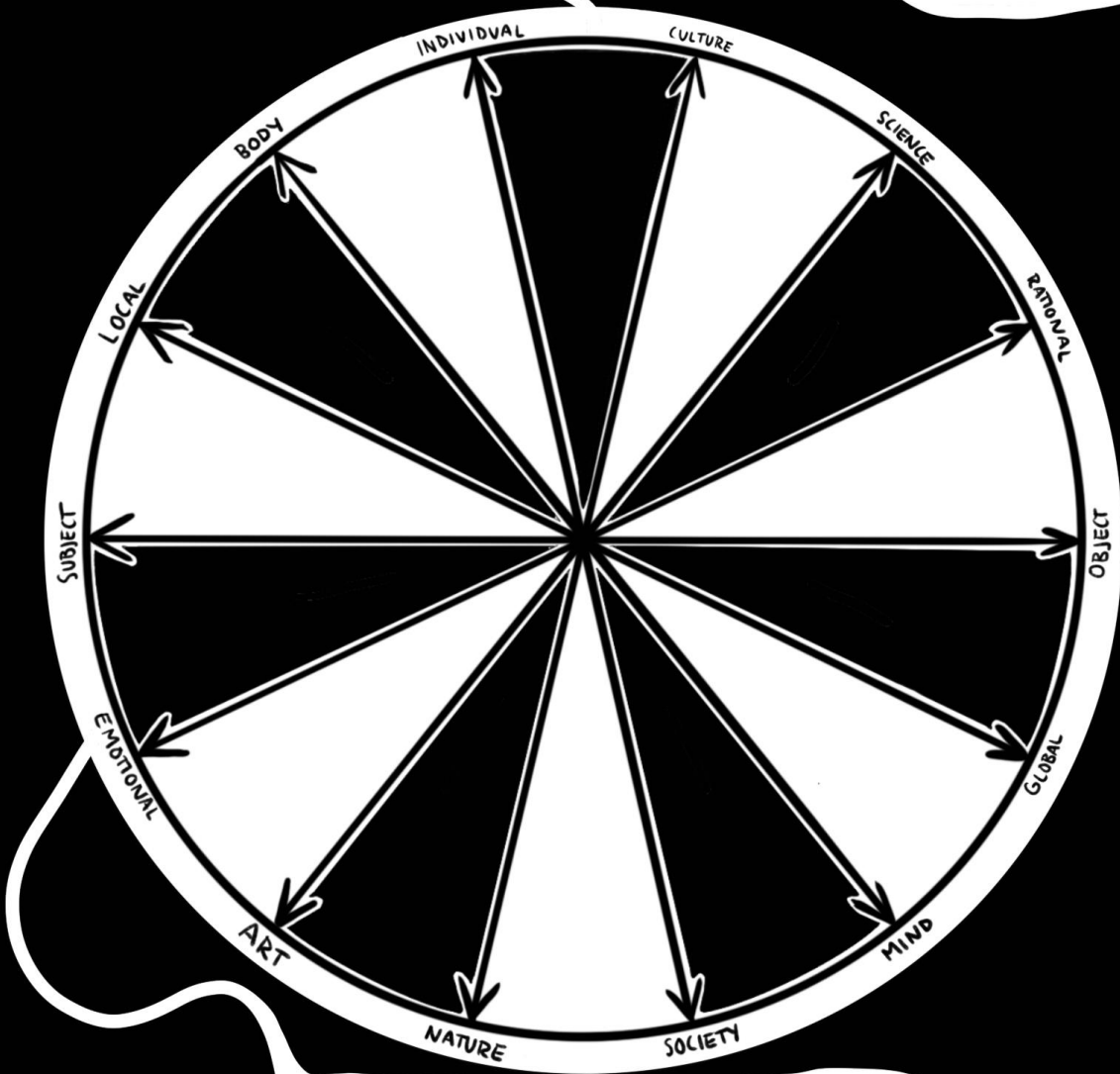
IT MUST BE DISCUSSED IN RELATION TO INDUSTRY, THE ECONOMY, POLITICS, CONSUMERS, RACE, CLASS, GENDER, AND IDENTITY



IT IS A MULTI-LEVEL SYSTEMIC CONCEPT THAT DESERVES A MULTI-LEVEL SYSTEMIC APPROACH

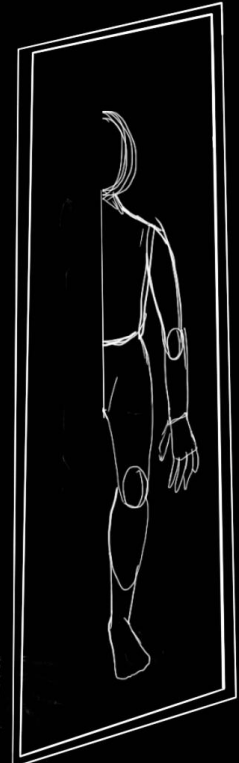
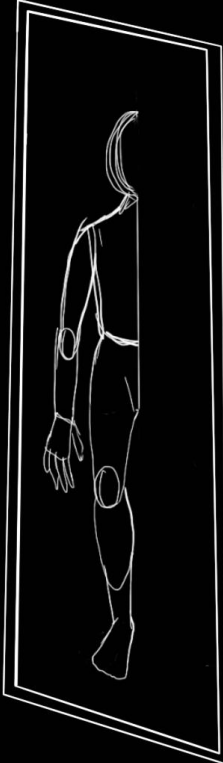
THE ANTHROPOCENE IS ALSO EVIDENCE OF THE FRAGILITY OF HUMAN PATTERNS OF THOUGHT AND THE SYSTEMS WE HAVE CREATED.

