

EMBEDDED WITHIN LANDSCAPES: AGRARIAN PHILOSOPHY AND
SUSTAINABLE AGRICULTURE

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Small-scale, conservation-based agrarianism provides a model for sustainable human habitation within heterogeneous landscapes. Thoreau's Transcendentalism and the historical roots of American Agrarianism are explored as influences for wilderness preservation and the New Agrarian movement. Idealizing a distant wilderness too often means overlooking the ecological and socio-economic environment where people live. Middle landscapes between nature and culture, or between wilderness and cities, can either increase or reduce ecological and social functioning within the landscape matrix. Managing middle landscapes by agrarian principles helps move both nature and culture towards ecological, economic, and social sustainability. This thesis ends with a discussion of agrarian themes, such as supporting decentralized local economies and increasing community connectivity, applied in urban, rural, and wilderness landscapes.

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INTRODUCTION

Agri-cultural Landscapes

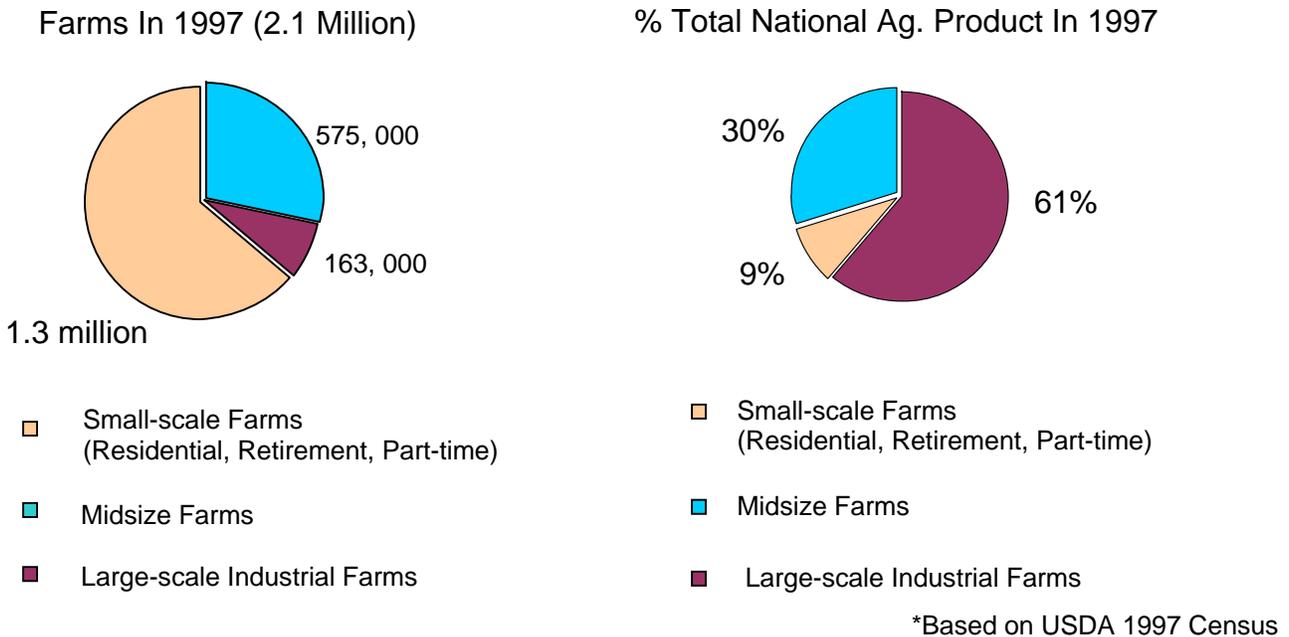
Human beings are born *into* an environment. At almost every point in their lives, humans are embedded within landscapes modified by varying degrees of human management. Human society is fast approaching a point in time—if it has not already crossed it—when human activity directly shapes *all* landscapes. From this perspective, all landscapes are cultural landscapes to some degree. And yet, “nature” is often portrayed as something “out there,” pristine places uninhabited by humans, and needing protection from being “ruined.” Meanwhile, the inhabited landscapes humans call home pass as thoroughly “cultural,” sacrificial landscapes with little ecological value. The nature/culture divide underlying this perspective gives a false impression that humans and human landscapes are somehow unnatural, and conversely that any use of nature is abuse.

It is possible, however, for human-inhabited landscapes to sustain both people and ecosystem health. This thesis argues that within the United States, small-scale, alternative agriculture is a possible “middle ground” between nature and culture, wilderness and city, increasing the social and ecological connectivity of heterogeneous urban, suburban, and rural patches within the landscape matrix.

By and large, agriculture in the United States seems an unlikely place for healthy human habitation within landscapes. Currently, the United States is moving towards a “bifurcated” food and farming system which reflects the shifting role agriculture plays in this country. Some important statistics reflecting this bifurcation include:

- The number of farms in the United States has steadily dropped over the years, from around 6.6 million in the 1930s (the peak in farm numbers) to around 2 million in 2001, with the greatest decline between the 1950s and the 1980s. Ninety percent of the 4.6 million farms lost were subsistence or small-scale farming operations. ¹
- As figure 1 indicates below, there are roughly 1.3 million small farms (economically determined with sales less than \$250,000), 575,000 midsize farms, and 163,000 large or industrial farms. Almost all of these farms (99 percent) are technically “family farms,” in that they are family-owned, family-held corporations or family partnerships. ²

Figure 1*



¹ Fredrich Kirschenmann, “The Future of Agrarianism: Where Are We Now?” 2003, p. 2. Self-published, 2003, at http://www.leopold.iastate.edu/pubs/speech/files/042502-future_of_agrarianism.pdf.

² Ibid.

- The total acreage of farmland (including ranches), which peaked at about 1.2 billion acres in 1950, declined to around 930 million acres in 1997. The U.S. is currently losing 1 million acres of farmland per year. From 1992-1997, 11,392,400 acres of rural land was lost to urbanization (industrial and suburban growth primarily), with farmlands comprising 6,172,800 acres of the total number.³
- Between 1960 and 1990, metropolitan-area populations in the U.S. grew by 50 percent, while the amount of developed land for housing and commercial enterprises rose 100 percent. This growth has encroached upon small-scale farms on adjacent lands.⁴
- The average size of farms increased from about 300 acres in 1959 to approximately 470 acres in 2001.⁵
- 50 percent of farm acreage is on middle-sized farms. From 1992-1997, 32,000 midsize farms were converted into large-scale industrial farms, either through mergers or consolidation, putting approximately 15 million more acres of farmland into industrial production.⁶

Based on these statistics, a few observations can be made. First, while the U.S. has lost more than 4 million small-scale farms in the last 70 years, primarily due to the “green revolution’s” industrialization of agriculture, 1.3 million farms are still defined as small-scale in America. The future of these farms is currently threatened more by urban and suburban growth than industrial agriculture. Midsize farms, however, are “rapidly

³ Farmland Information Center, “National Statistics Sheet.” Published at http://www.farmlandinfo.org/agricultural_statistics/.

⁴ Ibid., p. 6.

⁵ Ibid.

⁶ Ibid.

disappearing” due to economies of scale, which are forcing these farmers to go industrial or sell their land.⁷ So, while almost all farms are still “family-owned,” there are fewer families on farms.

As the total number of farms have dropped, the agriculture landscape is quickly bifurcating into industrial and small-scale farming operations; farming is losing its middle. According to the most recent (1997) USDA statistics, 61 percent of the total U.S. national agricultural product is now being produced by 163,000 industrial farms, and 63 percent of that production is tied to a market or input firm by means of a contractual relationship.⁸ These farms produce “a single, undifferentiated bulk commodity, for a consolidated firm, most often under a contract written to accommodate the business interests of the firm.”⁹ The actual *number* of industrial farms is predicted by agribusiness to shrink due to increased mergers and consolidation. Industrial farms are just getting bigger.

On the other side of the spectrum, and as a reaction to the industrialization of mainstream American agriculture, the U.S. has a growing niche market of diverse, small-scale, ecologically aware farms that predominately market their products directly to their customers. In fact, the *only* sector of agriculture where the *number* of *farms* is growing is small-scale, direct-market agriculture, which is primarily located in or adjacent to metropolitan areas.¹⁰ There are no reliable statistics established yet to measure what proportion of total agriculture production is served by small-scale direct-

⁷ Natural Resources Conservation Service, “Interim Appraisal and Analysis of Conservation Alternatives,” (Sept. 2001). Published at <http://www.nrcs.usda.gov/technical/land/pubs/rca/>.

⁸ Fredrich Kirschenmann, “The Future of Agrarianism,” p. 2.

⁹ Ibid.

¹⁰ Ibid, p. 2; Lorna M. Butler, “Rural-Urban Interdependency and the Future of Agriculture,” presented at the Agriculture Outlook Forum, February 22, 2002, p. 5. Accessed at the USDA website, www.usda.org.

market agriculture. However, The USDA estimates a 63 percent increase in farmers' markets between 1994 and 2000, putting the total number in at around 2,866 markets. Approximately 19,000 farmers sold their produce at farmers' markets, providing local food and value-added products to rural and urban centers around the country.¹¹ Another direct-marketing method is called "community supported agriculture operations," or CSAs. CSAs have expanded in the United States over the last eighteen years to include as many as 1,700 small farms.¹² While these farms represent only 1.6 percent of the total 1.3 million "small-scale farms" in the U.S., the potential for further growth in this sector seems substantial. As industrial agriculture continues to increase its hold on the overall market, and as urban sprawl continues to squeeze neighboring farmland, these ecologically progressive and locally-focused farms might serve as a model for the future economic sustainability of small-scale agriculture.

Many labels often connected to sustainable agriculture, such as "family farms," are not well defined. As I stated earlier, 99 percent of all farms fit this definition, including industrial farms. In term of small-scale agriculture, however, family farms are generally understood as farms inhabited by families (or residences living on the land), where the family is integral to the organization, decision making, labor, and direction of the farm. I argue in this thesis that well-run, small-scale family farms are necessary socially and economically for sustainable agriculture, but are not sufficient. They represent just one element of a "new" paradigm (or conceptual framework) developing in agriculture in response to the dominant industrio-mechanistic paradigm. This new

¹¹ U.S. Department of Agriculture (USDA), "Farmers' Market Facts," Accessed at the USDA website, www.ams.usda.gov/farmersmarkets/facts.htm.

¹² Ibid., p. 139. See also, Steven McFadden, "Community Farms in the 21st Century: Poised for Another Wave of Growth?" published at <http://www.thenewfarm.org/features/0104/csa-history/part1.shtml>.

paradigm has labeled itself in various ways, including “alternative, ecological, low-input, and green.” It has also utilized different farming “systems,” such as “biodynamic, holistic, permaculture, ecoagriculture, no-till, low-input, agroforestry, natural systems, and integrated pest management.” What these different approaches have in common is their overall commitment to creating a food system which is sustainable. I define the philosophical framework underpinning this sustainable paradigm as “agrarianism.”

In my thesis I make the case for agrarianism as a model of sustainability. I first explore the Puritan and Transcendental foundations for the North American preservationist movement’s focused on wilderness preservation. Using J. Baird Callicott’s essay “The Wilderness Idea Revisited,” my main argument is that the *idea* of wilderness is dualistic, ethnocentric, and unscientific because it is based upon a faulty understanding of what it means to be human.¹³ Thus, past theories of environmental ethics which argue for wilderness as the landscape of primary ethical concern, and the North American environmental movements’ conceptualization of “wild spaces” as being void of humans or human management, are ethically and socially problematic. Moreover, there is a contradiction at work in the idea of wilderness: the argument is made that nature is best understood as wilderness-*sans*-humans, but people’s connection with “wild nature” is an integral part to being/staying human, and a primary motivator for wilderness protection. In other words, that environment which supposedly makes us most human is also the most off-limits. Chapter One ends with the search for middle ground in the nature/culture debate provided by Aldo Leopold’s essays on the

¹³ J. Baird Callicott, “The Wilderness Idea Revisited: The Sustainable Development Alternative,” in Callicott and Nelson, *The Great New Wilderness Debate*, pp.337-366.

farmer as a conservationist. For Leopold, agriculture can be a productive “middle space” for increasing social and ecological connectivity across heterogeneous landscape.

In Chapter Two, I will use Jerry Franklin’s work on “landscape matrixes” to show how agro-ecosystems play a role within conservation biology and biodiversity preservation. Not only do conservation biologists argue that landscapes need more strategic wildlife reserve patches within them, but conservation efforts need to focus on what lies outside of and between those reserves, such as agroecosystems, both as a way of extending and connecting them, and because the *majority* of biological diversity lies outside of “wilderness” reserves. Increasingly, agriculture has a great impact on the connectedness of landscapes, especially mixed urban-rural landscapes.

Beyond using biodiversity as an indicator of ecosystem health within agricultural landscapes, I look at ecosystem *functions* across the landscape, and in particular agroecosystem functions embedded within the agro-landscape matrix. There is a correlation between losing farms and losing diversity (biological, social and economic), both in urban and rural landscapes, and loss of ecosystem functions. I conclude Chapter Two by showing that from a landscape level, diversified, heterogeneous agro-ecosystems help protect and sustain diversity, ecosystem stability and connectedness across landscapes.

In Chapter Three, I argue that diversified agrarian cultures are worth saving for more than ecological reasons. Indicators of cultural and economic health are needed just as much as biotic indicators of ecological health to measure sustainable landscapes. Agrarianism places high value on socioeconomic and ecological diversity, offering a holistic philosophical framework for developing and measuring sustainable

agroecosystems. As a way of life, agrarianism over the last fifty years has been dramatically affected by industrial agriculture, which places economic efficiency as a value above all others, including quality of life on farms and in farming communities, ecological integrity, and aesthetic appreciation. The heart of the New Agrarianism is a critique of industrialism, especially the industrialization of agriculture. For agrarians, the fundamental characteristics of the industrial paradigm are: specialization; standardization; centralization of control. The resulting organization of land, labor, capital and management based upon these characteristics is viewed as unsustainable socially, economically, and ecologically for agrarians.

Chapter Three also gives an overview of agrarian thought in the United States from 1782-2004, beginning with the St. John de Crèvecoeur, and including Jefferson, Emerson, Thoreau, the Twelve Southerners, Aldo Leopold, Wes Jackson and Wendell Berry. The historical lineage of agrarianism gives insight into its most recent manifestation over the last three decades, dubbed the “New Agrarianism.” Fundamentally, the New Agrarians view agriculture as something more than rural farming, emphasizing its connection to ecological stewardship of private land, healthy local communities and economies, self-sufficiency, and an agricultural alternative to increased specialization, standardization and centralization. My point in Chapter Three is that the resurgence of agrarian values in America is important, not just as a reactionary response to the industrialization of food systems, but to the positive creation of ecologically sound, economically viable, and socially responsible agriculture.

The final chapter gives recent examples of applied agrarian philosophy in urban, rural and “middle” landscapes, and their intersection. I specifically look at ranching

practices in the Southwest, The Land Institute in Kansas and its work on perennial polycultures which mimic prairie ecosystems, and urban-agrarian relationships fostered in King County, Washington, between the city of Seattle and its neighboring communities. My aim in Chapter Four is to highlight the diverse ways agrarian values can change a community's relationship to and with the landscape, providing hope for a larger movement towards sustainability.

Defining Some Key Terms

Before moving on to Chapter One, I want to take this opportunity to clarify a few terms used in this introduction and throughout the thesis: *sustainability*, *organic*, *landscapes* and *landscape matrix*. In conservation biology and agroecology literature I reviewed for this thesis, sustainability was primarily defined in ecological terms. For instance, in an introduction to a special volume of the journal *Agriculture, Ecosystems and Environment* on biotic indicators for biodiversity in sustainable agriculture, Wolfgang Büchs defines sustainable agriculture strictly in ecological terms:

Sustainable agriculture (a) conserves the resources on which it depends; (b) restricts itself to minimum input of production means, which do not have their origin in the same farming system; (c) controls pests and diseases by internal regulation processes as far as possible; (d) provides natural resources with the ability to recover from disturbances through cultivation means and harvesting processes of natural succession.¹⁴

Similarly, Molly Anderson argues that agroecology as a field should focus just on ecological aspects of sustainability, suggesting the field “prune back the aims of agroecology to understanding what makes the tangible aspects of agricultural systems work, rather than trying to tackle cultural systems as well.”¹⁵ However, there is a

¹⁴ Wolfgang Büchs, “Biotic Indicators for Biodiversity and Sustainable Agriculture—Introduction and Background,” *Agriculture, Ecosystems & Environment*, 98 (2003): 1-16.

¹⁵ Molly Anderson, “Book Reviews,” *American Journal of Alternative Agriculture*, 6 no. 1 (1991): pp. 42.

growing recognition that both nature and society have been developed, produced, and reproduced by the ideas and activities of human beings. As such, agro-economist John E. Ikerd and professor of agriculture Lorna Butler have argued—echoing the sentiment of sustainable agriculture movements such as holistic range management, permaculture, ecoagriculture, and agrarianism—that if disciplines such as agroecology hope to measure in some way “the health and sustainability of agroecosystems, it must include the socioeconomic as well as the biophysical.”¹⁶ In other words, sustainable agriculture must have a “triple bottom line”: economic, social, and ecological.¹⁷ It makes little practical sense to speak of ecologically sustainable agriculture if there is no possible economic or socially sustainable way of doing it. In fact, the central point in this thesis is that people cannot develop agricultural that feeds us all *and* sustains ecosystem functions without sustaining a diversified, small-scale, equitable, localized economy and culture, and vice versa. So, sustainable agriculture means agriculture which sustains the cultural and economic aspects of the agricultural landscape, as well as ecosystem services within the landscape matrix.

By “landscape matrix,” I mean the complex of semi-natural and domesticated lands within which agriculture, like all human practices, is embedded. This thesis focuses on sustainable agriculture at the landscape scale because measuring ecological patches in isolation, whether it be reserves, industrial sites, or crop fields, makes it difficult to see and monitor larger spatio-temporal processes (i.e. disturbance

¹⁶ John Ikerd, “Assessing the Health of Agroecosystems: A Socioeconomic Perspective,” (University of Missouri, 1996), published at <http://www.ssu.missouri.edu/faculty/Jikerd/papers/Otta-ssp.htm>.

¹⁷ John Ikerd, “Farming in the Future: The Triple Bottom Line,” (University of Missouri, 1999), published at <http://www.ssu.missouri.edu/faculty/jikerd/papers/PA-Troy-Triple-Bottom-Line.htm>; Butler, “Rural-Urban Interdependency,” p. 4.

regimes, seasonal fluctuations, adaptation, migration, species interactions across ecosystems), and therefore monitor the “sustainability” of any one farm or field alone.¹⁸ Similarly, agriculture has to be regionally sustainable in terms of economics and culture; one well-run farm in a sea of industrial agriculture or suburbia (and rising land prices) does not give any indication of the farm’s future sustainability within that area. Thus, I have extended the term to refer to the social and economic landscape, because the landscape matrix is largely understood (especially in Europe) in terms of “an area containing a mosaic of land cover patches,” and measured by land-use, which reflects the “functional dimension” of the socio-economic situation in a region.¹⁹ Again, at the landscape-scale, ecological processes only come into resolution when social and economic processes are superimposed, and vice versa.

Organic farming is a good example of the problems inherent in measuring sustainability on an isolated patch level. Demand for foods labeled “organic” has grown rapidly in the U.S. as consumers look for healthier, more environmentally friendly food. Organic farming is unquestionably better ecologically than genetically modified foods grown with pesticides and herbicides. One report based upon 76 previous studies on “organic” agriculture concluded “that species abundance and/or richness, across a wide-range of taxa, tend to be higher on organic farms than on locally representative conventional farms.”²⁰ Unfortunately, organic agriculture does not include standards for how a farm fits into the larger landscape. As a result, by the mid-1990s, vast multi-thousand acre organic monocultures of nearly every conventional commodity, including

¹⁸ M.J. Swift, A.-M.N. Izac, and M. van Noordwijk, “Biodiversity and Ecosystem Services in Agricultural Landscapes—Are We Asking the Right Questions?” *Agriculture Ecosystems & Environment* 104 (2004).

¹⁹ Büchs, “Biotic Indicators for Biodiversity and Sustainable Agriculture,” p. 6.

²⁰ Hole et al., “Does Organic Farming Benefit Biodiversity?” p. 121.

grains, vegetables, grapes, dairy, meats, cotton and rice. These crops are being cultivated, year round, primarily for distant markets in the U.S. and worldwide. Organic agriculture has gone corporate and global, growing at a phenomenal annual rate of 20 percent. By 1995, 50 percent of organic production was controlled by 2 percent of certified producers. Daniel Imhoff writes:

The mainstream success of the organic movement has caused a growing number of people to question whether organic farming, through commercialization, has strayed too far from its roots. If organic production ends up mimicking conventional agribusiness (huge, faraway operations minus the chemicals, with centralized distribution and processing) what becomes of the independent, regionally- and quality-oriented, stewardship-minded farmer?²¹

The largest organic farms are now simply pesticide and herbicide-free industrial operations, with little connection to local culture, markets, or ecosystems. Moreover, a *small* farm can be labeled “organic” despite having its fields plowed “fence-row to fence-row,” with no wildlife habitat, no local markets, and surrounded by a sea of industrial farms. It has become apparent that the organic agriculture, while originally a step in the right direction in terms of sustainability, is not synonymous with sustainable agriculture, as it has no standards for taking the larger ecological, social, and economic context into consideration.²²

The term “landscape” can refer to varying spatial scales. As Büchs has pointed out, the United States, Canada and Australia divide large geographical units strictly between landscapes for production (agriculture and industry) and landscapes for nature conservation.²³ Landscapes in reference to the Southwestern United States, the Yukon of Canada, and Western Australia for instance, are measured on much larger scales

²¹ Imhoff, “Farming with the Wild: A Conservation Approach to Agriculture,” in *The Fatal Harvest Reader*, p. 309.

²² Imhoff, *Farming with the Wild*, p. 225.

²³ *Ibid.*, p. 9.

than highly diversified or mixed-use areas. However, this large-scale approach, which places multiple ecosystems together in each category, tends to define landscapes so broadly, the socio-economic landscape loses resolution.

In contrast, Europe uses cultural conditions to redefine landscapes as mixed communities.²⁴ Büchs argues, “in these traditionally grown cultural landscapes, production, recreation and nature conservation cannot be separated but are intensively linked to each other within the same region and geographic unit.”²⁵ Like Jerry Franklin, I am primarily adopting this European understanding of landscapes and landscape matrixes when discussing agro-ecosystems and agro-landscapes in order to catch socio-economic and ecological insights lost with coarser scales of resolution.

Not all of our landscape should be completely domesticated, for ethical, social, aesthetic, and ecological reasons. However, given the broad degrees of management within landscapes, the “middle landscape” of agriculture is not best served by a homogeneous, industrialized agricultural system. Urban and rural communities need an agriculture which connects people to their food, nourishes us and the environment, and which sustains a way of life within both rural and urban landscapes which can be sustained into the future. This, in a nutshell, is the argument for agrarianism.

²⁴ Ibid.

²⁵ Ibid., p. 9.

CHAPTER 1

THE WILDERNESS IDEA AND MIDDLE LANDSCAPES

Introduction

A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean...an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation...

U.S. Wilderness Act, Sept. 3, 1964 Sec. 2C

According to Dave Foreman, The Wilderness Act of 1964 seems to have done quite a bit of good for environmental policy, biodiversity preservation, scenic beauty and outdoor recreation.²⁶ And yet, the legislation is based upon an idea of wilderness which has been critiqued for over a decade as being elitist, dualistic, ethnocentric, sexist, and unscientific. This is not to say that the benefits of wilderness *areas* extolled by Foreman are not real. Rather, the problem lies in wilderness as a *concept*. As J. Baird Callicott succinctly puts it, "The *idea* of wilderness that we have inherited from Thoreau, Muir, and their successors may be ill conceived, but there nothing whatever wrong with the *places* that we call wilderness, except that they are too small, too few and far between, and...mostly mislocated."²⁷ By exploring the *idea* of wilderness, I am less concerned with pragmatic answers for how much effort environmentalists should devote towards wilderness designation, and more interested in what this effort *means*. What does the

²⁶ See Dave Foreman, "Wilderness Areas for Real," and "Wilderness: From Scenery to Nature" in J. Baird Callicott and Michael P. Nelson, eds., *The Great New Wilderness Debate* (Athens: University of Georgia Press, 1998).

²⁷ J. Baird Callicott, "Should Wilderness Areas Become Biodiversity Reserves?" in *The Great New Wilderness Debate*, p. 585.

idea of wilderness say about our personal and social self-image as human beings and the domesticated landscapes we inhabit?

Towards the end of William Cronon's article, "The Trouble with Wilderness," he succinctly articulates the central argument in this chapter: the wilderness idea is based upon a conceptually flawed Eurocentric nature/culture dichotomy which has the likely effect of distracting people from appreciating the natural qualities of their "soiled" urban, suburban, and rural landscapes. He writes:

But the most troubling cultural baggage that accompanies the celebration of wilderness has less to do with remote rain forests and peoples than with the ways we think about ourselves... Idealizing a distant wilderness too often means not idealizing the environment in which we actually live, the landscape that for better or worse we call home. The majority of our most serious environmental problems start right here, at home, and if we are to solve these problems, we need an environmental ethic that will tell us as much about *using* nature as about *not* using it. The wilderness dualism tends to cast any use as *ab-use*, and thereby denies us a middle ground in which responsible use and non-use might attain some kind of balanced, sustainable relationship. *My own belief is that only by exploring this middle ground will we learn ways of imagining a better world for all of us: humans and nonhumans, rich people and poor, women and men, First Worlders and Third Worlders, white folks and people of color, consumers and producers—a world better for humanity in all of its diversity and for all the rest of nature too. The middle ground is where we live.*²⁸

This chapter explores the "middle ground" of habitation within domesticated landscapes. I begin by discussing how the wilderness idea came about in America, connecting Callicott's discussion of New World Puritanism with Thoreau and American Transcendentalism. I argue that Thoreau, while not a "pure" Transcendentalist or theologian like his U.S. Contemporaries, nevertheless was a Puritan in his classification of wild "Nature" as "wilderness," to which he juxtaposed an inferior, domesticated "culture." Thoreau's dualism is codified in the U.S. Wilderness Act of 1964, and is still a

²⁸ William Cronon, "The Trouble With Wilderness, or, Getting Back to the Wrong Nature," in *The Great New Wilderness Debate*, p. 490.

driving force behind wilderness preservation. The danger behind this dualism is its implicit misanthropic, individualistic mentality which often overlooks beauty or wildness in domesticated landscapes. Turning to the wilderness idea itself, I will expand on Callicott's three primary points of critique in "The Wilderness Idea Revisited": the wilderness idea is based upon nature/culture dualism; it overlooks the presence and impact of indigenous people on the American landscape; and it overlooks perturbations and change within those landscapes.²⁹

What conceptual options are available for creating a healthier relationship between humans and their home environments? This chapter ends with an argument for agriculture as a "middle ground" connecting nature and culture, wilderness and domesticated areas. This alternative has been beautifully articulated by Aldo Leopold's essays on agriculture-as-middle-space, a permeable buffer connecting urban and wilderness areas. By conjuring the rustic images Leopold speaks of in his essays on rural land health, I will admittedly idealize domesticated landscapes. This idealization may be seen as presenting a goal for us to shoot for, that is, as an *ethos*, and one that seems to bring humans further along in producing, restoring, and sustaining a healthier image of people and their domesticated landscapes than the image implicitly behind the wilderness myth.

