

**THE DOWNFALL OF EFFICIENCY:
A SOCIO-MATERIAL STUDY OF THE INEQUALITY AT THE CENTER
OF THE MIDWEST'S AGRICULTURE SYSTEM, 1850-PRESENT**

by

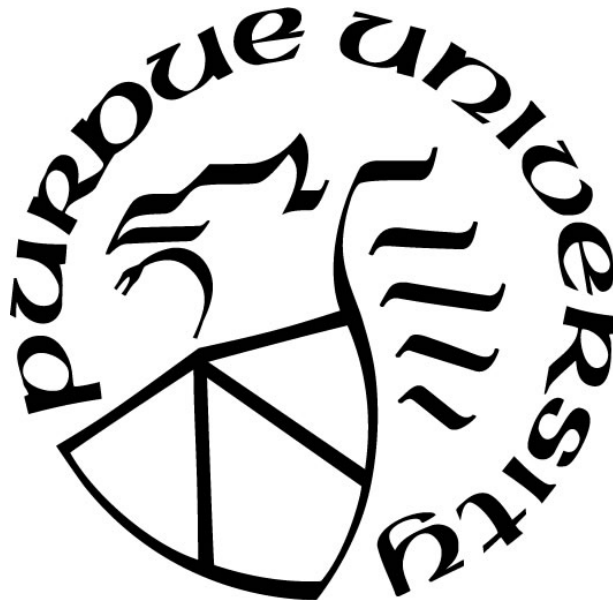
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*Dedicated to the Flora and Fauna of My Childhood Home Who Left an Indelible
Impression Upon My World*

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NOTE ON NOMENCLATURE

I believe that language is evolutionary in character, molding and reshaping over time. Therefore, and throughout this thesis, I capitalize the words Black, Indigenous, and Native when the terms are used in reference to groups of people who hold a distinct, essential, and shared sense of history, identity, culture, and community. I capitalize Indigenous and Native to signify the basic human rights, sovereignty, and rights to self-determination of the original inhabitants of a region or locale. I capitalize Black to highlight the humanity and cultural ties of Black individuals. Lowercase black represents a color, not a person or community.

Much consideration was made on how to identify plants and animals not indigenous to the North American continent. In an attempt to focus on the significance of the species referenced I have often included their common or scientific name. Terms such as invasive or alien were not used. Those terms are often disproportionately applied to species arriving to the North American continent from Asia despite the much longer transfer of species from Europe. Furthermore, I do not use the term non-native, as plant seeds and offspring, being very adept at traveling sometimes great distances, can at one point in time be considered new to a region and over time become an essential part of everyday life and acquire the label of native by locals. In addition, non-native often does not do the right kind of work for how I am analyzing species of plants and animals within the text. Key to my argument in this thesis, is that colonization and humanity reconfigured the landscape both in terms of the system and style of production and in terms of what/who was considered useful or important within legislation. For these reasons, I will refer to species brought to the North American continent by colonization and later conservation as introduced species.

ABSTRACT

From the beginning of the United States, enlightenment liberalism combined a for-profit zeal with an alienation of the non-human world. That false dichotomy between what was considered human and what was considered non-human laid the foundation of American land use patterns and American society. From the 1850s on, altering the midcontinent's aquatic systems was central to building the Midwest as a well spring of national power in agriculture production. After the forced and federally orchestrated removal of Indigenous populations, Agri-ecological technologies, including tile drainage, open ditching, and dredging, applied throughout the Mississippi River Basin to improve drainage efficiency, restructured the midcontinent's water apparatuses creating ecological and human crises. Like many midwestern states, Indiana, lost approximately eighty percent of its eighteenth-century wetlands to development between 1850-1980. Subterranean tile drains, placed at the lowest point of a crop field, lowered the water table by removing surface waters. That water, once piped into human-made ditches scattered across the Midwest like a spiderweb, traveled into streams, creeks, and rivers. Throughout the first half of the twentieth century, the success of drainage efficiency helped generate hundred-year floods every ten years in the Ohio, Wabash, White, and Mississippi Rivers. These floods created millions of dollars of damage, lost hundreds of lives, and made hundreds of thousands homeless. In tandem with soil exploitation, drainage also brought Dust Bowl-like conditions to Northwestern Indiana in the mid-1930s. Furthermore, this system transformed the speed with which water flowed and created a direct pathway for agriculture particulates. Fertilizers, pesticides, herbicides, and soil particles traveled this network to the sea. From the 1970s to today, this subterranean network was and continues to be identified as the root cause of the Gulf of Mexico's hypoxic zone. As conservation efforts continue to ignore tile drainage as an unsustainable practice and climate change continues, the increasing usage of industrialized agriculture chemicals and the rising prevalence of hurricanes will transport particulates further out to sea.

INTRODUCTION

“Our present swarms with the traces of our past.”
Carlo Rovelli, *The Order of Time*

There is, I propose, at least one key piece of inherited social labor and one key piece of technology central to the building of the modern socio-material landscape called America: the false dichotomy between humans and the non-human environment and subterranean drainage. In the bustle of human societies, knowledge, and its subsequent justified belief about social interactions, communities, and materials is created, reused, and altered by culture.¹ From colonization, nineteenth century American agriculturists received a set of knowledge which alienated humans from the environment and incentivized altering the landscape for profit. Beginning in 1849, subterranean tile drainage technology was implemented across the Mississippi River basin with disastrous effects. A microcosm for the history of land use in the Midwest, this historical study of northwest Indiana from 1850-present argues; first, that tile drainage implementation was rooted in a colonial culture of inequality; second, that as a technology which increased water drainage efficiency, destroyed the vast majority of Midwest wetlands and assisted in the development of twentieth century flood, drought, and economic crises; and third, through naturalization received unfettered use while continuing to create a dead zone in the Gulf of Mexico.

Early Anglo-American colonists viewed the environment separate from themselves. Setup originally as business ventures, the colonies sought to organize and control the pre-colonial American landscape of the seventeenth century within a for-profit market economy. The inherited human/non-human dialectic, which took hold in Liberalism as a European vision for the world,

1. This argument rests upon Michel Foucault’s theory on the relationship between power and knowledge, Benedict Anderson’s theory of imagine communities, and Edward Said’s theory of imagined geography.

manifested elsewhere materially through colonization. As participants and believers in that alienation, agriculturalists of the midcontinent, specifically in places like northwestern Indiana, sought to reorganize the drainage of American wetlands for cash crop production with disastrous effects.

The history of agriculture in the U.S. is intrinsically linked to water usage and the continent's energy producing systems. As many historians emphasize, it is the decisions of nation-states, groups, and individuals, founded within distinct world views, which shaped the actions taken towards environments.² Therefore, and in an effort to understand the context of local decisions, this work analyzes the legislative, cultural, and social history of the mid-continent alongside material change. In short, it studies how the false dichotomy between human and non-human affected Midwestern material relations to the land and how agri-ecological transformations affected environments both near and far.

To understand the complexity and history of the false dichotomy, let us begin with wonder and curiosity about the fabric of our modern society. Amid this complicated and ever connected globe lies significant inequality. Unequal treatment under societal laws, discriminatory actions and language towards individuals different from dominant culture, hunger and poverty for parts of the world with massive wealth for others, and immense environmental degradation to name a few. The latest of these materially manifested inequalities is climate change, perhaps the greatest crisis of our generation. But how did we get here? And more importantly why did historical actors make the cumulative decisions which so vastly altered their environments and world? I do not ask these

2. See William Cronon's, *Changes in the Land: Indians, Colonists, and the Ecology of New England*, Gordon G. Whitney's, *From Coastal Wilderness to Fruited Plain: A History of Environmental Change in Temperate North America 1500 to the Present*; Carolyn Merchant's, *The Death of Nature: Women, Ecology, and the Scientific Revolution*; Linda Nash's, *Inescapable Ecologies: A History of Environment, Disease, and Knowledge*; and Donald Worster's, *Dust Bowl: The Southern Plains in the 1930s*.

questions to place blame, although there is plenty of room to do so in some regards. Rather, I ask them because it is the important questions which need to be pondered if we hope to come to some sort of cultural understanding of what the twenty-first century global population has inherited.

In the seventeenth and eighteenth centuries an age of enlightenment began in Europe. A group of intellectual thinkers, known as empiricists, started to argue that human experiences, or more specifically the processing of stimuli through the human senses, was the only true way of generating knowledge about the world. Out of this intellectual change a professionalized field of scientific study began with the solidified use of the scientific method. In 1781, Immanuel Kant published his philosophical work, *Critique of Pure Reason* (CPR). Desiring to bridge rationalism and empiricism, Kant argued that knowledge is gained through the *senses* after *experience*.³ If we are to understand that a crucial element of our human nature is the collection of stimuli through our senses as contemporary psychology informs, then Kant was not entirely wrong.⁴ However, contemporary psychology and biology informs us that our bodies and memories are *permeable*.⁵ In CPR, Kant's argument rests upon a belief that the human, the senses, are separate from the outside world, or stimuli. Here, lies one of the core roots of European Liberalism, an ideology which embedded the delineation of humans from the non-human environment within representative government. Crucial to the origin story of Midwest land use under the United States was the managerial tools of the enlightenment societies of Europe such as resource classification, private property ownership, settler colonialism, and terraforming projects.

3. Immanuel Kant, *Critique of Pure Reason*. Translated by Marcus Weigelt. (London, England: Penguin Classics, 2003).

4. Carlo Rovelli, *The Order of Time*. Translated by Erica Segre and Simon Carnell. (New York: Riverhead Books, 2018).

5. See Linda Nash's, *Inescapable Ecologies: A History of Environment, Disease, and Knowledge*. (Berkeley, Los Angeles, and London: University of California Press, 2006), and Carlo Rovelli's *The Order of Time*.

As environmental historian Linda Nash argues the modern American society was built upon a belief in this dichotomy which forged, "...a great alienating, intensely managerial relationship with nature."⁶ This dichotomy not only forged a managerial relationship with nature, but also transformed other relationships. The false division relied upon subjective qualifications for each of its two categories. What species humans deemed natural, native, or beneficial changed over time based upon contemporary assumptions. Likewise, what fit the qualifications of human, or rather who was deemed to have a healthy body and therefore considered better, changed based upon fluctuations in dominant culture.

Linda Nash in her book *Inescapable Ecologies*, carefully points out, that the relationship between "bodies and environments in Euro-American culture has always been racialized."⁷ Authors Nancy Ordover and Siobhan Somerville examine the history of scientific racism and eugenics in their respective histories, *American Eugenics: Race, Queer Anatomy, and the Science of Nationalism* and *Queering the Color Line: Race and the Invention of Homosexuality in American Culture*. In them, they highlight how American scientists started in 1869 to conduct pseudo-scientific efforts to "fix" those they believed to be "afflicted" with homosexuality.⁸ Scientists believed that homosexuality was a disease which afflicted healthy human bodies and therefore must be eradicated before it could affect the overall health of the human population. This rested upon a belief that the human body was separate from the environment. The authors also

6. Linda Nash, *Inescapable Ecologies*, 2.

7. Linda Nash, *Inescapable Ecologies*, 13.

8. Siobhan Somerville, *Queering the Color Line: Race and the Invention of Homosexuality in American Culture*. (Durham and London: Duke University Press, 2000), 1-14.

point out the scientific racism of the nineteenth century which created pseudo-scientific measurements and assessments to argue that Blacks were less evolved and therefore less human.⁹

Once a false division was created, of what is human and what is not, arguments were easily built by Europeans for what constituted a better, civilized, more advanced human or organism. A line of thinking which lies at the center of some of the worst historical acts of violence. It was used to support slavery and voting discrimination in the eighteenth and nineteenth centuries. And was central to the arguments in favor of eugenics, the holocaust, housing discrimination, and segregation laws in the twentieth century. These histories demonstrate how such discriminatory beliefs, built off the human and non-human dialectic, permeated professionalized fields of study and the social relationships between people. In its discussion of the professionalization of the sciences in Indiana, chapter two in this work also illuminates the absorbency of eugenics and racist ideology into the state's professionalized knowledge apparatus.

Many of the transformations that occurred locally in the northwest of Indiana due to industrialized agricultural development affected far away landscapes that were seemingly disconnected. Environmental historian Nancy Langston, in *Sustaining Lake Superior*, writes about the effect of distant landscapes upon the health and stability of life in the basin of Lake Superior. In it, Langston acknowledges how chemical pesticides first created by American chemical companies were sold to and continue to be used today in places in Asia, Africa, and Latin America. Those chemicals, however, do not stay in those regions, rather they can travel the currents of the globe to end up compiling in places such as Lake Superior.¹⁰ Notwithstanding local environmental

9. See Siobhan Somerville's, *Queering the Color Line*, and Nancy Ordover's, *American Eugenics: Race, Queer Anatomy, and the Science of Nationalism*. (Minneapolis and London: University of Minnesota Press, 2003).

10. Nancy Langston, *Sustaining Lake Superior: An Extraordinary Lake in a Changing World* (New Haven: Yale University Press, 2017).

degradation, Lake Superior, through Langston's scholarship, is understood to be a part of a global environment which has the power to distribute human inventions. Likewise, this scholarship describes the ways altered water systems have the power to transport or distribute modern agriculture particulates far away from their Midwestern sources.

Historian Alfred Crosby was one of the first environmental historians to emphasize the climatic and global connections of the world following a period of intense European exploration in the fifteenth century. Detailing the "Columbian exchange" in the 1970s, Crosby discussed the importance of winds to climate, travel, and the water cycle in the context of a rapidly changing world. During the age of exploration across the Atlantic Ocean, peoples, goods, plants, animals, microbes, ideas, and a vast assortment of non-living materials moved back and forth. Unintentional exchanges occurred as a result of imperial desires to colonize. The very wind current which transported European sailboats was a part of a complex climatic global system.

Long before those travels, however, Indigenous peoples built vast empires throughout the Americas. Most notable was the Mississippian mound culture in the middle of North America which culminated at the great city of Cahokia, the Inca empire in South America, and the Aztec and Mayan empires in Central America. The connections between Native American groups and European invaders would not only change social structures, but the ecology of the Americas as well. Environments from the forests of New England in the northeast to the plains of Argentina in South America, drastically transformed as conflicts, pathogens, imperialism, colonization, and exploitation redefined relationships.¹¹ Countless numbers of historians have made this period of

11. See William Cronon's *Changes in the Land*, Alfred Crosby's *Ecological Imperialism*, Eric Jay Dolin's *Fur, Trade, and Empire*, Colin G. Calloway's *First Peoples: A Documentary Survey of American Indian History*, Matthew Restall and Kris Lane's *Latin America in Colonial Times*, Dawn G. Marsh's *A Lenape Among the Quakers*, Pekka Hämäläinen's *The Comanche Empire*, Richard White's *The Middle Ground*, Jill Lepore's *The Name of War*, and Shepard Krech III's *The Ecological Indian*.

tumultuous change their life's work entailing the resistance efforts made by Indigenous populations and the tactics imperialist powers used to gain Native lands. And though these interactions are vital to our understanding of the early stages of colonization, this work primarily focuses on a period significantly later, but not without nation-state expansions and invasions.