LEHTONEN (2018) PRESENT THE IDEA THAT TODAY'S PREVAILING MODERN THINKING CENTERS AROUND DICHOTOMIES.

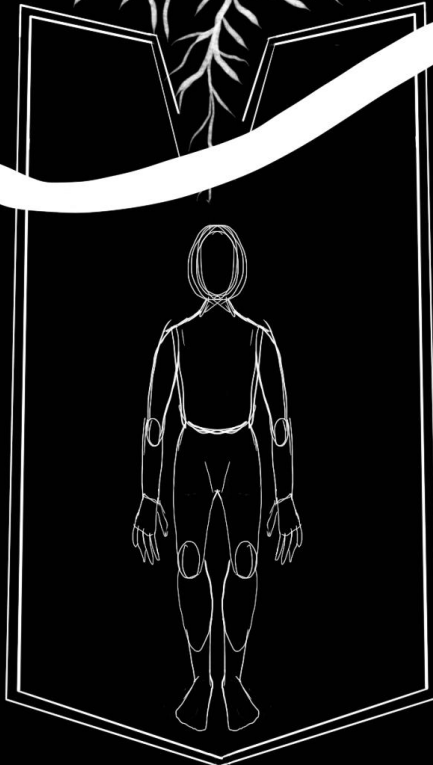


THESE DICHOTOMIES "GUIDE OUR PROBLEM SOLVING STRATEGIES AND MANAGEMENT OF LIFE, HOW WE RELATE TO THE WORLD, AND HOW WE PERCEIVE RELATIONSHIPS BETWEEN THINGS"

THESE AUTHORS SUGGEST THAT THIS WAY OF THINKING HAS LED TO THE CURRENT GEOLOGIC EPOCH OF THE ANTHROPOCENE IN WHICH HUMANS SEE THEMSELVES SEPARATELY FROM NATURE



DICHOTOMOUS THINKING RESULTS IN SEPERATING SYSTEMS THAT FUNCTION RELATIONALLY AND VIEWING THE WORLD THROUGH AN INDIVIDUALIST LENS



LEADING TO A MINDSET THAT IS AMBIVALENT TO THE SYSTEMS THAT MAKE THE WORLD FUNCTION

AUTHOR,
JOANNA MACY,
SUGGESTS



THE
ANTHROPOCENE
IS AN
OPPORTUNITY
FOR A SOCIETAL
SHIFT, NAMED:

“THE
GREAT
TURNING”

MACY PROPOSES THE
GREAT TURNING AS A
TITLE FOR THE SHIFT
FROM THE INDUSTRIAL
GROWTH SOCIETY



TO A LIFE-
SUSTAINING
CIVILIZATION

SHE SUGGESTS
THAT A
REVOLUTION IS
UNDERWAY
BECAUSE PEOPLE
ARE REALIZING
THAT OUR NEEDS
CAN BE MET
WITHOUT
DESTROYING THE
WORLD



WE HAVE
ALL THE
TOOLS WE
NEED



SHE PROVIDES THE THREE DIMENSIONS
OF THE GREAT TURNING:

1. ACTIONS TO SLOW THE DAMAGE TO EARTH AND ITS BEINGS, WHICH INCLUDES ALL POLITICAL, LEGISLATIVE, LEGAL WORK, AND CIVIL DISOBEDIENCE TO REDUCE DESTRUCTION.

2. ANALYSIS OF STRUCTURAL CAUSES AND THE CREATION OF STRUCTURAL ALTERNATIVES. THIS STEP INCLUDES UNDERSTANDING EARTH'S SYSTEMIC DYNAMICS AS WELL THE FUNCTIONING OF HUMAN SYSTEMS THAT LEAD TO DESTRUCTION, MAINLY CAPITALISM AND THE INDUSTRIAL GROWTH SOCIETY. PART OF THIS STEP ALSO INCLUDES INTRODUCING STRUCTURAL ALTERNATIVES TO DESTRUCTIVE SYSTEMS.

3. THE FINAL STEP IS A SHIFT IN CONSCIOUSNESS. WE MUST DEEPLY INGRAIN THE PREVIOUSLY STATED VALUES FOR EARTH STEWARDSHIP, IN BOTH COGNITIVE REVOLUTION AND SPIRITUAL AWAKENING. A FEW KEY PARTS OF THIS STEP INCLUDE GENERAL LIVING SYSTEMS THEORY, DEEP ECOLOGY, ECOPSYCHOLOGY, AND ECOFEMINISM.

PERHAPS THE ANTHROPOCENE IS AN OPPORTUNITY FOR REVOLUTION

AS DONELLA MEADOWS STATES, IT IS A LEVERAGE POINT



“A PLACE WITHIN A COMPLEX SYSTEM...

...WHERE A SMALL SHIFT IN ONE THING ...

...CAN PRODUCE BIG CHANGES IN EVERYTHING.”

WHAT ARE THE LEVERAGE POINTS OF THE ANTHROPOCENE?

OR IS THE LEVERAGE POINT MERELY IN ITS ACKNOWLEDGMENT ?

THE DECLARATION
OF THE
ANTHROPOCENE IS A
CALL FOR SYSTEMIC
AWAKENING



APPENDIX D: ORIGINAL PROPOSAL (March 2019)

Coming of Age in a Changing Climate: An Illustrated Thesis

Eleanor (Lena) Connolly
eleanor.connolly@uvm.edu
Sponsor: Amy Seidl
June 2019-May 2020

Project Description:

My first language is art. It's how I comprehend the world and communicate my interpretations of it. Art paired with words has the remarkable power to tell a holistic story by giving one the ability to communicate ideas they would not otherwise be able to. Through this capstone project, I will have the support to write and publish my first graphic novel about what it means to develop a sense of place in the rapidly changing climate of the Anthropocene.