Puritanism, Thoreau and the Idealization of Wilderness

The first generation of Puritan colonists understood wilderness as a negative space, a "wild, unruly stronghold of Satan," to be feared, loathed, and ultimately

²⁹ J. Baird Callicott, "The Wilderness Idea Revisited: The Sustainable Development Alternative," in *The Great New Wilderness Debate*, pp. 337-366.

eradicated.³⁰ Irene Klaver describes the colonial conception of wilderness as a by-product of Puritan fears,

the dark and dangerous, the unlimited, lurking at the limits, always on the verge of overgrowing the fragile new structures of culture, be it crops or lawns, with their respective outcasts of weeds, witches, and (were)wolves: their gleaming green eyes staring holes into the walls of our cities and souls.³¹

We should include in this list of fears the indigenous “savages” inhabiting the “undeveloped” wilderness, who—like weeds, witches and wolves—were systematically exterminated, displaced, and ostracized.

In place of “wilderness,” the Puritans set out building productive farms and “shining cities on hills.” Yet, the farms and cities were a bit *too* productive; once the Puritans transformed New England into domesticated landscapes resembling their mother country, they felt the cities had lost their supposed “transcendental luster”. Towns and cities became the negative space of both sinful affluence and worldly debauchery, a place of noisy distraction to flee from in favor of the innocent, calming and pure wild remnants of pre-settlement America that could be found here and there in Connecticut and Massachusetts.³² In essence, Satan moved in(to) the cities, and wilderness became the new Eden. The Calvinist minister Jonathan Edwards was a key figure in this transformation of ideology, preaching he could see in nature “the images or shadows of divine things.”³³ The new Puritan view, which anticipated by a century American Transcendentalism, viewed untouched Nature as “virginal,” vulnerable and

³⁰ J. Baird Callicott and Michael P. Nelson, “Introduction,” in *The Great New Wilderness Debate*, p. 4.

³¹ Irene Klaver, “Silent Wolves: The Howl of the Implicit” in David Rothenberg, ed., *Wild Ideas* (Minneapolis: University of Minnesota Press, 1995), p. 118.

³² Callicott and Nelson, *Wilderness Debate*, p. 4.

³³ Jonathan Edwards, “The Images or Shadows of Divine Things,” *Wilderness Debate*, p. 23.

therefore in need of protection. And yet, experiencing her became transcendental.³⁴

“This new concept reconceives wilderness as the sacred virgin, sacred nature which has the power to redeem, especially the power to redeem fallen culture.”³⁵ Wilderness becomes a purified symbol of Nature, allowing us to transcend a debased culture of the profane.

For Thoreau, culture was not only profane, it dulled the human animal’s *wildness*. By “wildness,” I take Thoreau to mean an undomesticated, self-determined will. It is conceptually important to distinguish wilderness, which is a physical “thing,” from wildness, which seems to not be a thing at all, but rather a quality of everyday, indeterminate life, defying structure. By “indeterminate” I mean conforming to causal laws, yet not fully predictable. Given this distinction, *wilderness* for Thoreau most exemplified the quality of unpredictable, undomesticated and free-willed *wildness*. He believed the more humans inhabit undomesticated landscapes, the more they (re)connect with their wildness within.

Thoreau never actually lived in wilderness proper, nor did he advocate it. He states in *Walden*, “It would be some advantage to live a primitive and frontier life, though in the midst of an outward civilization, if only to learn what are the gross necessities of life.”³⁶ Thoreau attempted this life to some degree, conducting his Walden experiment just outside of Concord, a town he knew well and visited almost daily. Thoreau depended on Concord, needing work, advice from the locals on homesteading, and the occasional meal at his mother’s house, yet he loathed any

³⁴ Val Plumwood, “Wilderness Skepticism and Wilderness Dualism,” *Wilderness Debate*, pp. 652-690.

³⁵ *Ibid.*, p. 660.

³⁶ Henry David Thoreau, *Walden* (Princeton: Princeton University Press, 1989), p.11. First Published in 1854.

connection to the town. He perceived the individual in their “natural” state as “a microcosm unto himself,” a self-sufficient island. Correspondingly, he believed knowledge comes not dialectically from others, but from within the individual. Yet, the individual cannot just access their universe within themselves, *a priori*, according to Thoreau. One needs inspiration from wilderness to conjure up the wild knowledge within themselves. There seems to be a contradiction implicit in this thinking: wildness is indeterminate and free-willed, and yet Nature, which *is* wildness, gives humans direct access to universal knowledge, which is based on a harmonious order of the cosmos. However, if Thoreau held a view of Nature as harmonious, stable and ordered, then wildness would be what preserves that order, while still remaining essentially undomesticated and free. Hence, Thoreau’s claim that “In Wildness is the preservation of the World.”

The “good life,” Thoreau was confident, involves living as close to Nature-as-wilderness as possible, eliminating layers of domesticity to discover the necessities of life. For Thoreau, society—human habitation from city to farm—is comprised of cultural layers that seem to imprison people in material possessions and societal expectations. Society *domesticates* the human spirit through cultural norms and responsibilities; it holds the individual back from self-discovery and self-reliance, and therefore needs to be thrown off. Thoreau longed to walk away from Walden to the archetypal Wild West, escape societal chains and live as a rugged individualist. Unfortunately, the shedding of cultural layers meant leaving others behind, for “the man who goes alone can start

today; but he who travels with another must wait till that other is ready, and it may be a long time before they get off.”³⁷

A duality seems to be emerging in Thoreau’s thought between wild nature and domesticated culture. In his 1862 essay, “Walking,” he describes “Nature” as a woman, to be experienced alone, and culture as the evil which rips us away from our mother. He writes:

Here is this vast, savage, howling mother of ours, Nature, lying all around, with such beauty, and such affection for her children, as the leopard; and yet we are so early weaned from her breast to society, to that culture which is exclusively an interaction of man on man,—a sort of breeding in and in, which produces at most a merely English nobility, a civilization destined to have a speedy limit.³⁸

Note here that Thoreau understands humans as initially “natural,” and it is only out of our fall from Eden—a bucolic and beneficent Mother—brought on by culturalization, that we fall from wildness. Hence, “all *good* things are wild and free” from culture.³⁹

And yet, the wilderness mentality *itself* domesticates us, boxes us in, allowing/causing an externalization of the “other.” Klaver argues: “The other becomes a symbol, no longer experienced as part of one’s own life but externalized, categorized, stigmatized, confined to a determined area or to an abstract definition.”⁴⁰ Plumwood sees this externalization of Nature and rejection of domesticating culture as an act of sexist dominance, because wild (nature) becomes a masculine sphere of individual transcendence in opposition to the domestic communal sphere (culture) of femininity.⁴¹ She argues that “if feminine immanence is expressed in limitation to the domestic, masculine transcendence is expressed in escape to a superior realm of true spiritual or

³⁷ Ibid., p. 72.

³⁸ Thoreau, “Walking,” in *Wilderness Debate*, p. 40.

³⁹ Ibid.

⁴⁰ Klaver, “Silent Wolves,” p. 120.

⁴¹ Plumwood, “Wilderness Skepticism and Wilderness Dualism,” p. 661.

adventurous experience in a nature defined against an inferiorized, familiar sphere of dullness and dailiness.”⁴² Nature in Thoreau’s writing is valorized as an adventurous and spiritual male alternative to women’s daily grind of domesticated culture.

Thoreau’s conflation of wilderness with wildness and transcendence presently looms over much of North America’s collective unconsciousness. *Walden* re-emerged from obscurity in the early 20th century, making Thoreau an icon of a “wilderness man” who found himself by walking away from society. His disdain for towns and their inhabitants, along with his biophilic romanticizing of communing with “wild nature,” has overshadowed his daily life on Walden Pond as an agrarian homesteader and self-taught ecologist. The mythical overshadowing is not surprising. In fact, it fits in well with the United States’ image of itself. With “a cultural inferiority complex vis-à-vis Europe,”⁴³ “wilderness” became the United States’ celebrated alternative to cultured society, a refuge from other people, crowded countries and modern complications.

The migration across North America before Thoreau, beginning with President Jefferson’s secret congressional order to trespass on French property in 1804, and ending with the completion of the transcontinental railroad in 1869, was motivated by the search for landscapes where settlers could spread out, find themselves, and start over.⁴⁴ Americans were searching in part for a more solitary lifestyle, one free from government and neighbors. Ironically, the more “wilderness” that is “settled” in this country, the more that the settlers’ object of longing disappears both within the landscape and themselves.

⁴² Ibid.

⁴³ Klaver, “Silent Wolves,” p. 119.

⁴⁴ Wendell Berry, *The Unsettling of America: Culture and Agriculture*, 3rd ed. (San Francisco: Sierra Club, 1996), p. 12-15

The Thoreauvian dichotomy of the world into wilderness and cities leaves one to believe that if humans inhabit domesticated landscapes as farmers, or ranchers, or as urbanites, they effectively destroy what is most valuable to those landscapes and themselves: wildness. The environmental movement's continued focus on both pristine wilderness and hyper-individualistic escapism reflects this belief. The environmental movement paradoxically conceptualizes nature as wilderness sans humans on one hand, and then argues that connection with "wild nature" is an integral part to being/staying human on the other (Thoreau's transcendental experience). According to William Cronon, Dave Foreman's "ideal 'Big Outside' bears an uncanny resemblance to that of the frontier myth: wide open spaces and virgin land with no trails, no signs, no facilities, no maps, no guides, no rescues, no modern equipment...one hasn't really encountered wilderness unless one can go for days at a time without encountering another human being."⁴⁵

By this perspective, humans are left with a rather pathetic self-image: in order to define wilderness as "out there," separate from humans, and yet its wildness as what one needs for transcendence, humans have to completely give up on the possibility of living in harmony with the land and other people. One is left believing humans are physically meant for cities, but mentally meant for wilderness. Yet, either humans are functionally and ontologically meant to be part of ecosystems, or they are not. We cannot have it both ways. It is no wonder, then, that David Brower's Sierra Club and The Wilderness Society, two of America's largest environmental groups, are primarily

⁴⁵ William Cronon, "The Trouble With Wilderness, or, Getting Back to the Wrong Nature," in *Wilderness Debate*, pp. 488, 491.

focused on protecting pristine nature from humans, yet attract members who often use these areas as a “retreat.”⁴⁶

Wilderness reserves have certainly been an important accomplishment in the preservationist movement, both for humans and nonhumans. However, sustainable conservation—the practice of sustaining the health and diversity of human and nonhuman communities—is also an important value that threads through the environmental movement; a value which give an alternative view of humans as part of nature. Creating a sustainable *society*, rather than just sustainable wilderness areas, necessitates creating sustainable domesticated landscapes, and thereby re-theorizing humans as always already *in Nature*. Within domesticated landscapes, wildness as a quality is ever-present and needs to be recognized; and within undomesticated landscapes, culture needs to be recognized. Plumwood suggests humans see nature and culture as a continuum, recognizing “both the culture which has been denied in the sphere conceived as pure nature, and [recognizing] the nature which has been denied in the sphere conceived as pure culture.”⁴⁷ Likewise, as I argue in the following chapter, Jerry Franklin suggests we view urban, suburban, rural, and wilderness areas as part of a heterogeneous “patchwork mosaic” within a “landscape matrix,” where nature and culture permeate each other’s artificial boundaries.⁴⁸ Viewing landscapes as a heterogeneous matrix reinforces the “possibility of hybrids and boundary crossings

⁴⁶ Russel Mittermeier and Cristina G. Mittermeier, *Wilderness: Earth’s Last Wild Places*, (CEMEX, 2003), p. 49.

⁴⁷ Plumwood, “Wilderness Skepticism,” p. 670.

⁴⁸ Jerry Franklin, “Preserving Biodiversity: Species, Ecosystem or Landscapes,” *Ecological Applications* 3 no.2 (1993): 202.

which break up the neatly regimented polarity of nature and culture, and which enable wilderness reserves to be understood as part of a continuum.”⁴⁹

Some Conceptual Problems Within the Wilderness Idea

There is something culturally amiss in the very concept of wilderness. Callicott argues that the wilderness idea is conceptually incoherent for three reasons.⁵⁰ First, and most generally, it perpetuates the Puritan separation of “man” from nature, while from a Darwinian point of view, *Homo sapiens* are just one species of animals. Similarly, since “man” is assumed to be separated from nature, any human alteration of nature is understood as an act of degradation. Therefore, pristine nature is by definition *sans* humans, and whatever pristine nature we have left must be “roped off” from any human habitation. Note how this definition is not identical to Thoreau’s, who argued that humans came from Nature, and that we are natural, yet too domesticated.

Holmes Rolston III is a leading proponent of the argument that humans are not natural.⁵¹ He argues that *Homo sapiens* uniquely possesses culture, a means of adapting the environment to/for itself that is different in kind to other animals. In contrast, Nature possesses spontaneous evolutionary and ecological processes. Culture is not spontaneous, and is typified as “a post-evolutionary phase of our planetary history.” Moreover, our “cultural processes by their very ‘nature’ interrupt the evolutionary processes: there is no symbiosis, there is antithesis.”⁵² Because “the human presence is so radically different, humans ought to draw back and let nature

⁴⁹ Plumwood, “Wilderness Skepticism,” p. 670.

⁵⁰ See “The Wilderness Idea Revisited,” pp. 337-366.

⁵¹ See Holmes Rolston III, “The Wilderness Idea Reaffirmed” in *Wilderness Debate*, pp. 367-386.

⁵² *Ibid.*, p. 371.

be.”⁵³ The Wilderness Act crystallizes Rolston’s man/nature dualism by arguing that pristine nature is that which is home to no humans. The act reads: “A wilderness, in contrast with those areas where man and his works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain.”⁵⁴

In contrast to Rolston, Callicott argues that *Homo sapiens* are “only a species among species, one among twenty or thirty million natural kinds.”⁵⁵ Callicott continues: “If man is a natural, a wild, an evolving species, not essentially different in this respect from all the others, as Gary Snyder (1990) reminds us, then the works of man, however precocious, are as natural as those of beavers, or termites, or any of the other species that dramatically modify their habitats.”⁵⁶ Callicott is arguing that human modifications of landscapes, while often “precocious,” is part of our ontology as *Homo sapiens*. If this is the case, then perhaps this issue is *how* we modify landscapes, not *if* we modify them.

Callicott and Rolston III are articulating rather extreme arguments which may not be necessary to defend their main point. Callicott’s argument, that human culture is *no more* “unnatural” than any other species behavior, is obviously a hard argument to make for anyone who wishes to make a value distinction between a wetland and a strip mall. Similarly, Rolston’s argument that humans are not a part of nature is surely based upon pre-Darwinian Puritanism, and seemingly void of empirical justification. Moreover, it is not necessary to fully conflate or dichotomize nature and culture to make their point:

⁵³ Ibid., p. 369.

⁵⁴ “Wilderness Act of 1964,” in Callicott and Nelson, *Wilderness Debate*, p. 121.

⁵⁵ Callicott, “Wilderness Idea Revisited,” p. 350.

⁵⁶ Ibid.

humans are no strangers to healthy ecosystems, but historically healthy ecosystems are those that have escaped the wrath of colonial, European civilizations.

This brings us to Callicott's second critique of the wilderness idea: it relies upon a concept of a healthy ecosystem which is "complete" or "pristine" from lack of humans. Many scholars in Callicott and Nelson's edited book *The Great New Wilderness Debate* make this point in various ways, as it is now well documented that indigenous cultures throughout the Americas altered and managed their landscapes significantly.⁵⁷ This reality seems to have been overlooked for two possible reasons. First, many previously managed landscapes had been abandoned between the time when European-introduced diseases spread through the Americas, killing around 90% of the indigenous population, and "the time when Europeans actually set foot in second-growth forests, shrub-invading savannas, or defaunated deserts."⁵⁸ The second, more insidious reason, is that the European conquest and settlement of the Americas and Australia was intimately tied to the idea of wilderness as *terra nullius* (empty land). Europeans purposely ignored signs that the land had already been managed, though at a different scale and intensity than they were used to, because they psychologically needed the wilderness concept to mean empty, forsaken land in order to "[erase] those inhabitants from Western consciousness—and thus from conscience."⁵⁹ By this logic, as Gary Nabhan points out, "either the pre-Columbian inhabitants of North America were not

⁵⁷ The following studies are sighted as evidence by Callicott and Gary Nabhan: Kat Anderson and Gary Nabhan "Gardeners in Eden," *Wilderness* 55, vol. 194 (1991): 27-30. William M. Denevan. "The Pristine Myth: The Landscape of the Americas in 1492," *Annals of the Association of American Geographers* 82, vol. 33 (1992): 369-385. Suzanne K. Fish, Paul R. Fish, Charles Miksicek, and John Madsen. "Prehistoric Agave Cultivation in Southern Arizona," *Desert Plants* 7, vol. 2 (1985): 107-112; Eugene Parker's "Forest Islands and Kayapo Resource Management in Amazonia: A Reappraisal of the *Apete*." *American Anthropologist* 94 (1992): 406-83.

⁵⁸ Gary P. Nabhan, "Cultural Parallax in Viewing North American Habitats," in *Wilderness Debate*, p. 635.

⁵⁹ Callicott and Nelson, "Introduction," p. 7.

human or they did not significantly interact with the biota of the areas where they resided.”⁶⁰

This is not just a matter of historical colonialist omission, however. A good example of this present day omission is Rolston III’s response to Callicott. Rolston baldly states that indigenous people were not capable of making large changes to the landscape, because “The Indian technology for larger landscape modification was bow and arrow, spear, and fire. The only one that extensively modifies landscapes is fire.”⁶¹ Similarly, ecologist Daniel Botkin has stated that “the idea [of restoration ecology] is to create natural areas that appear as they did when first viewed by European explorers. In the Americas, this would be the landscape of the seventeenth century...If natural means simply *before human intervention*, then all these habitats could be claimed as natural.”⁶² Gary Nabhan gives a powerful rebuttal to these statements:

And so we are often left hearing the truism, “Before the White Man came, North America was essentially a wilderness where the few Indian inhabitants lived in constant harmony with nature”—even though four to twelve million people speaking two hundred languages variously burned, pruned, hunted, hacked, cleared, irrigated, and planted in an astonishing diversity of habitats for centuries...And we are supposed to believe, as well, that they all lived in some static homeostasis with all the various plants and animals they encountered.⁶³

While some large areas of the North American continent remained beyond the influence of human cultures, “hundreds of thousands of acres in various bioregions of North America were actively managed by indigenous cultures.”⁶⁴ In fact, Callicott states: “Much of their most magnificent fauna—horses, camels, elephants, for example—were exterminated by the original discoverers of the New World, ten thousand or more years

⁶⁰ Nabhan, “Cultural Parallax,” p. 633.

⁶¹ Rolston III, “Wilderness Idea Reaffirmed,” p. 377.

⁶² Quoted in Nabhan, “Cultural Parallax,” p. 633.

⁶³ *Ibid.*, p. 635-636.

⁶⁴ *Ibid.*, p. 634.

before Columbus stumbled on it.”⁶⁵ Nabhan is more cautious, stating instead: “Regardless of how major a role humans played in the Pleistocene extinctions, the loss of 73 percent of the North American genera of terrestrial mammals weighing one hundred pounds or more precipitated major changes in vegetation and wildlife abundance.”⁶⁶ Shockingly, Paul Martin argues that “North American wilderness areas *have been lacking ‘completeness’ for over ten millennia* and would require the introduction of large herbivores from other continents to simulate the ‘natural condition’ comparable to those under which vegetation cover evolved over the hundreds of thousands of years prior to these extinctions”!⁶⁷

Martin’s claim highlights Callicott’s third critique of the wilderness idea, which sees the received concept of wilderness as “freeze-framing” successive ecological and evolutionary processes in their “climax stage,” such that wilderness stays wilderness, without human intervention and without further succession.⁶⁸ The idea, then, is that wilderness is by definition a climax community which needs to be protected from change, human or nonhuman. The problem with Clements’ “climax community” concept and seeing healthy ecosystems as “stable” are so well documented, it is not necessary to review them here. The point Callicott is making is that designated wilderness areas are currently so isolated, manipulated, and small, they must be actively manipulated, and restored if necessary, to remain fit habitat for native flora and fauna. Thus, paradoxically, the wilderness concept *necessarily* includes a hands-on human component for its future existence *because* it is not stable.

⁶⁵ Callicott and Nelson, “Introduction,” p.17.

⁶⁶ Nabhan, “Cultural Parallax,” p. 633.

⁶⁷ Ibid., emphasis added.

⁶⁸ Callicott, “The Wilderness Idea Revisited,” p. 349.

Based on these three critiques, Callicott states as a thesis:

If we conceive of wilderness as a static benchmark of pristine nature in reference to which all human modifications may be judged to be more or less degradations then we can duck the hard intellectual job of specifying criteria for land health in four-dimensional, inherently dynamic landscapes long inhabited by Homo sapiens as well as by other species.”⁶⁹

The issue, then, is how to manage dynamic landscapes in a healthy way.

Aldo Leopold argued, “The more monasteries or sanctuaries, the grimmer the incongruity between inside and outside” those sanctuaries and secular culture.”⁷⁰

Leopold’s point is that during the Dark Ages, European people believed “the world was so wicked it was better to have islands of decency than none at all,” thereby relieving people from guilt and responsibility for their wickedness.”⁷¹ While Leopold’s account of monasteries may or may not be accurate, his point is that monasteries shouldn’t need to exist, that the world may not be as wicked or hopeless as people think. Callicott uses Leopold’s statement to draw a parallel argument: “Implicit in the most passionate pleas for wilderness preservation is a complacency about what passes for civilization.”⁷² Put another way, Ramachandra Guha argues that conservation via wilderness preservation “runs parallel to the consumer society without seriously questioning its ecological and socio-political basis.”⁷³ By externalizing wildness outside of the self, one does not have to seriously question consumer culture, and therefore one does not have to take full responsibility for socio-political and ecological ramification of what one consumes.

⁶⁹ Ibid., p. 354.

⁷⁰ Quoted in Callicott, “The Wilderness Idea Revisited,” p. 337.

⁷¹ Ibid.

⁷² Ibid., p. 339.

⁷³ Ramachandra Guha, “Radical American Environmentalism and Wilderness Preservation: A Third World Critique,” *Wilderness Debate*, p. 239.

Plumwood makes a similar argument for why men like Dave Foreman are so intent on wilderness. She states:

I think wilderness lovers who hope to rework the wilderness concept in the context of a radical ecology can concede that the 'set aside' approach had been emphasized to such exclusion by conservative elements in the green establishment precisely because revering nature in distant wilderness does not force us to reconsider nature in our daily relationships to ordinary land and to economic life."⁷⁴

Again, think here of David Brower's Sierra Club, Greenpeace, Foreman's Wilderness Project, Edward Abbey's *The Monkeywrench Gang*, and one begins to see a denial of civilization as a motivation for protecting "wildness" in wilderness.

In contrast to this preservationist-only mentality, Callicott argues: "A harmony-of-man-and-nature conservation philosophy such as Leopold espoused implies re-envisioning civilization as well as critically revisiting the wilderness idea."⁷⁵ The reason for this re-envisioning is straightforward: as *Homo sapiens*, people are capable of living in harmony with the environment. The focus for conservation should be as much on how we can adapt civilization to create healthy ecosystems, as on setting aside wilderness areas. I am not saying designated wilderness areas are unimportant or not a part of conservationist goals. I *am* saying the idea of wilderness can lead one to believe wilderness areas will save us from ourselves. Perhaps a new goal for conservation should be to emphasize the wildness within, such that we don't need saving.

Leopold and Middle Landscapes

In Leopold's essay "Wilderness," he argues for a more mature vision of conservation than the perceived choice between a thoroughly developed landscape and a thoroughly hands-off landscape. While Leopold argued his whole life for wild

⁷⁴ Plumwood, "Wilderness Skepticism and Dualism," p. 667.

⁷⁵ Callicott, "The Wilderness Idea Revisited," pp. 339-340.

sanctuaries, they were just one component of a much broader and subtler conservation philosophy. He states, “This impulse to save wild remnants is always, I think, the forerunner of the more important and complex task of mixing a degree of wildness with utility.”⁷⁶

In a collection of Leopold essays titled *For the Health of the Land*, editors J. Baird Callicott and Eric T. Freyfogle collected published writings and manuscripts documenting Leopold’s work around pastoral, mixed landscapes. Leopold left the Southwest in 1924 for farm country in southern Wisconsin. He became the owner of a worn-out eighty acre farm north of Madison, where he was surrounded by small-scale farmers. His experiences on his farm, along with the courses he taught on game management at UW Madison, began galvanizing his conservation interests beyond wilderness preservation, as he became concerned with wildness in middle landscapes of North America—that is, the rural landscape between densely settled urban areas and the largely unsettled “wilderness” areas. In this context, Leopold’s work and lifestyle began to blur the nature/culture dichotomy by visioning middle landscapes as a continuum offering connectivity across the landscape.⁷⁷

In his essay “The Farmer as a Conservationist,”⁷⁸ Leopold’s central concern is how the maintenance of native plants and animals on privately owned farms can be beneficial for biodiversity, crop production, and non-economic intangibles such as aesthetic beauty and intellectual stimulation. To benefit from this maintenance, however, “the farm family must do more than permanently set aside acreage, fence

⁷⁶ Aldo Leopold, “Wilderness,” in *Wilderness Debate*, p. 518.

⁷⁷ This paragraph summarizes biographical history on Leopold presented in the “Introduction” to Aldo Leopold, *For the Health of the Land*, edited by J. Baird Callicott and Eric T. Freyfogle (Washington: Island Press, 1998).