From the eighteenth century on American policy and Americans invading the Old Northwest Territory built an uneven system of control within the land. Significantly, Indian resistances to such intrusions, noted in chapter one in this thesis, demonstrate the uncertainty of an expansion westward by a weakly organized United States. By 1849 population numbers had drastically fluctuated due to the failure of the U.S. government to restrain colonists and because of U.S. military efforts to systematically remove Indian groups. In fact, defeats in battle to a confederacy of Miami, Shawnee, Wea, Potawatomi, and Delaware peoples emboldened the U.S. to formalize its army. A wide variety of variables influenced the balance of power, but by the mid-nineteenth century the U.S. after removing and displacing many Indian groups from their homelands set about a new land mission.

In 1849, the state of Louisiana earned through federal legislation a vast amount of federally held inundated lands. This legislation became known as the first Swampland Act and set course for a massive century long statecraft and terraforming enterprise. As the question of slavery continued to be debated, a largely southern controlled congress passed the first act in 1849 and then quickly followed with the Swampland Act of 1850. This second act included states such as Georgia, California, Mississippi, Alabama, Indiana, Ohio, Michigan, Illinois, Wisconsin, Minnesota, and Florida. From 1850 to the turn of the twentieth century, these states sold swamplands in vast quantities using the sale of land patents. They then utilized the profits to reorganize the drainage apparatuses of the continent with tile drainage.

Whether within the busy streets of a city or in the middle of the rows of a flat agriculture field, drainage systems make up a significant, yet often unnoticed, part of modern America. A technology employed on this continent since European colonization, subterranean tile drainage is one of the fundamental building blocks of the nation-state. Perhaps even less acknowledged about this technology is that once employed in vast quantity it contributed to the size of massive floods, contributed to the effects of droughts, and over a period of roughly one hundred years created one of the most significant ecological crises of today; the hypoxic zone in the Gulf of Mexico.

Located deep into the interior of the North American continent lies an unimposing creek. Big Pine Creek and its surrounding tributary are located roughly one hundred miles southeast of Chicago, Illinois in the state of Indiana. Since the last ice age this creek and the many streams, creeks, rivers, and wetlands made up the many branches and veins of the Mississippi River Basin. It was within this extensive energy system that Native Americans created their own relationships towards the landscape. They hunted, farmed, fished, built homes, gathered, moved, and developed distinct identities, politics, and beliefs. Building cities within the interior that rivaled the population of medieval London at the same time.¹² Like all human populations these peoples relied upon the landscape's water.

The maize farming of Native populations around the great city of Cahokia, now residing within the political borders of the state of Illinois, created extensive fields of the grain that were rotated. This was supplemented by the trade provided from its proximity to the confluence of the Missouri, Mississippi, and Illinois Rivers.¹³ Though this agricultural system would collapse before

12. Colin G. Calloway, *First Peoples: A Documentary Survey of American Indian History*, 6th ed. (Boston and New York: Bedford/St. Martin's, 2019), 60-62.

13. Colin G. Calloway, *First Peoples: A Documentary Survey of American Indian History*, 33-35.

European arrival, later peoples such as the Miami and Potawatomi would continue to farm maize in the tall grass prairies. That farming style, and subsequent relationship to the land, drastically changed after European invasion. More importantly, Europeans demanding land for agriculture created “Indian policies, which, throughout the nineteenth century, operated on the conviction that Indians must be taught to farm...” stating that they had “every right to take it [land] because the Indians were not making good use of it anyway.”¹⁴ Euro-American colonization employed such myths not only to assert social difference through dehumanization, but to obscure the violence used to obtain material power over the continent’s environments.

The job of the historian, and in essence my task with the following narrative, is to uncover those connections and interactions between spaces, peoples, and ideas over time. Understanding the context of wet prairie drainage enables one to discover the origin and travel of ideologies, peoples, and technology across the globe which helped build this central aspect of the modern American state. Any history of modern Indiana cannot be told without accounting for the major statecraft and environmental transformations that occurred in the late nineteenth-century. If not for the fact that 80% of its wetlands have disappeared, then for the larger environmental issues this work will highlight it is a part of. The process of transforming the Grand Prairie was a complex unstructured project; one that relied upon nation-state policy and market incentives, an inherited cultural knowledge, and materially wealthy individuals.

The first chapter, herein, provides the setting for the uneven implementation of tile drainage from 1850 to the early twentieth century. Covering the establishment of Anglo-American agriculture in the northwestern portion of Indiana, this chapter highlights the state policies which actively sought to ensure farming was largely white owned, the physical transformations created

14. Colin G. Calloway, *First Peoples: A Documentary Survey of American Indian History*, 57.

by cultivation and drainage, and the rise of tenant farming. Throughout the chapter, and within the rest of the work, I bridge together regional, national, legislative, social, and environmental histories written about nineteenth century America, Indiana, and the Mississippi River basin. Bridging these bodies of work together, this thesis is able to build an argument which stretches and connects beyond the micro-historical focus of northwestern Indiana.

In the mid-nineteenth century, state officials, particularly in Louisiana, called on congress to grant states legal authority and money to drain inundated lands. States received such legislation and sold land parcels. However, mismanaged funds meant drainage at the state level stagnated until the early 1870s. In the upper Wabash River Valley and other prairie rich areas an immigrant workforce, often Irish immigrants, was minimally paid to complete drainage projects. Across the country minority groups bared the weight of the implementation of the initial drainage system. In the American south, Louisiana specifically, enslaved Blacks under state legislation were no longer enslaved by individual plantation owners but enslaved as public property of the state to dredge, ditch, and drain swamplands.¹⁵

In addition, wealthy landowners in the South and in the North began and paid the costly endeavor of changing the flow of water within the mid-continent. Under wealthy individuals in the Lafayette, Indiana area tenant farming was implemented, and massive estates erected. This change in farming technology and social order not only created million-dollar estate control over lands but lead to expanded sensitivity to national economic booms and busts. Some of the country's largest agriculture and land-grant institutions were established from these wealthy landowners. The oligopoly of the late nineteenth century intensified tile drainage and by the first few decades

15. Aaron R. Hall, "Public Slaves and State Engineers: Modern Statecraft on Louisiana's Waterways, 1833-1861," *The Journal of Southern History* 85, no. 3 (August 2019): 531-576, <https://doi.org/10.1353/soh.2019.0162>.

of the twentieth century added fast drainage to high spring rainfalls to create some of the most severe floods of the corn belt region.

In chapter two, I discuss these floods as hundred-year floods began to happen every ten to fifteen. As the country transformed in the Great Depression due to drought and ecological disasters, the federal government began to document the hardships encountered by farmers across the country. In the prairie region of Indiana, the Dust Bowl brought difficulty. Building upon histories of the Dust Bowl, this research denotes changes brought by that disaster to the prairies of Indiana. In wake of the Dust Bowl, Great Depression, and the modern conservation movement new policies established the Soil Conservation Service (SCS). Under this new department of the United States Department of Agriculture (USDA) counties within each state created local SCS offices. The federal government bought up bankrupt farms and ecologically damaged lands from farmers and relocated farmers to new land. Local SCS oversaw the implementation of wind breaks and other new practices in damaged environments in Indiana. Practices for minimizing erosion took center stage, but subterranean tile drainage continued to be used. The very system of drainage largely designed between 1850-1930 was “grandfathered in” by the U.S. Food Security Act of 1985. An action which resulted in further wetland degradation and encouraged a belief that the altered state of the American interior was natural, or at least so naturalized into the agricultural system to be understood as a fact of nature.

In the 1970s widespread use of chemicals in farming, having traveled from tile drains to creeks and rivers, were finally noticed by the government to be causing a region of low oxygen in the Gulf of Mexico. After WWII, agriculture became intensely commercialized and industrialized. The U.S. economy at the same time witnessed a change in global capitalism. As Saudi Arabia leveled an oil embargo upon the U.S., Americans found themselves waiting in long lines at the gas

pump. The interconnections of the global economy and the rise of large-scale production of crops and goods in the Global South meant competition for the U.S. domination of the agriculture markets.

Locals and agriculturists from land grant institutions of the interior were instrumental in crafting new international legislation meant to maintain the U.S. agriculture economy. Historical figures such as previous Purdue University Dean of the School of Agriculture and Secretary of Agriculture Earl Butz would intensify calls for the expansion of industrialized agriculture. From 1968 on subterranean ceramic drainage tiles became replaced by corrugated plastic drains which could withstand the increased weight of large farming machines with a significantly longer life. It was an update to and intensification of the colonizing technology which first drained the nineteenth century landscape. The resulting overproduction led to multiple farm crises over the course of the late twentieth century and the loss of 100-acre farms for thousand-acre operations. Many, locals and federal officials, believed that the American farmer simply needed to evolve, get smarter, or make their farms larger rather than pay attention to monopolies.

Since the 1970s the hypoxic zone in the Gulf grew and in the twenty-first century it was definitively linked to the erosion of crop fertilizers such as phosphates and nitrates into tile drainage. The same technology which helped enable the U.S. to produce and sell vast quantities of crops across the globe for a profit not only created immense and life-threatening floods but continues to generate fish kills and ecological disasters in the Gulf of Mexico. In 2017, this hypoxic zone became the largest it has ever been spanning an area roughly the size of the state of New Jersey.¹⁶ The European invention of tile drainage redefined crop production, global economics,

16. U.S. Department of Commerce, “Gulf of Mexico ‘dead zone’ is the Largest Ever Measured: June Outlook Foretold of New Jersey-sized Area of Low Oxygen,” Oceans & Coasts, National Oceanic and Atmospheric Administration, August 2, 2017, <https://www.noaa.gov/media-release/gulf-of-mexico-dead-zone-is-largest-ever-measured>.

and aquatic environments in the hands of Anglo-Americans. Initially, and often continually, a state sponsored enterprise, tile drainage assisted the American nation-state's Locean goal of "improving the land" in order to solidify its political and economic power in the form of private property. This thesis poignantly highlights the significance of such a technology to the history of the Mississippi basin, the history of northwestern Indiana, and the history of environmental inequality.

Like the advocacy of the modern environmental movement which sparked the beginnings of the field of environmental history, perhaps it is time that we reassess our relationship to the environment to which humanity is intrinsically a part of. Amid the unprecedented environmental disaster of climate change which lies before us, now is the time to have a healthy amount of skepticism about normalized conditions in our modern world. That investigation must engage with the history of this altered landscape in order to provide a fuller argument for memory. In the past, Americans have questioned America's cultural practices when in times of crisis. We must re-examine the human and non-human dialectic and learn that our existence is far more complex than any simple dichotomy we have put forward. It is a time again to question our current relationships and remove those aspects of modernity that create inequality. This can be the work towards environmental as well as other forms of justice.

CHAPTER 1 IMPEDIMENTS TO PROGRESS: BUILDING AN AGRICULTURAL EMPIRE 1850-1920S

“...hundreds of towns scattered throughout these fertile lands...All of them played their part in the building of an agricultural empire from the vast wilderness of the great Northwest territory.”

~ Howard C. Gillespie, *Tales of a Prairie Town*

From 1850 to the 1920s, agri-ecological transformations laid the foundation of the modern American nation-state. The changes made to aquatic systems throughout the Mississippi Basin were critical to the exertion and continuation of U.S. power. By transforming the vast prairies, wetlands, and oak-hickory forests of the Louisiana Purchase and Northwest Territory into agriculture production, Americans radically altered the environment of the previous century. As this chapter will demonstrate, the growth of the American nation-state was a complex and uneven process which relied heavily upon the ecologically rich landscapes of pre-colonial North America. It also relied upon a perspective on humankind's relation to the American environment. Beginning with the Swamp Lands Act of 1850, Anglo-Americans, having forcibly acquired lands easiest to convert to grazing and sowing crops, sought to transform inundated environments into economically productive land. After the nation-state advanced the removal of Indigenous peoples, it played a direct hand in the further commodification of Indigenous lands as it sold inundated lands under U.S. patents. By the 1920s, farmers in northwestern Indiana and other locations in the basin effectively bought those patents and installed a network of tile technology, draining away waters to extend land ownership and U.S. control.

Pursuing U.S. Control in the Old Northwest Territory

The development of westward expansion was an uneven, and arguably, interior process of colonization consistently countered by Native American populations. After expansions upon the eastern, southern, and western coasts of the continent, the U.S. government used new legislation to exert control over sovereign Native lands in the Old Northwest Territory (ONT). From the 1780s to the mid-nineteenth century the American government sought to strip away the material power of Native Americans through the passage of the Northwest Ordinances of 1785 and 1787. A key aspect of the expansion of U.S. power was the establishment of federal trading posts along major waterways, thereby inserting the early American capitalist economic system deeper into the continent and providing strongholds for military actions. Secondly and more importantly, the Northwest Ordinances proclaimed the establishment of a public domain of land. The Northwest Ordinance of 1787 formally stipulated the federal government was the arbiter of all lands within the ONT.¹ That legislation violated the sovereignty of Indigenous groups, established a system of federal control of inundated lands, and set the course for later westward expansion.

In July of 1787, the Continental Congress enacted the second Northwest Ordinance which stated that, “The said territory, and the States which may be formed therein shall forever remain a part of this Confederacy of the United States of America, subject to the Articles of Confederation...”² With its passage, the U.S. aimed to resolutely organize control over, and national expansion into, Indigenous lands through the creation of a territorial government. Furthermore, the law generated federal ownership requiring “The legislatures of those districts, or

1. United States Continental Congress, “An Ordinance for the Government of the Territory of the United States North West of the river Ohio,” *Journals of the Continental Congress*, vol. 32, (Washington D.C.: Library of Congress), July 13, 1787.

2. Ibid.

new States, shall never interfere with the primary disposal of the Soil by the United States in Congress Assembled...”³ The Ordinance of 1787 prescribed federal jurisdiction over a landscape already inhabited by a diverse array of Native groups and while the Ordinance of 1785 previously established a survey of the region. As discussed later, surveyors saw the landscape for the profitable contribution it was believed to provide at the time of surveillance. The two acts worked in tandem to categorize, commodify, and undermine Native control of the region before acquiring treaties with those Natives.⁴

After legislation, trade and military force became the two tactics utilized by the U.S. government to remove Natives and ensure American nation-state expansion. The U.S. trade and military posts were harkened by President George Washington to be spaces “conducted without fraud, without extortion...and a stated price for what they [Indians] give in payment and receive in exchange.”⁵ Under the Jefferson administration, however, the many U.S. forts for trade were used to place Indians in debt. According to Jefferson in a letter to then Indiana governor William Henry Harrison in 1803, the American nation-state would be “glad to see the good and influential individuals among them [Indians] run in debt, because we observe that when these debts get beyond what individuals can pay, they become willing to lop them off by cession of lands.”⁶ The

3. United States Continental Congress, “An Ordinance for the Government of the Territory of the United States North West of the river Ohio,” *Journals of the Continental Congress*, vol. 32, (Washington D.C.: Library of Congress), July 13, 1787.

4. Bethel Saler, “The National State Faces West,” in *The Settlers' Empire: Colonialism and State Formation in America's Old Northwest*, (Philadelphia: University of Pennsylvania Press), 2014.

5. George Washington, “Third Congress—First Session, the President’s Speech,” in *Address of the Successive Presidents of the United States to both Houses of Congress* (Washington, DC: Samuel Harrison Smith, 1805), 62. Quoted in Eric Jay Dolin, *Fur, Fortune, and Empire: The Epic History of the Fur Trade in America*, (New York: W. W. Norton and Company, 2010), 129.

6. Letter from Thomas Jefferson to Governor William Henry Harrison (February 27, 1803), in Jefferson, *The Writings of Thomas Jefferson*, vol. 9, 370.

initial design of those trading posts was to install a commodities based market in Indian territories that substantially affected Native relations. Furthermore, the passage of the Trade and Intercourse Act of 1790 clarified that the U.S. government held absolute control over trade interactions and Indian treaty negotiations.⁷ Power to determine the flow of commodities and the acquisition of Indigenous lands was the largest concern of the federal government in regards to the ONT.

