In the midst of the "Anthropocene", wherein human activity constitutes the greatest threat to the environment and our planetary survival, it is a challenging intellectual endeavor to imagine a solution to our environmental problems whose solvency is not premised on changing human behavior writ-large. Climate change is currently *the* environmental problem for most folks and most lawmakers. More specifically, the question of how we are to substantially decrease our carbon emissions is dominating both public and private discourse on climate change. Yet while it is true that human beings must drastically decrease emissions, the fact is that merely cutting emissions *alone* will not decrease atmospheric carbon fast enough to reverse or even halt climate change. Similarly, attempting to solve climate change *alone* is not the end-all-be-all solution to the environmental catastrophe we are presently facing. There are many more natural processes which we are threatening by continuing our unsustainable way of living. As a species, we need a massive shift in how we think about sustainability. As individual members of a species, we each must reorient our personal relationship to nature and the Earth, which requires an understanding of the difference between biotic and violent land use as well as an understanding of how we can live our lives in accordance with how nature works, instead of continuing to live at odds with it.

The distinguishing factor between biotic and violent land-use is simple, but not easy to grasp given our current way of thinking about nature. According to Aldo Leopold, biotic land-use includes practices which work *alongside* nature to maintain the integrity, stability, and beauty of an ecosystem. A central assumption of biotic land-use is that if something exists in an ecosystem, odds are it is there for a reason and is an integral part of the ecosystem as a whole. While it is true that human beings must inevitably use land to some extent in order to procure food, shelter, and water, ecosystems cannot survive if all of its essential components are either degraded or ruined by careless activity. Leopold warns us to err on the side of caution when we are unsure if a particular land-use practice is biotic or violent, as "no man can say where utility begins or ends" (438). This assumption, other thinkers call it "non-disruption", is particularly difficult for modern human beings to grasp because it insinuates that there are inherent limits to what we can know, control, and be certain of. Perhaps fruitlessly, we have created entire fields of

knowledge and praxis in order to figure out precisely those things. Given that the answer to our environmental catastrophe has not yet sprung forth, it is safer to assume that however we carelessly damage nature will become irreversible.

In contrast, what characterizes violent land-use is its disruption of natural, ecological processes on which an ecosystem depends to survive and flourish. As this is also a difficult concept for modern human beings to grapple with, the best way to conceptualize it is through example. Monocultural farming is one example of how so-called "sustainable" and "efficient" agricultural practices can wreak havoc on the integrity and stability of land and soil. Monocultural farming – the practice of planting a single crop on a single piece of land – is a violent land-use practice insofar as it is at odds with the way nature works. There is no piece of land or ecosystem that can survive with only one species of flora or fauna. Biodiversity is essential is any ecosystem, as each organism performs a unique ecological function.

Biodiversity is the lynchpin of Earth's life-sustaining ecological processes. Healthy ecosystems provide important services including oxygen production, water purification, soil formation, nutrient cycling, and waste disposal. These ecological processes rely on a litany of species working together through a series of complex interactions. Often, several parts of an ecosystem will perform similar – i.e. redundant – functions. This redundancy ensures that an ecosystem will survive if a certain species goes extinct or its ecological functions become disrupted, either naturally or due to human activity. In this sense, biodiversity maintains environmental resilience.

Monocultural farming saps essential nutrients from arable land and, since crops are harvested and eaten by humans as opposed to falling off their vine and decomposing, critical nutrients are never returned to the soil. As the topsoil of agricultural sites becomes less and less arable, farmers must increasingly rely on synthetic nitrogen fertilizers. These fertilizers were invented specifically to solve a human-made problem: the problem of not having enough biologically-available nitrogen to feed mass-produced crops. Having sapped all available nitrogen from topsoil, we created a technological instrument which only exacerbates soil infertility. Nutrient cycles within soil require a give-and-take relationship in

order to perform their ecological function. Synthetic nitrogen fertilizer is just another violent land-use practice used to band-aid over the consequences of its predecessor, also a violent land-use practice. Empirically, human beings have not heeded nature's warning after bumping up against an ecosystem's natural limit.

Partially due to the advent of technology, humans conveniently forgot that we must live within the bounds of nature. Once upon a time, human beings lived in nomadic hunter-gatherer societies. The land-community in which they lived constituted all that they had. Resource and energy consumption were zero-sum games. One could not expend all of their energy doing a single task because the entire group depended on the mutual cooperation of all its members. Similarly, one could not consume resources at the expense of others. In fact, these nomadic groups in early human societies moved around from land-community to land-community precisely to avoid depleting a singular area of its natural resources.

Our modern way of living gives human beings a false sense of superiority to and separation from nature. When we run out of food, we drive our fossil-fuel powered cars to the grocery store and buy some. Or, better yet, we pay someone to deliver us food by driving their fossil-fuel powered car to our home so that we do not have to waste our personal energy gathering food. It is difficult to think of an aspect of our modern way of living that does *not* waste energy in some form. One of the main takeaways from biomimicry that human beings need to grapple with is the biological reality that nature relies on sustainable energy cycles, creating no waste and recycling all excess energy.