⁷⁸ Aldo Leopold, “The Farmer as a Conservationist,” *For the Health of the Land*, pp. 161-174.

woodlots, and leave wetlands undrained.”⁷⁹ They must understand conservation in a new way, as an active manager whose goal is a healthy ecosystem. Leopold writes,

Conservation means harmony between men and land. When land does well for its owner, and the owner does well by his land; when both end up better by reason of their partnership, we have conservation. When one or the other grows poorer, we do not...Conservation, then, is a positive exercise of skill and insight, not merely a negative exercise of abstinence or caution.⁸⁰

Leopold is arguing that we need both nature and culture, but makes a plea for conservationists and/or private landowners to not abandon the hybrid zones, the middle landscapes that feed most of society, that bring connectivity to heterogeneous landscapes, and that he himself called home for much of his adult life. Leopold believed it was possible for humans to live in harmony-with-nature if they recognize the nature already surrounding them and within themselves, and use skill and insight to more gracefully integrate *that* nature into inhabited landscapes. Furthermore, and perhaps most interesting, this “exercise of skill and insight” is both self-reflective, and gives us meaning. Leopold writes:

The landscape of any farm is the owner’s portrait of himself. Conservation implies self-expression in that landscape, rather than blind compliance with economic dogma. What kinds of self-expression will one day be possible in the landscapes of a cornbelt farm? What will conservation look like when transplanted from the convention hall to the fields and woods?⁸¹

Leopold, then, is both an advocate for wilderness, and bringing wildness back into domesticated and semi-domesticate landscapes, starting with the people themselves.

Leopold’s argument seems a bit different at first from Callicott’s in that Leopold retains the nature/culture dichotomy, though he makes the plea for a symbiotic integration between the two. Callicott, on the other hand, reduces human culture to the

⁷⁹ Callicott, “The Wilderness Idea Revisited,” p. 345.

⁸⁰ Leopold, “The Farmer as a Conservationist,” pp. 161,164.

⁸¹ *Ibid.*, p. 172.

“natural,” such that human and natural history are one and the same. The difference between *Homo sapiens* and other species is, in this regard, a matter of degree, not of kind for Callicott. While humans are a part of nature for Leopold, he does not support the claim that everything humans do is natural. Leopold understands human culture as distinguishing human actions and purposes in life from those of most other beings and processes in the world.

Upon closer examination, however, Leopold and Callicott’s positions are quite similar. For instance, Callicott argues that human actions on the land, when measured on appropriate evolutionary and ecological time-scales, *are* of a different kind in duration and intensity from that of normal ecological processes. In this context, Callicott argues that wilderness designation should be defined “in contrast to domesticated or civilized regions of the Earth, [not] in contrast to human inhabitation and human influence in general.”⁸² In other words, *how* we inhabit ecosystems makes a difference when change is profound on a geological timescale, such as that of cities and their adjacent farmland.⁸³ Here, I take Callicott’s process of thinking to go from “all human action are natural” by way of John Stuart Mill, to “human culture could be sustainable if our actions could conform to the scales of geological change.”

Based upon this reading of Callicott, his call for more and bigger wilderness areas as “biodiversity reserves,”⁸⁴ and his endorsement of human cultures symbiotically embedding themselves into natural and semi-natural landscapes, makes perfect sense: conservation needs both. He states:

⁸² Callicott and Nelson, “Introduction,” p. 17.

⁸³ Ibid.

⁸⁴ See Callicott, “Should Wilderness Areas Become Biodiversity Reserves?” in *Wilderness Debate*.

Reconceiving wilderness areas as biodiversity reserves effectively partitions the ecologically degraded human sphere from the remnant and recovering natural sphere. Substituting the concept of wildness for wilderness, we can envision (re)inhabiting nature symbiotically. In contrast, the basic free nature/sustainability/reinhabitation idea does not deanthropocentrize the classic preservation approach to conservation, but tries to maintain or reestablish, as the case may be, a human harmony with nature, a mutual beneficial relationship between *Homo sapiens* and the ecosystems human beings inhabit....If *Homo sapiens* is a part of nature, all people can, in principle, either rediscover or reinvent a way of living sustainably and symbiotically with their nonhuman neighbors.⁸⁵

In other words, human always live in nature, and everything we do is technically natural. However, by practicing “skill and insight,” human can live symbiotically within landscapes as just another member of the land community, causing change no greater than on an ecological level.

How can mainstream society in the U.S. develop the idea of free nature/sustainability/reinhabitation? The first step, it seems, is to begin appreciating the open spaces in backyards, gardens, vacant lots, and city parks. People can do this by consciously shifting more attention to the nature they come into contact with every day. A second step might be to emphasize the concept of embeddedness. I am defining “embeddedness” as the conscious act of placing ourselves *in* land, as a fish in the sea, such that we no longer see nature as something “out there,” but as what surrounds us and constitutes us at all times. There is an “otherness” still here, to be sure. The size and force of human modifications of landscapes indicate we are not *just any* members of a land community. The goal, however, is to blur that line as much as possible, not just for the sake of ecosystem health, but for one’s self-identity and health.

Once humans appreciate the “naturalness” of domesticated areas which surrounds them, the next logical step would be to reach out to other places and people,

⁸⁵ Ibid., p. 15.

making connections across individual patches, create an interconnected cultural, ecological, and economic “patchwork mosaic.” As I argue in the following chapters, locally-focused agriculture as practiced by ecologically and socially-minded agrarians offers one model for increasing this connectivity through across the landscape matrix. This integration of heterogeneous patches through increased connectivity reestablishes landscapes as spectrums of varying degrees of management, and the goal of sustainability as fundamentally connected to that management. In the agrarian worldview, farming has the potential for helping establish not just sustainable food systems, but sustainable cultural and ecological landscapes.

Conclusion

I have been arguing that the wilderness idea reflects many problematic assumptions concerning ecological and cultural landscapes. Most notably, I have used Thoreau to show how the wilderness idea is based upon a romanticized notion of nature and a deep ambivalence towards domestication. The concept further depends upon a separation of humans from nature, making nature a stable “other,” as well as a rejection of the naturalness and wildness of culture. Thus, the wilderness idea is grounded in a dualistic, ethnocentric, individualistic, and unscientific conceptualization of landscapes. Wilderness becomes a place that paradoxically makes us most free, yet by definition is not our home. This, I have argued, leads to devaluing the wildness in ourselves as well as in the inhabited landscapes we call home.

What seems to be needed is reconciliation between city and wilderness, nature and culture. This reconciliation might begin with recognizing and enhancing nature within urban, suburban, and rural areas, as well as adapting a conservationist approach

to “middle landscapes,” such as farmland. This conservationist approach, as Leopold emphasized needs to work with private landowners to be ecological stewards of the land, as well as protect the health of the communities upon which these farmers depend, socially and economically. In other words, conservation needs to focus on (re)inhabitation of place in socially, economically, and ecologically sustainable ways. As Gary Snyder eloquently points out, reinhabitation is restorative to both human and nonhuman community:

We are all indigenous to this planet, this mosaic of wild gardens we are being called by nature and history to reinhabit in good spirit. Part of the responsibility is to choose a place. To restore the land one must live and work in a place. To work in a place is to work with others. People who work together in a place become a community, and a community, in time, grows a culture. To work on behalf of the wild is to restore culture.⁸⁶

⁸⁶ Gary Snyder, “The Rediscovery of Turtle Creek,” in *Wilderness Debate*, p. 651.

CHAPTER 2

AGRICULTURE, BIODIVERSITY AND FUNCTIONAL ECOSYSTEMS

Introduction: Humans in the Landscape

Dana and Laura Jackson argue that “for many conservation biologists and card-carrying members of the national environmental organizations...farming in North America is a kind of ecological sacrifice zone with a conservation profile as low as its perceived cultural status.”⁸⁷ This sacrifice is more than metaphorical. Some agronomists and conservation biologists, seconded by the vice-president of Monsanto, Robert Fraley, have proposed that farming practices be intensified even further in the U.S. via industrial agriculture so that we can spare more temperate and tropical wilderness.⁸⁸

Agribusiness has successfully persuaded farmers, politicians, civic leaders, agronomists, county extension agents, and even conservation biologists that agricultural modernization inevitably leads to industrial-size intensification and specialization, and that financially viable alternatives are unavailable.⁸⁹ However, evidence is mounting that industrial agriculture is not sustainable—socially, economically, or ecologically. Industrial values prioritize economic interests on a purely short-term, global scale, while

⁸⁷ Laura L. Jackson, “The Farm, the Nature Preserve, and the Conservation Biologist,” in *The Farm as Natural Habitat: Reconnecting Food Systems with Ecosystems*, ed. Dana L. Jackson and Laura L. Jackson (Washington, D.C.: Island Press, 2002), p. 40.

⁸⁸ Ibid. See also R. B. Horsch and R.T. Fraley, “Biotechnology Can Help Reduce the Loss of Biodiveristy,” in *Protection of Global Biodiversity: Converging Strategies*, ed. L.D. Guruswamy and J.A. McNeely (Durham: Duke University Press, 1998), pp. 49-65; D.T. Avery, *Saving the Planet with Pesticides and Plastic: The Environmental Triumph of High-Yield Farming* (Indianapolis: Hudson Institute, 1995); M. Huston, “Biological Diversity, Soils, and Economics,” *Science* 265 (1993): 1676.

⁸⁹ Jackson and Jackson, *The Farm as Natural Habitat*.

overlooking how intensification, specialization and standardization cumulatively affects local and regional land, air, water, and biodiversity.⁹⁰

Farming communities do not profit from large-scale farming, socially or ecologically. The green revolution has contributed to the loss of four million small-scale family farms over the last century.⁹¹ The Center for Rural Affairs has estimated that “...with the loss of each farmer there is an economic loss to a rural community of \$720,000 due to all of the associated business supported by farm activity.”⁹² This not only destroys local economies, but disconnects people further from their food sources. Moreover, there is a direct correlation between losing farms and losing biodiversity. The United States has lost three quarters of all its agricultural biodiversity—or genetic diversity of crops—over the last 100 years.⁹³ Daniel Imhoff reports that by the mid-1990s, farming and ranching (combined) were the primary reason that 429 of the 631 threatened or endangered species were listed in the contiguous states.⁹⁴ As modern agriculture becomes larger, more capital intensive, more production-centered and thereby more industrial, it is increasingly responsible for loss of biodiversity primarily due to pollution and habitat destruction.

Even in the short-term, the socio-economic reality of farming in America is that we are losing our most productive farmland to increased land value due to

⁹⁰ Although local and regional changes can be very far reaching. For example, the zone of hypoxia in the Gulf of Mexico, in which seven thousand square miles depleted of marine life because of excess nutrients flowing down the Mississippi River from the Corn Belt.

⁹¹ Calvin Beale, quoted in Fred Kirschenmann, “The Future of Agrarianism: Where Are We Now?” Self-published at http://www.leopold.iastate.edu/pubs/speech/files/042502-future_of_agrarianism.pdf, (2003), p. 1.

⁹² Quoted in Fred Kirschenmann, “A Revolution in Agriculture,” 2003. Self-published at http://www.leopold.iastate.edu/pubs/speech/files/0502_glynwood.pdf, (2002), p. 2

⁹³ Wes Jackson, “Farming in Nature’s Image: Natural Systems Agriculture,” in *The Fatal Harvest Reader: The Tragedy of Industrial Agriculture*, ed. A. Kimbrell (Washington, D.C. Island Press), pp. 65-75.

⁹⁴ Daniel Imhoff, “Farming With the Wild: A Conservation Approach to Agriculture,” in *The Fatal Harvest Reader*, p. 309. Farming was cited as a contributing factor to 42 percent of listed species, and ranching 26 percent.

developmental pressures. With few exceptions (such as land trusts and conservation easements), land spared from industrial agricultural expansion is not going fallow or turning back into wilderness, as conservationist would like; our farmlands are turning into suburbia. Nina Leopold Bradley writes, “If we don’t work hard and work together to improve farmers’ profitability and secure land base for small farming in the face of urban development, many of us will live in sprawl, drive through sprawl, and work in sprawl.”⁹⁵ Both development and industrial agriculture’s values are antithetical to the farming culture they are displacing (often by the “family farmers” themselves, trying to keep up with economies of scale). As I argue in Chapter Three, the industrial vision of agriculture does not take into account the cultural ramifications of intensification and homogenization in agrolandscapes.

Humans have evolved as part of the world’s ecosystems. Modifying land is a process of this co-evolution, as natural for humans as it is for termites and beavers.⁹⁶ Human civilization has intentionally transformed landscapes throughout time. More particularly, human beings do not exist without the peculiar transformations of their environment needed to produce food and fiber commodities. And while environmental ethics, ecology and conservation biology necessarily view the overall human impact on modified landscapes as a problem that needs to be solved through an understanding of changes within ecosystems,⁹⁷ sustainable human modifications of landscapes also need to be identified and conserved. Thus, even if industrial agriculture were not

⁹⁵ Nina Leopold Bradley, Foreword to *The Farm as Natural Habitat*, p. xi.

⁹⁶ J. Baird Callicott, “Aldo Leopold’s Concept of Ecosystem Health,” in *Beyond the Land Ethic: More Essays in Environmental Philosophy* (New York: SUNY Press, 1999), p. 336.

⁹⁷ V. Thomas Parker and Steward A. Pickett, “Restoration as an Ecosystem Process: Implications of the Modern Ecological Paradigm,” *Restoration Ecology and Sustainable Development*, eds. Krystyna Urbanska, Nigel Webb, Peter J. Edwards (Cambridge: Cambridge University Press, 2000), pp. 17-31.

threatening biodiversity, as it is, the social and cultural practice of farming is an environmental issue. In the end, it may be just as important for agriculture—which covers 50% of the earth’s terrestrial land—to save the cultural diversity within the human species as it is for saving the diversity of nonhuman species. One could argue that small-scale alternative agriculture is a “boundary object” in our cultural landscape, bringing together conservationists, farmers, community and cultural activists, just to name a few, as we search for a way to live in an economically, ecologically and socially sustainable way.

Humans currently inhabit and transform ecosystems in myriad ways, however, so why should agroecosystems in particular be a concern for conservationism? Three relatively simple answers come to mind. First, even conservationists need to eat. If our food system is not sustainable, we as a culture are not sustainable. Second, agriculture as it is now widely practiced is largely responsible for total biodiversity loss and the corresponding breakdown of ecosystem function over the last century. Third, “sustainable agriculture” might give humans a blueprint for creating ecologically and culturally sustainable landscapes.

In this chapter, then, I will be arguing: while agroecosystems themselves need a relatively small number of species representative of functional groups *within* crops, a small-scale, conservationist approach to agriculture can enhance crop yield while maintaining, or even enhancing connectedness and biodiversity in the landscape matrix. Biodiversity *per se* might not be as important to agroecosystem function as maintaining the most productive species within functional groups, but it is a good general *indicator* of ecosystem health and therefore a sound focus for both conservation and agriculture.

Crucial to this conservationist approach, however, is maintaining *human* diversity across landscapes that are capable of managing agroecosystem functions with knowledge and care. In order to see and value these socio-cultural and ecological interactions properly, however, it is important to measure and manage sustainability at the landscape level.

The Landscape Matrix

Modern land conservation efforts require a cobbling together of multiple land uses into one mosaic for land health. In his 1939 essay, “The Farmer as a Conservationist,” Leopold writes: “Doesn’t conservation imply a certain interspersion of land uses, a certain pepper-and-salt pattern in the warp and woof of the land use fabric?”⁹⁸ Connected to this idea, Leopold states that conservation efforts on certain parts of the land would fail if other parts were ruthlessly exploited. He wrote in the essay “Round River”:

Conservation is a state of harmony between men and land. By land is meant all of the things on, over, or in the earth. Harmony with land is like harmony with a friend; you cannot cherish his right hand and chop off his left. That is to say, you cannot love game and hate predators; you cannot conserve the waters and waste the range; you cannot build the forest and mine the farm. The land is one organism.⁹⁹

Similarly, Izac and Swift argue that sustainable land management could most effectively be achieved at the landscape scale by means of balance between aggrading and degrading areas, i.e. between interspersed (and often rotating) patches of high intensification and fallow or rest, in contrast to advocacy of high protection and diversity

⁹⁸ Leopold, *For the Health of the Land*, ed. J. Baird Callicott and Eric T. Freyfogle (Washington, D.C.: Island Press, 1999), p. 168.

⁹⁹ Leopold, *A Sand County Almanac with Essay on Conservation from Round River*, (New York: Ballantine Books, 1966). For a discussion of Leopold’s use of the “land as organism” metaphor, see J. Baird Callicott, “Aldo Leopold’s Concept of Ecosystem Health,” esp. pp. 334-345.

over the entire landscape.¹⁰⁰ Soil organic matter change is a specific and far-reaching example. In areas of intense production and harvest the soil carbon content may decrease, but under fallow or tree-based production it can be rebuilt. Alternating these two options across a landscape balances ecosystem functions such as nutrient cycling, soil structure, water regimes and the emissions of greenhouse gases.¹⁰¹

Like conservation in general, biodiversity conservation requires the maintenance of species habitat across a wide array of spatial and temporal scales.¹⁰² Jerry Franklin has argued forcefully that “larger-scale approaches—at the levels of ecosystems and landscapes—are the *only* way to conserve the overwhelming mass—the millions of species—of existing biodiversity.”¹⁰³ Species-based conservation policies can only deal with a small fraction of existing diversity due to constraints in time, financial resources, societal patience, and scientific knowledge.¹⁰⁴ Moreover, conservation biologists have “focused too heavily on wild and aesthetically pleasing landscapes,” such as national parks at middle and high elevations, “which probably do not do a good job of serving the bulk of biological diversity.”¹⁰⁵ The traditional approach in conservationism has been to focus on biodiversity reserves isolated spatio-temporally from one another. In contrast, domesticated landscapes—such as agriculture, forestry, and human settlements—occupy as much as 95% of the terrestrial environment, and empirically “a large portion

¹⁰⁰ M.J. Swift, A.-M.N. Izac, and M. van Noordwijk, “Biodiversity and Ecosystem Services in Agricultural Landscapes—Are We Asking the Right Questions?” *Agriculture, Ecosystems & Environment* 104 (2004): 127.

¹⁰¹ *Ibid.*

¹⁰² Swift et al., “Biodiversity and Ecosystem Services,” pp. 113-134.

¹⁰³ Jerry Franklin, “Preserving Biodiversity: Species, Ecosystem or Landscapes,” *Ecological Applications* 3 no.2 (1993): 202.

¹⁰⁴ *Ibid.*, p. 202.

¹⁰⁵ *Ibid.*, p. 204.

of the world's biological diversity coexists in these ecosystems."¹⁰⁶ Agriculture and ranching cover 50% of total terrestrial surface area, commercial forests 20%, and human settlements (cities, towns and villages) 25%.¹⁰⁷ Franklin takes special note of what E.O. Wilson calls "smaller" organisms, such as invertebrates, fungi, and bacteria, and nematodes, which are highly dependent upon settled land for habitat, make up over 90% of *all* species, and dominate the structure and function of land ecosystems.¹⁰⁸ So, while maintaining and expanding nature reserves continues to be important for conservationist goals, it is the semi-natural landscape that dominates most inhabited regions of the world, and that occupies the most productive land, such as valleys and lowlands.¹⁰⁹

Franklin argues whether or not a protected wilderness reserve or park will ultimately be able to maintain its biological diversity is largely determined by the surrounding human-managed landscape. Surrounding areas provide species habitat at smaller spatial scales, increase the effectiveness of reserve areas, and control connectivity in the landscape. To manage this habitat, conservation must focus on both domesticated and wild patches within the "*landscape matrix*," which Franklin defines as "the complex of semi-natural and domesticated lands within which most reserve systems will be embedded." Like Leopold, Franklin states that instead of ignoring domesticated land, "we can either 'soften' the matrix, making it less hostile for the dispersion of organisms, or enhance its lethality."¹¹⁰

¹⁰⁶ D. Pimentel and U. Stachow, "Conserving Biological Diversity in Agricultural and Forestry Systems," *Bioscience* 42, no. 5 (May 1992): 354-364.

¹⁰⁷ *Ibid.*

¹⁰⁸ Franklin, "Preserving Biodiversity," p. 204.

¹⁰⁹ *Ibid.*

¹¹⁰ *Ibid.*, p. 202-205.

A key concept in agricultural conservation of biodiversity is *connectivity* within the landscape matrix. Franklin argues that “if a reserve is imbedded in a matrix that is highly dissimilar—has a high contrast—a much larger reserved area is going to be required to achieve the same level of protection.”¹¹¹ He notes that the higher the contrast between patch types, the greater the effects on biodiversity loss. One reason for this is that dissimilar land patches or farms often have highly contrasting borders, and edge influences can be extensive. The other is that when there is a loss of structural and functional connectivity from one patch to the next, the patches become “hostile” to each other, not allowing for species migration and interaction. Thus, “the condition of the matrix is absolutely critical to overall landscape connectivity and, in most cases, will be the primary controller.”¹¹²

Given this issue of connectivity, we can construct two contrasting landscape models for biodiversity conservation in *agriculture*: one model focuses on increasing and protecting the biodiversity on reserves, and minimizing the lethality of land adjacent to reserves; the other model focuses on conservation across the landscape matrix as a whole to enhance dispersion and in-place survival of organisms.¹¹³ Based on the first model, agrolandscapes might contain large islands of pristine unmanaged ecosystems embedded within a sea of intensive large-scale agroecosystems with highly contrasting borders. Swift et al. notes that “such a landscape often carries with it a substantial cost in terms of social disruption and inequity,”¹¹⁴ often due to an uneven distribution of

¹¹¹ Franklin, “Preserving Biodiversity,” p. 204.

¹¹² *Ibid.*, p. 205.

¹¹³ J.H. Vander and I. Perfecto, *A Breakfast of Biodiversity*, (San Francisco: IFDP, 1994).

¹¹⁴ M.J. Swift and others, “Biodiversity and Agroecosystem Function,” in *Functional Roles of Biodiversity: A Global Perspective*, ed. Harold A. Mooney and others (New Jersey: Wiley & Sons/ SCOPE 55, 1996), p. 293, <http://www.icsu-scope.org/downloadpubs/scope55/scope55-ch11.pdf>.

resources between the landowners or reserve visitors, and the laborers or neighbors bordering reserves. For instance, the overall increase in homogeneity across the European farming landscape during the latter half of the 20th century due to larger farms and fewer farmers has had a profoundly negative impact on farmland biota, economic equity and land distribution.¹¹⁵

An alternative model is a heterogeneous landscape with a high concentration of small-scale farms minimizing edge effects in the landscape and connecting a large number of reserve patches. As farms diversify, they tend to become smaller (due to economies of scale). Wendell Berry asks: “Can increasing the number of farms and farmers in an agricultural landscape enhance the quality of that landscape as wildlife habitat? Can it increase what we might call the wilderness value of that landscape?” And he replies, “It can, and the determining factor would be diversity.”¹¹⁶ Swift et al. similarly imagine a patchwork mosaic of a heterogeneous landscape and farms as a promising approach (bio)diversity preservation in agrolandscapes.¹¹⁷ Biodiversity conservation at the landscape scale is usually optimized by heterogeneity—a diversity of farmers using the land in heterogeneous ways—though this generality will need specificity for any given landscape with respect to patch types, sizes, shapes, patterns, location in the landscape, and management practices.¹¹⁸ For example, a heterogeneous landscape supporting high levels of biodiversity could contain a gradient of land uses blending into each other, including unmanaged ecosystems (reserves), high-density

¹¹⁵ D.G. Hole and others, “Does Organic Farming Benefit Biodiversity?” *Biological Conservation* 122 (2005): 123.

¹¹⁶ Wendell Berry, “For Love of the Land,” *Sierra Magazine* (May/June 2002): p. 2, <http://www.sierraclub.org/sierra/200205/land.asp>.

¹¹⁷ Swift et al., “Biodiversity and Ecosystem Services.”

¹¹⁸ *Ibid.*, p. 126.

human settlements, small-scale farmers and ranchers, traditional agroforestry, abandoned agricultural fields, home gardens and other agricultural systems perhaps designed with structural features resembling a forest.¹¹⁹

I will argue that appropriate agroecosystem design provides a major opportunity for biodiversity conservation across the landscape matrix.¹²⁰ While there is no certainty yet as to which of the above models truly conserves the most biological diversity, most empirical evidence thus far suggests the second strategy of landscape heterogeneity supports more biological diversity than the first.¹²¹ A diverse landscape model creates a range of microhabitats, thus providing more opportunities for various assemblages of species to invade and take hold: the “meta-community” effect gives rise to far greater diversity than simply the sum of the individual community patches.¹²²

Heterogeneous landscapes depend on economic and cultural diversification, which is equally crucial to sustainable agriculture as ecological diversity. In contrast, the green revolution provides a good illustration of landscape homogenization and “hard” boundary lines drawn. Homogenized landscapes are generally supported by policy interventions that tend to promote homogeneity in farmer goals, practice and behavior as well, at least over the short term.¹²³

¹¹⁹ J.J. Ewel, “Designing Agricultural Ecosystems for the Humid Tropics,” *Annual Review of Ecological Systems* 17 (1986): 245-271.

¹²⁰ A. Gomez-Pompa, and A. Kaus “Taming the Wilderness Myth,” *Bioscience* 42 (1992): 271-279. Pimentel et al., “Conserving Biodiversity in Agricultural and Forestry Systems.”

¹²¹ Swift et al., “Biodiversity and Ecosystem Services;” Franklin, “Preserving Biodiversity;” Hole et al., “Does Organic Farming Benefit Biodiversity?”

¹²² Swift et al., “Biodiversity and Agroecosystem Function,” p. 293.

¹²³ Swift et al., “Biodiversity and Ecosystem Services,” p. 126.

Biodiversity as an Indicator of Ecosystem Function

Jerry Franklin et al. recognize three major components of ecosystems: composition, structure, and function.¹²⁴ These three attributes determine, and in fact constitute, the biodiversity of an area based on their interconnections along several levels of organization.¹²⁵ *Composition* is the taxonomic identity and variety of elements in an assemblage, including species lists and measure of species diversity and genetic diversity. *Structure* is the physical organization or pattern of a system, from habitat complexity as measured within communities to the pattern of patches and other elements at a landscape scale. *Function* involves ecological and evolutionary processes, including gene flow, disturbances, and nutrient cycling. Franklin points out the need to measure biodiversity along structure and function levels, and not just composition as has been the case historically. Hence, Noss argues that structural simplification of ecosystems and disruption of ecosystem function may not be fully appreciated as of yet.¹²⁶

Noss elaborates Franklin's three attributes of biodiversity into a nested hierarchy, which shows their interconnectedness and similar levels of organization at the landscape, ecosystem, species and genetic level. According to Noss, "hierarchy theory suggests that higher levels of organization incorporate and constrain the behavior of lower levels."¹²⁷ In other words, measuring biodiversity on one scale may not hold true for other scales, such as higher levels of organization, though higher levels of organization broadly determine biological structure, composition, and function at lower

¹²⁴ Reed F, Noss, "Indicators for Monitoring Biodiversity: A Hierarchical Approach," *Conservation Biology* 4, no.4 (Dec. 1990): 356.

¹²⁵ Ibid.

¹²⁶ Ibid., p.357.