Before the 18th century, Indigenous groups shifted across the region in response to disease, treaties, Indigenous conflicts, and European colonization more broadly. Tribes shifted the location of their villages and hunting grounds while other groups from the east resettled into the area prior to the Northwest Ordinances.⁸ Tribes from the eastern seaboard like the Delaware and Wea crossed into Ohio, Michigan, and Indiana. Indigenous groups defended themselves while also engaging in the fur trade.⁹ These tribes moved within the ONT to maintain their cultures and self-determination. However, with the enactment of the Trade and Intercourse Act of 1790 the U.S. aimed to control such trade. The fur trade relied upon the wealth of animals which thrived in Midwestern wetlands, such as minks, beavers, and river otters. Federal policy in the 1790s and on shifted beyond this trade in an attempt to exert U.S. control over the landscape of the Midwest.

By the end of the 1700s squatters, government officials, traders, and the U.S. military came face to face with the strength of Native Americans in the Great Lakes region. In their efforts to halt the invasion of the ONT, the Miami, Huron, Chippewas, Delawares, Ojibwas, Ottawas,

7. U.S. Congress, "An Act to Regulate Trade and Intercourse with the Indian Tribes," ch. 33, 1 Stat. 137, Library of Congress, July 22, 1790.

8. See Richard White's, *The Middle Ground*; and Bethel Saler's, "The National State Faces West," in *The Settlers' Empire: Colonialism and State Formation in America's Old Northwest*, University of Pennsylvania Press, 2014.

9. Eric Jay Dolin, *Fur, Fortune, and Empire*, 128. Also see Richard White's *The Middle Ground: Indians, Empires, and Republics in the Great Lakes Region, 1650-1815*.

Potawatomi, Twichtwee, Cherokee, and Shawnee Indians created the Western Confederacy. This confederacy met from November 28, 1786 to December 18, 1786 in what is now Detroit, Michigan and formally wrote to the U.S. Congress. In their letter, the Confederacy acknowledged that they “were disappointed finding ourselves not included in that peace [The Treaty of Paris 1783] according to our expectations.” Furthermore, they requested that the U.S. would “prevent your surveyors and other people from coming upon our side of the Ohio River... if fresh raptures ensue we...shall most assuredly with our limited force be obliged to defend those rights and privileges which have been transmitted to us.”¹⁰ The U.S. proceeded to pass the Northwest Ordinance of 1787 in July thereby proclaiming U.S. control of lands in the ONT and funding survey missions into the territory. By 1790, the Western Confederacy were engaged with U.S. regiments sent to Ohio to defend American colonists entering Native lands. The Miami chief Mihšihkinaahkwa, (Little Turtle), along with other leaders successfully defeated U.S. regiments under General Josiah Harmar and General Arthur St. Clair from 1790-91.¹¹ To this day the defeat of General St. Clair’s forces remains the largest defeat of the American Army by Native Americans. These defeats led the federal government to invest supplies and expenditures to build a formal army.

Native Americans were successful in attacking supply trains and slowing the westward push of squatters. By robbing supply trains Indians kept materials needed to construct new forts from reaching their destinations. However, in August of 1794 General Anthony Wayne defeated the Western Confederacy at the Battle of Fallen Timbers and the U.S. forced the signing of the

10. “Speech of the United Indian Nations at their Confederate Council,” December 1786; Letters from Major General Henry Knox, Secretary of War; Papers of the Continental Congress, 1774-1789; Records of the Continental and Confederation Congresses and the Constitutional Convention, Record Group 360; Washington, D.C.: National Archives.

11. James H. Madison, *Hoosiers: A New History of Indiana*, (Bloomington, IN: Indiana University Press, 2014), 29. And Eric Jay Dolin, *Fur, Fortune, and Empire*, 128-129.

Treaty of Greenville in 1795 which ceded most of Ohio and parts of Indiana. As historian R. Douglas Hurt argues in his book, *The Ohio Frontier: Crucible of the Old Northwest, 1720-1830*, the battles between the American Army and Indians led to the establishment of a highly trained military force in the U.S.¹² Previous to these encounters, the U.S. army looked more like a sporadic assemblage of militia groups. And some of the earliest formal structures of the nation-state west of the Appalachian Mountains came in the form of forts along major rivers of the midcontinent. To establish material power the U.S. government navigated waters, raised trained army regiments, and strived to exert control over the market of services and goods generated from the pre-colonial landscape.

Many of the Native Americans within the ONT were farmers and hunters. They grew corn, beans, and squash while also hunting White-tailed Deer, American Bison, American Wild Turkeys, and other animal species of the prairie and forest. Groups of Indians within the Ohio region, "...used the environment and changed it..."¹³ However, Anglo-Americans logged the forests with great speed and numbers, tilled the prairies, and burned the brush to make way for European style cash crop farming. In addition, one of the biggest shifts by far was the significant increase of American colonists streaming into the region from the eastern seaboard. This increase led to a shift in population demographics and challenged the majority long held by Indigenous groups.

The expansion of U.S. power into Indian lands was not destined, but legislatively and violently asserted. In the fall of 1838, the U.S. military forcibly removed Chief Menominee's band of Potawatomi, marching them from Twin Lakes, Indiana to Osawatomie, Kansas. Of the "nearly eight hundred Potawatomis from northern Indiana" marched to Kansas, a reported three hundred

12. Hurt, *The Ohio Frontier*.

13. Hurt, *The Ohio Frontier*, 6.

became sick by mid-September.¹⁴ It is estimated that more than forty Potawatomi Indians died on the journey including children.¹⁵ Indian removals conducted by the U.S. military in the 1830s and 1840s removed bands of Miami and Potawatomi as well as other Great Lakes Indigenous groups from their ancestral lands. However, the violence of removal did not eliminate all the Miami and Potawatomi Indian populations within Indiana.¹⁶ Some bands and families chose to lay claim to their lands through private property ownership. Their struggle for autonomy, like many other Indigenous groups, continued well passed the 1840s.

The federal government saw Native Americans as impediments to progress which either needed to be removed or assimilated. In his address to congress on October 25, 1791, President George Washington expressed plans to bring the sovereign Indian nations into the folds of the U.S. To have an “intimate intercourse” with Natives “to attach them firmly to the United States.”¹⁷ The young nation sought to attach Native Americans to the country out of a fear of uncertainty; a belief that Indians’ loyalty or diplomacy could be manipulated by the British. Being a relatively new and weak nation, the U.S. was repeatedly concerned about providing more land for its growing population and about the potential for Indians to side with the British in the ONT. President Washington wanted to bring Native populations under the power of the federal government.

14. Bowes, John P. *Land Too Good for Indians: Northern Indian Removal*. Norman: University of Oklahoma Press, 2016) 169-70.

15. Thomas J. Campion, “Indian Removal and the Transformation of Norther Indiana”, *Indiana Magazine of History*. (Bloomington, IN: Indiana University Press, 2011), 107 (1): 32-62, and John P. Bowes, *Land Too Good for Indians: Northern Indian Removal*. Norman: University of Oklahoma Press, 2016) 6-15.

16. For more on removals of and treaties with Great Lakes Indians see John P. Bowes’s, *Land Too Good for Indians: Northern Indian Removal*; and John P. Bowes’s, *Exiles and Pioneers: Eastern Indians in the Trans-Mississippi West* (Cambridge; New York: Cambridge University Press, 2007).

17. George Washington, “Address to Congress, October 25, 1791,” in *The Debates and Proceedings in the Congress of the United States, Second Congress* (Washington, DC: Gale and Seaton, 1849), 13.

Over a period of less than a hundred years the U.S. at times quickly and sometimes slowly enacted violence to gain territory. A fair amount of the violence directed towards Indian groups came from an unjustified belief that the Indigenous were poor and inefficient farmers that needed to be taught how to farm and become “civilized”. This desire is clearly witnessed in a letter addressed to “Brothers and friends of the Miamis, Powtewateamies, and Weewauks” in 1802 from President Thomas Jefferson. “...We shall with great pleasure, see your people become disposed to cultivate the earth, to raise herds of useful animals, and to spin and weave, for their food and clothing.”¹⁸ The Miami and Potawatomi were both hunters and agriculturists, but their methods of farming and living did not match European practices of monoculture farming for market sale. Nor, as will be demonstrated later, did they fit into the country’s burgeoning idea of civility.

What Jefferson truly sought was to consolidate Native Americans to the point that their culture would meld into that of Europeans or be removed west of the Mississippi.¹⁹ As large numbers of American colonists entered the region, the areas cleared by fire and with well-drained soils became the first privately owned. Controlled within a legal system which provided voting rights and private property rights to white males, a great number of commodified land parcels became owned by Anglo-Americans moving from the East to set up farming. That shift was facilitated by, as author Christian B. Keller writes, “...the government’s inability to isolate the Indians from the onslaught” of “illegal encroachment.”²⁰ Keller’s argument sheds light on the state of the nation at the time between the Revolutionary War and the second half of the nineteenth

18. Quoted in H. A. Washington, *The Writings of Thomas Jefferson*, 185.

19. Christian B. Keller, “Philanthropy Betrayed: Thomas Jefferson, the Louisiana Purchase, and the Origins of Federal Indian Removal Policy.” *Proceedings of the American Philosophical Society* 144, no. 1 (2000): 45, 51-52.

20. Christian B. Keller, “Philanthropy Betrayed: Thomas Jefferson, the Louisiana Purchase, and the Origins of Federal Indian Removal Policy.” 54.

century. The Federal government was weak and unable to adequately enforce regulations on the multitudes of Americans crossing over the Appalachian Mountains seeking greater prospects. And more importantly, under the Jefferson administration and after, the nation-state sought to assist such expansion through land commodification.

What the Twentieth Century Inherited: Mid-America's Economic and Cultural Roots

Over the course of the first half of the nineteenth century many federal officials held the belief that the U.S. was destined for expansion. Many state actors and non-state actors outright called or compared the U.S. to an empire on the cusp of greatness. In February of 1849 Thomas Hart Benton, a senator from Missouri and later the namesake of Benton County, Indiana, stood before congress arguing for the establishment of a national road from the East to California. Likening America to the Roman Empire, Benton stated, "...the Romans—from whom we borrow so many of our ideas, useful or grand—never considered a conquered territory added to the republic or the empire until it was perforated by a road."²¹ Since the beginning of American history roads, surveys, legal processes, canals, mills, and land commodification simplified and delineated the environment into regimented for-profit entities.

The Northwest Ordinances embodied that nation-state dream some sixty years prior. Upon charting and cataloguing details about the region's positive qualities from the view of government-hired officials, a grid like pattern was proposed (See Figure 1). President Jefferson believed that land should be divided into sections of 10 square miles once new states were carved out of the northwest. Congress ultimately decided that townships would be made up of 36 sections each

21. Thomas Hart Benton, speech in the Senate, February 7, 1849, *Congressional Globe*, 30th Cong., 2nd Sess. 473.

containing 1 square mile of land. This rested upon an assumption of universality and an abstraction of the physical properties of the areas selected.

Much of land in northwestern Indiana and Illinois was wet during select parts of the year and contained ponds and small lakes. So, the survey conducted also included brief notes on the state of the landscape. Still this relationship to the land was radically different from that of some Indigenous groups whose oral and local histories in the region stretched back to before European colonization. As author James C. Scott writes "... [the European surveyor] tended to ignore all but the main commercial use of a field."²² Similar to official surveyors, early travelers described the region now containing Benton, Tippecanoe, White, and Jasper counties for its usefulness to European style farming and settlement as well. "Nearly all the streams are bordered with marsh, on which grows the most luxurient crop of grass, which affords the greatest abundance of good hay to the new settlers..."²³ Such a narrow vision of midwestern lands continued well into government and local views during the twentieth and twenty-first centuries. One of the most visible displays of the lasting power of this surveyed vision of the Midwest is found in the current Midwest's continued arrangement by square mile measurements.

22. James C. Scott, *Seeing Like A State: How Certain Schemes to Improve the Human Condition Have Failed*, (New Haven: Yale University Press, 1998), 47.

23. Letter from Solon Robinson to the editors of the *Madison Republican and Banner*, December 16, 1834. Reprinted in *Travel Accounts of Indiana 1679-1961*, (Indianapolis: Indiana Historical Bureau, 1970), 155-156.

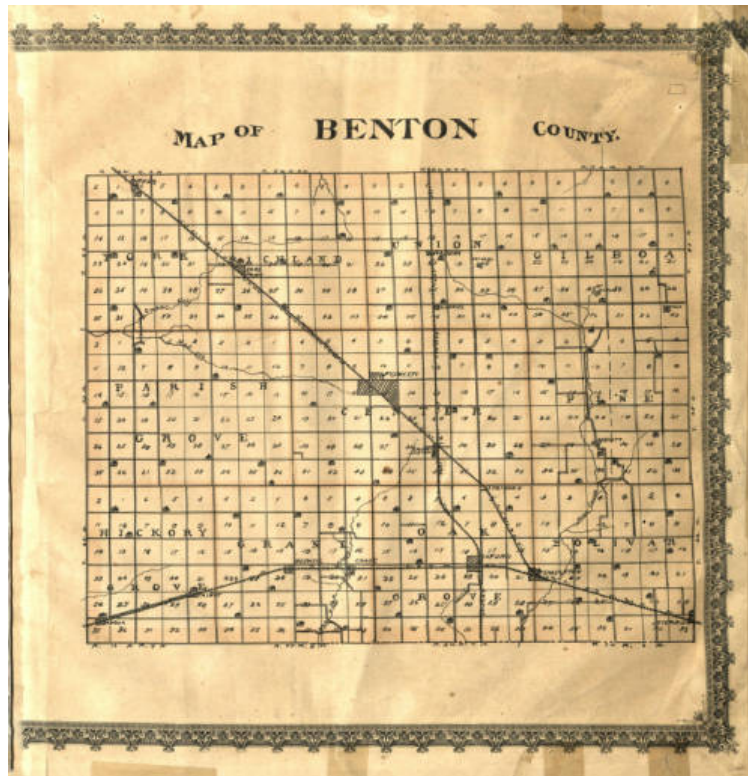


Figure 1. Map showing grid pattern of townships for Benton County Indiana, from Atlas of Benton County, Indiana, c. 1888, Cory & Sons (Lafayette, IN), Public Domain, located at the Indiana State Library.

Despite repeated efforts to remove and dissolve Native populations throughout the Midwest, groups of Indians, specifically groups of Miami, Wyandot, and Potawatomi Indians, found ways to endure. Counter to Jefferson’s vision for Indigenous erasure through assimilation or removal, these groups often maintained whatever control they could through land ownership.²⁴ A 1888 map of Tippecanoe County, Indiana denotes the lands held by Indians in the area under the labels, “Burnett Res.,” “Longlois Res.,” and “Richardsville Wyandotte Res.” (See Figure 2). Corroborated with the Federal treaty made with the Potawatomi in 1832 the labels correspond to specific names of Native Americans. Among the list of names to receive lands in the Treaty of

24. R. David Edmunds, *Enduring Nations: Native Americans in the Midwest*, (Urbana and Chicago: University of Illinois Press, 2008), 1-12.