For me, the place where art and words most meaningfully collide is in graphic novels. Throughout my life, I have always been intrigued by comic arts. I taught myself how to draw when I was a child by tracing comics in the Burlington Free Press. Since then, I have been obsessed with the art of telling stories through comics. Lately, I have been enthralled by graphic memoirs, an autobiographical genre of graphic novels that involves written stories and drawings of personal events. This genre has the capacity to explore memory, history, family dynamics, physical and mental health, and identity all in the context of a personal narrative. Within this genre, I believe there are countless tools for visual communication and opportunities for layered storytelling that simply are not possible in solely written language. Graphic memoirs give the author the agency and ability to illustrate their own viewpoint in a distinctive way. Graphic novels that have deeply resonated with me include *Fun Home* by Alison Bechdel, *Blankets* by Craig Thompson, *The Best We Could Do* by Thi Bui, *Rx* by Rachel Lindsay, and *You and a Bike and a Road* by Eleanor Davis. It is my dream, as an artist and writer, to produce a piece of work as profound and impactful as the graphic novels that I have spent my life reading.

As a graduation requirement for the UVM Environmental Studies Program, each student must complete a capstone project that culminates their gained knowledge and allows for further rumination on interests they have cultivated during their time as an undergraduate. This endeavor has always been in the back of my mind: how could I combine my knowledge and interest in my environmental studies major with my life-long passion for art? One day, I realized that writing my thesis in the form of a graphic novel would be the perfect way to illustrate what I have learned in school and an excellent step to propel me into my future career exploring the nexus of environment and art. I have always wanted to write a graphic novel and the Ian Worley Award will give me the support and freedom to take on this project for my senior thesis, something I would not otherwise be able to do given my financial and time-related constraints.

My idea for writing a graphic novel for my thesis is a creative way of discussing environmental topics with the overarching theme of what it means to develop a sense of place in the Anthropocene. I hope to elucidate the transdisciplinarity of numerous environmental issues and social justice topics through personal narratives, illustrations, academic literature, and scientific data. I will address these themes through topics that I have learned about in my courses

that included *Ecofeminism, Environmental Art: Field and Studio, Environmental Policy, Media Literacy, and Activism, Land and Food Justice Movements, Transforming Food Systems, The Anthropology of Food, Bees and Society, Human Ecology, and Seminar in Climate Change.*

The list of topics I want to address is quite broad, and I hope that by starting my project this summer, I will be able to specify and anchor my interests into a concise and approachable thesis. My studies over the last few years have primarily focused on food systems and environmental justice; the intersection of these two topics will become the main focus of the graphic novel. I anticipate that many of my interests will be deepened over the next two months as I participate in a program with the Wild Rockies Field Institute where I will gain hands-on, immersive experience overlaid by these concepts. I also hope to explore the theme of restoration within environment and culture through examining the interconnections of restoration ecology, regenerative agriculture, and restorative justice. I would also like to interview and research organizations such as Soul Fire Farm, The Intervale Center's farm incubator program, Pine Island Goat Farm, Digger's Mirth Collective Farm, and Wild Roots farm that are all establishing a connection between communities and land as a therapeutic method of regaining identity and agency in traditionally marginalized communities. My exploration of these themes will be done so through interviewing members of agrarian and environmental communities as well as analyzing my own experiences in academia, the outdoors, and in the communities that have been particularly influential in contributing to my sense of place.

I think that a graphic novel is an ideal way to tell this type of story because it is an art form as intersectional as the topics I will be discussing. I have been making art throughout my life and feel that I have the necessary technical skills to take on such a large visual project (see attached art samples). Additionally, I took a graphic novel writing class through Burlington City Arts from January to March 2019. In this short course, I began to learn how to structure and layout a comic as well as how to design characters and fonts. I also feel that I have the skills to write this after working as a writing tutor at my previous school, College of the Atlantic, and taking several writing courses that focused on building language, voice, and structure. As for the topic matter, I feel that I have enough experience in the environmental field to tell this story. I attended two environmental and social justice-focused semester schools in high school (The Conserve School and The Woolman Semester School); I've worked as an outdoor trip leader at several institutions; I attended the College of the Atlantic for a year to study human ecology and food systems; I've worked on two different farms, I have taken numerous environmental courses while attending UVM for the last two years; and I will be studying abroad with the Wild Rockies Field Institute this semester. I believe that I am qualified to complete this project for a number of reasons. My passion for the environment runs deep; it is as much a part of my personal life as it is part of my academic life. My most meaningful personal growth stems from experiences in the natural world. The environment is and continues to be my catalyst for coming of age.

Writing a graphic novel is no small feat. It takes some authors the better part of a decade to complete one, for others, it takes months. I think a realistic goal for me, given the timeframe, would be to write a shorter graphic novel, between 50-75 pages. If I receive this award, I would be able to start my project early this summer and continue to work on it through the 2019-2020 academic year until my graduation in May 2020. I would hope to spend this summer doing research and going on small trips around New England while being based in Burlington. This research would include interviewing farmers, members of the Vermont food system, my peers, as well as leaders in food justice (such as Leah Penniman of Soul Fire Farm, Jon Turner of Wild Roots Farm, those involved with Migrant Justice, members of the Northeast Organic Farming

Association and the Maine Organic Farmers and Gardeners Association) who have used farming as a tool for empowerment in marginalized groups. I would also like to speak with authors who have successfully written graphic novels as well as other comic artists. These experiences will give me the tools and mentorship that I need to get a jump start on this project as well as academic research that will ground my thesis.