¹²⁷ Ibid.

scales. The results of measuring biodiversity on one scale may be misleading if it is not in context. For instance, in their study of landscape structures as indicators of biodiversity, Jens Dauber et al. claim that “though habitat quality may be the most important factor determining the presence of a species at a given site,” habitat quality of a patch in turn “depends on the structure of the surrounding landscape,” or the “matrix effects.”¹²⁸

Studies in biodiversity in agroecosystems have verified this theory of nested hierarchy, in that measuring biodiversity at the patch or crop level does not give a very good context for understanding the larger ecological processes at work on the landscape scale, which largely determine the ecosystem structure and processes on the patch scale. The major variables for species diversity in landscape patches—such as disturbance, matrix- heterogeneity, isolation, and boundary discreteness—are all highly determined by larger scales.¹²⁹

Over the past billion years, adaptation and diversification have tended to increase the number of species. The theory of “island biogeography” argues that diversity within an ecosystem at any point in time is the result of a “self-selection” process that involves co-evolution of species comprising the biological community within a given ecosystem by interactions between them and with their abiotic environment through time.¹³⁰ This process is not isolated (like an island), as new species may enter an ecosystem from neighboring areas, some establishing themselves and others failing to do so. Moreover, successful newcomers, or new adaptations emerging from existing

¹²⁸ Jens Dauber and others, “Landscape Structures as an Indicator of Biodiversity: Matrix Effects on Species Richness,” *Agriculture, Ecosystems and Environment* 98 (2003): pp. 321-322.

¹²⁹ Reijja Hietala-Koivu, Jussi Lankoski, and Sanna Tarmi, “Loss of Biodiversity and its Social Cost in an Agricultural Landscape,” *Agriculture, Ecosystems and Environment* 103 (2004): 77.

¹³⁰ Ibid.

ones (such as competitors, predators, pests or diseases), as well as fluxes in the physical environment, can cause local extinctions.¹³¹ Thus, specific ecosystems and species co-evolve, such that ecosystem functions support species populations, and species populations in turn support ecosystem functions.

The diversity of any system is not adequately represented simply by the number of species or genotypes present, but by the relationships between them in space and time. Attempts to assemble combinations of the same number of species under slightly different conditions, and in particular without the history of interaction, often fail.¹³² What makes any existing species combination into a “system” is still largely elusive for ecologists at this point in research.¹³³ Moreover, often interest in “biodiversity” is actually an interest in the *functional roles* of the biotic community, which usually has more to do with the composition or “structure” of the vegetation and the relationships between different “functional groups,” rather than diversity as such.¹³⁴ Swift et al. define a “functional group” as “a set of species that have similar effects on a specific ecosystem-level biogeochemical process.”¹³⁵

The type and abundance of functional groups will vary across ecosystems that differ in age, area, habitat diversity, structure, matrix heterogeneity, isolation and boundary discreteness.¹³⁶ Miguel Altieri and Clara Nicholls give a list of “functional

¹³¹ Ibid.

¹³² J.J. Ewel, “Natural Systems as Models for the Design of Sustainable Systems of Land Use,” *Agroforestry Systems* 45 (1999): 121.

¹³³ Swift et al., “Biodiversity and Ecosystem Services.”

¹³⁴ Ibid., 114.

¹³⁵ Ibid., p. 118.

¹³⁶ Hietala-Koivu et al., “Loss of Biodiversity and its Social Cost,” p. 77.

components” similar to Swift et al.’s “functional groups,” and the ecological functions they provide. Below is a modified list specific to agroecosystems¹³⁷:

<u>Components/Groups</u>	<u>Functions</u>
Pollinators.....	Pollination, genetic introgression
Predators and Parasites.....	Population regulation, biological control
Herbivores.....	Biomass consumption, nutrient cycling
Non-Crop Vegetation.....	Competition, allelopathy, Source of natural enemies, crop wild relatives
Earthworms.....	Soil structure, nutrient cycling
Soil Microfauna..... (microarthropods, nematodes, protozoa)	Nutrient cycling, disease suppression
Soil Mesofauna..... (mites, collembola)	Decomposition, predation, nutrient Cycling.

Swift et al. further links these functional groups to “ecosystem goods and services.”

Ecosystem goods include food, fiber and latex, pharmaceuticals and agro-chemicals.

Ecosystem services include nutrient cycling, regulation of water flow and storage, regulation of soil and sediment movement, regulation of biological populations including diseases and pests, de-toxification of chemical or biological hazards including water purification, and regulation of atmospheric composition and climate.¹³⁸

One primary reason given for maintaining and/or encouraging natural biodiversity is that biodiversity is somehow connected to the above ecosystem functions and services. Swift et al. define “ecosystem functions as the minimum aggregate set of processes (including biochemical, biophysical and biological ones) that ensure the biological productivity, organisational integrity and perpetuation of the ecosystem.”¹³⁹

They further hypothesize that if ecosystem functions can be maintained by a minimal number of representatives of the essential functional groups, it is unclear what the

¹³⁷ Modified from Miguel A. Altieri and Clara I. Nicholls, “Biodiversity, Ecosystem Function, and Insect Pest Management in Agricultural Systems,” in *Biodiversity in Agroecosystems*, ed. Wanda W. Collins and Calvin O. Qualset (Boca Raton: CRC Press, 1999), p. 72.

¹³⁸ M.J. Swift et al., “Biodiversity and Ecosystem Services,” p. 132.

¹³⁹ *Ibid.*, p.115.

ecological significance is of the often high diversity within functional groups past the point of functionality. Vitousek and Hooper further contribute to Swift et al.'s theory by hypothesizing three different possible relationships between plant diversity and broad-based ecosystem functions, such as the rate of plant production:

1. Ecosystem function and species number have a linear relationship: ecosystem function improves indefinitely with increasing numbers of species.
2. Ecosystem function requires diversity for efficiency to be maximized, and this saturation point is reached at a relatively low species number;
3. Ecosystem function stabilizes very quickly with minimal diversity, and plateaus once community niches are filled by one or two species in a functional group.¹⁴⁰

Their analysis of current evidence led them to propose that the second relationship (#2) was the correct one. This suggests that while the essential functions of an ecosystem, such as primary production, requires a minimal level of diversity to maximize efficiency, this effect is saturated at a relatively low number.¹⁴¹ Swift and Anderson proposed that this relationship could also apply to the decomposer system as well as plant productions, though the communities of organisms contributing to the ecosystem function of decomposition are taxonomically much more diverse than those of plant production.¹⁴² If this is the case, then “the minimum diversity essential to maintain any given ecosystem can be represented by one or a few functionally distinct species i.e. one or a few representatives of a small range of functional groups.”¹⁴³ In other words, a minimum amount of biodiversity may be needed which covers the basic ecosystem functions needed for an ecosystem to be healthy.

¹⁴⁰ Swift et al., published the Vitousek and Hooper information in the form of a (vague) graph in “Biodiversity and Ecosystem Services,” p. 117.

¹⁴¹ Ibid.

¹⁴² M.J. Swift and J.M. Anderson, “Biodiversity and Ecosystem Function in Agricultural Systems,” in *Biodiversity and Ecosystem Function*, ed. E.D. Schulze and H. Mooney (Berlin: Springer 1993).

¹⁴³ Swift et al., “Biodiversity and Ecosystem Services,” p.118.

Debate on this relationship has been lively in ecology for decades.¹⁴⁴ What happens to these functions as ecosystems are simplified? In 1973, systems ecologist Robert May overturned the widely held tenant in ecology dating back to Elton¹⁴⁵ and Odum that the more diversified the species are living in an area, the more complex their linkages are, and the more stable the system is.¹⁴⁶ While conservationists and ecologists alike were using diversity preservation as the key to preserving a stable environment, “May, working, with theoretical models on a computer, found that the more species there were, the more fragile was the system.” However, May warned that “until such time as we better understand the principles which govern natural associations of plants and animals, we would do well to preserve large chunks of pristine ecosystems.” He reasoned, like E.O. Wilson and Rolston III, that biodiversity has a “long evolutionary history,” and that “unnatural” ecosystems such as agroecosystems “are usually intrinsically unstable.”¹⁴⁷

More recently, over the last six years the debate has become full-blown, especially between David Tilman, Michael Huston and Phil Grime.¹⁴⁸ Studies conducted by Tilman and Naeem have tried to make a clear connection between biodiversity and ecosystem on a plot scale, with a small pool of species. Critics such as Huston and Grime claim the higher productivity seen with more species on a plot scale could be explained by simply adding a few highly productive species to the mix, a phenomenon

¹⁴⁴ M.S. Loreau and others, “Biodiversity and Ecosystem Functioning: Current Knowledge and Future Challenges,” *Science* 294 (2001): 804-808.

¹⁴⁵ Elton argued that “simple communities were more easily upset than that of richer ones; that is, more subject to destructive oscillations in populations, and more vulnerable to invasions.” C.S. Elton, *Ecology of Invasions by Animals and Plants* (London: Chapman & Hall, 1958).

¹⁴⁶ Donald Worster, *Nature's Economy: A History of Ecological Ideas*, 2nd ed. (Cambridge: Cambridge University Press, 1994), p. 409.

¹⁴⁷ Ibid.

¹⁴⁸ Jocelyn Kaiser, “Rift Over Biodiversity Divides Ecologists,” *Science* 289, no. 5483 (2000): 1282.

known as the “sampling effect.” This sampling effect does nothing to prove (in isolation) that an array of species is any better than planting a monoculture of the most productive species. To show a real benefit from diversity, these ecologists have argued, plots would have to demonstrate “overyielding”—put simply, productivity would have to be synergistically greater than that of the single most productive species grown in isolation.¹⁴⁹ To date, no isolated experiment yet has been able to show that one thousand organisms are better than one hundred for any given ecosystem function. Kinzig and Tilman have compiled a new book showing empirical progress in dealing with the “sampling effect” issue, and argue there are now enough independent studies using verifiable methodologies to show a clear link.¹⁵⁰ However, Swift et al. argue that “the strictest interpretation of many of the experiments [upon which Tilman et al. base their generalizations] would be that the conclusions apply only to the specific combinations of organisms used in the tests, and in most cases these are assemblages constructed for experimental purposes rather than naturally co-evolved communities.”¹⁵¹ Swift makes the further point that “at a fundamental level such experiments suffer from a basic methodological paradox—in order to describe and understand diversity and complexity we need to simplify it, and take away the self-selection that governs real-world diversity.”¹⁵²

Generally, the scientific community working on this issue tend to agree more unanimously on the importance of Swift’s “functional groups” designation. For example, Loreau, Naeem and others argue, “It is not yet clear, however, whether this dependence

¹⁴⁹ Ibid.

¹⁵⁰ Ann P. Kinzig Stephen Pacala, and David Tilman, eds., *The Functional Consequences of Biodiversity: Empirical Progress and Theoretical Extensions*, (Princeton: Princeton University Press, 2002).

¹⁵¹ “Swift et al., “Biodiversity and Ecosystem Services,” p.118.

¹⁵² Ibid.

on diversity arises from the need for recruitment of a few species from within the regional species pool or is due to the need for a rich assortment of complementary species within particular ecosystems.¹⁵³ Similarly, Altieri and Nicholls conclude that “species composition is more important than species numbers per se...The challenge is to identify the correct assemblages of species that will provide through their biological synergisms key ecological services....”¹⁵⁴ In an overview article titled “The Diversity-Stability Debate,” Kevin McCann concludes from the literature:

Taken together, recent advances indicate that diversity can be expected, on average, to give rise to stability. The evidence also indicates that diversity is not the driver of this relationship; rather, ecosystem stability depends on the ability for communities to contain species, or functional groups, that are capable of differential response.¹⁵⁵

He further states, “Just how much ecosystem deterioration is sufficient to precipitate a collapse is difficult to assess, but current experiments and theory agree that drastic community changes can accompany the removal or addition of even a single species.”¹⁵⁶

What are we to make of McCann’s association of functional groups with “differential response”? Vandermeer et al. argue that biodiversity enhances ecosystem function because different species or genotypes perform slightly different functions (have different niches).¹⁵⁷ On the other hand, there are many more species than there are functions, and thus redundancy is built into the ecosystem. This redundancy enhances ecosystem function because those components that appear redundant at one

¹⁵³ M.S. Loreau et al., “Biodiversity and Ecosystem Functioning,” p. 804.

¹⁵⁴ Altieri and Nicholls, “Biodiversity, Ecosystem Function, and Insect Pest Management,” p. 82.

¹⁵⁵ Kevin S. McCann, “The Diversity-Stability Debate,” *Nature* 232 vol. 405 (May, 2000).

¹⁵⁶ *Ibid.*, p. 233.

¹⁵⁷ J. Vandermeer and others, “Global Change and Multi-Species Agroecosystems: Concepts and Issues,” *Agriculture, Ecosystems & Environment* 67(1998): 1-22.

point in time become important when some environmental change occurs. Thus, over time, key functions in ecosystems are highly vulnerable if they are dependent upon a small pool of species under all spatio-temporal circumstances of stress and disturbance. The capacity of a system to respond to and recover from disturbances is termed its *resilience*. This property is attributed in part to the degree of connectivity within an ecosystem, a feature that depends at least in part on the composition and diversity.¹⁵⁸

Interactions between the populations of organisms at the various trophic levels (plants, herbivores, symbionts, parasites, decomposers, predators and secondary predators) result in a dynamic balance of population sizes. The total diversity can be huge, but any single population is only influenced by a relatively small number of interactions. So, for instance, in order to manage biological pests or diseases in an ecosystem, there needs to be a significant level of diversity among its parasites and predators. These parasites and predators in turn may depend on other elements of diversity for their survival, such as the presence of microhabitats, alternative hosts, nesting or egg laying sites, or refuges provided by vegetation cover.¹⁵⁹ With higher diversity, even if one or several predator species are hit by disease, others are available to fill in. So, in fluctuating environments, biodiversity may insure ecosystems against decline because many species provide guarantees that some will keep functioning even if others fail.¹⁶⁰

¹⁵⁸ Swift et al., "Biodiversity and Ecosystem Services," p. 120.

¹⁵⁹ Ibid., 119.

¹⁶⁰ Shigeo Yachi and Michel Loreau, "Biodiversity and Ecosystem Productivity in a Fluctuating Environment: The Insurance Hypothesis," *Ecology* 96 (1999): 1463-1468.

Biodiversity and Land Health

Almost everyone in the environmental sciences has regarded biodiversity as the rallying entity to be saved since the 1980s. Pimentel and Stachow sum up this point of view nicely: “Biological diversity is essential, whether for agricultural and forestry systems, pharmaceutical products, aesthetics, tourist income, evolutionary processes, stabilizing ecosystems, biological investigations, protection of overall environmental quality, or intrinsic worth of all species on Earth.”¹⁶¹ Similarly, Swift et al. argue that biodiversity has several levels of value: *intrinsically* it can be valued for cultural, social, aesthetic and ethical benefits; *utility* value exemplified by its economic or “direct use” benefits, such as for pharmaceutical products and tourism; its *serpendic* (bequest) value to future generations; and finally its *functional* value as a life support through the preservation of ecological structure and integrity.”¹⁶²

Should biodiversity be valued in and of itself? I don't think so. If we could increase biodiversity above an unmanaged ecosystem level, this would not necessarily be a benefit to ecosystems, either ecologically or aesthetically. I will argue below that the more critical indicator for ecological sustainability is the connections between species and overall ecosystem functions. Ecosystems are not static zoos; biodiversity is nonlinear, controlled partly by the environment through stochastic fluxes and disturbances on multiple spatio-temporal scales. Nor are all species created equal. As I will discuss below, evidence is growing that ecosystems usually need a relatively small number of highly productive species in each functional group in order for ecosystem functions to operate smoothly. Replacement of local species by intrusive exotics does

¹⁶¹ Pimentel and Stachow, “Conserving Biological Diversity in Agricultural/Forestry Systems,” p. 354.

¹⁶² Swift et al., “Biodiversity and Ecosystem Services,” pp. 115-116.

not necessarily change ecosystem processes, or local richness, although there are dramatic exceptions, such as kudzu. Nor are rare or endangered species intrinsically needed for their functions in ecosystems (if at all); this fact may indeed be the reason why some species not affected by anthropogenic change are still facing extinction. And unless our *only* or primary valuation of species is on an individualistic, species-by-species level, such as aesthetic, religious, or “rights” reasons, as opposed to ecological functionality, the value of speciation is not defined by body count or richness.

Biodiversity is descriptive in and of itself, at least until we understand *why* ecologically there are so many species on this planet. When it is attached to ecosystem functionality, however, it becomes normative because ecosystem functionality is normative. We can redefine this relationship as “ecosystem health.” J. Baird Callicott writes, “Like the medical norms of bodily health, the norms of ecosystem health would be simultaneously descriptive and prescriptive.”¹⁶³

In terms of agroecosystem health, Wendell Berry argues that in order for farming to be “sustainable,” it must be managed at a level that conforms to the natural laws that govern the local ecosystems. “As the economic geographer J. Russell Smith put it 70 years ago, you have to ‘fit the farming to the farm’-not to the available technology of the market, as important as those considerations are, but to the farm.” And the major

¹⁶³ Callicott, “Leopold’s Concept of Ecosystem Health,” p. 335. Callicott argues via Leopold that “ecosystem function” has intrinsic value, by analogy to the healthy functioning of an organism. Health as a characteristic is both instrumentally good (for ecosystem services), and good in and of itself, according to Callicott. He further makes the analogy between a person who has undergone “unnecessary and disfiguring operations that an unscrupulous doctor might perform on an unwitting patient, none of which ultimately compromised the patient’s health, to satisfy the doctor’s own whims or economic interests,” which would violate the patient’s dignity and rights. By analogy, species and ecosystems have a right to continue, and should not be manipulated through purposeful extinctions or disfigurement of the landscape. This may be true, but since environmental ethicists have yet to show convincingly (to non-environmental ethicists especially) wherein intrinsic value lies (especially in reference to health), I am not arguing that the normative evaluation of ecosystem health is based on the intrinsic value of individual species, nor on an organismic metaphor of health, but rather on functional value of ecosystems, as I explain below. See Callicott, “Leopold’s Concept of Ecosystem Health,” p. 345.

indicator for this conformation is *health*.¹⁶⁴ Leopold defines “land health” as “nature’s capacity for ‘self-renewal,’ a definition which he reiterates in subsequent usages and a definition that carries, importantly, both dynamic and functional rather than static and structural connotations.”¹⁶⁵ Leopold further writes, “There are two organisms in which the unconscious automatic processes of self-renewal have been supplemented by conscious interference and control. One of these is man himself (medicine and public health) and the other is land (agriculture and conservation).”¹⁶⁶ Maintaining land health means maintaining ecosystem functionality, which includes the functional integrity of biodiversity, and not necessarily individual organisms *per se*. This is seen in Callicott’s paraphrasing of Leopold: “The ‘rule of thumb’ for ‘ecological conservation’ then should be...“land should retain as much of its original membership as is compatible with human land-use [and] should be modified as gently and as little as possible.”¹⁶⁷ When the land is “ill,” all symptoms of land illness that Leopold notes, such as the qualitative deterioration in farm and forest ecological services, pest and disease outbreaks, boom-and-bust wildlife population cycles, and reliance on off-farm inputs, are not only failures in ecological function (as opposed to mere alterations in composition), but they are failures in systems *management*.¹⁶⁸ In fact, for Leopold, densely populated and heavily used land, whose biotic composition was necessarily simplified and modified, such as Western Europe, can be healthy in the sense that they “function and persist.”¹⁶⁹

¹⁶⁴ Wendell Berry, “For Love of the Land,” *Sierra Magazine*, p.4.

¹⁶⁵ Callicott, “Leopold’s Concept of Ecosystem Health,” pp. 338-339.

¹⁶⁶ *Ibid.*

¹⁶⁷ *Ibid.*, p. 341.

¹⁶⁸ *Ibid.*, p. 343.

¹⁶⁹ *Ibid.*, p. 344.

It is important to note that while there is as yet no resolution to this diversity-stability debate, in the end it may not be as relevant for the purposes of understanding biodiversity in agroecosystems, for several reasons. Sweeping generalizations from experiments that are necessarily restricted in space and time, and cannot account for interactions between patches embedded within a landscape matrix, are unlikely to be helpful in guiding the development of agroecosystems that have to provide for short, medium and long-term functions.¹⁷⁰

Almost all the evidence that exists for the relationship between diversity and function in ecosystems concerns the plot or laboratory scale.¹⁷¹ This evidence may not be easily transferable to agroecosystems. Even though biodiversity has important ecological functions at the farm scale, it is nevertheless possible to decrease biodiversity levels very substantially at that scale while maintaining the productivity and resilience of agroecosystems, as I discuss below.¹⁷² However, much of the diversity in landscapes exist at scales beyond the farm (between-farm variability being larger than within-farm variability), and the dynamics of diversity thus depend on the degree to which different farms remain (or become) different.¹⁷³ Biodiversity becomes more and more connected to ecosystem resilience and adaptation as the scale of operation moves from the farm to the farming landscape. Moreover, monitoring biodiversity is logistically easier and a more accurate task on a landscape level. For instance, Wolfgang Büchs argues that spatio-temporal processes and interactions, which are extraordinarily effective at landscape level due to the extremely variable performances

¹⁷⁰ Swift et al., "Biodiversity and Ecosystem Services," p. 130.

¹⁷¹ Ibid., p. 125.

¹⁷² Ibid., p. 126.

¹⁷³ Ibid., p. 125.

of cultivated habitats within seasonal changes, often are not measurable on a plot scale.¹⁷⁴

Agrodiversity and Ecosystem Function

Agroecosystems do not aim to be “natural” ecosystems. Farmers are by-and-large interested in keeping their farms running, as opposed to keeping as many species on and around the farm as possible. In ecological terms, agroecosystems are maintained by a high frequency of disturbance, in an early successional stage, primarily for human benefit.¹⁷⁵ By definition, “Agroecosystems are ecosystems in which humans have exerted a deliberate selectivity on the composition of the biota, i.e. the crops and livestock maintained by the farmer, replacing to a greater or lesser degree the natural flora and fauna of the site.”¹⁷⁶ Farmers purposely modify ecosystem structures in multiple ways. Most obviously, they simplify plant communities, often replacing native with exotic species, thereby changing the composition of plant communities. Farmers intervene in natural processes to regulate the populations of specific organisms (“weeds,” “pests,” “diseases,” and their vectors, alternate hosts and antagonists), to produce specific ecosystem services.¹⁷⁷ These interventions of course influence the composition and activities of non-targeted herbivore, predator, symbiont and decomposer sub-communities.

On the other hand, the connection between biodiversity and ecosystem function is more pronounced (and less academic) in agroecosystems because farmers in many

¹⁷⁴ Wolfgang Bücks, “Biotic Indicators for Biodiversity and Sustainable Agriculture—Introduction and Background,” *Agriculture, Ecosystems & Environment* 98 (2003): 1-16.

¹⁷⁵ G.R. Conway, “Sustainable Agriculture: The Trade-Offs With Productivity, Stability and Equitability,” in ed. E.B. Barbier *Economics and Ecology: New Frontiers and Sustainable Development*, (New York: Chapman & Hall, 1993), p. 46-65.

¹⁷⁶ Swift et al., “Functional Roles of Biodiversity,” p. 261.

¹⁷⁷ Swift et al., “Biodiversity and Ecosystem Services,” p. 116.

parts of the world utilize biodiversity as a management tool. For instance, biodiversity is often managed to maintain the genetic diversity essential for successful crop and animal breeding. Biodiversity is also managed for “ecosystem services” beyond food, fiber, fuel and income. Examples include cycling and movement of nutrients, air and water purification, control of local microclimates, decomposition and detoxification of organic wastes, mitigation of floods and droughts, renewal of soil fertility, pollination of crops and natural vegetation, dispersal of seeds, protection from the sun’s harmful ultraviolet rays, stabilization of the climate, and moderation of weather extremes and their impacts, just to name a few.¹⁷⁸ What do functional groups have to do with these ecological processes? According to McNeely and Scherr, a lot:

By feeding on leaves, fruits, and seeds, animals greatly influence the composition and structure of natural vegetation, affect the reproductive success of plants, make soils more fertile, and regulate populations of pests. Biodiversity creates the conditions that maintain healthy ecosystems. Various species pollinate plants (birds, bees, bats, [beetles]); decompose wastes (earthworms, microorganisms, dung beetles, vultures, crows); disperse seeds (birds, primates, squirrels, ants, fish); and maintain a sort of balance among species through predation and grazing. Microorganisms in the soil may have a total biomass that adds up to as much as 1.5 tons per hectare. Soil faunal groups, including arthropods, earthworms, nematodes, and mollusks, facilitate movement of air and water within the soil matrix, regulate nutrient cycling, and build soil. Wild relatives of domestic plants and animals may provide valuable genetic material for crop and livestock improvement.¹⁷⁹

Thus, modern agriculture is dependent upon ecosystem services such as pollination, generation of soils and renewal of their fertility, pest control, and decomposition of wastes. The loss of just one of these processes can produce disastrous results. Take pollinators, for example. A quarter of North America’s wild and domestic honeybees have disappeared since 1988, primarily due to an epidemic of mites that prey on the bees. The cost to American farmers of the declining honeybee population is \$5.7 billion

¹⁷⁸ G. Daily, *Nature’s Services: Societal Dependence on Natural Ecosystems*, (Washington D.C.: Island Press, 1997).

¹⁷⁹ McNeely and Scherr, *Ecoagriculture*, p. 14.

per year.¹⁸⁰ Similarly, declines in 1,200 wild vertebrate pollinators are leading to depressed yields of blueberries and cherries in Canada, cashew nuts in Borneo, Brazil nuts in South America, and pumpkins in the U.S.¹⁸¹

Industrial agriculture is also keenly aware of the interconnection between biodiversity and ecosystem function, mostly because it has to pay for it. In unmanaged or casually managed ecosystems, ecosystem functions are internally regulated by plant biodiversity.¹⁸² In contrast, the industrial farming system represents the ultimate reduction in crop biodiversity—the genetically uniform, continuous cultivation of a monocrop over thousands of acres. As a result, industrial agriculture must shift internal (largely biological) control of agroecosystem function to external (largely economic) regulation, through inputs of nonrenewable external origin.¹⁸³ Altieri gives a brief list of these inputs and what function they replace:

Commercial seedbed preparation and mechanized planting replace natural methods of seed dispersal; chemical pesticides replace nonhuman controls on population of weeds, insects, and pathogens; and genetic manipulation replaces natural processes of plant evolution and selection. Even decomposition is altered since plant growth is fully harvested and soil fertility maintained, not through nutrient recycling, but with fertilizers.¹⁸⁴

Moreover, these farms rely on huge petroleum-driven machinery for tillage, crop management and harvest.¹⁸⁵

These inputs result in the reduction of diversity, both at the inter-farm level and at the landscape level. For instance, belowground ecosystems are intensely dynamic,

¹⁸⁰ Gary Nabhan and S. Buchmann, "Services Provided by Pollinators," in *Nature's Services: Societal Dependence on Natural Ecosystems*, ed. G.C. Daily (Washington, D.C: Island Press, 1997), pp. 133-150.