1832 lie the names, Paul Longlois, Peter Longlois, and James Burnett.²⁵ Moreover, a 1926 article in the *Indiana Magazine of History* mentioned there was at least one reservation of land given to a Potawatomi principal chief in Benton County, Indiana.²⁶ That is supported by the 1832 treaty as well where the text reads, “To To-pen-ne-bee, principal chief, one section.” Across Indiana, Native Americans found their hunting grounds and historical homelands restricted, sold, and inked into the imagined geography drawn by the United States government. Despite the continued presence of groups of Potawatomi, Miami, and other Natives within Indiana, American settlers asserted private ownership of most of Indiana land by 1860. The federal government sold the public domain lands first claimed under the Northwest Ordinance of 1787. In the mid-nineteenth century, the sale of those lands designated as swamplands and the use of drainage technology led to destruction of wetlands and the plowing much of the landscape.

25. United States Congress, *Treaty with the Potawatomies*, October 27, 1832, A Century of Lawmaking for a New Nation, Library of Congress, <https://memory.loc.gov/cgi-bin/ampage?collId=llsl&fileName=007/llsl007.db&recNum=410>.

26. J. Wesley Whickcar, “The Potawatomie Reservations in Benton, Fountain, Warren, and Tippecanoe Counties,” *Indiana Magazine of History*, vol. 22, no. 1 (March 1926), 28-36; Thomas Cory, “Map of Tippecanoe County, Indiana,” Lafayette, IN: Cory & Sons, 1888.

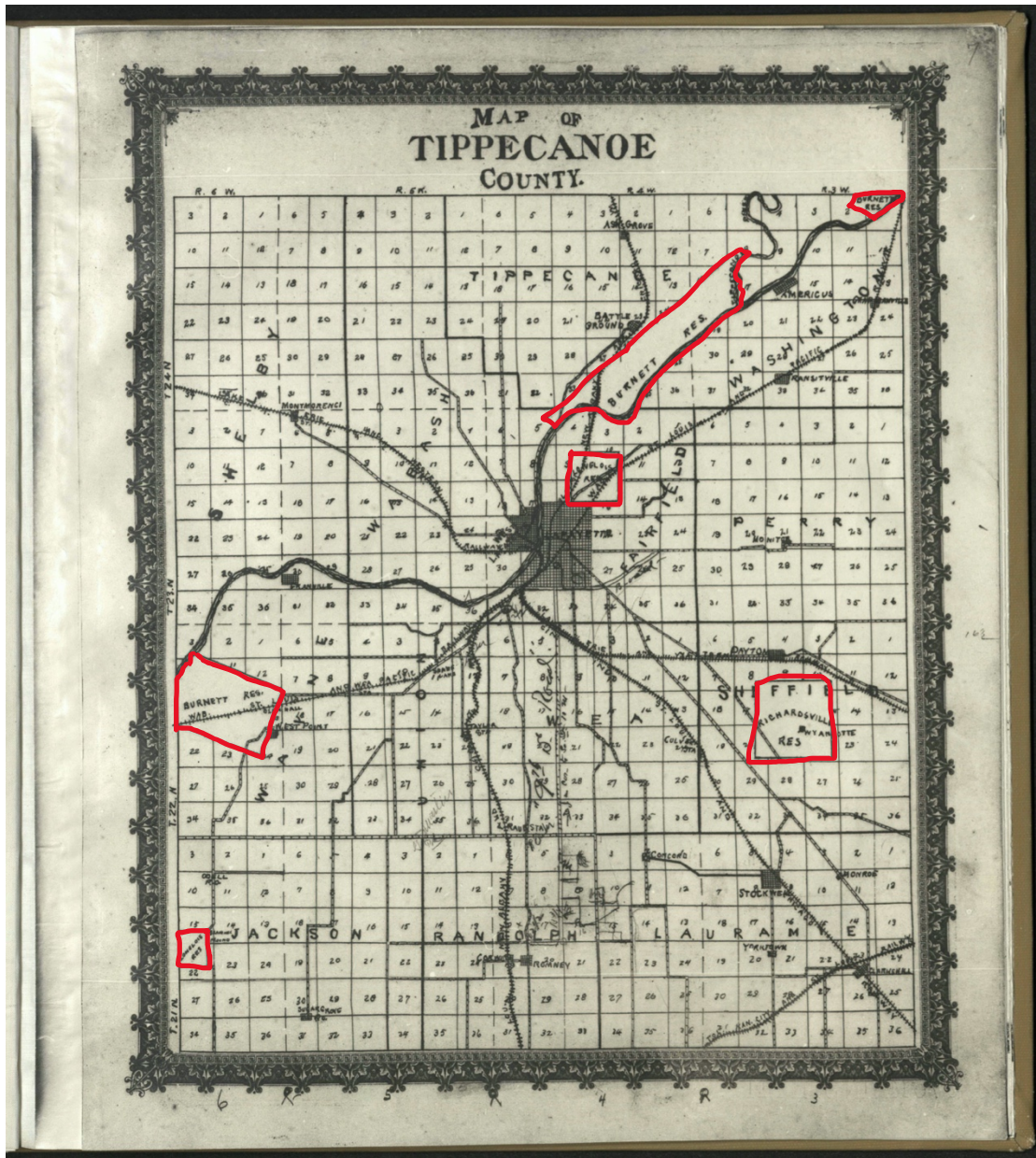


Figure 2. Map of Tippecanoe County, IN, pinpointing Indian reservation locations, c. 1888, Digital Collections, Indiana State Library.

Why did Anglo-Americans envision and terraform the landscape in this way? In the beginning the American colonies were the extension of imperial Britain, being set up by private or royal charter to generate and extract profit from the North American continent. That mercantile regime was emboldened into the young nation-state after the war for independence and combined

with liberalism. As historian John Lauritz Larson argues, “Colonial Americans owed their very existence to British mercantile outreach...British imperialism morphed into classical free-trade liberalism during the nineteenth century.”²⁷ The actions made by the American nation-state to organize the continent were a part of an inherited social labor which argued humankind needed to bring organization to the supposed chaos of nature and the unknown.

There is a long history surrounding humankind’s desire to organize the material world. However, at the center of American material transformation lies one important world view: the human and non-human dialectic. To understand the cultural inheritance of this dialectic to the American nation-state we must look at European thinkers, or rather, their ideas which entered European society and traveled with colonists and settlers. One of the most influential groups of European writers on the relationship between humanity and nature were empiricists. Some of the most foundational writers in this tradition were Francis Bacon, John Locke, and David Hume. Empiricism argued that observable data and experience provided the only avenue to gain knowledge about the world including humanity.

In 1781, Immanuel Kant, influenced by these empiricist thinkers and the rationalism of the enlightenment, wrote *Critique of Pure Reason (CPR)*. In it, Kant argues that knowledge is known through the *human senses* after *experience*.²⁸ And there, I argue lies the dialectic between human and the non-human. The *senses* being the human component and the *experience* being the receiving of stimuli from the outside world, or environment. In trying to bridge rationalism and empiricism, CPR fundamentally rests upon a belief that humanity, or more specifically humanity’s ability to perform logical thinking and our consciousness, is separate from the outside world, or the

27. John Lauritz Larson, *Laid Waste!: The Culture of Exploitation in Early America*, 173-174.

28. Immanuel Kant, *Critique of Pure Reason*.

environment. How such intellectual knowledge was disseminated into European society is a topic for another book.

For now, let us focus upon what opportunities that human and non-human dialectic ideology opened during the late nineteenth century. As historian Linda Nash recently argued the modern American society was built upon a belief in the division of humans from the non-human world and forged, “a sharp alienating, intensely managerial relationship with nature.”²⁹ Americans during the mid-nineteenth century believed that the human body, being separate from the environment, could be infected, attacked, or corrupted by seemingly unsafe or unhealthy environments. This belief in miasmas has been traced by countless historians from colonization through nineteenth century settler colonialism.³⁰ Early travel accounts of Indiana portray the swamps, marshes, and wetlands as dangerous to progress and civil humanity as well. The view of humankind separate from the environment enabled arguments in favor of improving the landscape. The environment was threatening to civilization and progress until it was developed by European technology to be controlled and used to produce wealth.

Senator Benton’s arguments for a national road in the mid-nineteenth century highlight what he and other state actors believed lied ahead and indeed constituted the nation-state’s purpose. “I followed the idea of Mr. Jefferson, La Salle, and others, and I endeavored to revive attention to...find a route to answer the purposes of a commercial communication...”³¹ A Northwest passage meant for material power. To the British and nineteenth century American businessmen

29. Linda Nash, *Inescapable Ecologies*, 2.

30. See Carolyn Merchant’s *The Death of Nature*, Linda Nash’s *Inescapable Ecologies*, Ann Vileisis’s *Discovering the Unknown Landscape*, Gordon G. Whitney’s *From Coastal Wilderness to Fruited Plain*, Hugh Prince’s *Wetlands of the American Midwest*, Carey McWilliams’s *Factories in the Field*, Rodney James Giblett’s *Postmodern Wetlands: Culture, History, Ecology*, and David McCally’s *The Everglades: An Environmental History*.

31. Thomas Hart Benton, speech in the Senate, February 7, 1849, *Congressional Globe*, 30th Cong., 2nd Sess. 470.

such a path represented not only a supposed unfettered access to Asian commerce, but also access to power achievable through commodifying the environment found throughout the continent. Westward expansion was not just a new presentation of colonial exploration, but as seen earlier a belief in the coming of civilization and order.

Such beliefs did not just reverberate within the halls of congress. Anglo-Americans settling in the ONT also believed it was American destiny to bring forth a continental progress. Those individuals with enough wealth to move into the interior often wanted to achieve more than just subsistence. Wealthy non-state actors in the nineteenth century held material power much like wealthy state actors. Their monetary clout within social circles in the east were a crucial part of their bolstering of interior lands for speculation.

In March of 1836, “Henry L. Ellsworth, of Connecticut, who had been Commissioner of Patents under President Andrew Jackson, entered some lands south and west of the present town of Otterbein,” Indiana.³² A law graduate of Yale University, Ellsworth came to the area looking for better land than the fields found at his Connecticut farm. Not long after visiting the northwest of Indiana, he, accompanied by his family, settled in Lafayette. Ellsworth began to send word back to Connecticut of the richness of the wet prairie soil. He “proclaimed that one acre of this blue-stem land was worth more than ten acres of timber.”³³ That was if one could drain the land, or as he and Senator Benton often separately phrased it, “improve” the land. In a letter to his son Ellsworth wrote: “If the health of the inhabitants can be so easily promoted...I sincerely hope the adventitious aid of labor-saving machines, will be invoked to bring the expanse within the means of every proprietor...Health is paramount to riches, and I rejoice in every attempt to secure or

32. Jesse Setlington Birch, *History of Benton County and Historic Oxford*, v-vi.

33. Jesse Setlington Birch, *History of Benton County and Historic Oxford*, v-vi.

improve it.”³⁴ Drainage meant progress both in the sense of acquiring wealth and for what the Ellsworths genuinely believed was a very real way to bring plenty and health to society.

In 1838, *Valley of the Upper Wabash, Indiana, with Hints on its Agricultural Advantages: Plan of a Dwelling, Estimates of Cultivation, and Notices of Labor-saving Machines* was published. This book by Henry L. Ellsworth’s son, Henry W. Ellsworth, provides a glimpse into the ideology of this area’s early wealthy landowners. “From this fertile and rapidly increasing portion of our country, the writer has selected Indiana, and of that state, the rich Valley of the Wabash, as the subject of his remarks...the position of that valley, the extraordinary productiveness of its soil, its delightful climate...designate it as a region better adapted than any other...”³⁵ Henry L. Ellsworth sought to turn the wet prairie into fields for corn production and cattle ranching. In a letter to his son in 1838 Ellsworth states that he sent technologies to facilitate improvement to the valley to Lafayette. “In addition to the machines already ordered for Lafayette, I shall soon send others, calculated for ditching, sowing, reaping, raking...”³⁶ Already wealthy Americans like Ellsworth were setting their minds to drainage.

By 1850, the United States had drastically expanded its material, political, and military boundaries, adding territorial claims as far away from Washington, D.C. as California. The Mexican American War, or the Intervención Estadounidense en México, concluded just two years prior adding formal claims to California and the Southwest. Many Americans, poor and rich,

34. Henry W. Ellsworth, *Valley of the Upper Wabash, Indiana, with Hints on its Agricultural Advantages: Plan of a Dwelling, Estimates of Cultivation, and Notices of Labor-saving Machines*, (New York: Pratt, Robinson & co., 1838), viii.

35. Henry W. Ellsworth, *Valley of the Upper Wabash, Indiana, with Hints on its Agricultural Advantages*, viii.

36. Henry W. Ellsworth, *Valley of the Upper Wabash, Indiana, with Hints on its Agricultural Advantages*, xi-xii.

traveled from the east crossing through or staying in the ONT.³⁷ However, California and the west coast had long been visited by Americans. The region's aquatic mammals became an economic benefactor to the U.S. as fur traders brought in almost a million dollars annually from 1786 to 1820.³⁸ Not to mention the wealth generated by the California gold rush beginning in 1848 two years before statehood. In many regards, westward expansion was not so much a seamless and steady movement from east to west, but rather an interior expansion. Americans abroad ships were bringing wealth in the form of fur and whale oil from the west coast to ports like Boston.³⁹ Legislation and scientific expeditions encouraged further American colonization within the continent's interior and west.

The term expansion in American historiography often carries the desire for a selected beginning and closing, that is a periodization. There are a myriad of arguments as to the beginning and end of American westward expansion.⁴⁰ However, the attempts to place these dates neglects the very real need on the part of the nation-state to continually empower its structures. Rather than focus on the endings so many historians previously addressed, this story of the Mississippi Basin places emphasis upon continuities. One key artifact from the colonization of the interior which continues to shape life in twenty-first century North America, is agricultural tile drainage. Tile

37. At least four residents of Benton County left in search of gold in California. Those being Thomas Lewis, Wesley Lewis, William M. McConnell, and John Lane. See Jesse Setlington Birch, *History of Benton County and Historic Oxford*, (Oxford, IN: Craw & Craw, Inc., 1928), 284-285.

38. Eric Jay Dolin, *Fur, Fortune, and Empire: The Epic History of the Fur Trade in America*, (New York: W. W. Norton and Company, 2010), 164.

39. See Nancy Shoemaker, *Native American Whalers and the World: Indigenous Encounters and the Contingency of Race* (Chapel Hill: The University of North Carolina Press, 2015) and Eric Jay Dolin, *Fur, Fortune, and Empire: The Epic History of the Fur Trade in America*, (New York: W. W. Norton and Company, 2010), 165.

40. Historians such as Margaret D. Jacobs argue that ending the story of American settler colonialism at the supposed closing of the frontier neglects the colonial actions of the U.S. towards Indigenous children well into the mid-twentieth century. See her book, *White Mother to a Dark Race: Settler Colonialism, Maternalism, and the Removal of Indigenous Children in the American West and Australia, 1880-1940*.

drainage systems led to the creation of “new” land for farming, but also led to the disappearance of greater than 80% of the wetlands of Iowa, Illinois, Indiana, Ohio, Missouri, and Kentucky by 1980 (See Figure 3).⁴¹ Once easily plowed areas became mapped, purchased, and organized for farming on the Great Prairie, Americans moving to the area began farming on wetlands with the help of state sponsorship.