If decreasing the impact of human activity on the environment is of paramount concern to us, we must remedy the damage that we have already wrought on land and soil. What is even more imperative is that we do so in a way which works alongside nature to restore its previous functions. Even our so-called "alternative" agricultural practices are at odds with the way that nature works. Regenerative agriculture focuses on restoring and maintaining the health of land and soil and attempts to restore the land's ability to operate as a natural carbon sink. Carbon farming, the practice of enhancing the capacities of soil, grasses, wetlands, and forests to extract and sequester atmospheric carbon, is one such practice. If

employed in a way that worked with nature, carbon farming has the potential to reverse some of the damage which human activity has done to our atmosphere. Renowned soil scientists agree that harnessing the power of photosynthesis performed by living plants is an incredibly effective way to capture and return carbon to the soil. Healthy plants actively nourish ecosystems by returning crucial nutrients like carbon back to where they are needed. More specifically, as plants combine hydrogen and carbon atoms during photosynthesis to produce energy, their roots inject trace amounts of carbon into topsoil. Additionally, when their rootlets die, the carbon sequestered in them during their lifetime is returned to the soil. This carbon feeds mycorrhiza: the microorganisms and fungi which perform critical decomposition processes within each layer of soil. Mycorrhiza play a key role in carbon cycles because they decompose organic material, thus sequestering carbon that would have otherwise returned to the atmosphere.

However, within our current understanding of nature, carbon farming is doomed. One of the main arguments against carbon farming is that it lacks proof of concept, despite the reality that planet Earth has been doing it by itself for billions of years. Another main argument against carbon farming is that it cannot be implemented on a large enough scale to make it cost efficient. Similar arguments are made against other alternative land-use methods, like polyculture. The fact that these are common counterarguments against changing the way we use land suggests that there are socio-cultural barriers to large scale change – at least immediate large scale change. Carbon farming is one of many alternative land-use methods that cannot be implemented on a large scale. To attempt this is to assume that land is only soil, and that soil is just dirt. Soil is different in each ecosystem and is best suited for that ecosystem's needs.

The root cause of our environmental problems lies in human beings' inability to perceive, understand, and adapt to the way nature works. This phenomenon, while not unique to modern human society, is certainly made salient by our modern way of life. Now more than ever, human beings are far removed from the conditions which create life. It is virtually impossible to source our food, most of us

cannot fathom the physical manifestation of our waste problem, and the majority of the natural world is either being managed, controlled or manipulated by human beings who want to utilize its resources. What is even more problematic is the way we run to technological solutions to solve environmental problems caused by technology in the first place. Rather than relying solely on technological innovation to solve our environmental problems, human beings will only learn how to live sustainably by taking lessons from planet Earth and employing them. This is why change must start at the individual level. While it is true that the environmental disaster we currently face is symptomatic of a larger, civilizational concern, the fact is that all individuals have aesthetic preferences and visions for how they would like the world to be. It is the drama of life to balance one's aesthetic preferences with reality. For instance, carbon farming appears on-face to be a great way to reduce atmospheric carbon; however, it does not go far enough because it does not look at how particular ecosystems work in particular places. Scientific knowledge, while important for establishing a base-line understanding of ecology, is more so a representation of reality than a reality itself. For Wendell Berry, the scale of attention is an important consideration. He argues that there is already an "order" to nature which, if paid attention to, shows us how to use it fittingly (43).

While all animals must rely on scientific knowledge to some extent in order to understand how the world works, human beings must individually adjust their lifestyle to be in accordance with this "order". This is one aspect of the complex culture which Berry contends is essential to cultivating a nuanced understanding of nature. A culture in and of itself takes cultivation, which necessitates that each individual cultivate their own character. In terms of energy use, there are certain fundamental lifestyle changes which human beings could implement such that we would use our own, personal energy more efficiently. Placing value on conserving our own energy is the first step. Realizing that we each have our own natural processes which we must maintain in order to survive is the second step. Personally, trying to equate myself with nature helped me conceptualize myself as an organism with inherent limits which can be exceeded, but not without consequences. It was also not until I read more about soil and its role in

larger ecosystems that I understood that human beings are constantly bumping up against natural limits and ignoring them. Just as sleep deprivation makes you more susceptible to illness, depleting natural energy in one part of a whole has direct trade-offs with natural energy in other parts of that whole.

Certain sects of scientific knowledge attempt to explain human beings as merely bundles of neurons and cells responding to external stimuli, an understanding which only hampers what we can know and learn about ourselves *as* nature. I have certainly internalized the pressure of modern living to constantly be productive, in motion, and striving to achieve a new potential without regard to my own natural limits. My peers and I joke that we wish we did not have to sleep or eat in order to survive, because we feel guilty while at rest. We also wish that there were more than 24 hours in a day so that we could finish all that we set out to accomplish in the morning. As Leopold points out, human beings tend to think about conservation in terms of "dealing with the supply of resources" (496). While I learn to live within my own limits and conserve my own energy, I have to stop wishing that there was more time or more energy or more resources at my disposal; there are already enough within me that I need to learn how to use more wisely. Similarly, when we bump up against the natural limits of the environment, we must stop and evaluate the "state of health in the land" which we are using (496). Human beings certainly need to use energy and land to *some* extent. Land-use is necessary for food production and raw materials must be acquired to build shelter. However, we need not continue our violent land-use practices to attain these necessities. If we continue to use land violently, there will be none left from which to procure them.