¹⁸¹ McNeely and Scherr, *Ecoagriculture*.

¹⁸² Swift et al., "Biodiversity and Agroecosystem Function."

¹⁸³ *Ibid.*, p. 263.

¹⁸⁴ Altieri et al., "Biodiversity, Ecosystem Function, and Insect Pest Management," p. 72.

¹⁸⁵ Swift et al., "Functional Roles of Biodiversity," p. 267.

fragile, and extremely diverse in species.¹⁸⁶ There is abundant evidence that soil invertebrates within the ecosubsystem play an important regulatory role on soil microbial processes, soil structure and hydrological fluxes at the plot scale.¹⁸⁷ Plant arrangement in rows of monospecific crops with no biomass residue leave soil bare during fallow periods. These monocultures result in a loss of diversity in soil invertebrates and microorganisms.¹⁸⁸ With increasing inputs of energy, water and agrochemicals to maintain monocultures, the minimum “functional groups” needed to regulate soil biological processes in natural systems are replaced by mechanical and chemical controls of soil fertility. While these inputs may temporarily buffer some ecosystem functions, they also run the risk of further damaging others. For instance, the addition of pesticides may control disease of immediate negative impact to crops, but also kill non-target organisms crucial to other ecosystem functions such as pollination or soil fertility enhancement.¹⁸⁹

To give a further example, nowhere are the consequences of species reduction on ecosystem function more evident than in the realm of agricultural pest management. Often a major consequence arising from the conversion of natural ecosystems to agroecosystems is a destabilization of arthropod populations, which can lead to pest outbreaks. Historically, the management of pest populations has followed two alternative routes: the first depends on the use of increasingly sophisticated chemical pesticides to assume the ecological function of population control; the second attempts to establish a biologically controlled equilibrium of pest populations in agroecosystems

¹⁸⁶ Franklin, “Preserving Biodiversity,” p. 203.

¹⁸⁷ Swift et al., “Functional Roles of Biodiversity,” p. 286.

¹⁸⁸ Ibid., p. 271.

¹⁸⁹ Swift et al., “Biodiversity and Ecosystem Services,” p. 121.

by the conversion, augmentation and importation of natural enemies.¹⁹⁰ Several studies have shown that it is possible to stabilize the insect communities of agroecosystems by designing and constructing vegetational architectures that support populations of natural enemies or that have direct deterrent effects on pest herbivores.¹⁹¹ Successful methods utilized include increasing the genetic diversity of the crop plants, intercropping and weed cultivation. Creating nectar sources, overwintering sites and alternate victims to natural enemies has been demonstrated in a large number of studies showing that plant diversity outside the crop provides reservoirs for enemies and leads to increased mortality of insect pest.¹⁹² Such effects can occur over relatively small spatial scales, such as enemies colonizing fields from wild plants growing along field margins, to much larger, landscape scales, such as predator migration from woodlots or fallows.¹⁹³

In contrast, huge expanses of genetically homogenous species make crops and livestock extremely vulnerable to pest outbreaks. The effects of this genetic reduction of plant diversity on outbreaks of herbivore pests and microbial pathogens are well documented in the agricultural literature.¹⁹⁴ In fact, worsening insect pest outbreaks are reliable *indicators* of instability in industrial agroecosystem function, at least on the population level; the more intensely such communities are modified, the more abundant

¹⁹⁰ Swift et al., "Functional Roles of Biodiversity," p. 281.

¹⁹¹ R.M. Perrin, "The role of Environmental Diversity in Crop Protection," *Protection Ecology* 2 (1980): 77-114; S.J. Risch, D. Andow, and M.A. Altieri, "Agroecosystem Diversity and Pest Control: Data, Tentative Conclusions, and New Research Directions," *Environmental Entomology* 12 (1983): 625-629.

¹⁹² These studies are reviewed in H.F. Van Emden, "Plant Diversity and Natural Enemy Efficiency in Agroecosystems," in *Critical Issues in Biological Control*, ed. M. Mackauer, L.E. Ehler, and J. Roland (Andover, Mass: Intercept, 1990), pp. 63-80.

¹⁹³ M.A. Altieri, J.R. Cure, and M.A. Garcia, "The Role and Enhancement of Parasitic Hymenoptera Biodiversity in Agroecosystems," in *Hymenoptera and Biodiversity*, ed. J. LaSalle and I.D. Gauld (Wallingford: CAB International, 1993), pp. 235-256.

¹⁹⁴ See D.A. Andow, "Vegetational Diversity and Arthropod Population Response," *Annual Review of Entomology* 36 (1991): 561-586; M.A. Altieri, *Biodiversity and Pest Management in Agroecosystems*, (New York: Haworth Press, 1994).

and serious the pests.¹⁹⁵ These alternative practices for dealing with pest outbreaks highlight the broad importance of maintaining some degree of biodiversity in agroecosystems in order to stabilize populations and decrease management costs.¹⁹⁶ Just *how much* biodiversity, however, is the issue. Anderson argues that diversity, *per se*, of species in the plant and soil subsystems is less critical for sustaining soil fertility than the maintenance of the control mechanisms associated with organic input quality, such as plant residue; and this situation “is probably achievable with a relatively low number of plant species.”¹⁹⁷

Finally, industrial agriculture has created a homogenous landscape lacking in cultural and social diversity. Within the last fifty years, agriculture has moved from primarily small family farms to consolidated and standardized farming systems covering hundreds of millions of acres. Industrial farming is primarily defined in terms of scale, inputs, and values. The overarching value of industrial agriculture is efficiency, which means maximizing production. As such, it plants monocrops, or “cash crops,” on a grand scale, requiring inputs of huge machinery. This type of farming requires an amazing amount of capital and preexisting distributional relationships to sell the product. It also requires a huge input of chemicals to protect the vulnerable monocrops from pests and weeds: “pest, fungi, and weeds are controlled by pesticides, fungicides, and herbicides broadcast from airplanes.”¹⁹⁸ Callicott further observes: “Processes are reduced to their simplest elements, as on an assembly line. Products are standardized;

¹⁹⁵ M.A. Altieri and D.L. Letourneau, “Vegetation Management and Biological Control in Agroecosystems,” *Crop Protection* 1 (1982): 405-430.

¹⁹⁶ Swift et al., “Functional Roles of Biodiversity,” p. 282.

¹⁹⁷ *Ibid*, p. 286.

¹⁹⁸ J. Baird Callicott, “The Metaphysical Transition in Farming: From the Newtonian-Mechanical to the Eltonian Ecology,” *Journal of Agricultural Ethics* 3 no. 1 (1990): 39.

scale is magnified; and crops are specialized and monocultured. Food 'processing' is automated."¹⁹⁹

What this means for family farms is that they either compete with corporations, find alternative markets to sell their products, or call it quits. Since the 1950's there has been a steady decline of family farmers (rates of 4.6%-2.7 % per decade).²⁰⁰ Now, 61 percent of all U.S. food is being produced by just 163,000 farms, and 63 percent of that production is tied to a market or input farm by means of a contractual relationship.²⁰¹ Such concentration is forcing processors, manufacturers and seed suppliers to concentrate even further to supply the retail giants with mass-produced, uniform supplies at low margins. Farms, in turn, will continue to consolidate to produce the essential raw materials in specialized, uniform mass quantities, at further reduced costs.²⁰²

Measuring Biodiversity in Agroecosystems

Swift et al. have suggested that biodiversity and ecosystem function can be measured along a gradient of intensification of land-use (and subsequent invasiveness of intervention into the pre-existing ecosystem):

A generalized gradient might move from: *unmanaged vegetation* (usually a forest or grassland) to "*casual*" *management* (including shifting cultivation, home gardens and nomadic pastoralism), to *low-intensity management* (including traditional compound farms, rotational fallow and savanna mixed farming), to *middle-intensity management* (including horticulture, pasture mixed farming, and alley farming), to *high-intensity management* (including crop rotation, multi-cropping, alley cropping and intercropping), and finally to *modernism* (plantations, orchards, and intensive cereal and vegetable production).²⁰³

¹⁹⁹ Ibid.

²⁰⁰ Kirschenmann, "The Future of Agrarianism," p. 1.

²⁰¹ Kirschenmann, "A Revolution in Agriculture," p. 2.

²⁰² Ibid., p. 1.

²⁰³ Swift et al., "Biodiversity and Agroecosystem Function," p. 268.

It is generally acknowledged that diversity decreases as habitats change from forest to traditional agriculture to modern agriculture.²⁰⁴ However, there in fact exists a wide range of agroecosystems with biodiversity comparable to that of natural ecosystems and occasionally exceeding it.²⁰⁵ Casually managed agriculture, such as shifting forest cultivation, nomadic pastoralism, and home gardens can reach a level of total diversity on par with that of many neighboring natural systems. For instance, Swift et al. argue that “forests showing scars of former subsistence agricultural activity seem to have higher species diversity than those on which such intervention is missing, suggesting that casually managed agroecosystem may actually promote more species diversity than their unmanaged counterparts.”²⁰⁶

Swift et al. argue that “shifts between different states of functional efficiency with changes in diversity are more likely to be rather abrupt.”²⁰⁷ However, even though the relationship between intensification and biodiversity will be monotonic and decreasing as we move along the gradient, just *how* biodiversity and ecosystem functions react to intensification is dependent upon what spatio-temporal scales one uses. Fluctuation and disturbances (e.g. geological and climate conditions), and anthropogenic (e.g. specific management practices and habitat fragmentation) environmental conditions, ecological processes and socio-economic factors, as well as the type and location of

²⁰⁴ See, e.g., M.A. Altieri, “Why Study Traditional Agriculture?” in *Agroecology*, ed. C.R. Carroll, J.H. Vandermeer, and P.M. Rosset (New York: McGraw-Hill, 1990), pp. 521-546; J.D. Holloway and N.E. Stork, “The Dimensions of Biodiversity: The Use of Invertebrates as Indicators of Human Impact,” in *The Biodiversity of Microorganisms and Invertebrates: Its Role in Sustainable Agriculture*, ed. D.L. Hawksworth (Wallingford: CAB International, 1991), pp. 67-71; Pimentel et al., “Conserving Biological Diversity.”

²⁰⁵ Swift et al., “Biodiversity and Agroecosystems,” p. 261.

²⁰⁶ Ibid., p. 269.

²⁰⁷ Swift et al., “Biodiversity and Ecosystem Services,” p. 120.

agroecosystem have to be taken into account, both on the patch and landscape level.²⁰⁸ Moreover, just as the theory of “minimum species threshold” for basic ecosystem function does not give a precise species count needed for sustainable ecosystem function, neither does Swift et al.’s gradient theory tell us at which point intensification reaches the “critical point” where more simplification will cause either temporary or permanent damage (hidden temporarily by unsustainable inputs), or complete ecosystem collapse. Swift et al., however, suggest that initial stages of management have only a minor impact on total biodiversity, and that further loss is gradual until some rather critical stage of management intensity is reached.

Much more scientific work needs to be done in this area of agricultural science. As Swift et al. state, in the final analysis “there has been very little controlled experimentation in agroecosystems in which the effect of species number (or other features of biodiversity) on a specific function or set of function has been directly examined,” and of these experiments, there are “very few case studies that can unequivocally relate biodiversity to function.”²⁰⁹ What remains important, however, is that mostly intact ecosystems with a diverse range of functional groups stabilize and insure ecosystems. Regardless of the point of collapse, the empirical evidence clearly shows diversity within functional groups as an important regulator of agroecosystem function, not only in the strictly biological sense of impact on plant production and other ecosystem processes, but also in satisfying a variety of needs of the farmer and services for society at large.²¹⁰

²⁰⁸ Rainer Waldhardt, “Biodiversity and Landscape.”

²⁰⁹ Swift et al., “Biodiversity and Agroecosystems,” pp. 275, 292.

²¹⁰ Ibid., p. 261.

Methods for Increasing Agrobiodiversity and Attaining Ecosystem Health

J. Baird Callicott lays out three general ecological principles for agriculture to increase biodiversity on the plot or farm scale. First, Callicott states that agroecosystems strive to create “an artificial plant and animal community created to...imitate the structure of a natural biotic community.”²¹¹ He continues:

That is, a “correct” agriculture, from an ecological point of view, should reflect, on a smaller, necessarily simpler scale, the integrated, mutually dependent, symbiotic relationships of coevolved species in a natural ecosystem. This would imply a multiplicity of niches, i.e., as wide a variety of plant and animal cultivars as practically possible, with as many relationships among them as practically possible. An agricultural ecosystem-in-microcosm would also imply a dovetailing of death and life, waste and resource, predator and prey.²¹²

Second, agroecosystems must be feathered into natural ecosystems. Callicott notes that natural ecosystems, such as food forests, can be understood as crops and an income source as well; “Wild crops, such as game, fish, nuts, berries, fruits, fuel, wood, and timber are encouraged or managed in addition to domesticated crops.”²¹³ By utilizing the biodiversity of natural ecosystems, the cultivated land remaining could be small-scale with a variety of local, natural biotic communities that could (and should) actually *increase* the biodiversity of the regional ecosystem.²¹⁴ Third, Callicott states that agroecosystems must be ready for change and adjustments within the regional and local ecosystem, such that those adjustments eventually lead to “ever greater diversity, complementarity, efficiency, and productivity.”²¹⁵

So how do we accomplish these goals? First, on the patch/plot scale, farms need to be managed for conservation. Hole et al. concluded after a review of 76 studies on

²¹¹ Callicott, “The Metaphysical Transition in Farming,” p. 46.

²¹² J. Baird Callicott, “Agroecology in Context,” *Journal of Agricultural Ethics* 1, no. 1 (1988): 8.

²¹³ Callicott, “The Metaphysical Transition,” p. 47.

²¹⁴ Ibid.

²¹⁵ Callicott, “Agroecology in Context,” p. 8.

“organic” agriculture (which they define broadly to encapsulate most “sustainable agricultural” practices, indicated below) and biodiversity, “that species abundance and/or richness, across a wide-range of taxa, tend to be higher on organic farms than on locally representative conventional farms.”²¹⁶ Farming practices they found increased biodiversity (and sometimes associated with “organic” farming in the United States, though certainly not intrinsic to it) include²¹⁷:

- Prohibition/Reduced Use of Chemical Pesticides
- Prohibition of Mineral-based Fertilizers
- Mechanical Weeding
- Farmyard and Green Manuring
- Minimum Tillage
- Intercropping and Undersowing
- Sensitive Field Margin/ Hedgerow Management/ Creation of Non-Crop Habitats
- Small Field Size
- Spring Sown Cereals
- Crop Rotation
- Mixed Farming

As I have suggested, soil management is generally the most important area agriculture needs to improve upon to increase biodiversity. Soil contains a high proportion of *all* wild biodiversity. Proper management of microfauna, decomposers, pests, pathogens, and microsymbionts are all necessary. These microorganisms: make soil nutrients available to crops by breaking down organic matter and fixing nitrogen; suppress soil-borne diseases and pests; detoxify waste materials; maintain good soil structure; and improve absorption of rainfall or irrigation water.

Several well-known farming practices contribute to proper soil management. Frequent tillage not only damages or destroys soil structure via erosion and runoff, but also significantly reduces soil biodiversity. No-till farming maintains productivity with

²¹⁶ Hole et al., “Does Organic Farming Benefit Biodiversity?” p. 121.

²¹⁷ Ibid., pp. 124-125.

strategies such as integrated pest management, planting perennial polycultures and clustering symbiotic guilds, rotating crops, and leaving crop residue fallow on the ground in autumn and winter. Currently, biodiversity-friendly measures such as cover crops and green manures are widely used, even in large commercial systems. Cover crops are high-biomass crops, such as alfalfa and legumes, that are grown after the main crop is harvested so as to maintain effective ground cover, thus reducing soil erosion from wind and rain, soil compaction, water runoff, and increasing soil organic matter.²¹⁸ In addition, cover crops can increase vegetative diversity in the crop ecosystems, and adds shelter and refuge for beneficial arthropods. Except for green plants that capture solar energy to feed themselves and certain bacteria that use inorganic material as an energy source, other species of organisms rely on plant biomass as their energy resource. Thus, leaving crop residues in the fields contributes to large quantities of nutrients and organic matter returning to the soil.²¹⁹

In the United States, many plant species exist in managed ecosystems. For example, “of the estimated 21,750 plant species approximately 6000 are crop species, including forages; 708 are commercial trees; and 2000 are weeds.”²²⁰ Planting diverse species has been shown to increase arthropods in ecosystems,²²¹ but it also keeps the pool of genetic variations of edible foods from becoming too shallow. Moreover, underutilized niches on the farm often can be filled with economically valuable indigenous species.

²¹⁸ Pimentel et al., “Conserving Biological Diversity,” p. 5.

²¹⁹ Ibid.

²²⁰ Ibid.

²²¹ Altieri et al., “Biodiversity, Ecosystem Function, and Insect Pest Management.”

On a landscape scale, Mcneely and Scherr layout five specific goals for “agroecology” that go beyond the single farm and into managing the landscape matrix for biodiversity.²²² Their approach “places food security and rural livelihoods at the center of strategies for biodiversity conservation and ecosystem management” in a seemingly contradictory way: by using techniques in agriculture that *intentionally* aims for biodiversity increase as an end in itself. While their approach focuses primarily on wild biodiversity in and around the farm, “agricultural species and system diversity are often essential to enhance the quality and sustainability of wild habitat or the level and sustainability of agricultural production.” Towards this goal, ecoagriculture offers five strategies.²²³

First, ecoagriculture emphasizes the need to “*create biodiversity reserves that also benefit farming communities.*” These are large protected areas that enhance reproduction and offer habitat for “interior” species that cannot flourish on agricultural edges or in fragments of habitat. The local community will usually know the most promising reserve land available. By keeping these preserves public and allowing limited rights of use, neighboring farmers and their land can benefit greatly from this arrangement.

A second strategy is to “*develop habitat networks in nonfarmed areas.*” Nonfarmed areas can be utilized to provide patches of certain types of habitat, or to form corridors that link protected areas and enable species to maintain genetic contact between populations that otherwise would be isolated. These areas also provide shelter

²²² Mcneely and Scherr, *Ecoagriculture*, p.109.

²²³ *Ibid.*, pp. 108-109.

for beneficial parasites and predators.²²⁴ There are hundreds of ways to develop this strategy, but the most obvious places are hedgerows, shelter belts, farm wetlands, woodlots, windbreaks, uncultivated strips, living fences, along access roads, and in little-used or low-productivity croplands and grasslands. See figure 6.1 attached in appendixes. These strategies also increase biodiversity by reducing soil erosion and moisture loss and increasing the biomass present in the managed systems.

Third, ecoagriculture calls for a *reduction (or reversal) of converting wild lands to agriculture by increasing farm productivity*. This strategy calls for an increase in efficiency in ecological agricultural systems, while maintaining its basic methods. By focusing on genetic and species diversity of crops, extracting resources via strategies one and two above, and reducing inputs through marketing for local markets, productivity can increase without resorting to labor-saving, capital-intensive farming.

Like most of alternative agriculture in general, ecoagriculture seeks to “*minimize agricultural pollution, both as an input and output*.” This strategy is mostly a managerial issue of monitoring nutrients, pests, and waste. In practice, pollution control is part of a larger strategy to “*modify management of soil, water, and vegetation resources*.”

The final strategy for designing agroecosystems expands Callicott’s agro-ecological principles for increasing biodiversity to the landscape level. Mainly, ecoagriculture seeks to “*modify farming systems to mimic natural ecosystems*.” One of the primary goals here, though it is never permanently attained, is *stabilization*. By selecting and encouraging vegetation adapted to the local climate, closing nutrient cycles (as much as possible), planting perennial polycultures, and planting patchwork

²²⁴ Pimentel et al., “Conserving Biological Diversity,” p. 6.

mosaics, agriculture becomes dovetailed into either surrounding agriculture or “natural” ecosystems.

In Chapter Four, I will apply some of these approaches to current agrarian activities in ranching, prairie management, and urban ecology. Biodiversity must be understood as cultural and economic issue as well as an ecological issue. If these conservation approaches are to be sustainable, they must increase connectivity between domesticated (urban, suburban, rural) and wild patches within the landscape matrix. This means other goals for increasing biodiversity in farming landscapes need to include diversifying farms and increasing heterogeneity of land uses (to prevent “hostile” monocultures), while discouraging land-use intensification, standardization and specialization.

Conclusion

Franklin concludes his paper on preserving species at a landscape scale by arguing that the U.S. needs a highly diverse patchwork of land-uses in order to preserve biodiversity. He writes, “We must see the larger task –stewardship of *all* of the species on *all* of the landscape with every activity we undertake as human beings—a task without spatial and temporal boundaries.²²⁵ Even the role of sustainable agriculture is not to preserve biodiversity as such, the same approach is applicable to maintaining critical ecosystem functions in a sustainable way on multiple spacio-temporal levels. I have labeled this approach “ecosystem health.” In general, the more farming landscapes resemble a highly diversified patchwork mosaic, the more farming becomes healthy for the land in terms of maintaining biodiversity and ecosystem function. This is not always true, of course, especially in terms of ranching. Furthermore, the more

²²⁵ Franklin, “Preserving Biodiversity,” p. 205.

individual farms are used in order to create a buffer and softer gradient between “wild” unmanaged reserves and “domestic” agroecosystems, the more agriculture will be able to conserve the landscape ecologically. Moreover, this patchwork mosaic is needed to maintain social and economic sustainability in agriculture, as I will argue in the next chapter.

CHAPTER 3

AGRARIANISM AND SOCIOECONOMIC SUSTAINABILITY

Introduction

In chapter two, I argued that properly managed agroecosystems can act as a conservationist tool, enhancing crop yield while maintaining biodiversity within the landscape matrix. This type of management is not possible, however, unless a diversity of farmers and farming practices are sustained across the landscape. The celebrated essayist, fiction writer and poet Wendell Berry argues that agriculture needs “a greater range of species and varieties of plants and animals, of human skills and methods, and a diversified economy, so that the use may be fitted ever more sensitively and elegantly to the place.”²²⁶ In other words, in order to create diversified agroecosystems which mimic and feather into natural biotic communities, we need a culture of many skilled farmers, ranchers and planners working together on both the plot and landscape level, and supported by a diversified local economy.

Unfortunately, the trend since the “green revolution” of the 1950’s has been a steady rate of decline in farm population. Frederich Kirschenmann argues that the rate of decline in farm population has not changed appreciably during the last four decades, and that this decline has been caused primarily by the industrialization of agriculture at the expense of small family farms. He writes:

The rate of decline in the 1950s was 3.8 percent; in the 1960s, 4.6 percent; in the 1970s, 3.1 percent; and in the 1980s, 2.7 percent. It is revealing that the rate of decline in the “boom” years of the 1970s was slightly *higher* than it was in the “crisis” years of the 1980s—evidence that decline in farm population is not strictly linked to market and price fluctuations. In other words, the decline in farm

²²⁶ Wendell Berry, “An Argument for Diversity,” in *What Are People For?* (San Francisco: North Point Press, 1990), p. 114.

population is symptomatic; it is endemic to the industrialization process. As a result, the total number of farms has declined from 6.5 million in 1935 to 2.05 million in 1997, and most of this huge decline took place among family-type farms. It occurred among farms where a family makes all the important operating and investment decisions, owns a significant portion of the assets, and supplies most of the farm's labor—*the very farms that are at the heart of the agrarian ideal*.

The U.S. is steadily losing the number and type of farmers needed to transform agriculture into a culture of sustainable agrolandscape management.

Paralleling the need for accurate biotic indicators of ecologically sustainable agriculture, John E. Ikerd argues that we need socioeconomic indicators of agroecosystem health as well. Ikerd gives a tentative list of these indicators:

- Quantity, quality, and cost of food or fiber produced
- Risks of degrading water quality
- Risks to human health and worker safety
- Number of people productively employed
- Utilization of human abilities
- Rewards for human productivity
- Social dignity of work
- Equity of opportunities with respect to gender, ethnicity, social status, etc.
- Opportunities for individual ownership
- Potential for strengthening families
- Potential for strengthening local communities
- Support of resource stewardship ethics or actions
- Support of environmental stewardship ethics or actions.²²⁷

Most of these indicators are value-laden. This chapter deals with the philosophical underpinnings of these social and cultural values which would indicate some measurement of socio-economic sustainability. The philosophy associated with bringing the socio-economic indicators back into discussions of agri-cultural sustainability has been traditionally defined as “agrarianism.”

²²⁷ John Ikerd, “Assessing the Health of Agroecosystems: A Socioeconomic Perspective,” (University of Missouri, 1996) p. 7. Published at <http://www.ssu.missouri.edu/faculty/Jikerd/papers/Otta-ssp.htm>.

Eric T. Freyfogle introduces his edited book, *The New Agrarianism: Land, Culture, and the Community Life*, with the observation that agrarianism is again on the rise in America: “In small corners and pockets, in ways for the most part unobtrusive, people are reinvigorating their ties to the land, both in their practical modes of living and in the ways they think about themselves, their communities, and the good life.”²²⁸

Freyfogle labels this movement the “New Agrarianism,” invoking its heritage and inspiration from the “New Criticism” Southern agrarian literary movement of the 1930’s. I will argue below that the New Agrarianism’s connection to the New Criticism lineage is ideologically important, because it recognizes that agrarianism’s idea of “the good life” is always culturally situated, and not always easily defined. For instance, Freyfogle comments that “when all the pieces of agrarian life come together—nutrition and health, beauty, leisure, manners and morals, satisfying labor, economic security, family and neighbors, and a spiritual peacefulness—we have what agrarians define as the good life.”²²⁹ Most of these goals of the “New Agrarianism,” like the goals of the “Twelve Southerners,” have as much to do with social commentary and cultural ideals as with agriculture *as such*.

Wendell Berry has argued that industrial agriculture, “by narrowing itself so fanatically...has, in one sense, left its margins extremely wide.”²³⁰ Agrarianism, as Freyfogle broadly defines it, is a way of life inhabiting these wide margins of modern agriculture, through small-scale ecological agriculture, holistic ranching, homesteading, subsistence farming, farmer-to-consumer community supported agriculture (CSA),

²²⁸ Eric T. Freyfogle, “Introduction: A Durable Scale” in Eric T. Freyfogle, ed., *The New Agrarianism: Land, Culture, and the Community of Life* (Washington: Island Press, 2001), p. xiii.

²²⁹ Freyfogle, *The New Agrarianism*, p. xxxiv.

²³⁰ Wendell Berry, *The Unsettling of America: Culture and Agriculture*, 3rd ed. (San Francisco: Sierra Club, 1996), p. 179.

urban farmers' markets, and community gardens, just to name a few practices. With more and more ecologically minded people in their twenties and thirties—often with no background in farming—reclaiming farm life,²³¹ and the rise of new tools such as land trust easements supporting ecologically minded small farmers financially, this niche sector of small farms is growing rapidly, both financially and in number of farmers. While farmers, gardeners, and community activists in the agrarian movement have reached the attention of only a small number of Americans, they represent a growing alternative to America's industrial agriculture, which by definition cannot fully absorb the niche markets which serviced by alternative agriculture.