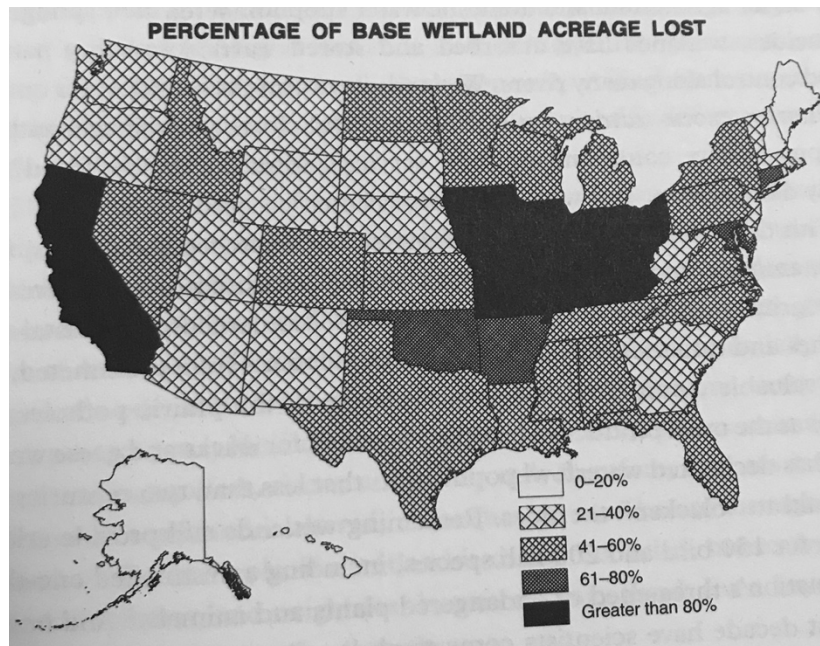


Figure 3. Map of the Percentage of Base Wetland Acreage Lost from 1780-1980, from *Discovering the Unknown Landscape* by Ann Vileisis, c.1997.

Swamplands, Artifacts, and Legislation

Accounts detailing northwest Indiana and other sites of the Grand Prairie were not wrong. The landscape was productive and rich just not in the way that was imagined. Across this region

41. Ann Vileisis, *Discovering the Unknown Landscape: A History of America's Wetlands*, (Washington, D.C.: Island Press, 1997), 3. Statistic derived from the National Wetlands Inventory.

grasses had evolved deep fibrous roots which held together the rich plant materials gathered every year in the passing of the seasons. These species adapted to wet springs of standing water and dry hot summers followed by yet again another period of high rainfall in the autumn time. Amongst the scattered forests of oak savanna and prairies of Big and Little Blue Stem Grass were an abundance of wildlife and flora. American Bison, White-tailed Deer, Prairie Chickens, quail, beaver, mink, and even wolves could be found in this area.⁴² Some these species continued to adapt, or more easily adapted, to the disruptions created by the modern world. However, some over time lost breeding and foraging grounds, or were overhunted and did not recover their numbers. The wet prairie was a complex ecosystem in which prairie grass slowed soil erosion, retained moisture, and through fire built feet of nutrient rich top soils. In time, farmers drained these wetlands, removed the prairie grasses , and affected the movement of water during years of heavy rainfall and years of drought.

Treaties, surveys, and territorial claims in the second half of the nineteenth century needed material stasis if the U.S. wanted to control that space. Despite being one of the last portions of the state to contain American settlements, northwest Indiana holds a unique position in the story of U.S. material control. Being the site of where the forest met the wet landscape of the Grand Prairie, a zone stretching from Benton to western Iowa, this area's transformations are reflective of a much larger interior movement to intensely colonize the pre-Great Depression environment. This historical change began with legislation and by the turn of the twentieth century left most swamps, and Indiana's largest lake, drained of the surface water so intrinsic to its established biota.

42. Accounts found in Jesse Setlington Birch's, *History of Benton County and Historic Oxford*, (Oxford, IN: Craw & Craw, Inc., 1928), demonstrate that wolves did inhabit the northwest area of Indiana. Once Anglo-American farmers began to raise their livestock free range hunting teams began to chase down on horseback wolves wherever they were spotted. Greater Prairie Chickens were overhunted in the hundreds. Their meat was consumed by the new arrivals and their feathers sold at markets.

Drainage technology from the east combined with the embedded ideology of the American nation-state; prescribing nature as something to be linked to private ownership and “improved” for profit.

The upper Midwest was not alone however as inundated lands across the continent came under attack throughout the late nineteenth century. The swamps, marshes, ponds, lakes, potholes, and bogs of the American South, Midwest, and Far West were drastically different ecologically from each other. What historian Ann Vileisis significantly pointed out in 1997 was that the move to drain such places interlaced their histories.⁴³ In a 1925 map of forested land in 1620 America by W. B. Greenley, this distinct commonality is visually displayed. The white sections of Indiana, Illinois, and Iowa in the map represent the estimated area of the Grand Prairie. Similarly, no one will find forested land in California’s central valley, Florida’s everglades, or Louisiana’s Mississippi River delta (See Figure 4).⁴⁴ All are different swamp-like environments with a common history of tile drainage.

43. Ann Vileisis, *Discovering the Unknown Landscape*.

44. The term “virgin forest” used as the title of this figure is from its original author and that is its only purpose for reuse. These forests and prairies were not unchanged before European invasion as the word “virgin” sought to imply. Moreover, as historian Carolyn Merchant argues in *The Death of Nature*, classifying the land as virgin also meant the tying of Western gender perceptions onto the non-human world, making the pre-colonization forest synonymous with that of 17th century sexual ideology towards women.

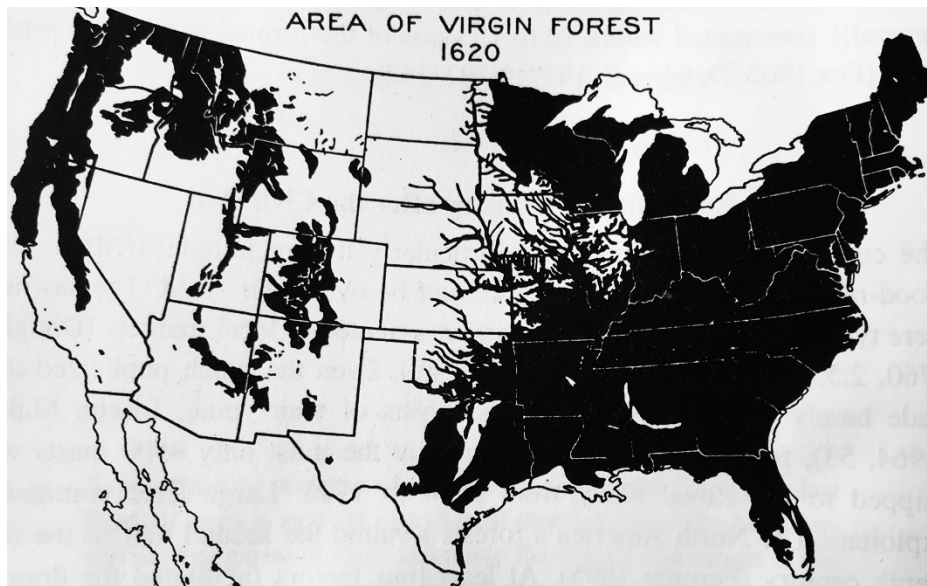


Figure 4. "Area of Virgin Forest 1620," from W. B. Greenley, c. 1925, *Economic Geography* 1.

A European derived agri-ecological technology further developed within the eastern U.S.; drainage tiles provided a way for Americans to attempt to control the energy flows of the Grand Prairie. By directing the flow of water through a given area, ditches, acted as reservoirs and channels for runoff. The cylindrical tile drains were made of kiln-fired clay and when placed end inside of end formed a subterranean pipe which actively syphoned off waters lying at the surface (See Figure 5). The first open ditches in Benton County, Indiana were constructed in the 1850s followed soon after by the first tile drainage in 1875.⁴⁵ These structures increased the speed of water movement through the landscape causing the local creeks and rivers to receive runoff waters at a much faster pace. This increased with the implementation of dredging during the start of the twentieth century.

45. Jesse Setlington Birch, *History of Benton County and Historic Oxford*, (Oxford, IN: Craw & Craw, Inc., 1928), 244-245.



Figure 5. Photograph of young child helping with drainage tiles, c. 1930s, Benton County, IN, Farm Security Administration Photographic Collection, Library of Congress.

Early states such as Ohio, Illinois, Indiana, and Louisiana were financially weak during their early years and lacked the funds and power to transform the landscape aquatically on their own. And by itself Louisiana did not have federal claim to the sale of inundated lands nor enough funds to build widespread drainage and flood structures.⁴⁶ In the American South, wealthy plantation owners began the call for federal sale of wetlands in the hopes of gaining new lands. Long a land reorganized by levees at the Port of New Orleans, Louisiana is where the congressional efforts to seek to control the waters of the midcontinent began.

In order to exert more than just soft power, the nation-state advocated a restructure of the continent's cultural, environmental, and social systems in the name of progress.⁴⁷ However,

46. Ann Vileisis, *Discovering the Unknown Landscape*, 78-79.

47. See Northwest Ordinance, July 13, 1787; (National Archives Microfilm Publication M332, roll 9); Miscellaneous Papers of the Continental Congress, 1774-1789; Records of the Continental and Confederation Congresses and the Constitutional Convention, 1774-1789, Record Group 360; National Archives.

traditional farming practices, those which relied upon well-drained flat land at higher elevations, were stunted in the wet lands of the American south, California's central valley, and the Midwest.⁴⁸ The tall grass prairie region of northwest Indiana, though distinct as the entrance to the Grand Prairie, stands as a microcosm for the first era of state building in America's central prairies. Like the Grand Kankakee Marsh, the Dakota potholes, and so many other northern wetlands, the small lakes and creeks of the Benton County area were seen as an impediment by Americans. The wet prairie created difficulty for long distance travel and the land was long thought to be never settled because of wet conditions.⁴⁹ Early agriculturalists, however, noticed that such wet soils were also nutrient rich.

In September 1850, Congress passed the second Swamp Lands Act, this time applying to the states of Missouri, Illinois, Ohio, Wisconsin, Michigan, Indiana, California, Florida, Alabama, Arkansas, and Mississippi in addition to Louisiana. The sale of these diverse inundated lands has been thoroughly traced by historian Ann Vileisis who writes, "Congress gave nearly 15 million acres to midwestern states alone. Indiana received nearly 1.3 million acres of swamplands...settlers purchased swamplands for a minimum of \$1.25 per acre, with the understanding that the state would drain them at a future date."⁵⁰ However, progress in that endeavor was slow and only started in earnest during the 1870s. The first steps towards drainage in the area was completed once wealthy agriculturalists and political figures arrived from the east.

48. See Philip Garone's *The Fall and Rise of the Wetlands of California's Great Central Valley*, (Berkeley and Los Angeles: University of California Press, 2011), 60-61; David McCally's *The Everglades: An Environmental History*, (Gainesville, FL: University Press of Florida, 1999), 121-128; and Hugh Prince's *Wetlands of the American Midwest: A Historical Geography of Changing Attitudes*, (Chicago and London: University of Chicago Press, 1997), 203-206.

49. Hugh Prince, *Wetlands of the American Midwest: A Historical Geography of Changing Attitudes*, (Chicago and London: University of Chicago Press, 1997), 203.

50. Ann Vileisis, *Discovering the Unknown Landscape*, 83.

These first settlers purchased vast sums of the land for the sole purpose of draining it for production and constructed a system of labor exploitation with connections beyond Indiana.

Labor on the Prairie, Market Networks, and Millionaires

More than just a shared history of tile drainage connects Louisiana to the history of states like Indiana in the late nineteenth century. Louisiana's continued use of slavery placed the weight of land improvement labor upon the shoulders of enslaved Blacks. Blacks built a multitude of that state's early statecraft projects ranging from roads to canals, levees, and tile drainage.⁵¹ But they also worked in the hot and difficult environment of massive sugar cane plantations. As the labor behind both transportation systems and the production of sugar, enslaved Blacks generated the abundance of profit made from the sugar economy. And it was an economy which stretched well into the interior to wholesale food markets such as those built in Lafayette, Indiana.

During the second half of the nineteenth century water was central to American expansion. The great rivers of the midcontinent acted as the thoroughfares of settler-colonialism and paths to markets. By 1843, the Wabash and Erie Canal was completed to Lafayette, Indiana. There Henry L. Ellsworth sought to connect agricultural production in the area to markets to the East accessible by transport on Lake Erie. In 1853, Indiana completed the Wabash and Erie Canal, linking by water the southernmost tip of Lake Erie with the Wabash River and from there the Ohio River.⁵² With its establishment came goods and foods from the Eastern seaboard and the southern port of

51. Aaron R. Hall, "Public Slaves and State Engineers: Modern Statecraft on Louisiana's Waterways, 1833-1861," *The Journal of Southern History* 85, no. 3 (August 2019): 531-576, <https://doi.org/10.1353/soh.2019.0162>.

52. W. N. Logan, E. R. Cumings, S. S. Visher, C. A. Malott, W. M. Tucker, and J. R. Reeves, *Handbook of Indiana Geology*, The Indiana Department of Conservation Division of Geology. (Indianapolis: Dept. of Conservation, 1922), 36.

New Orleans. Moreover, this canal provided for the shipment of Louisiana sugar to wholesale food stores.

Moses Fowler originally of Circleville, Ohio arrived in Lafayette, Indiana in 1839 the business partner of John Purdue. The two started and managed a wholesale food store in Lafayette until 1844 when Fowler left the partnership to go out on his own. Their business however profited greatly from the Wabash and Erie Canal which provided access to far away markets such as New York and St. Louis. As Fowler expanded his business, he brought supplies, including sugar and molasses, upon chartered steamboats from New Orleans to the Wabash Valley's settler population.⁵³ Water networks throughout the interior became linked to one another and the product of the enslaved Black's toil traveled to new American estates and homes on the prairie's edge.

Moses Fowler would also go on to own some "three quarters of a million dollars" worth of Benton County land. His material power from such wealth allowed him, like other wealthy landowners, greater power over the changes to the county. Many of these wealthy landowners, Henry L. Ellsworth included, because of their power were able to withhold paying taxes for up to five years after their due date.⁵⁴ Fowler's estate continued to expand until his death in 1889. Through this unrestricted oligopoly, Fowler was able to manipulate county official business by quite literally orchestrating the movement of the county seat from Oxford to the town of Fowler, named after him and resting within the very center of his landholdings.⁵⁵ Fowler's business included cattle farming and crop production on the open prairie and later after his wife's death created a vacuum of power which led to several years of court battles. "[John] Purdue...remained

53. Bob Kriebel, "Moses Fowler Had Far-Reaching Influence," *Lafayette Journal and Courier*, March 18, 2016.

54. Hugh Prince, *Wetlands of the American Midwest*, 167,172.

55. Jesse Setlington Birch, *History of Benton County and Historic Oxford*, 36-38.

primarily in the dry goods wholesale business, became a multimillionaire, and gave money, land, and ‘political clout’ for Purdue University...”⁵⁶ Both became rich off an exploited labor force.