After completing the project, I will have a printed illustrated thesis in the form of a graphic novel that demonstrates my personal understanding of sense of place within environmentalism from the viewpoints of food systems, colonization, environmental justice, restorative justice, ecofeminism, social justice, and environmental art. I envision this capstone endeavor to be a catalyst for other people to understand and ponder their own sense of place as well as how it has developed and shifted over time in the historical, cultural, and environmental context of the Anthropocene.

definition implies that humans have caused an unnatural shift in Earth's basic functions, mainly through mass-industrialization, globalization, and a significant increase in population. Many describe the Anthropocene as a turning point for the world, and a time for the human species to reinstate and evaluate the systems they created that are now causing harm to the Earth.

The Anthropocene is a term introduced as "a division in the geological periodization of Earth's history that separates the current time of global human impacts on the planet's environmental systems from the Holocene, the most recent geological epoch that spans approximately the last ten thousand years" (Andrew, 2016). This shift in epochs signifies the irreversible and systemic impact of humans on the planet. It is a term that warrants new relationships between how humans relate to the planet and indicates the domination of the human species on natural systems.

I first learned of the Anthropocene when I was sixteen. It was presented to me as a drastic change that would inevitably alter life as we know it, whether positively or negatively. As a teenager whose upbringing centered around a future of climate change, I assumed it meant the rise of humans and the fall of nature. I imagined a future I had only seen in dystopian films, one in which the air was thick and grey, where humans lived ~~in bubbles~~, sealed off from toxins in the atmosphere. Where fresh produce was hard to come by and corporations pumped the Earth full of poisons so volatile that they eradicated any trace of life. This was an interesting contradiction in which to find myself: sixteen, on the verge of life. The Anthropocene: an inevitable collapse. I cannot help but think my identity was altered by this realization.

[Since then, I have learned that the Anthropocene is not the end of the world, it is a declaration of human influence. The Anthropocene can mean many different things, but most centrally, it dictates a turning point of human impact. One that proves how long-lasting our presence will be. The Anthropocene is a rich concept, bursting with science, philosophies, theories, creativity, and life. It is full of potential. Perhaps, I hope, it will bring realizations. Realizations of how detrimental our capitalist, colonial, domination-based lifestyle is for the planet. Perhaps we will realize that we are part of the nature we've spent so long distancing ourselves from. Perhaps we will learn from the past in order to shape our future, recognizing the patterns of thought that have led us to where we are today.

The Science of the Anthropocene

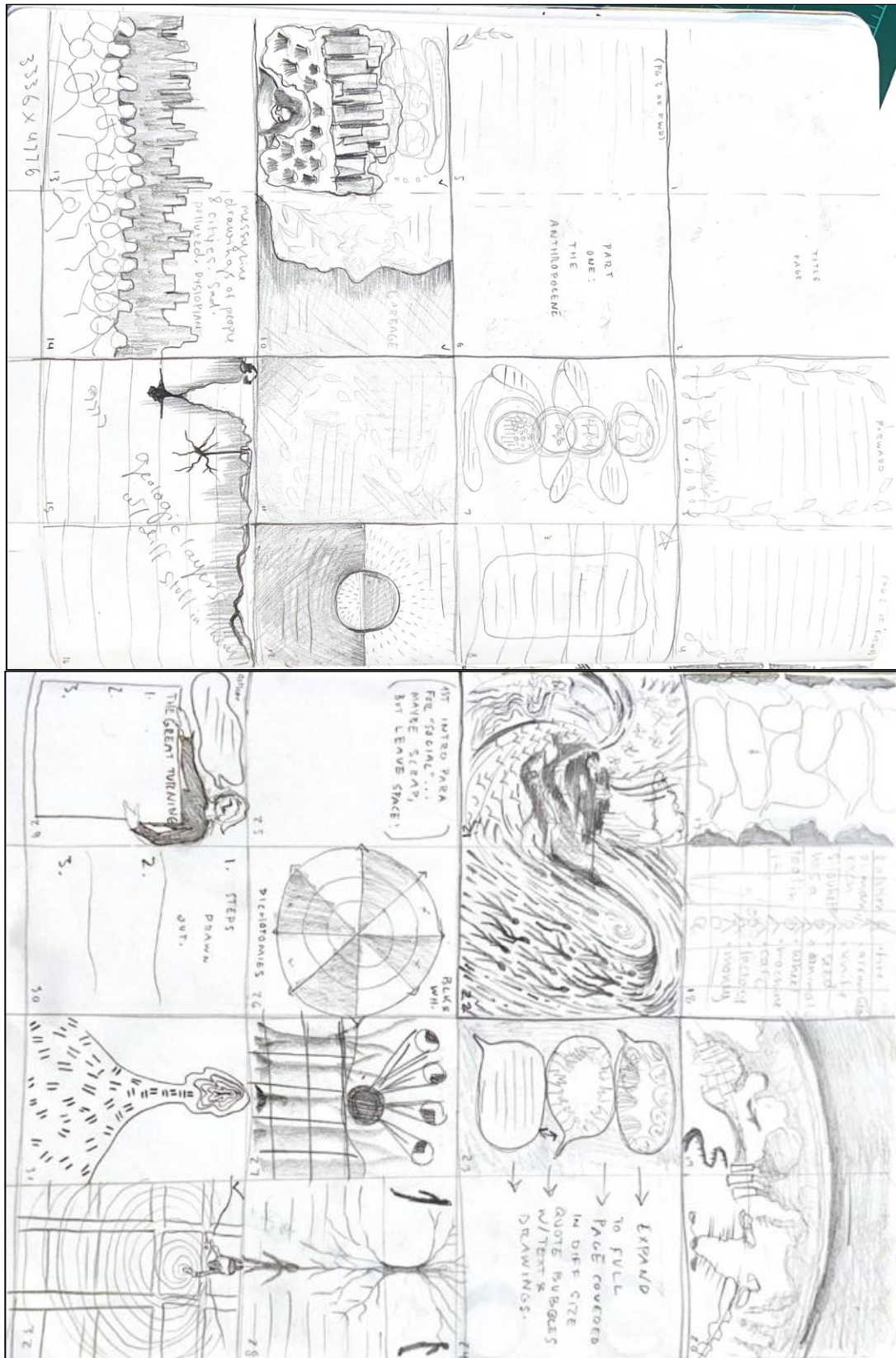
At its core, the Anthropocene is a geologic concept. It is the declaration of a new epoch, indicated by notable shifts in Earth's sedimentary layers. Epochs tell Earth's history, noting major events, shifts in climate, and the presence of different species. The declaration of a new epoch only happens when there is a significant and noticeable change in the makeup of sediments; the Anthropocene is indicated by increases in toxins, pollutants, and plastics in the soil and atmosphere.