Agrarianism as an ethic entails much more than ecologically mindful agriculture.

Freyfogle gives a concise explanation of the New Agrarianism as follows:

It is a temperament and a moral orientation as well as a suite of economic practices, all arising out of the insistent truth that people everywhere are part of the land community, just as dependent as other life on the land's fertility and just as shaped by its mysteries and possibilities. *Agrarian* comes from the Latin word *agrarius*, "pertaining to land," and it is the land—as place, home, and living community—that anchors the agrarian scale of values.²³²

This chapter articulates agrarianism's moral orientation, specifically looking at agrarianism's commentary on socio-economic and ecological practices "pertaining to land." I will begin by focusing primarily on agrarianism's most prominent contemporary, Wendell Berry. I will then compare Berry's work with the Northern and Southern writers of the historical agrarian tradition, beginning with the Twelve Southerners, J. Hector St. John de Crèvecoeur's agrarianism of the American Revolution, and the socio-economic ideology surrounding Jefferson's promotion of a nascent America made up of agrarian

²³¹ Kate Winslow, "Young Agrarians," *Santa Fe Reporter* July 3 (2002).
<http://www.sfreporter.com/archive/07-03-02.html>

²³² Freyfogle, "Introduction," *The New Agrarianism*, p. xiii.

“freeholders.” I will also explore the first genuinely “American” philosophy of transcendentalism and the agrarian roots of its most prominent thinkers, Emerson and Thoreau. Finally, I will return to 20th century articulations of rural land health by focusing on Aldo Leopold. As I hope to show, these historical agrarians form a dialogical relationship with Wendell Berry and the “New Agrarians,” though this discursive history indicates there is no direct lineage of thinkers that make up the standard agrarian cannon in North America.

From the outset, we can make some general observations concerning agrarianism. There are aspects of historical agrarianism, what we might call a darker current of “blood and soil” environmental determinism connected to European fascism, racism and sexism in a division of labor, as well as a belief that private property is a “natural right” for those who mix their labor with land, all of which have been muted or rejected in agrarianism’s contemporary formulations, and will be only briefly dealt with below. The New Agrarianism distances itself from this history most notably in its heavy emphasis on *sustainability* as the higher good, instead of some invented patriotic or deterministic connection to soil. The New Agrarianism does resemble its pre-WWII past in four key ways, however. It is skeptical of industrial agriculture’s principles of specialization, standardization, and centralization, as well as its narrative of growth-as-Progress; it rejects efficiency as the primary measure of value; it has an overarching concern for conserving traditional values in work, family, religion, and community; and it believes that democracy is best realized by producing self-sufficient and well-rounded citizens. These similarities connect the New Agrarianism with a tradition which embeds

concern for nature within a socio-economic cultural landscape, giving us a “holistic” model of sustainability, be it on a local, non-universal scale.

The Family Farm

The resurgence of agrarianism in the United States corresponds with the loss of family farms in post WWII agriculture. Several agrarians, such as Jim Hightower and Marty Strange, have focused just on saving family farms for purely political or economic reasons. Hightower, for instance, makes no case for any aesthetic or ethical value to be associated with family farms as do other agrarians, such as Wendell Berry. Rather, he argues via Jefferson (see below) that family farms are in essence the last bastion of individualism, self-determination, and populist democratic power, all of which are political “goods” for Hightower.²³³ Similarly, Strange argues that family farms are in fact more efficient than industrial agribusiness farms and more likely to achieve long-term economic goals society has set for agriculture generally: steady yields, quality commodities, and a secure and sustainable food source.²³⁴

Saving family farms is not the same thing as saving sustainable agriculture. Small, independent farms have not always been managed to prevent soil erosion, protect water quality, or maintain vibrant communities. It *is* fair to say that many family farmers have included these nobler considerations in their management decisions as a way of insuring the health of the farm for future generations.²³⁵ Moreover, larger social and economic forces have partially determined the sustainability of family farm. David

²³³ Jeffrey Burkhardt, “Coming Full-Circle? Agrarian Ideals and Pragmatist Ethics in the Modern Land-Grant University,” in *The Agrarian Roots of Pragmatism*, ed. Paul B. Thompson and Thomas C. Hilde (Nashville: Vanderbilt University Press, 2000), p. 289.

²³⁴ Ibid.

²³⁵ Fredrick Kirschenmann, “The Future of Agrarianism: Where Are We Now?” Paper for Conference Commemorating Wendell Berry’s *The Unsettling of America*, (April 25-27, 2002), p.3. Published at http://www.leopold.iastate.edu/pubs/speech/files/042502-future_of_agrarianism.pdf

Orr makes the point that in an individualistic, capital-driven economy, life on the land has often been hard, insecure, and lonely.²³⁶ Farm life—where farmers must spend all of their energy on getting by economically and are isolated culturally—leaves no opportunity to cultivate other interests. Agrarian living in America’s past was particularly hard on children and women. It was also rooted in the displacement of native peoples, and in the Southern plantations, it was built upon slave labor, and hence on injustice. The fact is, outside of the Amish culture, a durable, flourishing land-based *culture* of family farms never took shape in the United States. Agrarianism, then, cannot be based on protecting just the family farm or a past that never existed.

For most agrarians, then, “Saving the family farm” is not some preservationist goal for a flawed cultural and economic past, but rather a symbol for sustaining ethical lifestyles, ecologically, economically and culturally. In Wendell Berry’s essay “A Defense of the Family Farm,” for instance, he makes political and economic points similar to Hightower and Strange. However, the thrust of his argument is social and ecological. He states that we need a high ratio “between eyes and acres” on usable land, symbolized by the family farm, because the proper usage of land “requires intimate knowledge, attention and care,” a point I will deal with below. He goes on to argue that in order for ecological (and therefore small-scale and diversified) agriculture to function, the land-community’s *values* are what needs saving:

The family farm is failing because it belongs to an order of values and a kind of life that are failing. We can only find it wonderful, when we put our minds to it, that many people now seem willing to mount an emergency effort to ‘save the family farm’ who have not yet thought to save the family or the community, the neighborhood schools or the small local businesses, the domestic arts of

²³⁶ David Orr, “The Urban-Agrarian Mind,” in *The New Agrarianism*, p. 96.

household and homestead, or cultural and moral tradition—all of which are also failing, and on all of which the survival of the family farm depends.²³⁷

The larger issue, then, is that a whole ethical and ecological comportment (or intentional conduct) towards the world is being lost. For agrarians, family farming represents an integration of people into what Paul B. Thompson calls “a moral ecology, a cluster of mutually reinforcing values that define good farming,” including “good” stewardship and citizenship.²³⁸ For Berry, the *well-run* family farmstead undoubtedly provides the locus of this moral ecology. By “well-run,” Berry means the farmstead is an idealized place where people make a living, not a profit; where people are satisfied with possessions that are durable and functional, rejecting consumer culture and its values; where farmers are encouraged to grow diverse crops for their own subsistence and for small local markets; where farmers are conscious of and supportive of their neighbors and community, both human and nonhuman; where most economic activity originates from the farm, either through “cottage industries” within the household or from the field, farm animals, the garden, orchard, woodlot, and tool shed; where people meet their needs from within so as to reduce dependence upon the external market; where people have a direct connection with nature through their work and play; where the young are socialized and taught both by nature and by their elders; where knowledge is collective, general, and comes primarily from experience; where work is as much a “labor of love” as it is about survival. As Freyfogle puts it, the good life for agrarians “is not starkly divided between work, school, and home; between production and consumption;

²³⁷ Berry, “A Defense of the Family Farm,” in *Home Economics* (San Francisco: North Point Press, 1987), p. 167.

²³⁸ Paul B. Thompson, *The Spirit of the Soil: Agriculture and Environmental Ethics* (New York: Routledge, 1995), p. 78.

between means and ends.”²³⁹ These values—stewardship, community, appropriately scaled economy—make up the heart of agrarianism’s vision of a sustainable family farm.

Wendell Berry and the New Agrarianism

Wendell Berry has emerged as the leading figure in voicing this contemporary version of American agrarianism. His 1977 book, *The Unsettling of America: Culture and Agriculture*, revitalized agrarianism and its critique of both industrial agriculture and modernity’s effects on agrarian socio-economic and ecological values in general. Berry’s primary concern is that industrial agriculture, endorsed by both the Department of Agriculture and Land Grant Universities (at least through the 1970’s and 80’s), is destroying agrarian ways of life that are not only meaningful for themselves, but our best hope of saving our communities and our economy from ecological annihilation.

Central to Berry’s thought is the contrast he makes between “*exploitative*” and “*nurturing*” mentalities. The exploitative mentality was the one Europeans brought with them to the New World: “The first and greatest American revolution, which has never been superseded,” Berry remarks, “was the coming of a people who did not look upon the land as a home land,” a place to put down roots. Instead, they preyed upon the native productivity of land and people, and thereby destroyed rather than learned from the management practices of the Native American culture.²⁴⁰ Berry uses the strip-miner as modern example of this exploitative mentality:

I conceive a strip-miner to be a model exploiter, and as a model nurturer I take the old-fashioned idea or ideal of a farmer. The exploiter is a specialist, an expert; the nurturer is not. The standard of the exploiter is efficiency; the standard of the nurturer is care. The exploiter’s goal is money, profit; the

²³⁹ Freyfogle, *The New Agrarianism*, p. xxii.

²⁴⁰ Berry, *The Unsettling of America*, p. 4.

nurturer's goal is health—his land's health, his own, his family's, his community's, his country's....The exploiter wishes to earn as much as possible by as little work as possible; the nurturer expects, certainly, to have a decent living from his work, but his characteristic wish is to work as *well* as possible. The competence of the exploiter is in organization; that of the nurturer is in order – a human order, that is, that accommodates itself both to other order and to mystery. The exploiter typically serves an institution or organization; the nurturer serves land, household, community, place.²⁴¹

This mentality has also threatened and continues to threaten the existence of subcultural formations, such as many agricultural communities, within the dominant society. Industrialism in the form of an exploitative agribusiness employs the same colonialist mentality, imposing “the same catastrophe upon the small farms and the farm communities, upon the shops of small local tradesmen of all sorts, upon the workmanship of independent craftsmen, and upon the household of citizens,” thereby destroying rather than learning from agrarian culture.²⁴²

Berry argues that while industrial agriculture thrives without diversity in the landscape, communities and local economies upon which small-scale agriculture depends and which it supports must be intact and diversified. *Agrarianism argues that agriculture needs social, ecological, and economic diversity in order to be sustainable.* Berry states, “In a varied and versatile countryside, fragile in its composition and extremely susceptible to abuse, requiring close human care and elaborate human skills, able to produce and needing to produce a great variety of products from its soils, what is needed, obviously, is a highly diversified local economy.”²⁴³ He thus correlates the complexity and fragility of landscapes with the need for a diversity of intelligent landowners who will be able to “fit the farming to the farm.”

²⁴¹ Ibid., p. 7.

²⁴² Ibid., p. 6.

²⁴³ Berry, “An Argument for Diversity,” in *What Are People For?*, p. 112.

What does it mean to have a socio-economically diversified landscape?

Depending on the carrying capacity of land and the needs of the community, which vary dramatically from one landscape to another, there should ideally be as many residential landowners and diversified land-uses as possible to meet the specific socio-economic and ecological expectations of the landscape. In agricultural landscapes in particular, “as the quality of use increases, the scale of use (that is, the size of operations) will decline, the tools will become simpler, and the methods and the skills will become more complex.”²⁴⁴ In other words, caring for the land necessitates landowners who care about the land and landscape, who know it well and have the time to focus attention to its details. Agrarian communities cannot be based upon economies of scale (“get big or get out”) or *mono*-culture landscapes.

The landscape in post WWII Rural America has changed dramatically as a result of the “green revolution” of the 1950’s and the increasing industrialization of agricultural methods. Not only has the U.S. lost millions of farms to industrialization, but over half of the remaining farmers are 55 or older.²⁴⁵ The farming population is aging, with fewer options and less skilled help, due to a continual out-migration of the young and productive into urban and suburban areas.²⁴⁶ Kirschenmann points out that as agricultural operations push towards specialization, concentration, and uniformity, “the ‘farmers’ who provide the labor for these operations will be allowed only minimal independent judgment and creativity,” especially if they have contracted out their land to

²⁴⁴ Ibid., p. 114.

²⁴⁵ USDA, Economic Research Service, *1996 Agricultural Resource Management Study*, p. 47.

²⁴⁶ Mark B. Lapping and Max J. Pfeffer, “City and Country: Forging New Connections through Agriculture,” in *Visions of American Agriculture*, William Lockeretz, ed. (Ames: Iowa State University Press, 1997), pp. 91-92.

a larger firm.²⁴⁷ For Berry, these trends not only mean fewer caretakers for the land; they also lead to “a vast amnesia” of local knowledge which threatens both the local community and economy.²⁴⁸ With more farmers on the land, agrarian communities are able to keep locally based and small-scale industries, producing a diversity of value-added products instead of just shipping out raw materials to urban centers. For example, Berry argues that the U.S. needs “a system of decentralized, small-scale industries to transform the products of our fields and woodlands and streams: small creameries, cheese factories, canneries, grain mills, saw mills, furniture factories, and the like.”²⁴⁹ In contrast, when agricultural communities only export raw materials, most of the profit flows to urban areas and large food processors, distributors, and input suppliers – not farmers.²⁵⁰ This relationship leaves rural areas economically degraded and rural farmers as serfs of their own land. In terms of socially just economies, farmers, their families, and their laborers (family or not) need to make living wages. So for Berry, land needs a diversified and socially just economy able to support local farming and other industries, run by people who can read the landscape and know how to best work within its contours, borders and limits.

All landscapes are cultural landscapes to some degree. Berry writes, “the maintenance of the landscape—which are to so large an extent the making and the maintenance of culture—brings us to the inescapable final step in an argument for diversity: the realization that without a diversity of people we cannot maintain a diversity

²⁴⁷ Kirschenmann, “The Future of Agrarianism,” p. 5.

²⁴⁸ Berry, “The Work of Local Culture,” in *What Are People For?*, p. 157.

²⁴⁹ Berry, “An Argument for Diversity,” p. 113.

²⁵⁰ Lorna M. Butler, “Rural-Urban Interdependency and the Future of Agriculture,” presented at the Agriculture Outlook Forum, February 22, 2002, p. 4. Accessed at the USDA website, www.usda.org.

of anything else.”²⁵¹ By a diversity of people, Berry does not mean “a diversity of specialists, but a diversity of people elegantly suited to live in their places and to bring them to their best use, whether the best use is that of...leaving a place wild, or that of the highest sustainable productivity.”²⁵² In other words, sustainable agriculture needs a culture of people willing to customize their farming to the landscape. People are not environmentally determined to be within a particular landscape for the New Agrarians, nor do they have any inherent right to it. Rather, becoming “elegantly suited to live in their places” means people need to pay close attention to the places they call home, and adapt their practices accordingly.

While the industrial mentality is antithetical to the agrarian mentality, many agrarians are split on the value of science and technology. Wendell Berry conflates science with industrialism, specialization and colonialism. However, agrarians such as Wes Jackson and David Orr view science merely as a tool, highly useful when well directed but highly destructive when it is not.²⁵³ Orr, for instance, argues, that “the marriage of agrarian and industrial minds will require the merger of these different ways of knowing—the empirical, specialized world of science, and the holistic, moral, experiential world of the responsible agrarian.”²⁵⁴ What agrarians insist on, then, is that the products of science be tested before implementation to see whether they sustain or undercut agrarian values and goals. Furthermore, any technology is “good” for agrarians which improves their ability to care for the health of the land, improves their

²⁵¹ Ibid., p.121.

²⁵² Ibid.

²⁵³ Freyfogle, “Introduction,” p. xxxvi.

²⁵⁴ Orr, “The Urban-Agrarian Mind,” p. 101.

connection to their neighbors, and sustains the integrity of local economies. It is “bad” technology when it tends otherwise.

Agrarian writers, such as Alan Thein Durning and Orr, have connected this industrial specialization to lack of accountability in the “product cycle,” the movement of a product from the earth to the consumer to waste.²⁵⁵ Berry defines specialization as being “elaborately and expensively trained *to do one thing*.”²⁵⁶ With highly specialization and centralized societies comes a kind of personal disconnect and irresponsibility on the part of citizens for the consequences, especially the socio-economic and ecological consequences, of the jobs they serve or the products they consume. Industrial specialization tends to produce a society of people without generalized knowledge or responsibilities outside of themselves, and with a disposable attitude towards the products they consume. On the other hand, agrarians argue that farm life tends to produce a diversified culture of people whose everyday life depends on generalized knowledge of place, often including knowledge of local ecology, hydrology, horticulture, animal husbandry, mechanics, electrical engineering, architecture, carpentry, masonry, financial planning, business management, marketing, food preparation, child rearing and community development. This knowledge of place and how to manage it, as well as a dependency upon the land for one’s livelihood, connects agrarians to the life cycle of the products they are using.

Dissenting from the modern capitalist view, agrarians in general believe that those who buy products are implicated morally in how and where these products are being produced, just as those who discard waste items are morally involved in their final

²⁵⁵ Freyfogle, “Introduction,” p. xxxvii.

²⁵⁶ Berry, *The Unsettling of America*, p. 7.

end.²⁵⁷ Berry summarizes this point well: “At present, it is virtually impossible for us to know the economic history or the ecological cost of the products we buy; the origins of the products are typically too distant and too scattered and the processes of trade, manufacture, transportation, and marketing too complicated.”²⁵⁸ This lack of knowledge indicates how fragmented and detached we have become both from the product we use and from their producers. For instance, in his essay, “The Work of Local Culture,” Berry writes that if a forty-eight hour power failure occurred in American,

Such a calamity would thus reveal how far most of us are now living from our cultural and economic sources, and how extensively we have destroyed the foundations of local life. It would show us how far we have strayed from the locally centered life...based to a considerable extent on what we now call solar energy, which is decentralized, democratic, clean, and free. If we note that much of the difference we are talking about can be accounted for as an increasing dependence on energy sources that are centralized, undemocratic, filthy, and expensive, we will have some sort of historical parable.²⁵⁹

In contrast, Berry argues that a “good community” is one which fosters generalized knowledge of place, its people and products. This community “depends on itself for many of its essential needs and is thus shaped, so to speak, from the inside—unlike most modern populations that depend on distant purchases for almost everything and are thus shaped from the outside.”²⁶⁰

The New Agrarianism is not just a philosophy specific to rural populations, however. Generalized knowledge is attainable for people, rural or not, who decide to not live specialized, industrialized lifestyles. Moreover, urban and suburban populations can make agrarian connections to land, both in their buying power, and in their involvement within their own land community. In fact, approximately one-third of all farms are located

²⁵⁷ Ibid., p. xx.

²⁵⁸ Berry, “The Whole Horse,” in *The New Agrarianism*, p. 65.

²⁵⁹ Berry, “The Work of Local Culture,” in *What Are People For?*, p. 160.

²⁶⁰ Ibid., p. 158.

within Metropolitan Statistical Areas, and produce more than two-thirds of all fruits and vegetables in the U.S., and three-quarters of greenhouse, nursery, and horticultural crops.²⁶¹ Lorna Butler argues that 16 percent of the nation's best farmland is located in urban areas.²⁶² Many metropolitan farmers are just within a few miles of city centers, and it is predominantly *these* farms which are small-scale, diversified operations that meet the demands of local (mostly urban) markets.²⁶³ Thus, agrarian landscapes usually include urban farms and urban centers in order for agriculture to remain socially and economically viable in North America. As Orr puts it, "for agrarianism to work, it must have urban allies, urban farms, and urban restaurants patronized by people who love good food responsibly and artfully grown."²⁶⁴ I will discuss further aspects of the urban-agrarian movement in the following chapter.

As might be expected, the underlying value connecting alternative agriculture for the New Agrarians is not a preservationist mentality seeking only to protect "pristine" landscapes from human habitation. On the contrary, New Agrarians see themselves as conservationists in Leopold's sense: using skill and insight, "not merely a negative exercise of abstinence and caution," to achieve "land health," or sustainable human utilization of the land.²⁶⁵ Similarly, Berry argues that land health is "the one value," the one "absolute good," that makes sense only when defining community at the landscape level; such a community "is the smallest unit of health."²⁶⁶ "By community," Wendell Berry writes,

²⁶¹ Lapping and Pfeffer, "City and Country," p. 93.

²⁶² Ibid.

²⁶³ Ibid., p. 94.

²⁶⁴ David Orr, "The Uses of Prophecy," in *The Last Refuge*, (Washington, D.C.: Island Press, 2004), pp. 106-107.

²⁶⁵ Aldo Leopold, "Wilderness," in Callicott and Nelson, *Great New Wilderness Debate*, p.518.

²⁶⁶ Wendell Berry, *Another Turn of the Crank* (Washington, D.C.: Counterpoint Press, 1995), p. 90.

I mean the commonwealth and common interest, commonly understood, of people living in a place and wishing to continue to do so. To put it another way, community is locally understood interdependence of local people, local culture, local economy, and local nature.²⁶⁷

The agrarian landscape is an interdependent human and nonhuman community, a cultural landscape, which agrarians believe can thrive when managed properly by humans. This conservationist outlook to nature views humans as special members of any land community, but they are *always* members for agrarians, and *key* members in agroecosystems. Manipulating landscapes is arguably part of human ontology, not something people should feel innately guilty about. Because humans must manipulate nature to survive, agrarians such as Berry, Wes Jackson, Scott Russell Sanders and Daniel Imhoff view agriculture as a potential model for sustainable land use. A *good* farmer is defined by Berry as the agrarian who dissolves the boundaries of nature and culture, such that *agri-culture* becomes a way for humans to live ecologically, socially and economically sustainable lives. Learning how to nurture land and community requires *skill*, intimate knowledge of a place over time, attention to its possibilities and to its social context, remaining alert to its cultural and ecological idiosyncrasies, adapting techniques to the specificity of place, and commitment to nurturing. Most of these are lacking in industrial agriculture, which is therefore a regrettable “development” for the New Agrarians.

The point here is not that farmers are better people or citizens than, say, a politician or plumber; history shows that working with soil does not make you moral (or intelligent). Rather, the point is that people are always a part of land-communities; if we want these communities to flourish, they must be cared for by people, and so we need

²⁶⁷ Wendell Berry, *Sex, Economy, Freedom, and Community* (New York: Pantheon Books, 1993), pp. 119-20.

more nurturers. Correspondingly, the nurturer's intimate knowledge of place, its needs, potential and limits, requires comportment towards the world that agrarians see fundamentally enriching to human ontology.

Agrarian philosophy is most easily applied to small family farms, but the half-million midsize farms in the U.S. are the most vulnerable to the economic pressures of scale. Twenty-seven percent of these farms are tied to a marketing of input firm by means of a contract that determines at least some of the management decisions on the farm.²⁶⁸ The rest are finding it increasingly difficult to find niches for their products in an increasingly bifurcated food system. No land use can endure if it makes no economic sense, and in the short run at least, good land use for these midsize farms is more costly than bad land use. In the short run, various practices of industrial agriculture, such as the use of inorganic fertilizers, chemical pesticides, fossil fuels, expansive monocultures, and extensive subsurface drainage all cut costs on midsize and large farms while sapping overall land health. Similarly, plowing hillsides raises yields while eroding soil. Agrarians argue that these trends can be resisted in at least four ways with a change in management practices. First, many find alternative ways to farm land, such as entering into a long-term lease with a land trust as owner, or working the land as a part-time job. Second, agrarians try addressing as many of their own needs as possible, or turn to neighbors in their community for support, limiting their dependence on the market. Third, agrarian farming is almost always diversified in some way, such that the farmer has multiple products to sell to multiple outlets during multiple seasons. As I argue below, small-scale diversified farming is more efficient than industrial agriculture. Fourth, for more than a century, cooperative buying and direct marketing

²⁶⁸ Kirschenmann, "The Future of Agrarianism," p. 3.

efforts have been a staple agrarian response to a fluctuating market. In recent years, agrarians have sought local outlets for their produce via natural food stores, community supported agriculture (CSA), and farmers' markets. *All* of these strategies, however, require that farmers reach out to their community, and either build or utilize a preexisting cultural and ecological landscape open to local markets. Agrarianism is interdependent upon sustainable communities and economic systems.

Agrarian critics such as Paul B. Thompson have dismissed agrarianism philosophy, and Berry's work specifically, as antithetical to environmental ethics because Thompson misses precisely this interdependency. Thompson accuses agrarianism of a "wise use" mentality and therefore does not truly "love nature in its natural state."²⁶⁹ In other words, agrarianism's ecological view is misguided because it includes humans. Thompson writes,

While there is much to admire in Berry's moral thought, a true environmentalist should question whether the agrarian world every produced environmentally conscious stewards in the manner that Berry describes. In point of fact, agricultural production comes into conflict with environmental values, even when modern industrial technology is removed from the picture...No matter how conceived, stewardship does not resolve the contradiction between agriculture and the preservation or restoration of lands set aside for wildlife, wilderness, swamps, and grasslands.²⁷⁰

Thompson's argument is question-begging, as it assumes rather than shows how "environmental values" go against a conservationist approach to land health. He views environmental values solely in terms of "hands-off" wilderness preservation, implying that farmers by definition cannot be environmentalists. However, once agriculture is

²⁶⁹ Paul B. Thompson, *The Spirit of the Soil: Agriculture and Environmental Ethics* (New York: Routledge, 1995), p. 88.

²⁷⁰ *Ibid.*, p. 86.

viewed from a landscape level, it becomes clear that conservation and preservation goals are compatible in agrolandscapes, as I argued in Chapter Two.

Moreover, Thompson's overall argument is based upon three flawed premises. First, he is working with the assumption that human habitation inevitably "ruins" a "pristine" ecosystem, and thus environmentalism and environmental ethics means protecting wilderness through a nature/culture divide, an idea I critiqued in Chapter One. Second, Thompson fails to put agrarianism in its landscape context, such that he overlooks the social and economic dimensions of land stewardship. Take, for instance, land that is only saved from development within urban, suburban, and outlying rural landscapes because it is in agricultural production by small-scale farmers or ranchers selling to the region. This land provides connectivity and heterogeneity in across a landscape matrix, saving it from homogeneity and increasing isolation of less managed areas. As I mentioned above, Thompson misses the interdependency between sustainable communities and economic systems. Finally, Thompson goes on to claim that industrial agriculture, properly modified, gives a better (pragmatist) alternative to agrarianism, because technology will allow us to save huge swaths of land while intensely producing crops for urban and semi-urban people. This hope in an industrial agricultural future seems logical if one views agroecosystems as "sacrifice zones" for natural habitat within the landscape matrix, if one feels humans should destroy "their own" landscapes in order to "save" others, if one thinks local economies and agrarian cultures are either culturally unimportant or economically inefficient, or if one does not worry about the takeover of U.S. food systems by a small number of multinational corporations.