In the late 1830s to the 1850s Henry L. Ellsworth relocated to Lafayette and generated an immense estate that created a near monopoly of prairie lands in the area of Benton, Tippecanoe, and Warren counties. This vast estate was managed by Mr. Ellsworth and his son and was envisioned as a tenant farming operation. Crafted as a model farm, Henry W. Ellsworth sought to demonstrate to “people with substantial capital” in the east that the wet prairie was worth investment.⁵⁷ Of course this large scale project required tenant farmers who were paid a fraction of the profits of their labor to till and improve the land’s production levels. This endeavor was like others in American wetland environments which sought experimentation in agriculture and labor exploitation as a means for expanding profit and interest. In Louisiana, “the state...sponsored a slaveholding ‘model plantation’ for ‘experiments...in agriculture and horticulture.’”⁵⁸ The difference between these two examples was of course the enslavement of Blacks in Louisiana. Both, however, display the range of inequality placed into the land owning structure and state building process. A process which favored unrestricted laissez-faire capitalism and led to severe economic crashes within the Midwest throughout the second half of the nineteenth century.

Moses Fowler, Henry L. Ellsworth, and Edward Sumner were a part of a landowning elite in the upper Wabash River Valley. As men with connections to the U.S. government, Yale University, and eastern investors and institutions they could acquire greater economic safety for their large investments. They banked on classical supply and demand, buying cheap land in the

56. Bob Kriebel, “Moses Fowler Had Far-Reaching Influence,” *Lafayette Journal and Courier*, March 18, 2016.

57. Henry W. Ellsworth, *Valley of the Upper Wabash, Indiana, with Hints on its Agricultural Advantages*, viii; and Hugh Prince, *Wetlands of the American Midwest*, 186-188.

58. Aaron R. Hall, “Public Slaves and State Engineers: Modern Statecraft on Louisiana’s Waterways, 1833-1861,” *The Journal of Southern History* 85, no. 3 (August 2019): 539.

hopes that eventually as less land became available property prices would increase.⁵⁹ Sumner and Fowler were some of the first to create ditches in the area and begin tile drainage. Sometime between the late 1840s and the late 1880s an approximately 200-acre shallow lake named “Hickory Grove Lake”, located “about a mile northwest of Fowler,” was drained.⁶⁰ Since Sumner and Fowler owned the land around the town of Fowler almost in entirety, it is almost certain that such drainage was executed on their request. Moreover, Fowler was the main financier of the section of railroad built through the prairie and the town of Fowler.

These findings are mirrored in the history of many agricultural counties throughout the Midwest. As historical geographer Hugh Prince explains, “By draining and farming intensively they not only made larger profits than from cattle ranching or wheat growing but also enhanced the value of their property...it became easier to finance further improvements by raising rents or mortgaging...”⁶¹ After death, however, their vast fortunes became entangled in particularly difficult legal cases. Ellsworth’s estate was damaged badly by the economic crash of 1857 and most of his property was sold. What remained was divided up upon his death in 1858.⁶² The boom bust agricultural economy, thoroughly detailed by Hugh Prince, resulted from the inability of farmers to pay off the debt which they accrued from loans taken to “improve” the land. In short, grain production was still greatly affected by the environments it was planted in. From 1850-1929

59. Hugh Prince, *Wetlands of the American Midwest*, 161.

60. Jesse Setlington Birch, *History of Benton County and Historic Oxford*, 196. The lake was reported to exist in the late 1840s but does not show up on a plat map of the area from 1888. This was not the only lake to completely disappear in the face of drainage. Many ponds and another lake called “Silver Lake” outside of Fowler no longer exist.

61. Hugh Prince, *Wetlands of the American Midwest*, 209-210.

62. Yale University and Wabash College were to be the sole inheritors of his remaining estate as laid out by his last will. However, this was contested, and both received only part of the estate. See Jesse Setlington Birch’s *History of Benton County and Historic Oxford* which contains a compilation of local reports during the time.

several agricultural crises occurred either from a failed crop or surplus that caused grain prices to drop below what farmers needed to pay off their debt. Because these landlords owned most of the land, when one went bankrupt, the entire community was affected.⁶³

Conclusion: Trouble for the Hoosier Empire

The construction of tile drainage was encouraged by the state government and reinforced an expansion of material human networks deep into previous Indigenous lands. The springs and streams of Indiana offered water and food early on for invading American settlers moving from settlements in the southern part of Indiana to the northwest portion. The influx of Anglo-Americans to this region brought a crucial transformation to the landscape with the establishment of European style agriculture. Large landowners began a tenant farming enterprise in the area which was reported to be over forty percent of farming operations in Benton and Warren counties by 1880.⁶⁴ Though the economy affected some large landowners, others maintained their holdings and became millionaires such as Edward Sumner, whose daughter inherited more than one million dollars' worth of his land in 1904. Crucial to this story, however, is the physical transformations to water movement in the environment wrought by wealthy individuals through their actions to improve and manage the land.

Even though agriculture was creating economic wealth in northwestern Indiana, changing the flow of water and plowing the prairie grass did not occur without repercussions. What Missouri senator Thomas Hart Benton in 1851 called, "impediments to progress" were the long established

63. Ellsworth lost around 110,300 acres of land due to the crash of 1857 a significant chunk of which resided in Benton County. See Hugh Price's *Wetlands of the American Midwest*.

64. U.S. Census Office, *Tenth census: Productions of agriculture, 1880* (Washington, D.C. 1883), vol. 3: 28-101. Quoted in Hugh Prince's *Wetlands of the American Midwest*, 198.

and ecologically diverse environments that protected the landscape against severe soil and water loss.⁶⁵ During the early decades of the twentieth century, as tile drainage continued to be a practice in agriculture, the state of Indiana began to witness historic floods. Flooding on Big Pine Creek, the Wabash River, the Ohio River, and the Mississippi River was a part of the pre-colonial mid-continent. However, floods of this magnitude typically only occurred once in one hundred years. Large once in a hundred-year sized floods occurred in 1913 and again in 1937. Despite these floods there was another danger beginning to unfold across the American prairies. The Dust Bowl affected more than just the southern plains region of the country and the unprotected soil of northwestern Indiana alongside the Great Depression created trouble for the little agricultural empires which had sprung up.

65. Congress, Senate, 31st Cong., 2d sess., Congressional Globe, vol. 96 (27 February 1851), 740. Quoted in Ann Vileisis, *Discovering the Unknown Landscape: A History of American Wetlands*, (Washington D.C.: Island Press, 1997), 75.

CHAPTER 2 MODERN ECOLOGICAL CRISES: UNDERSTANDING THE DRAINED PRAIRIE DURING THE BEGINNING OF THE TWENTIETH CENTURY

“...old ways of thinking about the Dust Bowl and ecological crises in general obscure our vision, so that we do not see the direct thread tying the past to the present, the unresolved issues of the period that lead to the extreme ecological and social injustices of today.”

~ Hannah Holleman, *Dust Bowls of Empire*

At the turn of the twentieth century, cities and rural communities alike began to experience a series of ecological crises. Once in a hundred year floods started to occur ever 10-20 years with periods of drought exaggerated by a lack of vegetation to contain soil moisture. By at least the end of the nineteenth century it was clear to early soil scientists and other specialists that the mass exploitation of American prairies, as well as landscapes across the globe, was leading to large amounts of soil erosion. In 1887, the nation-state created agriculture experiment stations. These stations became the keystone of a new knowledge apparatus designed to disseminate “methods of soil improvement” crafted by agriculturalists.¹ Large public universities became the bureaucracy and leaders of knowledge for erosion control projects between the national government and the farming community. Land Grant schools like Purdue University encouraged a managerial culture of agricultural business to counter erosion. This economic revolution signaled a desire to bridge aspects of previous colonial land practices with the managerial character of an expanded capitalist economy. In a time of global ecological crises, new ideas for land practices, outside of these institutions, garnered a large audience. However, the power of nation-state funded institutions ensured that basic colonial structures in the midcontinent’s agriculture, such as tile drainage, would remain intact.

1. William C. Latta, *An Outline History of Indiana Agriculture*, (Lafayette, IN: Alpha Lambda Chapter of Epsilon Sigma Phi, 1938), 121.

Water Must Go Somewhere: The Efficiency of Drainage Which Became a Problem

Farmers who set out originally to drain wetlands recognized that when one area's surface water was drained, lands at the end of those structures received an increased amount of water. Purdue University Professor William Carroll Latta acknowledged this in 1938 when he wrote about why progress in drainage beginning in 1870 was at first slow. "Many outlets had to be deepened. The mains often had to cross the farms of ignorant owners who blocked the movement...drain plans frequently failed to include the entire watershed."² The first instructor of agriculture science at Purdue, Latta was one of the foremost knowledgeable at the time about early agriculture in Indiana. His comment highlights the complicated nature of drainage in the state and his thoughts about those farmers who did not drain land. The tile drain system required entire watersheds to be interlaced with a subterranean infrastructure not just individual farms. Otherwise, the undesired waters of shallow lakes, ponds, and wetlands would not run off within tiles into ditches, streams, creeks, and rivers.

A network of artificial infrastructure funded by the federal government, state government, and local farmers transformed a diverse landscape into an expansive farmland with high drainage efficiency. At first this meant farmers could farm flood plains and other previously unfarmable land. And, in turn, as monoculture farming on previous wetlands produced high profits, the price of land rocketed to new heights making Benton County some of the most expensive land in the entire state.³ The systems of control, ditches, tiles, canals, and levees, under spring runoff would continually have to be expanded and maintained. Ditching became a profitable business and

2. William Carroll Latta, *An Outline History of Indiana Agriculture*, 122-123.

3. W. N. Logan, E. R. Cumings, S. S. Visher, C. A. Malott, W. M. Tucker, and J. R. Reeves, *Handbook of Indiana Geology*, The Indiana Department of Conservation Division of Geology. (Indianapolis: Dept. of Conservation, 1922), 18-19.

eventually the ditches themselves would become economic entities with their own ledger books (see Figure 6).⁴ However, historic floods in 1913, 1927, and 1937 highlight that efficiency was not everything agriculturalists hoped.

Control 211

DATE				QUANTITIES	FROM WHOM RECEIVED	FOR	Principal	Interest and Penalty	Total Collected	Assessments (Principal)	Encumbrance	Liabilities	Receipts	Balance
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			35284	Open County Co Sp	Interest									1674.93
			35285	Open County Co Sp	Interest									367.22
			35286	Open County Co Sp	Interest									2444.00
			35287	Open County Co Sp	Interest									24104.18
			35288	Open County Co Sp	Interest									24104.18
			35289	Open County Co Sp	Interest									489.00
			35290	Open County Co Sp	Interest									24104.18
			35291	Open County Co Sp	Interest									24104.18
			35292	Open County Co Sp	Interest									1560.27
			35293	Open County Co Sp	Interest									24150.00
			35294	Open County Co Sp	Interest									24150.00
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cities in Indiana, Illinois, Kentucky, and Ohio. How these once in a hundred year floods began to happen with such frequency requires a complex explanation.

The flood of 1913 and 1937 consumed parts of Indianapolis, Evansville, Columbus, and many other cities and towns in feet of water. Both springs brought extreme weather to the Indiana area dumping several inches of rain in a matter of hours over a period of days.⁵ Previously saturated soils and intense amounts of rain meant water needed a place to go. After the American Civil War Indiana had lumbered most the state's seventeenth century forests by 1920 (See Figures 7-8).⁶ In addition, by 1889 about 50-75% of Indiana's surface area was considered "improved" meaning drained.⁷ Both of these actions undoubtedly increased the rate of speed at which rainfall water flowed into rivers and streams.

5. Indianapolis Star Staff, "Hundreds Are Cut Off From Aid by High Water," *The Indianapolis Star*, March 26, 1913, Newspapers.com, The Indianapolis News Staff, "West Indianapolis Flood Refugees are Hurried to the Hospitals Not Enough Ambulances for the Work." *The Indianapolis News*, March 26, 1913, Newspapers.com, Indianapolis Star Staff, "Evacuation from Southern Indiana Border is Speeded," *The Indianapolis Star*, January 27, 1937, Newspapers.com, and The Lafayette Journal and Courier Staff, "132 Persons Dead as Torrents Rise," *Lafayette Journal and Courier*, January 26, 1937, Newspapers.com.

6. Gordon G. Whitney, *From Coastal Wilderness to Fruited Plain*, 174-175.

7. Hugh Prince, *Wetlands of the American Midwest*, 227-229.

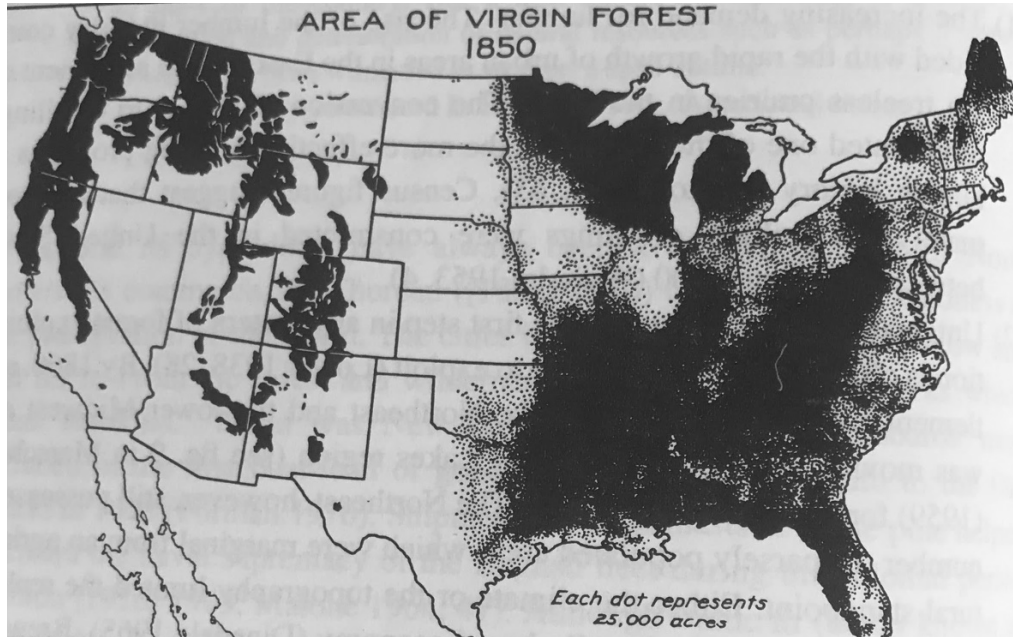


Figure 7. "Area of Virgin Forest 1850," from W. B. Greenley, *Economic Geography* 1: 4-5, c. 1925.

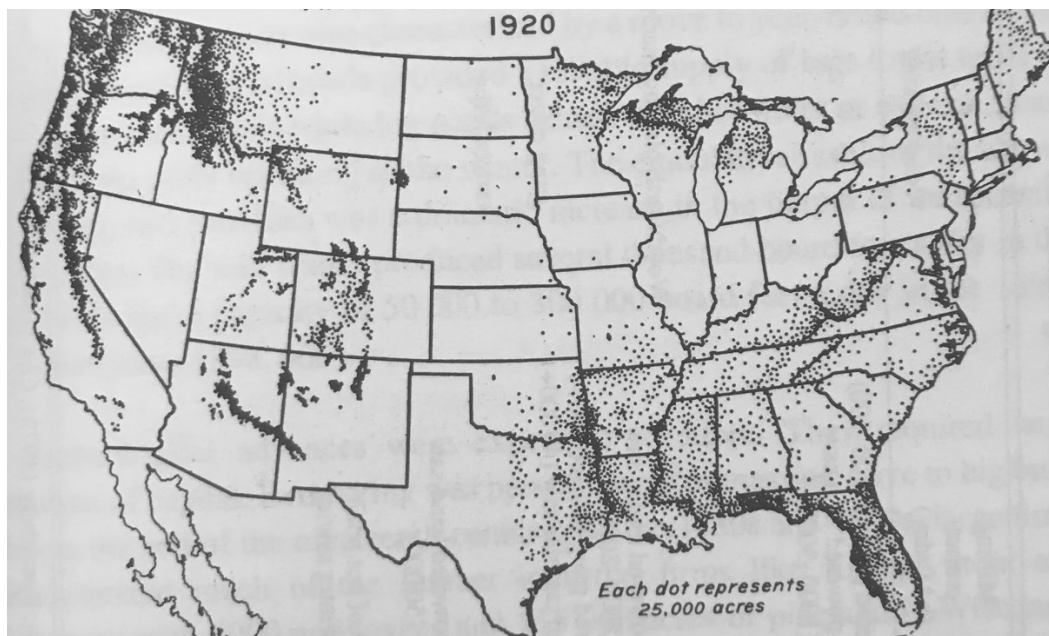


Figure 8. "Area of Virgin Forest 1920," from W. B. Greenley, *Economic Geography* 1: 4-5, c. 1925.