[There is much debate amongst the scientific community about when—or if— the Anthropocene actually began. The question of officially declaring the Anthropocene is still a largely debated topic, with many arguing that humans have simply not existed long enough for an entire epoch to be dedicated to them. Most scientific groups continue to argue against the declaration of the Anthropocene, stating that the expansion of human civilization could be considered an event, but not an epoch. While those outside of hard science fields argue that, despite the short time that humans have existed, their impact on the planet and natural forces is enormous and deserves some level of acknowledgment.]

Handwritten notes and diagrams:

- Top right: A vertical chain of five circles with arrows pointing outwards from each.
- Right margin: "maybe *diff. TEXT w/ geologic layers & kgnd"
- Left margin: "Cut... maybe don't... slow down... tell."
- Left margin: "turning pt Footprints" with a drawing of two footprints.
- Right margin: "FACES. MESSY. SCARY." with a drawing of four faces in a grid.
- Right margin: "THIS SHOULD BE LAYERED IMAGE" with a drawing of a layered rectangular shape.
- Bottom right: "overwhelming discourse" with an arrow pointing to the text.

APPENDIX F: STORY BOARD/ THUMBNAIL

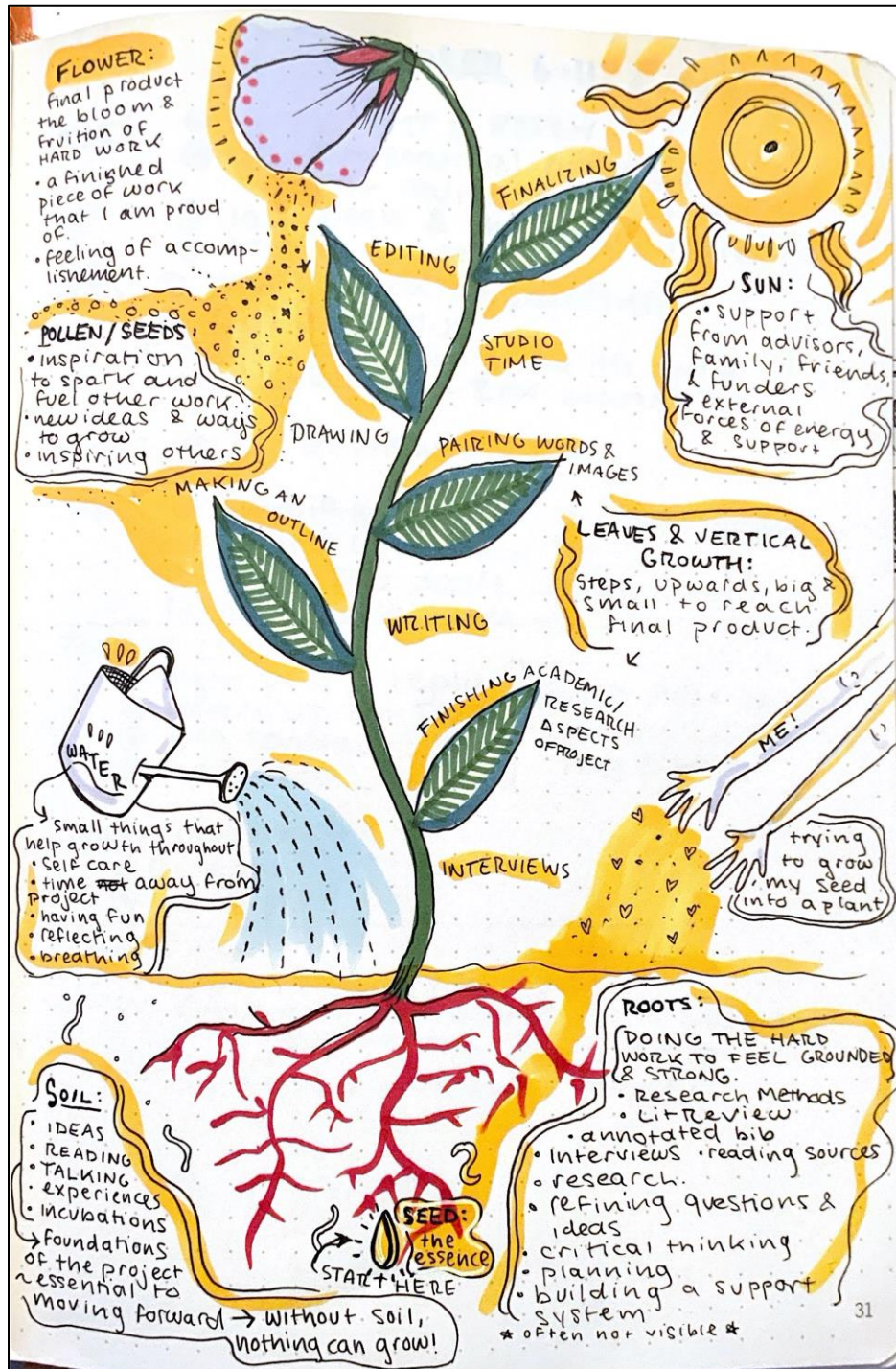


APPENDIX G: VIDEO OF PAGE CREATION

To watch video (below) follow link:

https://drive.google.com/file/d/1PJy2ODMyDxZ1wYBrhnbVNRTqPmvZKh_k/view?usp=sharing

APPENDIX H: MIND MAP/VISUALIZATION OF PROJECT



BRAIN STORM 11/20

RESILIENCE & SYSTEMS THINKING

- metaphors & ideas to provide context throughout
- building bones of theory, skeleton cycles, launching point
- does it make sense to start here?

- ball of string - ball in basin - disturbance regimes - stochastic events - epochs

examples in ecology

- flood planes • forest fires •
- disturbances forces growth → keeps the world turning and changing
- disturbance / regime change isn't always bad, but isn't always good, but it's necessary → mandatory exchange of energy

examples in society:

- election of Trump •
- ↳ forcing people to hold firm to / re-establish values
- colonization • declaration of independence

STOCHASTIC EVENT: Not the same as regime change

ex: • plague & everyone dies

- ↳ • colonization
- fundamental shift that doesn't allow for evolution / revolution
- ↳ ecology / society shift

- emergence
- Novel system

PANARCHY → loop illustrating systems visuals.

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SENSE OF PLACE / BIOREGIONALISM

- A way to hold on / resist regime changes and stochastic events
- Responsibility and commitment to Place allows for a relationship grounded in reciprocity and mutual caring
- developed bioregions give people the knowledge needed to advocate for places and notice when irregular changes occur. (relate personally) time travel



- Dorothy / HOPI NATION