For Thompson, *efficiency* is often the primary argument justifying industrial agriculture and its mandate to “feed the world.”²⁷¹ Economic efficiency, as defined by industrial agriculture, has admittedly not been a primary goal for agrarianism, but rather a value competing against the cultural and ecological values of family farms. Based on economic efficiency, it has been argued that we must have industrial agriculture, it is a necessary evil not just to protect wilderness, but because small-scale farms are less *efficient* in terms of *productivity* than industrial agriculture, and thus we wouldn’t be able to feed ourselves otherwise. However, Thompson is careful not to argue that industrial agriculture is more efficient in terms of *yield*; rather, he is speaking about costs per unit acre. He states: “Note that an increase in productivity means that the rate at which costly inputs are converted to valuable outputs has been increased, not that the volume of output has increased.”²⁷² How are industrial farms more productive in this way? In an article published in defense of industrial agriculture’s “vision”, Thompson argues:

When food production industrializes, small farms often are consolidated into larger operations that permit the use of larger technology or that maximize the productivity of labor or management expertise. This is clearly efficient from the perspective of the industrial operator—there is more production per unit of cost—but what about the farmers that lose their farms and must find alternative work? Clearly, they have experienced costs or losses that industrializing producers are not likely to include in their own efficiency calculations. Those costs must be included, too. But just as there are additional costs, there also are additional benefits. If the industrial farm produces food more cheaply, consumers will benefit.

So according to this line of argument, industrial agriculture gets more bang for its buck.

²⁷¹ While global effects of U.S. agricultural policy go beyond the scope of this thesis, it should be noted that world hunger is not caused by lack of food, but by poverty and landlessness, which deny people access to food. Industrial agriculture actually increases hunger by raising the cost of farming, by forcing tens of millions of farmers off the land around the world, and by growing primarily high-profit export and luxury crops. For a systematic critique of industrial agriculture’s “feeding the world” myth, see Andrew Kimbrell, *The Fatal Harvest Reader*, especially pp. 6-31.

²⁷² *Ibid.*, p. 105.

The belief that industrial agriculture is more efficient than small-scale agriculture is a myth. *Small-scale agriculture is more productive than industrial agriculture both in per unit costs and yield per unit acre.* In a review of agricultural research verifying this claim, Andrew Kimbrell writes,

These studies demonstrate that when farms get larger, the costs of production per unit often increase, because larger acreage requires more expensive machinery and more chemicals to protect crops. In particular, a 1989 study by the U.S. National Research Council assessed the efficiency of large industrial food production systems compared with alternative methods. The conclusion was exactly contrary to the “bigger is better” myth. *“Well-managed alternative farming systems nearly always use less synthetic chemical pesticides, fertilizers, and antibiotics per unit of production costs and lessens agriculture’s potential for adverse environmental and health effects without decreasing—and in some cases increasing—per acre crop yields and the productivity of livestock management systems.”*²⁷³

According to a 1992 survey by the U.S. Agricultural Census report, relatively smaller farm sizes are 2 to 10 times more productive per unit acre economically than larger ones. The smallest farms surveyed in the study, those of 27 acres or less, are more than ten times as productive (in costs per unit acre) than large farms (6,000 acres or more), and extremely small farms (4 acres or less) can be over a hundred times as productive!²⁷⁴

Factoring in ecological sustainability, the genetic weakening of crops, the environmental degradation of fertilizers, chemical, diversity and soil loss, the dependence upon fossil fuels, and the health impacts on humans, industrial agriculture will be even less efficient in the future. So, there is no logical argument based upon efficiency that the United States *needs* industrial agriculture to feed itself or foreign

²⁷³ Andrew Kimbrell, “Myth Four: Industrial Agriculture is Efficient,” in *The Fatal Harvest Reader: The Tragedy of Industrial Agriculture*, ed. by Andrew Kimbrell (Washington, D.C.: Island Press, 2002) p. 19-21, emphasis added.

²⁷⁴ *Ibid.*, p.22.

markets. Still, *even if* research verified Thompson's argument for productivity, consumers and policy makers would still need to judge the value of efficiency. That is, they would need to make individual and collective decisions whether or not they are willing to pay the ecological, aesthetic and cultural costs of industrial agriculture. If not, regardless of the fact that small-scale alternative agriculture is more efficient, "systems that use inputs and resources of greater human value to produce goods and services of lesser human value will not be viable."²⁷⁵

The Historical Roots of New Agrarianism

Writers on agriculture and environmental ethics seem split on the lineage of contemporary "New Agrarianism." On one hand, a group of professional philosophers, many of whom have historically been connected to Land Grant Universities (LGUs), and are overwhelmingly pragmatists, have emphasized the "Yankee" lineage. These thinkers, including Paul B. Thompson, James A. Montmarquet, Jeffrey Burkhardt, Thomas C. Hilde, and Gene Wunderlich, try to find a connection between historical agrarianism and pragmatist philosophy in thinkers such as Jefferson, Franklin, Emerson, Thoreau, and Liberty Hyde Bailey. As a result, in their book, *The Agrarian Roots of Pragmatism*, they draw a historical line leading to Wendell Berry and neo-agrarianism along the Mason-Dixie line, basically shunning "Southern agrarianism" as a viable strand of contemporary agrarian thought. The Southern conservative and agrarian traditions came together in an essay collection published in 1930, *I'll Take My Stand: The South and the Agrarian Tradition*, authored by Twelve Southerners.²⁷⁶ The

²⁷⁵ John Ikerd, "Assessing the Health of Agroecosystems," p. 3.

²⁷⁶ Twelve Southerners, *I'll Take My Stand: The South and the Agrarian Tradition* 2nd Ed. (New York: Harper Torchbooks, 1930 [1962]).

philosopher James Monmarquet argues in his book, *The Idea of Agrarianism*, that there is a:

distinctively southern tradition of Taylor and his twentieth-century descendants, the Vanderbilt agrarians....Alongside the southern agrarian tradition there is also, however, a distinctly Yankee lineage. Crèvecoeur belongs to this, as do Thoreau and Emerson; and in this century there are the interesting figures of Liberty Hyde Bailey and the leading agrarian writer of our own times, Wendell Berry. Where the southern tradition is courtly, conservative, and faintly suspicious of democracy, this northern tradition is idealistic, democratic, and strongly committed to individual freedom. This idealism extends not only to the social and political aspects of farming, but sometimes even to its technical side. There is a receptivity—though with important exceptions both past and present—to science and its applications for agriculture.²⁷⁷

Similarly, Thompson writes, “the word *agrarianism* is irretrievably linked to a group of historians, social theorists, and literary critics associated with Vanderbilt University in the 1920s and 1930s.”²⁷⁸ He then proceeds to criticize the Southern agrarians as a conservative gentry wanting to protect their exploitative culture, for knowing little about the agriculture they were promoting, and motivated by a self-aggrandizing desire for a distinctly Southern intellectual tradition, rather than giving an intelligible critique of “Northern industrialism.” Thompson and Monmarquet dismiss the Southern agrarians as antiquated, a backwater history of agrarianism best left alone, allowing them to marry historical Northern agrarians to a pragmatist philosophy that is more open to the technological shift in industrial agriculture. What they could be overlooking, however, is that the New Agrarianism’s cultural critique has its foundations primarily in the Southern tradition. Moreover, the very tradition that Thompson and others are holding up as the more egalitarian and democratic is steeped in an ideology of individualism and

²⁷⁷ James A. Montmarquet, *The Idea of Agrarianism: From Hunter-Gatherer to Agrarian Radical in Western Culture* (Moscow: University of Idaho Press, 1989), p. 221.

²⁷⁸ Paul B. Thompson, “Agrarianism as Philosophy,” in *The Agrarian Roots of Pragmatism* (Nashville: Vanderbilt University Press 2000), p. 27-28.

environmental determinism much more pernicious for ecological health than the Southern ideology, as I will argue below. It is primarily the “Northern” tradition which remains ethically problematic.

Another group of writers, made up primarily of actual agrarians and activists fighting for agrarian values, give as much, if not more attention to the Southern agrarianism as a modern influence than to thinkers such as Jefferson and Thoreau. Eric T. Freyfogle, for instance, writes: “Among American traditions, the New Agrarianism is most similar to the strand of thought sometimes referred to as Southern conservatism, a tradition ably carried into the post-World War II era by Richard Weaver...expressed most eloquently by Wendell Berry.”²⁷⁹ In fact, one of the most powerful characteristics of the New Agrarianism as a philosophy is its synthesis of the most progressive aspects of the Northern and Southern agrarian traditions, and leaving behind some of the more unsavory aspects that have been the subject of past criticisms.

I’ll give a few examples of what I mean by this agrarian synthesis.

1. Wes Jackson uses plant genetics to create perennial polycultures mimicking native prairies, but he is very critical of industrial agriculture’s manipulation of plant genetics and mono-culture mentality,²⁸⁰
2. Trauger Groh and Steven McFadden, authors of *Farms of Tomorrow Revisited*, have shown how farmers have redefined Jeffersonian democracy by taking community self-reliance into their own hands through community supported agriculture (CSA). These farmers have rejected industrial agriculture’s dependence upon free-market capitalism’s “economies of scale.” Instead, they

²⁷⁹ Freyfogle, “Introduction” p. xxxviii.

²⁸⁰ Wes Jackson, *Becoming Native to This Place* (Lexington: University Press of Kentucky 1994).

have built a movement that supports small farmers, conscious rural and urban consumers, ecological agriculture, and eliminates the 1,300 miles the average food item in the U.S. travels before reaching the dinner plate.²⁸¹

3. Daniel Imhoff has been inspired by Thoreau's celebration of wilderness and wildness, such that he advocates Thoreau's vision of "wild farming." He writes, Just as the community supported agriculture (CSA) movement has opened the door to new models and opportunities for local, small farming-based production and distribution systems, the concept of "farming with the wild" offers an expanded vision for the future of sustainable agriculture. Such a vision would begin with far more and far smaller farms that gracefully meld into landscapes pulsing with a wide range of native species. Every farm, while still being an ecosystem unto itself, would in some way function as a corridor connecting it to a larger, ultimately wilder landscape—through clear and free-flowing watersheds, through woodlots, grasslands, or wetlands, on into roadless areas beyond human intervention.²⁸²
4. David Orr writes, "[the Southern agrarian thinker] Allan Tate...had it right: A true agrarian world is yet to be created." Ironically, for Orr this agrarian world must be created by marrying the rural agrarian and urban industrial mind, such that LGU's and other universities would begin teaching from an agrarian perspective, and industrial thinking would become a tool benefiting local culture.²⁸³

In pointing out these brief examples, I want to show that farmers and activists implicitly or explicitly aligning themselves with the New Agrarians are bringing together both "Northern" and "Southern" ideology to work for the best practical solutions. All of these examples show that agrarianism is an alternative to industrial agricultural values, though not *in principle* an alternative to its methods (such as utilization of technology).

²⁸¹ Trauger M. Groh and Steven McFadden, *Farms of Tomorrow Revisited: Community Support Farms, Farms Supporting Communities* (San Francisco: Biodynamic Farming and Gardening Association, 1997).

²⁸² Daniel Imhoff, "Farming With the Wild: A Conservation Approach to Agriculture," in *The Fatal Harvest Reader*, p. 310-311.

²⁸³ David W. Orr, "The Urban-Agrarian Mind," in *The New Agrarianism*, p. 96.

Out of all the New Agrarians, Berry is the most steeped in the writings of 1930s Southern agrarian tradition. For instance, in his most recent essay, “The Whole Horse,” Berry’s title derives from Allen Tate’s essay, “Remarks on the Southern Religion,” in *I’ll Take My Stand*. Tate argues that the “modern mind” tries to replace the horse with horsepower, thereby only seeing the horse for what it can do practically, not for what it *is* ontologically. Berry’s essay discusses the destructiveness of this modern mindset. He writes: “One of the primary results—and one of the primary needs—of industrialism is the separation of people and places and products from their histories.”²⁸⁴ Berry continues: “The fundamental difference between industrialism and agrarianism is this: Whereas industrialism is a way of thought based on monetary capital and technology, agrarianism is a way of thought based on land.”²⁸⁵

John Crowe Ransom was the first writer in this century to use the now ubiquitous term “industrialism.”²⁸⁶ Ransom’s contribution to *I’ll Take My Stand* characterizes industrialism as “the latest form of pioneering and the worst,” its driving energy the “principle of boundless aggression against nature.”²⁸⁷ The United States of the 1920’s and 30’s seemed increasingly devoted to materialism brought on by industrialism and its production of a boom-or-bust economy. This is precisely the critique of industrialism, materialism, and the “gospel of Progress” that Berry articulates in *The Unsettling of America*. Moreover, Berry’s critique of free-market capitalism as a type of communism came directly from the Twelve Southerners, who use the term “communism”

²⁸⁴ Berry, “The Whole Horse,” p. 64.

²⁸⁵ *Ibid.*, p. 67.

²⁸⁶ Freyfogle, “Introduction,” p. xxxix.

²⁸⁷ John Crowe Ransom, “Reconstructed by Unregenerate,” *I’ll Take My Stand*, p. 15.

interchangeably with “industrialism.” Berry makes this connection explicit in “The Whole Horse”:

The coming of the World Trade Organization was foretold seventy years ago in the “Statement of Principles” of *I’ll Take My Stand*, which said that “the true Sovietists or Communists...are the industrialists themselves. They would have the government set up an economic super-organization, which in turn would become the government.” The agrarians of *I’ll Take My Stand* did not foresee this because they were fortune-tellers but because they had perceived accurately the character and motive of the industrial economy.²⁸⁸

Neither Berry nor the Twelve Southerners are against industrialism *as such*, but rather its effect on the socio-economic stability of regional agri-cultures. Berry writes, “Agrarians would insist only that any manufacturing enterprise should be formed and scaled to fit the local landscape, the local ecosystem, and the local community and that it should be locally owned and employ local people.”²⁸⁹ In other words, industrialism should never thrive at the expense of local culture. These lines of thinking diametrically oppose Berry’s philosophy to pragmatist optimism towards “bigger is better” industrial agriculture that philosophers such as Thompson are committed to both professionally and intellectually, and that we can find historically in writers such as Emerson.

Moreover, agrarian sentimentalism is not just a “Southern” thing, but reaches as far back as the American Revolution, and to one of America’s first essayists, J. Hector St. John de Crèvecoeur. In his 1925 introduction to Crèvecoeur’s 1782 book *Letters from an American Farmer*, Ludwig Lewisohn writes:

[Crèvecoeur] is proud of his essential privileges as a mere man. He is moved by the sight of his wife and children, for they are his, and the objects of his protecting care. He loves the acres which he tills and which had been cleared and tilled before him. The daily labors of his farm are saturated for him with sentiment, and his life is filled with love. His cattle, his chickens, above all his

²⁸⁸ Berry, “The Whole Horse,” p. 73.

²⁸⁹ *Ibid.*, p. 75.

bees, and the wild doves that circle above his house—all these he surrounds with an emotional atmosphere.²⁹⁰

Major themes in contemporary agrarianism show up here: love of hard work; the centrality of family in farm life; the ideal of being a member of the land-community; and a romanticized account of animal husbandry. Moreover, Crèvecoeur's discussion of bees in Letter I, titled "Introduction," along with Letter XI, titled "The Botanist," concerning a Pennsylvania farmer who was America's first botanist, emphasizes the connection between farm life and living within a diverse plant and animal community.²⁹¹ Crèvecoeur's marriage of the naturalist and farmer predates Thoreau by almost a century.

Thomas Jefferson has continued to hold a strong influence on agrarianism, especially for Wendell Berry. In Jefferson's 1787 *Notes on the State of Virginia*, he famously states:

Those who labour in the earth are the chosen people of God, if ever he had a chosen people, in whose breasts he made his peculiar deposit of substantial and genuine virtue. It is the focus in which he keeps alive that sacred fire, which otherwise might escape from the face of the earth. Corruption of morals in the mass of cultivators is a phaenomenon of which no age nor nation has furnished an example.²⁹²

Jefferson did not live to see the industrialization of agriculture, which is either the cause of effect of a "moral corruption" in supposedly innocent farmers. Moreover, his point here is both practical and naturalistic. Practically speaking, Jefferson believed America should be settled by "freehold" farmers. Because they must put roots down in one place in order to make a living, they were thought to be better citizens, and possibly more

²⁹⁰ Ludwig Lewisohn, "Introduction" to J. Hector St. John de Crèvecoeur, *Letters from an American Farmer* (New York: Albert and Charles Boni 1925), p. xix. *Letters* was first published in London, 1782.

²⁹¹ *Ibid.*, pp. 1-21; 258-280.

²⁹² Thomas Jefferson, *Writings*, ed. Merrill D. Peterson (New York: Literary Classics of the United States, 1984), p. 290. *Notes on the State of Virginia* was written in 1781, and published in 1787.

motivated defenders of the country because they will have a reason to protect. Jefferson contrasts freeholders with the mobile manufacturing or mercantile citizenry. Berry writes extensively supporting this Jeffersonian argument in *The Unsettling of America*. Crèvecoeur makes the same argument in *Letters*, when a Russian comments to the botanist that Russian “lands are so unequally divided, and so few of our farmers are possessors of the soil they till, that they cannot execute plans of husbandry with the same vigor as you do, who hold yours, as it were from the Master of nature, unencumbered and free. Oh, America!”²⁹³

On the other hand, both Crèvecoeur and Jefferson’s naturalistic tendencies were heavily influenced by French natural philosophy, which argued for environmental determinism: climate and geography have the capacity to shape national character, providing different peoples with differing solutions to the basic problems of survival.²⁹⁴ For instance, Crèvecoeur wrote: “Men are like plants; the goodness and flavour of the fruit proceeds from the peculiar soil and exposition in which they grow.”²⁹⁵ It is not hard to see here how both Jefferson and Crèvecoeur were implicated in racist eighteenth century thought (though both were against the idea of slavery). A theory of moral and political development based on soil and land cultivation would become a vehicle for the myth of “blood and soil,” linking genetic determinism with respect to moral and political character. This is what Jefferson is doing in the above passage. Those who became native to soil were uniquely transformed by their environment to be the *best* inhabitants of that place. This connection was thought to motivate American settlers to fight in the

²⁹³ Crèvecoeur, *Letters from an American Farmer*, p. 269.

²⁹⁴ Paul B. Thompson, “Thomas Jefferson and Agrarian Philosophy,” *The Agrarian Roots of Pragmatism*, p. 135.

²⁹⁵ Crèvecoeur, *Letters from an American Farmer*, p. 56.

American Revolution, to defend *their* homeland. Moreover, this strand of native-soil mythology played into the rise of 20th century fascism, with the German National Socialists expressing allegiance to agrarian determinism. The Nazi party justified the eradication of Jews and Gypsies, who were prevented from owning land, based on the idea that they were morally inferior for either economic activities or nomadic lifestyles not based on land ownership.²⁹⁶ Thankfully, this side of agrarianism has not survived past WWII, and it is certainly not an ideology present in contemporary agrarian writers.

Not only has New Agrarianism divorced itself from any naturalistic claims or blood-and-soil narratives, it makes no claim to the old slave-based, plantation strand of agrarianism; “a regional variant to begin with, it deviated markedly from the family-based homestead ideal.”²⁹⁷ Thus, the slave-based economy implicitly romanticized by the Twelve Southerners has not carried over to the subsistence-based economy championed by Wendell Berry or other New Agrarians.

Thoreau and Emerson can also be thematically linked to the New Agrarians, though for the Transcendentalists farming is used more as a metaphor. For Emerson, who wrote “Farming” in 1858,²⁹⁸ farming represents a “midworld,” or a “clearing within which eternal truths appear.” Emerson believed truths were revealed to farmers, like poets, because they moved at the pace of nature, and had to be attentive to it’s inner-workings. Both of these observations fit agrarian thought well.²⁹⁹

²⁹⁶ Paul B. Thompson, “Agrarianism as Philosophy,” *The Agrarian Roots of Pragmatism*, p. 49.

²⁹⁷ Freyfogle, “Introduction,” p. xvii.

²⁹⁸ Ralph Waldo Emerson, “Farming,” in *The Selected Writings of Ralph Waldo Emerson*, Brooks Atkinson ed., (New York: Modern Library, 1858 [1942]).

²⁹⁹ Robert S. Corrington, “Emerson and the Agricultural Midworld,” in *The Agrarian Roots of Pragmatism*, pp. 140-152.

For Thoreau, any positive aspects of agriculture are also metaphorical. On one hand, Thoreau saw agriculture as Emerson and many New Agrarians now see it: a midworld or boundary connecting nature and culture. Thoreau lived on Walden Pond because it was physically and metaphorically the ideal distance between Concord and the countryside, which was still mostly wilderness in the 1850's.³⁰⁰ He was undoubtedly an advocate of the simple life, a life that rejects materialism and unnecessary industry and technology. His homesteading experiment is commendable by agrarian standards. His dispassion for hard work was less about work *as such*, and more about the banality of working *for* others, working more than we should have to, for money instead of subsistence, and not for our own health and wellbeing. By meeting his needs as simply as possible, and clearly understanding what those needs were, Thoreau is a model for agrarian economic values.

On the other hand, the only reason why Thoreau inhabits this midworld is because he cannot actually live in wilderness. Thoreau always maintains the nature/culture dichotomy in his city/wilderness distinction, and he wants to have as little to do with culture as possible. He yearns for "absolute freedom and wildness, as contrasted with a freedom and culture merely civil,—to regard man as an inhabitant, or part and parcel of Nature, rather than a member of society."³⁰¹ Correspondingly, he agrees with Crèvecoeur and Jefferson's environmental determinism, arguing

the climate does thus react on man, —as there is something in the mountain air that feeds the spirit and inspires. Will not man grow to greater perfection intellectually as well as physically under these influences?³⁰²

³⁰⁰ Henry David Thoreau, "Walking" in *The Essays of Henry David Thoreau*, Lewis Hyde ed. (New York: North Point Press, 2002), p. 154. "Walking" was first published in 1862.

³⁰¹ *Ibid.*, p. 149.

³⁰² *Ibid.*, p. 161.

Thoreau believes that living in proximity to wilderness cultivates wildness in humans, and correspondingly, culture impedes it, dulling our senses and domesticating us. He longed to “get away from it all,” to retreat from daily living, human connections and social responsibility. In his 1862 essay “Walking,” he states: “Let me live where I will, on this side is the city, on that the wilderness, and ever I am leaving the city more and more, and withdrawing into the wilderness.”³⁰³ This is the exact opposite of what agrarianism is committed to, which instead emphasizes building community, both in agrarian towns and with urban consumers, and celebrating the borderlife inherent in the patchwork mosaic of heterogeneous agrolandscapes.

In fact, Thoreau has little regard for agriculture as an end in itself. He states: “Hope and the future for me are not in lawns and cultivated fields, not in towns and cities, but in the impervious and quaking swamps.”³⁰⁴ The problem with farming, for Thoreau, is that it subdues/domesticates us and the land. He writes:

The weapons with which we have gained our most important victories, which should be handed down as heirlooms from father to son, are not the sword and lance, but the bushwhack, the turf-cutter, the spade, and the bog hoe, rusted with the blood of many a meadow, and begrimed with the dust of many a hard-fought field. The very winds blew the Indian’s cornfield into the meadow, and pointed out the way which he had not the skill to follow. He had no better implement with which to entrench himself in the land than a clamshell. But the farmer is armed with plow and spade.³⁰⁵

We have conquered the land, and both people and land are the worse off for it because we have lost wildness. This is why Thoreau calls not for the preservation of agriculture and small farmers, but for the preservation of wilderness areas, for species diversity, and for the wildness remaining in the human spirit. He writes, “I would not have every

³⁰³ Ibid., p. 158.

³⁰⁴ Ibid., p. 164.

³⁰⁵ Ibid., p. 166.

man nor every part of a man cultivated, any more than I would have every acre of earth cultivated: part will be tillage, but the greater part will be meadow and forest.”³⁰⁶ Thus, while Thoreau’s critique of an industrialized modernity, his advocacy of the simple life, and his call for the preservation of wilderness and wild spaces are all echoed in contemporary agrarianism, his frustration with his inability to live in wilderness, to be nomadic, to flea from human culture and responsibility to one place, and finally his belief that people become uniquely suited biologically to place, belies a value system very different from the New Agrarians.

In tracing some of the general lineage of the New Agrarianism, my main goal has been to show that it is a synthesis of both the Northern and Southern tradition, and perhaps therefore has a discursive lineage. I have also tried to show why “Northern” agrarianism is just as blemished as “Southern” agrarianism.

I want to end this historical section by tracking more closely the history of agrarianism’s emphasis on land health. To some extent, Crèvecoeur and Thoreau emphasized the benefit of rural life in giving humans access to wildlands as well as domesticated nature. However, the primary historical figure who has influence the New Agrarian conception of overall land health, or ecologically sustainable land use, is Aldo Leopold. While Leopold is known for his wilderness conservation and game management, he spent the last decade of his life not only as a Wisconsin agrarian, but as an advocate for ecological agrarianism. This focus on agriculture is apparent in Leopold’s *The Sand County Almanac*, and his articles published in agricultural journals, later collected in book form, *For the Health of the Land*, edited by J. Baird Callicott and Eric Freyfogle. The agrarian Scott Russell Sanders has said that Leopold “is one of the

³⁰⁶ Ibid., p. 171.

touchstones in our thinking about nature and culture, one of the essential figures we reckon with,³⁰⁷ and Wendell Berry sights Leopold as a primary influence to his evolution of ecological thought. This link between Leopold and Berry is obvious, not only because Berry cites Leopold often, but because their ethical outlooks overlap significantly. Leopold's land ethic was written primarily to convince *private* landowners to be wise-use conservationists, and his plea to them was to view land as something more than an economic asset. Leopold argues that "We can be ethical only in relation to something we can see, feel, understand, love, or otherwise have faith in."³⁰⁸ Berry echoes this in his justification for more farmers in a diversified patchwork mosaic of agricultural landscapes. Berry's distinction between the industrial mind and the nurturing mind (Berry's recent writings have juxtaposed the "Rational Mind" with the "Sympathetic Mind")³⁰⁹ parallels Leopold's Hume-Darwinian argument for sympathy as the foundation of ethical comportment towards land. Leopold writes:

Perhaps the most serious obstacle impeding the evolution of a land ethic is the fact that our educational and economic system is heading away from, rather than toward, an intense consciousness of land. Your true modern is separated from the land by many middlemen, and by innumerable physical gadgets. He has no vital relation to it; to him it is the space between cities on which crops grow. Turn him loose for a day on the land, and if the spot does not happen to be a golf links or a 'scenic' area, he is bored stiff. If crops could be raised by hydroponics instead of farming, it would suit him very well.³¹⁰

Leopold understood that conservation requires a nurturing mentality based upon a shift in the knowledge, skills, desires, and aesthetic sensibilities of the landowning populace.