In late March of 1913, a storm system from the southwest swept through Indiana and Ohio leaving parts of cities submerged and levees broken. Approximately 250,000 Hoosiers were made homeless and almost all the town of Miamisburg, Ohio along the Ohio River was washed away. Several hundreds of Americans lost their lives and well over a million dollars in damage resulted from the powerful flood waters of the Wabash, White, and Ohio Rivers and their tributaries that month.⁸ In Peru, Indiana alone, greater than 100 lives were lost. Floods in Indiana before this time were common, but not on this scale. Excess water from seasonal heavy rains normally collected in Indiana's pre-colonial wetlands which had covered roughly a quarter of the state. However, with drainage technology most of these wetlands no longer existed to hold spring rains.

For many the Great Flood of 1913 left a lasting impression. Indiana began its statewide flood control system following the flood, but most of all many believed it was so massive that the 1913's flood water levels could be used as a marker for flood safe zones and danger zones.⁹ In January of 1937, intense rains brought massive flooding again to the Midwest. Louisville, Evansville, Columbus, Indianapolis, and many of the previously affected cities found themselves in a potentially worse than before situation. In Evansville, flood damage amounted to just less than seventeen million dollars.¹⁰ The situation, however, was much worse for residents of the city of Louisville. On January 28, 1937 in Louisville 130 bodies were found and approximately 230,000 were homeless. The record shattering floods largely affected the poorest sections of the city with

8. Indianapolis News Staff, "Ohio Flood Swept; Death List is Long," *The Indianapolis News*, March 26, 1913, Newspapers.com, Indianapolis Star Staff, "Hundreds Are Cut Off From Aid by High Water," *The Indianapolis Star*, March 26, 1913, Newspapers.com, and Indianapolis Star Staff, "Flood Breaks Over Fall Creek Boulevard," March 26, 1913, Newspapers.com.

9. The Indianapolis Star Staff, "Losses Huge at Evansville," *The Indianapolis Star*, January 28, 1937, Newspapers.com.

10. The Indianapolis Star Staff, "Property Loss in Evansville Is Estimated at \$16,875,000," *The Indianapolis Star*, January 28, 1937, Newspapers.com.

the lower class bearing the brunt of the force of the raging Ohio River. The city's residents had believed that the 1913 flood peak was a sort of gauge maker for future floods. It was reported on January 28th in the *Indianapolis Star* that casualties were so bad that trench burials started in the Highlands without identification or body count.¹¹

These were not normal floods. In the time between them the worst flood in American history occurred along the Mississippi River, The Great Mississippi Flood of 1927.¹² And large floods would continue throughout the twentieth century. Soil erosion added another contributing factor to these disaster events. Soils have a wide range of water carrying capacities that are contingent upon soil composition and in particular the soil's amount of organic matter. Prairie grasses and forests held in moisture and absorbed rainfall like living reservoirs of water. The flood of 1937 was believed to be affected by frozen soil's inability to absorb rainfall.¹³ However, with significantly less forests and wetlands to slow the runoff of rainwater rivers, streams, and creeks became more susceptible to flash flooding. These major floods were as much a result of heavy rainfall as they were human alterations to the midcontinent's pre-colonial drainage system.

In fact, soil erosion held a long history as a problem in American agriculture practices. In the 1850s the United States began legislation and occupation of Pacific Islands for the extraction of guano, bird colony excrement, in order to replenish nitrogen levels in depleted American soils.¹⁴

11. The Indianapolis Star Staff, "Buried in Trenches," *The Indianapolis Star*, January 28, 1937, Newspapers.com.

12. Stephen Ambrose, "Man vs. Nature: The Great Mississippi Flood of 1927," *National Geographic*, May 1, 2001, Nationalgeographic.com.

13. Andrew Gustin, "Flooding in Indiana: Not 'If' But 'When'," *Indiana Geological & Water Survey Indiana University*, 2012, igws.indiana.edu.

14. Gregory T. Cushman, *Guano and the Opening of the Pacific World: A Global Ecological History* (New York: Cambridge University Press, 2013), 81-84.

This legislation alongside a global and American concern about soil erosion illuminate the widespread exploitation of soils across the world well before the ecological crisis of the early twentieth century. Tilling land, regardless of geographic location, leaves the soil exposed to movement by wind and water. Indiana agriculture plowed under the grasses and forests which had held soils in place like anchors for centuries. In tandem with springtime rain and with the desired efficiency of tile drainage rivers demonstrated the deadly effects of human transformations and urban planning which placed the poorest section of the population in harm's way.

Flooding was not the only threat possible from draining the landscape. As author Hannah Holleman thoroughly covers in her history of the Dust Bowl, "soil erosion was a well-understood problem long before the 1930s and was not limited to arid lands but also, it is important to understand, heavily impacted tropical and temperate regions."¹⁵ Northwestern Indiana, though far from alone in this endeavor, started to organize in 1887 action towards recognizing soil erosion and depletion, minimizing erosion, and mitigating effects of major drought.

Institutionalized Power & the Birth of Agriculture Extension Services

The invention of the agriculture experiment station, later named agriculture extension services, was closely tied to the earlier growth of agricultural schools across the midcontinent. In 1862 the federal government under President Lincoln passed legislation which permitted states to acquire "public lands" if it would transform those lands into the site of a land grant institution. The Morrill Land Grant College Act explicitly emphasized that the education derived from these

15. Hannah Holleman, *Dust Bowls of Empire: Imperialism, Environmental Politics, and the Injustice of "Green" Capitalism*, (New Haven and London: Yale University Press, 2018), 76-79.

colleges was to be focused on the sciences, agriculture, and mechanical arts.¹⁶ Purdue University, located along the banks of the Wabash River, was founded in 1869 from the land and monetary donations of John Purdue, the wealthy Lafayette businessman mentioned in the previous chapter. Through the Morrill Land Grant College Act, Purdue would become the premiere agriculture institution in northern Indiana. In 1887, congress passed the Hatch Act creating funds for the construction of agriculture experiment stations at land grant colleges across the U.S.¹⁷ Among its main goals was the study of soil improvement and providing soil science education to farmers. By the early decades of the twentieth century, Purdue University wielded a great amount of power in spreading agriculture practices from its agriculture experiment station.

By creating stations to which farmers could ask for advice and providing funds to local specialists at the station to travel to farms, the nation-state offered a new knowledge apparatus. Purdue began its first courses in agriculture science, under the direction of William Carroll Latta who arrived in 1882.¹⁸ Latta over the course of his career conducted new research, taught some of the University's first agriculture science students, and most importantly began the Purdue University Experiment Station in 1887. Latta was the guiding leadership for Purdue's experiment station throughout his tenure and as such his works grant a unique window into his land practice ideology. His 1938 book, *An Outline History of Indiana Agriculture*, and the Indiana Department of Conservation's 1922 book *Handbook of Indiana Geology* provide a glimpse into the state and local institutionalized knowledge promoted at the turn of the twentieth century.

16. "Act of July 2, 1862 (Morrill Act)," Public Law 37-108, 37th Congress, Enrolled Acts and Resolutions of Congress, 1789-1996; Record Group 11; General Records of the United States Government, National Archives.

17. "Hatch Act of 1887," Public Law 49-314, 49th Congress, March 2, 1887, General Records of the United States Government, National Archives.

18. William Carroll Latta, *An Outline History of Indiana Agriculture*, 5.

Despite the massive amounts of soil erosion occurring across the U.S. and the severe floods which affected Indiana residents as well as natural environments the Purdue University experiment station continued to support tile drainage. In his 1938 book, Latta expressed the reason for the continued use of drainage. “Laying the tile too shallow or on an uneven grade, frequently required doing the work over again. Doubting Thomases often delayed drainage operations until slowly convinced, by the experience of others, that drainage pays.” In other words, even if farmers were hesitant to drain their acreage, the increased monetary profits of neighbors who did chose to drain would bring competition and encourage drainage. The motivation for drainage was and continued to be for the maximization of profit.

Latta’s ideology wasn’t just words printed on the pages of a book. He began sometime in the first two decades of the twentieth century to hold “farm meetings along the highways and byways of Indiana to discuss current problems of crop and livestock production.”¹⁹ Once the experiment station was started, dissemination of knowledge across the state became well-funded. “Early in the present century, tile drainage and fertilizer experiments were conducted together by the Experiment Station...In these several cases the value of tile drainage in securing conditions for the profitable use of commercial fertilizers in crop production was amply demonstrated.”²⁰ Locations all over the state, including counties like Clay and Decatur in the southern portion of the state, witnessed demonstrations and experiments by the Purdue University experiment station. The institution’s ideology surrounding tile drainage brought physical changes to the Indiana landscape.

19. William Carroll Latta, *An Outline History of Indiana Agriculture*, 6.

20. William Carroll Latta, *An Outline History of Indiana Agriculture*, 123-124.

Published in 1922, *The Geological Handbook of Indiana* produced by the state government, expressed the state's view of Indiana's socio-material environment. A purview of the book quickly demonstrates the government's field of vision. Under the table of contents, the reader discovers titles such as Temperature and Crop Yields, Agriculture, Transportation, Population, Manufacturing, Mineral Wealth, Quality of the Land, and Forest Resources.²¹ Almost the entirety of the book is focused on the potential gains humanity can gain from extracting the wealth of state's physical features. Within the text, Indiana is transformed into a feminized entity full of bounty available to American society's economic production. "She has usually ranked fifth or sixth among the states in production of coal...in limestone for building purposes she now stands first..."²² The sexualization of nature and concern about its levels of production yields illuminates the influence of American social relations during this time. Congress had only just passed the 19th Amendment granting women the right to vote under the protection of the law in 1920. That historical moment was not met without extreme vitriol from male dominated power structures and misogynist ideology continued.

Building off the false dichotomy of nature and human, scientists during the turn of the century believed that humanity could be perfected through artificial selection. America during the 1920s and 1930s was the site of institutionalized scientific racism and eugenics, forms of pseudo-science now recognized as the center of Nazi Germany's acts of mass genocide during the Holocaust. *The Indiana Handbook of Geology*, which was housed at the Purdue Agriculture

21. W. N. Logan, E. R. Cumings, S. S. Visher, C. A. Malott, W. M. Tucker, and J. R. Reeves, *Handbook of Indiana Geology*, 9.

22. W. N. Logan, E. R. Cumings, S. S. Visher, C. A. Malott, W. M. Tucker, and J. R. Reeves, *Handbook of Indiana Geology*, 16.

Experiment Station, promoted theories of scientific racism. In an argument for Indiana's climate supremacy, the authors write,

“There is a second respect in which the long period during which the nighttime temperatures are about freezing and daytime temperatures about 50 degrees Fahrenheit is important. Ellsworth Huntington's studies of human efficiency, given in his 'Civilization and Climate,' indicate clearly that cool temperatures are most favorable to intellectual work...the temperature conditions which normally prevail in Indiana during the cooler half of the year are one of Indiana's greatest assets.”²³

The scientific knowledge housed at the experiment station and as part of the education system was far from wholly objective truth and must be recognized as a product of America's racialized, discriminatory, and white supremacist society during the beginning decades of the twentieth century.

Ellsworth Huntington was a full time professor of Geography at Yale University and the 1913 president of the Ecological Society of America. His work largely focused on environmental determinism and a scientific racism which used pseudo-science to argue that whites living in the northern temperate zone were climatically more intelligent than darker races living near the equator.²⁴ In 1923 he became the president of the Association of American Geographers and later from 1934-38 he was the president of the Board of Directors of the American Eugenics Society. More than the false dichotomy between human and non-human tied eugenics, racism, and environmental exploitation together; all were a part of the major institutions of education in modern America. The connections between these institutionalized forces illuminates the subjective aspects of modern scientific fields and the complex relationship between the social and material world.

23. W. N. Logan, E. R. Cumings, S. S. Visher, C. A. Malott, W. M. Tucker, and J. R. Reeves, *Handbook of Indiana Geology*, 18.

24. Ellsworth Huntington, "Changes of Climate and History," *American Historical Review*, vol. 18, No. 2 (January 1913), 213-232.

Gene Stratton-Porter: Seeing Differently

From 1890-1930s, conflicting views about how to relate and act towards the non-human world entered public discourse at multiple levels in response to the fast-paced expansion and exploitation in the continent. The feuds between Anglo-American preservationists and conservationists would play a critical role in the formation of national park legislation and dialogue within congress.²⁵ However, and as many conservation histories forget to mention, Midwestern writers, women in particular, created literature which garnered a significant position in the American consciousness.

Growing up on a farm in Wabash, Indiana, Gene Stratton-Porter started studying nature and the farm practices of her parents at a very young age. Her story is one of inspiration and exploration. Her works of fiction and non-fiction became best sellers of their time, with *Smithsonian Magazine* in 2020 calling her work's popularity similar to that of J.K. Rowling's Harry Potter series today.²⁶ Stratton-Porter was and still is a unique voice from the era of conservation and the New Deal. Her work was popular, well ahead of its time, and yet often receives little attention in comparison to that of male historical figures such as Gifford Pinchot, George Perkins Marsh, Henry David Thoreau, Theodore Roosevelt, Aldo Leopold, and John Muir.

More than popularity, Stratton-Porter's work often led her into the woods, swamps, and grasslands of Indiana. She trudged through deep waters and thickets to encounter wildlife in their daily lives (See Figures 9-11). She advocated for a study of wildlife which did not require hunting and taxidermy at the same time that she advocated for women's fashion to stop the use of feathers

25. See Conrad L. Wirth's *Parks, Politics, and the People*, (Norman, Oklahoma: University of Oklahoma Press, 1980) and Mark David Spence's *Dispossessing the Wilderness: Indian Removal and the Making of National Parks*, (New York and Oxford: Oxford University Press, 1999).

26. Kathryn Aalto, "The Legend of Limberlost," *Smithsonian Magazine*, Vol. 50, No. 10, (March 2020), 56-70.

from threatened bird species.²⁷ Her work did not fit into the typical early twentieth century society's gender roles for women and she utilized practices different from that of the male dominated field of biological sciences. In *What I Have Done with Birds*, Stratton-Porter wrote, "...be reasonable. Who is the most likely to know? The one who tries to cover the habits and dispositions of the birds of a continent in the lifetime of one person, or the one who, in the hope of picturing one bird, lies hidden by the day watching a nest?"²⁸ Stratton-Porter informed readers about her experiences with wildlife in Indiana whether that be through children's fiction or through scientific non-fiction.