- PALIMPSESTS & Layered SOP
- colonization = stochastic event that disrupted indigenous bioregions and in-depth knowledge of place.



essentially, we need to rebuild bioregions to heal broken post-colonial society. What does it mean to be native to place? or act?

— RWK & TTW & Vandana Shiva.

RATIONALITY, the battle for rational thought in the American character

- ↳ individualism is anti-ecological, yet is fundamental to american dream
- ↳ nuclearization
- the individual should be defined by their relation to others
- ↳ "each seed is part of a whole"
- LA QUERENCIA ~ B. LOPEZ
- ↳ a place where ones strength of character is drawn. the place where we speak our truths. speaks to our challenge in the modern world... the search for Querencia is a response to a threat & a search to find out who we are

global hospice
 SOP = provides comfort in the face of loss.

turning point image

THE ANTHROPOCENE

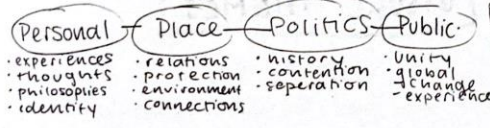
- on the cusp of systemic change
 - what will this regime change look like?
 - ecotones, edges, and thresholds
 - ↳ the edge is where systems are forced to adapt
 - ↳ evolution & revolution in the
- What anthropocene.
- ~~How~~ does sense of place look like in an age of human influence?
 - Cultivating wonder to foster SOP
 - people / ORGS exemplifying hope in this transition:
 - extinction rebellion - la via campesina
 - TTW - Sunrise Movement
 - Soul Fire Farm
 - ↳ reclaiming identity through landscape.

- Coming of age in a changing climate
- what it's like being a young person looking to a grim environmental / social future
 - Sometimes I think we need a stochastic event; that our marks on the planet need to be erased and reset
 - I know there is a way to exist in balance, we just need to try and also foster awareness of systems and our impact on them
 - working to develop my bioregion and knowledge of place so I can advocate
 - fostering community to support each other and cultivate hope to inspire action.
 - thinking in systems helps me understand how the world works and makes large scale issues more understandable
 - gives me a way to view the world, and my role in it, relationally and connected to experiences outside my own.

PERSONAL EXPERIENCES / THOUGHTS

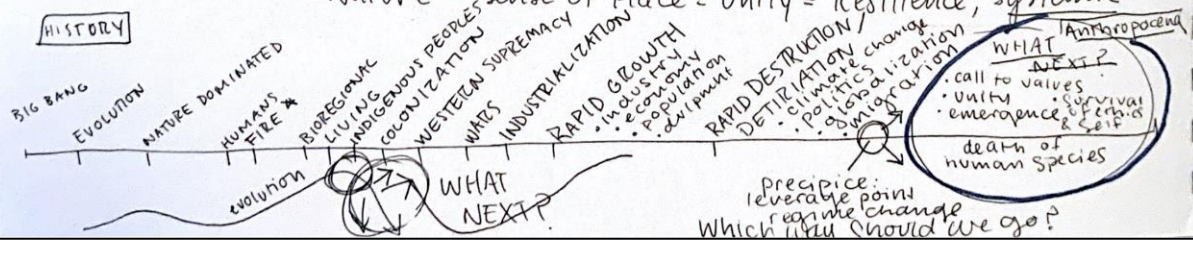
- The Phenology of Home Comic (sense of Place)
- The Crows / Patterns of noticing (sense of Place)
- ICF comic (Bioregionalism / sense of Place)
- WRFI - Seasonal Phenology (sense of Place)
 - Happy Canyon (SOP as advocacy)
 - Dorothy (SOP as advocacy)
- Interconnection activity from Woolman
- the process of walking - SOP, personal connection, mental space, solace
 - The problem w/ walking
 - ↳ conquering narrative
 - ↳ JMT vs. The Peoples trail. • RIDING BIKE
- experiencing environmental change.
 - ↳ Winters, changing
 - ↳ falls, esp Fall 2017
 - ↳ dwpunt in Burlington. How do we embrace change, but hold tight to values?