In this sense, Berry's ethical project is an extension of Leopold's land ethic.

³⁰⁷ Scott Russell Sanders, "Foreword: Reading Leopold," in Aldo Leopold, *For the Health of the Land*, J. Baird Callicott and Eric T. Freyfogle, eds. (Washington, D.C.: Island Press, 1999), p. xiii.

³⁰⁸ Aldo Leopold, "The Land Ethic," in *A Sand County Almanac* (New York: Oxford University Press 1989), p. 214.

³⁰⁹ Berry, "Two Minds," in *Citizenship Papers* (Washington, D.C.: Shoemaker & Howard, 2003), pp. 85-106.

³¹⁰ Leopold, "Land Ethic," pp. 214-215.

Like Thoreau, Leopold called for an integration of some degree of wildness into the working landscape mosaic of cultivated fields, pastures, woodlots, and wetlands. He called this “land health.”³¹¹ Unlike Thoreau, Leopold saw that agriculture could be a pleasing middle ground between the poles of urban civilization and pristine wilderness. Thus, for the first time in agrarian writings, we have an actual conservationist environmental ethic that is centered on humans as members (or citizens) of a land community, practicing an agrarian lifestyle with an attention to land health. Leopold rejected industrial agriculture as destructive to agricultural husbandry and wildlife preservation; but his land ethic is also a rejection of the Thompson’s view that our responsibilities to the land requires a “hands-off” approach. It should also be noted that based upon Leopold’s language and where he was publishing his agricultural and nature essays, his later writing were written primarily for the average person living the agrarian lifestyle, as opposed to the academic or scientist (who are usually not living agrarian lifestyles).³¹²

Influenced directly by Leopold’s conservationism, writers such as Jackson, Sanders, Freyfogle, and Berry have written extensively on wilderness and wildness preservation in agriculture, and species diversity of both agricultural and bordering ecosystems. As I argued above, the health of the land has been the galvanizing goal connected all other agrarian concerns, and the model for protecting land health is Leopold’s land ethic. The New Agrarians apply Leopold’s land ethic into their own analysis of the socio-economic context necessary for sustaining healthy people, communities, and landscapes.

³¹¹ Ibid., p. 17.

³¹² J. Baird Callicott and Eric T. Freyfogle, “Introduction” in Aldo Leopold, *For the Health of the Land* (Washington, D.C.: Island Press, 1999).

Conclusion

I have argued that a New Agrarianism has emerged, fostered primarily by Wendell Berry's writings on the social, economic and ecological consequences of industrial agriculture. This movement has strong ties to the Southern agrarian tradition, especially in its critique of industrialism, "progress", and specialization, as well as the Northern agrarian tradition of Crèvecoeur, Jefferson, Emerson, and Thoreau, and their emphasis on ecological farming and democratic citizenship. Noticeably missing from contemporary agrarianism is the lineage of environmental determinism and a distinct nature/culture split. I have also tried to present the New Agrarianism as a model environmental ethic, one that gives a holistic, three-pronged account of sustainable living: ecological, economic, and social integrity. An agrarian worldview views human beings as ontological members of a land community, part and parcel of this earth. Human culture is embedded in the landscape, and the landscape is embedded in human culture. Agrarianism argues that humans cannot have a healthy relationship to land without a healthy local economy and culture. Hence, agrarianism argues for a diversified, localized, community-supported agricultural system. Finally, agrarianism gives a forceful account of where the United States has gone wrong in its industrial consumer culture, and offers an alternative based on nurturing individuals, communities, and the land.

CHAPTER 4

NEW AGRARIAN LANDSCAPES: RECLAIMING CITY, FARM AND PASTURE

Introduction

Agrarianism—as a socio-economic philosophy and ecological ethos of sustainable land-use—is currently practiced in myriad forms within the United States. Unlike past incarnations of agrarianism, which have tended to reject industry and the “big city” in favor of a nostalgic past that most likely never existed, the New Agrarian movement is a product of what David W. Orr defines “the urban-agrarian mind”: “The marriage of the agrarian and industrial minds...the empirical, specialized world of science and the holistic, moral, experiential world of the responsible agrarian.”³¹³

Agrarianism has become more “urban,” both in its connections with urban markets and its cautious embrace of science (especially ecology) and appropriate technology.

In this chapter, I will briefly describe three urban-agrarian models: ranching in the New Mexico-Arizona-Mexico borderlands region traditionally referred to as the Malpais, or “badlands”; the work of The Land Institute in Kansas, which is experimenting with the genetic traits of the native tall-grass prairie to gain insights in developing sustainable farming methods tailored to local ecosystems; and the urban-agrarian movement taking place in Seattle, WA, and its surrounding farms. These models are embedded within regionally-specific social and ecological landscapes, which vary in their patterns of patchwork heterogeneity within the landscape matrix. This heterogeneity overlaps somewhat the degrees of “wildness” in the landscape, moving from the “untamed” West to the densely populated Pacific Northwest. All three models, however, demonstrate

³¹³ David W. Orr, “The Urban-Agrarian Mind,” in *The New Agrarianism: Land, Culture, and the Community of Life*, ed. Eric T. Freyfogle (Washington, D.C.: Island Press, 2001), p. 101.

how agrarianism is a critical practice towards achieving the overall sustainability of unprotected landscapes. My goal for this chapter is to highlight examples of agrarianism as a philosophy for 21st century sustainable agriculture.

Ranching in the Carrizo Valley and Chihuahuan Desert

It may not take long to become acquainted with a place, to meet one's neighbors and get a feel for the land. But understanding one's landscape enough to live off of it, to work with one's biotic neighbors, improve one's watershed, understand the social, economic and geographic contours of the land, recognize indicators of sickness and health, know what issues bind one's disparate human community together, that is, knowing the necessary information for living sustainably, that takes time and is never final or complete. In the non-indigenous public and private lands of the Southwest United States, this type of knowledge is still being work out, with ranching communities providing an microcosm of the region's struggles and conflicts in developing long-term sustainable land-use.

Sid Goodloe and his wife, Cheryl, own a ranch spanning 3,500 acres of Carrizo Valley, near Capitan, New Mexico. Like Wendell Berry, Sid argues that the *well-run* family farmstead provides the setting for fostering a nurturing mindset, ecologically and morally. Sid sees himself as both a rancher and restoration ecologist, using the agricultural science he learned from Texas A&M and Kenya, Africa, to bring his agrarian ideals to fruition. Bordered on three sides by national forest land, Sid has ranched in the valley for over fifty years. Slowly, he has pieced together the history of the land. What did it look like pre-settlement? How did it function ecologically? And how has it been managed by humans in the past? His holistic land management practices, which include

prescribed burning, reseeding native grasses, and short duration, rotational grazing, are based on the ecological history of the landscape. Sid found ruins of several homesteader plots; the original settlers farmed his land as if they were still living in Kansas. The land did not respond well, and the homesteaders were forced off the land as a result of drawing down fertility. Moreover, they probably did not respond well to the fires. Dendro-ecological studies show that every decade or so fires swept over the Carrizo Valley, keeping the invasive junipers, pinions, and ponderosa pines at bay while adding nutrients back into the grassland soil. Where these water-thirsty trees and shrubs now dominate, native grasses have disappeared, leaving only bare soil and gulleys caused by water erosion. Since the 1920s, the U.S. Parks Service has suppressed all fires in the valley, allowing the juniper-pinion-ponderosa vegetation (their “national forest”) to spread. Sid decided it was in everyone’s best interest to bring the fires back.

Sid Goodloe’s high-intensity, short duration grazing practices use cattle as surrogates for the massive bison herds that historically moved through the valley. Sid’s partitioned his land into 12 paddocks in 1970, allowing him to move cattle around, protecting cool-season grasses from overgrazing. His clearing of trees and prescribed burning methods have restored the savannah-like grasslands on his property, which in turn have improved hydrological flows throughout the landscape. Sid has also diversified the products he can sell from the land, including cattle, firewood, beams called vigas, Christmas trees, live trees for landscaping, and wild turkey and mule deer during hunting season. Diversifying products is increasingly becoming a strategy for

sustainable small-scale agriculture to remain economically viable, because most farmers and ranchers cannot live off of just one product.

Short-duration, fire-friendly ranching is also being tested by a larger ranching community located in the Malpais Borderlands. The Malpais is a semi-arid region of the Chihuahuan Desert, which runs from northern Mexico into the southernmost regions of New Mexico and Arizona. Ranches in the region are typically held in families for generations and span tens of thousands of acres (both public and private). The 320,000-acre Gray Ranch is perhaps the most magnificent of those stretches, straddling the northern edge of the Sierra Madre and the southernmost rim of the Rocky Mountains with the desert in between. Known by scientists as a megadiversity hot spot, the Chihuahuan desert landscape hosts over four thousand plant species, and a high diversity of reptiles and mammals. The region is along a major flyway for migratory pollinators and birds, with more than half of all breeding birds in North America represented.³¹⁴ The Borderlands is also notorious for its ranching history, which has been highlighted by exploitation and degradation of both public and private land over the last century.

Accordingly, the Malpai [their spelling] Borderlands Group (MPG) has been forged around two questions. First, is it possible to have prescribed burns large enough and often enough to restore the grasslands of the degraded Chihuahuan Desert? And second, even though cattle are mostly to blame for the degradation, can cattle ranching and desert restoration occur on the same land, possible even having a symbiotic relationship? The group has overwhelmingly proved the first question possible. The jury is still out on the second.

³¹⁴ Jake Page, "A Quiet Revolution in the Borderlands," *Smithsonian* (June 1997), p. 53.

A decade ago, new alliances began to form around the Gray Ranch, as ranchers, scientists and environmentalists put aside their differences and worked together for the first time to heal the land. They had three mutual problems: urbanization, water scarcity, and fire suppression. They all wanted open spaces, natural communities, unfragmented and undeveloped landscapes, and they disliked the vegetation conversion occurring due to overgrazing and fire suppression.

The solution came in two forms: defragmenting the landscape for large-scale controlled burning, and creating a grassbank. Regional ranchers controlling some 1 million acres of contiguous land began taking down their fences to allow for larger prescribed burns. They have realized that even the largest tracts of land cannot function as ecological islands in the desert landscape. After many years of scientific studies and close inter-agency collaboration, summer wildfires are beginning to be seen as a natural process of the grassland ecosystem. In 2002, nearly 45 square miles of grasslands burned in the region, coinciding with the timing of summer monsoon rains.

The second solution was to consolidate herds and rotate cattle across MPG's contiguous properties. The Gray Ranch, run by the Animas Foundation (which bought the easement-laden ranch from the Nature Conservancy), began the trend, using the ranch's open habitat to serve as a "grassbank" for neighboring ranchers, wildlife, and natural ecological processes in the area. The grassbank allowed the MPG ranchers to rest their own land while running their cattle on the Gray Ranch, using short term easements to determine the size of a rancher's grazing allotment. This idea will eventually spread to the total 1 million acres, thereby keeping the landscape intact and protected while using cattle as herbivore surrogates for ecological restoration. Whether

or not short-duration grazing and fire regimes will restore the degraded landscape is still an open question, but the ranchers, scientists and environmentalists are hopeful.

The ranchers' changing image of the land and its needs has also changed their self-image. The ranchers are slowly embracing a community-approach because they need each other. They also need the environmentalists and the scientists to monitor and enhance their efforts. Likewise, environmentalists have come to realize that the ranchers are their last hope for stopping "dude ranchettes" from moving in, thereby taxing (literally and figuratively) the already degraded landscape. The environmentalists are also beginning to embrace fire as restoration ecology, though questions about the ranchers' motives for starting fires still circulate, even among the ranchers. Are the MPG ranchers truly interested in restoring the landscape? Or are they just "pyromantics" wanting to modify existing habitat to allow for the more cattle-friendly grasses to flourish, without knowing the long-term ecological impacts of both setting fires and continued intensive grazing on the Chihuahuan landscape? The hope is that these are not mutually exclusive motives, that cattle and fire are as good for the region's long-term land health as they are for its economic and social health.

Together, this odd community is using science and agrarianism to bring down their own mental fences, striving to create a sustainable community, economy, and ecology on the landscape scale. The crisis they are tackling is specific to their landscape, time and place, to be sure. And in the end, the answers can come from this group alone, those that are already embedded and invested in the land. However, the alliances forged to protect the Chihuahuan desert while also protecting its agricultural

community can perhaps serve as a model for what agrarian policy will need to look like in the 21st century.

Natural Systems Farming

Like the ranches of the Malpais Borderlands, farmland in Kansas is increasingly being managed on the landscape scale. Unlike the borderlands, however, Kansas tallgrass prairies are suffering from industrial, large-scale agriculture creating large monoculture farms. A byproduct of this takeover is a homogeneous socio-economic and ecological landscape. Kansas' rural populations have been declining since the 1950s, taking with them local economies and community life. In response to this crisis, a group of agrarian minded scientists are working on new agricultural techniques mimicking the productivity, diversity and integrity of the native prairies, while producing harvestable crops for human consumption.³¹⁵ A particularly promising aspect of that work goes on at The Land Institute, near Salina, Kansas, where Dr. Wes Jackson heads a team of researchers studying the traits of the native tall-grass prairie in order to gain insights on developing sustainable farming methods tailored to local conditions.

As I argued in Chapter Two, one method for increasing agro-ecosystem biodiversity is designing “an artificial plant and animal community created to...imitate the structure of a natural biotic community.”³¹⁶ The Land Institute is domesticating wild perennial grains that can be grown in plant guilds (polycultures) mimicking the structure and function of native prairies.³¹⁷ Prairies around the world typically include combinations of four functional perennial plants: warm-season grasses; cool-season

³¹⁵ Scott Russell Sanders, “Learning from the Prairie,” in *The New Agrarianism*, p. 3.

³¹⁶ J. Baird Callicott, “The Metaphysical Transition in Farming: From the Newtonian-Mechanical to the Eltonian Ecology,” *Journal of Agricultural Ethics* 3 no. 1 (1990): 46.

³¹⁷ J.D Soule and J.K. Piper, *Farming in Nature's Image: An Ecological Approach to Agriculture* (Washington, D.C.: Island Press, 1992).

grasses; legumes; and sunflowers.³¹⁸ The specific species making up these guilds varies based upon local adaptation. The localized diversity of prairies provides built-in resilience to changes in climate, water, insects and pests, grazers, and other natural disturbances. Throughout the year, perennial guilds provide fertilizers and nutrients; weed control; shade, wind, and rain protection; and resistance to pests and diseases. Because perennial roots do not die as annual roots do, they hold soil through all seasons, even when drenched by rain. Moreover, perennial roots build soil. Perennial polyculture ecosystems thus maintain their own health independent of outside inputs, and at no expense to the planet or people.³¹⁹

The research at The Land Institute involves identifying and growing native high-yielding seed producing varieties of perennial polycultures—such as Eastern gama grass, Maximilian sunflower, or Illinois bundle flower—or producing crosses between domesticated annual grains and their wild perennial relatives. Such successful crossings have paired grain sorghum and Johnson grass, wheat and intermediate wheatgrass, rye and *Secale montanum* (perennial wilde rye).³²⁰ According to Jackson, all the major crops are in the process of being “perennialized,” including oats, barley, sunflower, chick pea, sorghum, wheat, and rye. Plant breeding work takes place throughout the winter, starting in the laboratory and then proceeding to both refrigerated and greenhouse conditions. Each summer, hundreds of new annual-wild perennial crosses are grown out in the fields for selection.³²¹

³¹⁸ Wes Jackson, “Farming in Nature’s Image,” in *Fatal Harvest Reader: The Tragedy of Industrial Agriculture*, ed. Andrew Kimbrell (Washington, D.C: Island Press, 2002), p. 73.

³¹⁹ *Ibid.*, p. 72.

³²⁰ Lee DeHann and Scott Bontz, “Breeding Wheat to Hold its Own and the Soil,” *The Land Report*, 72 (Spring 2002): 9.

³²¹ Daniel Imhoff, *Farming with the Wild: Enhancing Biodiversity on Farms and Ranches* (San Francisco: Sierra Club Books, 2003), p. 83.

Jackson's research has revolved around place-specific discussions. "We always start with some simple questions," says Jackson. "What was here? What will Nature require of us here? What will Nature allow us to do here? Then we find the crop analogs according to those very localized conditions."³²² Thus, the prairie model being developed will need to be adapted to specific agroecosystem landscapes. Jackson is also an advocate for local farming communities capable of doing the type of work needed to develop and care for locally adapted polyculture systems. The Land Institute is helping to rebuild a nearby agrarian community, Matfield Green, population 50, which has suffered from the "Get Big or Get Out" family farm eradication program that began in the 1960s. Jackson hopes to help revive the town in order to provide a holistic model of prairie farming in agrarian setting.

Once the genetics work at the Land Institute proves successful beyond the test fields, farm prairies will provide year round food with yields comparing favorably with the benchmark 1960s yield for Kansas winter wheat of 1800 lb/ac.³²³ Moreover, the farm prairie will serve as a new model for creating sustainable and diverse agroecosystems. As I argued in Chapter Two, soil management is generally the most important area agriculture needs to improve upon to increase biodiversity. Frequent tillage not only damages or destroys soil structure via erosion and runoff, but also significantly reduces soil biodiversity. By eliminating the need to till, prairie farming maintains crop and wildlife diversity through biomass buildup, clustering symbiotic guilds, and keeping the soil's structure undisturbed. Creating no-till perennials further closes the nutrient cycle, which would move agriculture away from extractive petroleum inputs. The Land Institute

³²² Imhoff, *Farming with the Wild*, p. 83.

³²³ "Natural Systems Agriculture," in *Biodiversity in Agroecosystems*, ed. by Wanda Collins and Calvin Qualset (Washington, D.C.: CRC Press, 1999), p. 178.

is currently working on a farm that runs solely on sunlight using their current research on perennial polycultures. Finally, by selecting and encouraging vegetation adapted to the local climate and mimicking native prairies, agriculture becomes dovetailed into its natural environment in innovative ways.

In order for this new direction in agriculture to work, agricultural communities of the future will need to decide as a whole to reject labor-saving, capital-intensive farming, because perennial polycultures cannot be harvested by conventional machinery. Engineers must design new methods for harvesting mixed grains that may ripen at different times, which will almost certainly call for more human labor (i.e. more farmers). Thus, prairie farms will need more people on the land, potentially supporting a whole new sector of economic growth. Consumers will also need to change their dietary preferences to meet the availability of less familiar, locally adapting grains, seeds and legumes. This, it seems, will be the larger challenge: convincing the average consumer to change their dietary habits that have historically been based upon a homogeneous, standardized food supply.

Urban-Agrarian Interdependence

One of the most interesting developments in the resurgence of agrarianism is its renewed connection to city life. Over the last fifty years, urban and suburban populations have boomed, while rural areas have lost millions of family farms. The demands of metropolitan and suburban consumers, as well as a global market, have pushed middle-sized farms to get bigger and consolidate, directly contributing to an

increased pauperization of rural farmers to satisfy urban markets.³²⁴ Ecologically and community-minded urban dwellers, especially in coastal cities, became aware of the *ecological* impacts of this change, without directly connecting it to the demographic and economic effects upon agrolandscape. In reaction, demand for organically grown products has grown rapidly in cities, and the organic industry has grown at an annual rate of 20 percent. Unfortunately, organic agriculture does not have standards to prevents organic farms from becoming pesticide and herbicide-free industrial agriculture. by the mid-1990s, vast multi-thousand acre organic monocultures of nearly every major crop were being cultivated, year round, primarily for distant markets in the U.S. and worldwide. It has become apparent that the majority of organic agriculture is no longer producing food by small-scale farmers, for local markets.³²⁵

In an effort to support local growers and markets once again, urban consumers began supporting direct-market agricultural systems. There are currently over 19,000 farmers selling their products at 2,900 farmers' markets.³²⁶ These markets provide a direct-marketing niche for local, small-scale farmers, connecting urban consumers to the people growing their food.

Likewise, Community-supported agriculture operations (CSAs), in which consumers (primarily urban) pay farmers in advance for a season's worth of fresh produce and value-added goods, are providing direct support for hundreds of small farms and clean local food for thousands of families. Simply put, a CSA farmer sells

³²⁴ Mark B. Lapping and Max J. Pfeffer, "City and Country: Forging New Connections through Agriculture," in *Visions of American Agriculture*, William Lockeretz, ed. (Ames: Iowa State University Press, 1997), pp. 91-92.

³²⁵ Imhoff, *Farming with the Wild*, p. 225.

³²⁶ U.S. Department of Agriculture (USDA), "Farmers' Market Facts," Accessed at the USDA website, www.ams.usda.gov/farmersmarkets/facts.htm.

“shares” in the farm to community members who, in return, receive a portion of fresh produce regularly throughout the growing season. Thus, the farmer has money to buy seed and carry her from the planting season through the harvest. Originating from the Japanese “teikei” system thirty years ago, CSA’s have grown in the United States over the last eighteen years to include as many as 1,700 small farms, with at least one CSA in every state.³²⁷ Finally, urban dwellers have taken to reclaiming urban space for the purposes of growing their own food and connecting with their neighbors. Large cities such as San Francisco, Portland, Seattle, Chicago, New York, and Austin have a large network of community gardens and market gardens throughout the city, often reclaiming vacant lots and unused park spaces.

The Puget Sound region of the Pacific Northwest provides one example of these hopeful trends. King County has 1.7 million people in the county, with Seattle as the major metropolis. Despite the high concentration of people, nature and gardening have a very strong presence in the city. Seattle has a greenbelt system snaking through the city and beyond, meandering through dozens of city parks and four adjacent towns before looping back to the Puget Sound. The county consciously planned for recreational open spaces, but it also made a commitment to support agriculture, both within and bordering the county.

Within Seattle city limits, a system of 55 community gardens, labeled “P-patches,” provide gardening and socializing opportunities in most major neighborhoods.³²⁸ The county is also known for its highly diversified small-scale farms and market gardens interspersed amongst the suburban and urban landscape. There

³²⁷ Ibid., p. 139. See also, Steven McFadden, “Community Farms in the 21st Century: Poised for Another Wave of Growth?” published at <http://www.thenewfarm.org/features/0104/csa-history/part1.shtml>.

³²⁸ See the City of Seattle website, <http://www.ci.seattle.wa.us/neighborhoods/ppatch/locations.htm>.

are currently five thriving farmers' markets in Seattle, not including the internationally famous downtown Pike's Place Market. All of the growers for these markets are local, many of whom farm within the city limits. Seattle also has one of the most developed CSA programs in the country. Forty-eight farms and market gardens in King County and adjacent counties provide weekly deliveries or drop-offs of fresh produce through the designated season to (primarily urban) participants.³²⁹

Both the CSA system and the neighborhood farmers' markets close the economic and cultural loop between growers and local markets, thereby supporting a more sustainable agriculture. Seattle's city planning and support for local agriculture demonstrates that agrarianism is not just a rural movement, and that symbiotic relationships can occur across the heterogeneous urban-suburban-rural landscape matrix. As a former volunteer for the community gardens in Seattle, and a frequent patron at the city's farmers markets, the elements embodied therein—loving company, neighborliness, inherited knowledge and good work, shared purpose, sensual delight, and environmental stewardship—sum up for me the type of community that is vital for an urban-agrarian mindset to flourish.

Conclusion

In order for agrarianism to survive into the 21st century, the movement must be creative and adaptable, ecologically, socially and economically. The potential ways that people may live sustainably on land are ultimately as varied as the landscapes on which they depend. What the Malpais Borderlands, the Land Institute, and Seattle markets have in common, however, is their commitment to a future agriculture which supports

³²⁹ Information on Seattle's CSAs and Farmers' Markets gathered from: <http://www.seattlefarmersmarkets.org/>, and <http://www.seattletilth.org/resources/csalist2002.html>.

local communities, local economies, and ecological integrity. Moreover, under the pressure of a globalized economy, hyper-individualism and booming development, these systems are becoming increasingly dependent for their future survival on a nurturing, agrarian outlook.

CONCLUSION

Economist Michael Porter argues that there are two ways to be competitive in a global economy. One is to be the lowest cost supplier of an undifferentiated product, and the other is the ability to provide unique and superior value to the buyer in terms of product quality, special features such as regional uniqueness or environmentally sound products, or after-sales service.³³⁰ It turns out that it is extremely difficult for a supplier to provide both services. Using small-scale cattle ranching as an example of the latter supplier, Fredrick Kirschenmann asks the reader: “Imagine with me, a large number of small and midsize family farmers, producing food products using sound conservation practices, providing their animals with the opportunity to live as nature intended, and preserving the identity of such food products by processing them in locally-owned processing facilities, and making them available in local marketplaces, giving customers access to the grower and the product’s life cycle.”³³¹ Kirschenmann’s thought experiment, which is actually happening, highlights the emerging opportunities for small-scale agrarian farmers to fill niches in the global economy. Short of an agricultural revolution, the sustainable agriculture movement will probably never be able to take over both markets, out-competing large firms, as long as consumers demand *cheap products*. So, despite concerns around industrial agriculture, such as its impact on the environment, health, aesthetics, social justice, community, and food security, and its dependence upon government subsidies and globalized trade to remain viable, this type of agriculture has dominated the global market. However, the point of this thesis is not to show if or how a large-scale revolution in agriculture will occur. Rather, the goal has

³³⁰ Michael E. Porter, *The Competitive Advantage of Nations*, (New York: Free Press, 1990).

³³¹ Kirschenmann, “The Future of Agrarianism,” p. 10.

been to show agrarianism as one possible model of what sustainable living would look like, and to emphasize how any measure of sustainability needs to take the socio-economic and ecological landscape into account. The increasing number of both consumers and farmers willing to support direct-market ecological agriculture is encouraging, especially as it shows further possibility for connectivity to take place across urban, suburban, and rural areas. This trend could be even greater if public policy began directing funds away from subsidizing a few bulk commodities—a policy that benefits no one except the consolidated firms—and toward agriculture products that support local economies. However, whether this type of agriculture could significantly shift overall agricultural practices and policy in the U.S. towards sustainability, or if agrarianism is the *only* sustainable alternative, are unanswered—and probably unanswerable—questions at this point in American agricultural history.

In this thesis, I have made the case for small-scale farming guided by agrarian philosophy as a model for sustainable agriculture. I have highlighted the fact that sustainable agriculture by definition must be economically viable, socially responsible, and ecologically sound. In order to meet these goals, I argued there should be more farmers able to practice conservationist agriculture, and as many diversified land-uses as possible to meet the specific socio-economic and ecological expectations of local landscapes. Moreover, ecological and socio-economic indicators for sustainability need to be identified and measured across agroecosystems. These landscapes, by and large, are mixed communities of urban, suburban and rural ecosystems. The challenge before sustainable agriculture is to connect these heterogeneous ecosystems to produce overall land health while also preserving cultural health. I have argued that agrarian

philosophy, in the form of the New Agrarian movement, is one embodiment of this integration.

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