Themes of book: Resilience: Calluses, emergence; something arising out of chaos: maybe this is the outcome of CC. What is to come from Climate Disruption? The earth will always be here, just a matter of what happens to us. CC is an issue that will impact us all in one way or another - maybe it will drive the world to unite against a problem by acting locally.

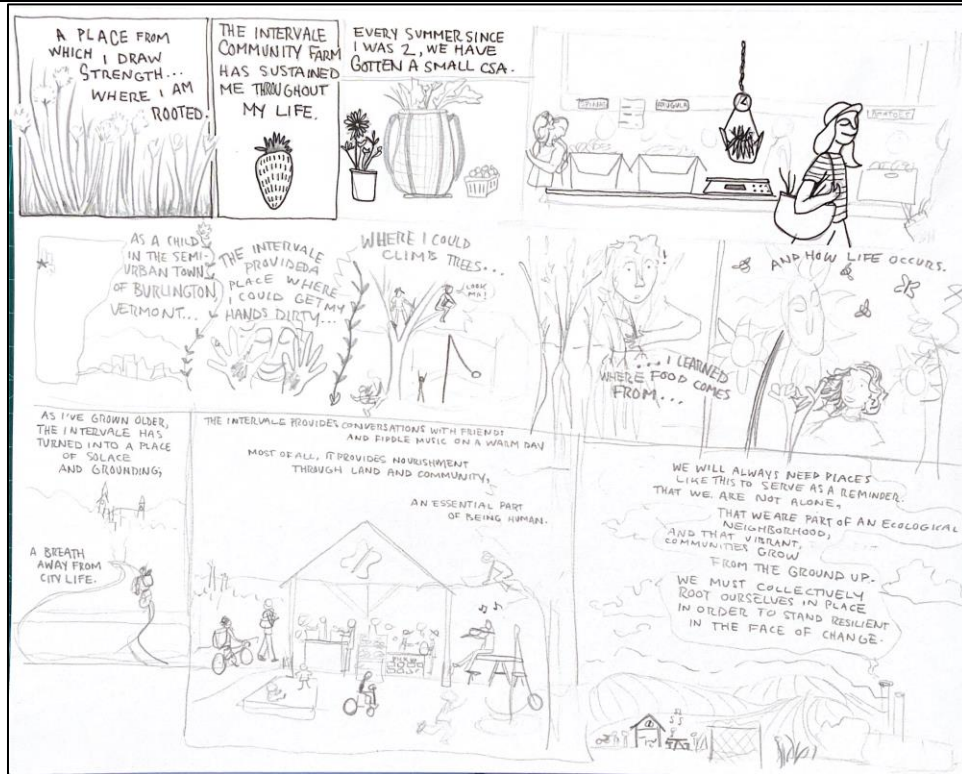
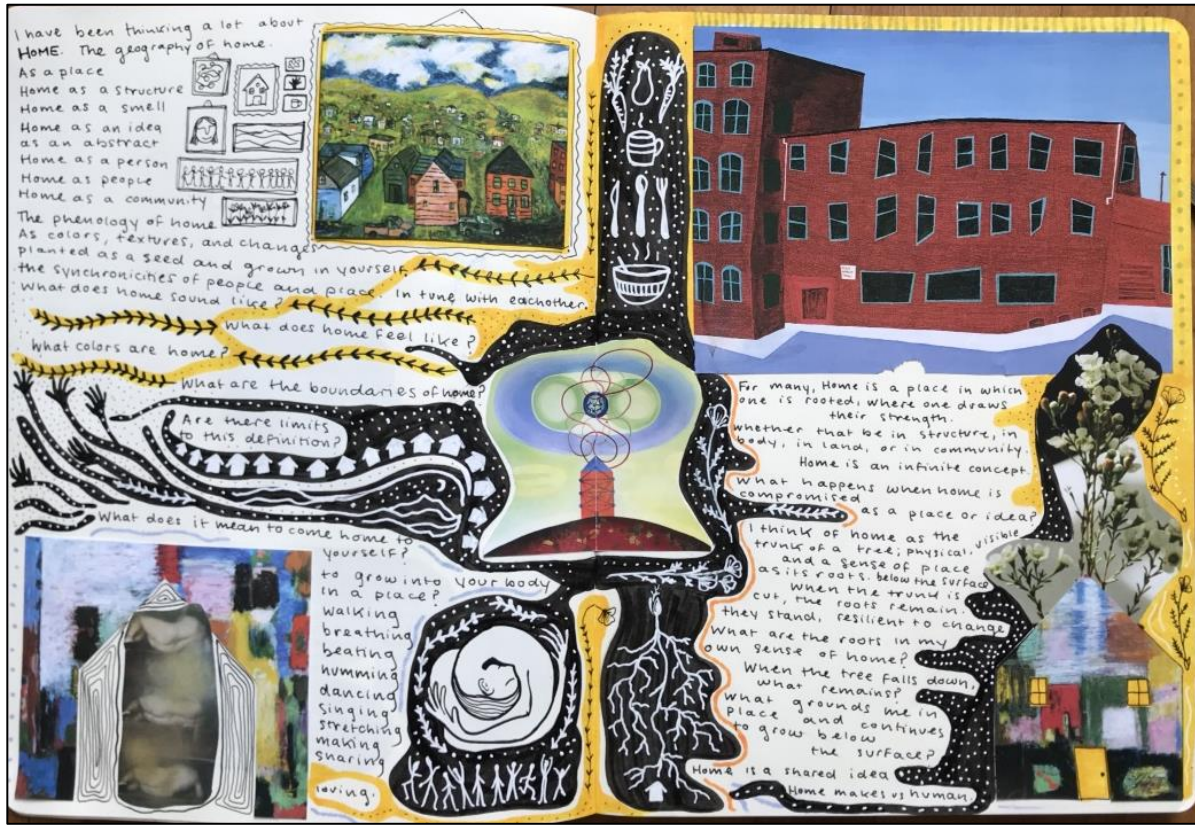


systems theory: changing a mindset to form solutions. CC is a problem unlike any we've faced before. Systems theory as unifying mindset.

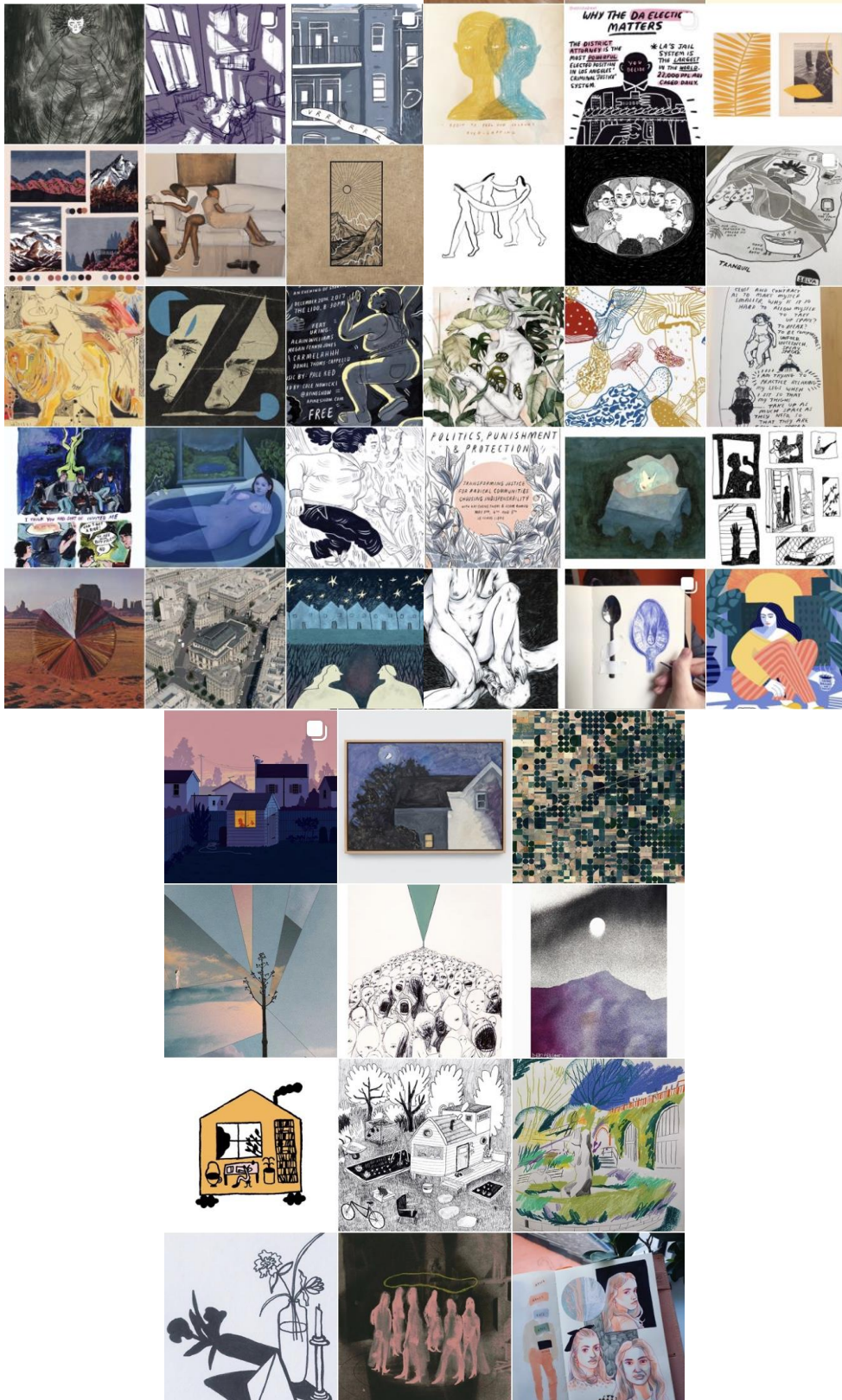
Sense of Place: WHY CC matters. We are a species grounded in landscape and have found ourselves separated. Sense of Place allows us to advocate and stand firm in convictions. Nature = Sense of Place = Unity = Resilience, Systemic



APPENDIX J: INITIAL DRAWINGS FOR PROJECT
 (Example of attempting to start with images instead of manuscript)



APPENDIX K: SOURCES OF INSPIRATION / IMAGE RESEARCH



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