More than all of this, however, her work argued for human interaction and coexistence with nature. Rather than the preservationist argument which placed humankind outside of nature and conservationists who argued for a managerial business-like focus in wildlife conservation, Stratton-Porter advocated that what was needed was experiences with wildlife regardless of one's educational background. To Stratton-Porter, the emphasis was not on how to manage life or separate it from society, but rather how to promote knowledge of wildlife at all levels of society. Never attending college or acquiring advanced degree, she came to know local species of birds and their habits more than the publications by professional regional and national biologists and ornithologists.

27. Kathryn Aalto, "The Legend of Limberlost," *Smithsonian Magazine*, Vol. 50, No. 10, (March 2020), 56-70.

28. Gene Stratton-Porter, *What I Have Done With Birds*, (Indianapolis, IN: The Bobbs-Merrill Company, 1907), 6-7.



Figure 9. "Kingfisher," Photograph from What I Have Done with Birds, Gene Stratton-Porter, c.1907.



Figure 10. "Baby Killdeer Just from Shell," Photograph from What I Have Done with Birds, Gene Stratton-Porter, c.1907.



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Figure 11. Photograph of Gene Stratton-Porter's field instruments, Indiana Historical Society, Gene Stratton-Porter Collection, Box 2, Folder 005.

Stratton-Porter was an avid reader and well educated on the dialogue of conservation occurring in America. Her responses to Thoreau's work exemplifies just how ahead of her time she was. In 1910 she wrote:

“It was Thoreau who, in writing of the destruction of forests, exclaimed, ‘Thank Heaven, they cannot cut down the clouds!’ Aye, but they can! That is a miserable fact, and soon it will become our discomfort in air until they meet other vapor masses, that mingle with them, and the weight becomes so great the whole falls in drops of rain. If men in their greed cut forests that preserve and distill moisture, clear fields, take the shelter of trees from creeks and rivers until they evaporate, and drain the water from swamps so that they can be cleared and cultivated, they prevent vapor from rising, and if it does not rise it can not fall. Pity of pities it is; but man can change and is changing the forces of nature. I never told a sadder truth, but it is truth that man can ‘cut down the clouds.’ In utter disregard or ignorance of what he will do to himself, his children, and his country he persists in doing it wherever he can see a few cents in the sacrifice.”²⁹

She was right. The clearing of forests and draining of swamps does alter weather patterns, temperatures, and the amount of annual precipitation. Her words speak of a naturalist concerned about the future of the United States as swamps, forests, prairies, and other kinds of ecosystems

29. Gene Stratton-Porter, *Music of the Wild: With Reproductions of the Performers, Their Instruments and Festival Halls*, (IN: Jennings & Graham, 1910), 332.

disappeared.³⁰ This was tied to her experiences in northeastern Indiana at the time where drainage, logging, and other human activities were fundamentally changing the wetlands and forest at her property at Limberlost.

Through her narratives she introduced wildlife and her experiences visiting them. This was possible because of her status as a wealthy white woman and largely through her desire to study the physical landscape and inform more Americans about why it mattered. She cared about the treatment of birds and a wide assortment of natural creatures because of the relationships and connections she had built observing and photographing them. In reflection about her childhood explorations and care of wildlife she wrote, “It did not occur to me that I was learning anything that would be of use in after years; now comes the realization that knowledge acquired for myself in those days is drawn upon every time I approach the home of a bird... This work is to tell of and to picture my feathered friends of the woods in their homes.”³¹ Her work in *What I Have Done with Birds*, highlights her ethic towards animals. To study them one needed to be patient, to meet them in their daily activities, and to allow their habits to inform your knowledge about the world. Once we gain experiential knowledge about something it is hard to forget. Our senses add depth to the memory, and we use those memories to inform our actions.³² Witnessing birds and animals in their habits meant thinking about their experiences and lives. Gene Stratton-Porter acknowledged that and wanted others to part-take in that endeavor. Public discourse had changed during this period and Gene Stratton-Porter alongside several others provided well-known publications about the effects caused by exploitation. The power structures in agriculture

30. Kathryn Aalto, “The Legend of Limberlost,” *Smithsonian Magazine*, Vol. 50, No. 10, (March 2020), 56-70.

31. Gene Stratton-Porter, *What I Have Done With Birds*, 7-8.

32. Carlo Rovelli, *The Order of Time*. Translated by Erica Segre and Simon Carnell. (New York: Riverhead Books, 2018).

facilitated technological fixes rather than address the unsustainable overproduction of monoculture farming for market profit.

The Dust Bowl on the Grand Prairie & the Birth of the Soil Conservation Service

By 1938, Latta wrote, “Soil exploitation was the general practice of the farmers in Indiana until about 1870. Prior to that date the farmers, generally, were unconscious or unintentional soil robbers...”³³ What caused such a massive reconsideration of early agricultural practices away from the great narratives provided by the Ellsworths during the mid-nineteenth century? In short, soil depletion and soil erosion resulting from extensive logging, plowing, the cultivation of crops without rotation, and drainage. Latta promoted a managerial approach to agriculture practices. He believed that burgeoning agriculture sciences at Purdue University would inform the public of new systems, technology, and treatments to fix the problem. Latta explained:

“Since its organization in 1887 the State Agriculture Experiment Station has been conducting an increased series of experimental soil investigations and demonstrations which, up to 1928, included twenty-eight well distributed points in the state. The purpose of this work is to get the response of muck soil, of so-called alkali...of silty clay, sandy, and loam soils...to the carefully planned treatments, including drainage, fertilization, terracing, and systems of cropping.”³⁴

What such measures advocated was the implementation of terrace structures, the use of chemical fertilizers such as lime to replenish trace minerals lost in annual production, and tile drainage for wet soils.

Latta believed, “...if intelligently and persistently followed, [those changes] will insure the permanent and profitable productiveness of Indiana soils.”³⁵ In short, better management of the

33. William Carroll Latta, *An Outline History of Indiana Agriculture*, 121.

34. William Carroll Latta, *An Outline History of Indiana Agriculture*, 236.

35. William Carroll Latta, *An Outline History of Indiana Agriculture*, 232.

land, in the face of erosion, meant adding more artificial land systems in order to permanently maintain *profitable* production. Profitable did not just mean a return on what was invested, but a quantity on top of total amounts of expenditure and maintenance. In addition, anyone who has experienced the annual fluctuations in weather patterns of the Midwest can attest to the overestimation of such theories for creating *permanent* consistency in production. What such an ideology illuminates is an unquestionable faith in science to provide fixes to the farmer's problems of shifting weather patterns and soil depletion. Institutions did not want to fundamentally address exploitation made by the agriculture system. Instead, they advocated further environmental changes that were based on the auspicious knowledge of early agriculture science and were believed to promise permanent profitability.

In the 1930s an ecological disaster began in the southern plains region of the United States. Author Hannah Holleman describes it, "...as major drought descended on the plains, winds and static electricity lifted the desiccated, exposed topsoil, forming dust storms on an unprecedented scale that wreaked havoc for years."³⁶ The topsoil of American prairies became exposed to wind and rain erosion as the semi-arid short grass prairie was disced annually for monoculture production and massive cattle ranching. Both these forms of land use were not suited for the semi-arid landscape. The grasses of the prairie had held the soil in place against the torrents of winds that typically swept the region. As one of the most prominent historians of the Dust Bowl, Donald Worster, wrote:

"It was easier for them to dismiss the grass as unproductive, unprofitable, and unnecessary, and to force the land to grow wheat instead. By the values they had been taught...they were contributors, they assumed, to national growth and affluence. But as it turned out, the culture they had brought to the plains—the culture that had brought them there—was ecologically among the most unadaptive ever devised."³⁷

36. Hannah Holleman, *Dust Bowls of Empire*, 3.

37. Donald Worster, *Dust Bowl: The Southern Plains in the 1930s*, (New York and Oxford: Oxford University Press, 1979), 97.

The federal government under wartime production during WWI encouraged increased production of crops. Because the war in Europe had cut off the supply of wheat from Russia, the U.S. under President Wilson seized the opportunity to increase U.S. wealth through unprecedented wheat production at an increased market price.³⁸ Federal farming incentives led to increased plowing of the plains and the destruction of its grass ecosystem. In conjuncture with years of drought dust storms and soil erosion became a regular occurrence.

However, as Hannah Holleman points out, in *Dust Bowls of Empire*, these conditions did not just occur in the American southern plains. In fact, the event was part of a globalized issue. There was a, "...broader context within which these changes occurred: the rapid expansion of colonialism and imperialism from which an international crisis of soil erosion emerged by the 1930s—of which the southern plains Dust Bowl was one traumatic instance."³⁹ Holleman's thesis recognized the Dust Bowl as a transnational phenomenon rather than a problem isolated to the American plains. Likewise, the Dust Bowl in the United States was not contained to the southern plains region as affects reached well beyond the states of Kansas, Nebraska, Texas, and Oklahoma. Places in the temperate region of the Mississippi River basin encountered similar Dust Bowl events.

On August 8, 1937 the *Muncie Sunday Star* and the *Indianapolis Sunday Star* ran a story about a severe erosion problem in Northwestern Indiana causing shorter and struggling crop production (See Figure 12). In the heart of Indiana's prairie region, drought and winds moved topsoil and created dust storms. The counties of Benton, Jasper, White, Warren, Porter, and Pulaski, some of the heaviest tile drained areas in the state, experienced a similar drought situation as

38. Donald Worster, *Dust Bowl*, 86-96.

39. Hannah Holleman, *Dust Bowls of Empire*, 7.

farmers in the southern plains.⁴⁰ In northwestern Indiana they had farmed and drained the wet landscape. By the late 1930s there was suddenly not enough water for crops to grow as before.⁴¹ The prairie grasses which had long protected the nutrient rich topsoil no longer existed and organic matter dried (See Figure 13). The tile drainage and annual plowing exaggerated the drought that year.

Topsoil carried by the wind wreaked havoc for farmers. In 1937, sixty percent of the farms of Benton County were under tenant operations.⁴² Working under rents, farmers had to focus on reaping as much profit from the land in order to cover the cost of rent and gain additional funds off the top. A report on the survey conducted by the Indiana State Planning Board stated, “A one year tenure and high rental terms give the tenant no other course then to take everything from the soil...”⁴³ The tenant farming operations of the area caused an intense exploitation of the land. What had been the most fertile soils in Indiana by 1937 had lost approximately fifty percent of its seventeenth century fertility.⁴⁴

40. Maurice Early, “Survey Cites Peril of Dust Bowl in State,” *The Indianapolis Sunday Star*, Vol. 35, No. 64, (Aug. 8, 1937), 1.

41. Maurice Early, “Survey Cites Peril of Dust Bowl in State,” 1, and The Muncie Sunday Star Staff, “Find Dust Bowl,” *The Muncie Sunday Star*, 2.

42. The Muncie Sunday Star Staff, “Find Dust Bowl,” *The Muncie Sunday Star*, 2.

43. Maurice Early, “Survey Cites Peril of Dust Bowl in State,” 1.

44. The Muncie Sunday Star Staff, “Find Dust Bowl,” *The Muncie Sunday Star*, 2.

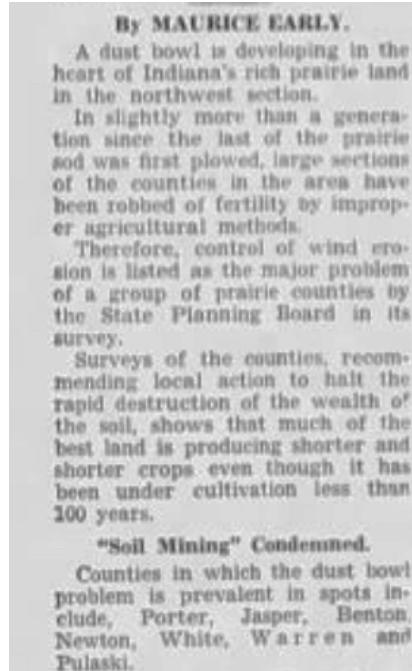


Figure 12. Newspaper clipping from The Indianapolis Sunday Star, Aug. 8, 1937.



Figure 13. Photograph of Benton County, Indiana during the late 1930s, Farm Security Administration Records, National Archives, Washington, D.C.

In response to the crisis in American soils and the Great Depression, the federal government under President Franklin D. Roosevelt began to implement its New Deal policies. As part of the government's efforts to control soil erosion the Farm Security Administration (FSA) and the Soil Conservation Service (SCS) were created. The FSA during the 1930s sought to capture the experiences of rural life through a massive continent wide photographic project. In addition, the FSA bought up some of the country's most exploited farmland and relocated many farmers.⁴⁵ Many Hoosier farmers received this kind of aid when they experienced dust bowl like drought on their farms. Several images taken of farmers in Indiana's prairie region by the FSA, however, depict the conflicted nature of farming there during the 1930s (See Figure 14). Despite the hardships of flooding and drought in the state and popular authors expressing the dangers, farmers maintained an ideology they were taught by local institutions; continue to drain the landscape.



Figure 14. Benton County farmer photographed carrying ceramic drainage tiles, c. 1930s, FSA, National Archives, Washington, D.C.

45. See Donald Worster's *Dust Bowl*, Hannah Holleman's *Dust Bowls of Empire*, and Library of Congress Digital Collections, FSA Photography, National Archives, Washington, D.C.

Federal policies, however, were subjective about who received aid during the Great Depression. At the same time that the FSA was helping a largely white population of farmers and rural poor, racist federal policies deported up to 1.8 million American citizens of Mexican ancestry across the country, including those working on farming operations.⁴⁶ Deportations occurred in places like Michigan, Illinois, Ohio, Colorado, California, and New York upon the belief that American citizens of Mexican decent were stealing white Americans' jobs.

In addition, policies and recommendations for solving the problem of dust bowl conditions in northwestern Indiana focused on adding more changes to an already altered environment. During the 1930's, wind breaks in the form of pine trees and Osage Orange tree plantings in addition to terracing land in cultivation were advocated by the Purdue agriculture experiment station.⁴⁷ The State Planning Board encouraged partially returning lands back into prairie to slow the erosion of the soil being cultivated around it.⁴⁸ While such measures helped control wind erosion and rain eventually returned to the area, the leaching of soils through tile drainage would continue well into the late twentieth century. To counteract the depletion caused by continued exploitation of the soil, farmers would be encouraged to use chemical fertilizers following the expansive industrialization of agriculture after WWII.

Conclusion

Ecological crises of the early twentieth century challenged American ideology surrounding the modern agriculture industry. As addressed earlier there were a multitude of perspectives and

46. See Becky Little, "The U.S. Deported a Million of Its Own Citizens to Mexico During the Great Depression," *History.com*, July 12, 2019, and Hannah Holleman's *Dust Bowls of Empire*.

47. See William Carroll Latta's *An Outline History of Indiana Agriculture*.

48. Maurice Early, "Survey Cites Peril of Dust Bowl in State," 1.

ideas concerning land practices at the time and how Americans should act towards wildlife. By the turn of the century agriculturalists could not have simply been ignorant of the effects caused by drainage and current farming operations. Agriculturalists knew well in advance of the 1930s the dangers of cash crop monoculture production. Popular writers, such as Gene Stratton-Porter, discussed the effects that drainage was having upon the land.

By plowing the landscape and implementing tile drainage systems, modern agriculture lowered the water table and increased runoff efficiency. In years of heavy rainfall this meant massive floods downstream while in times of drought it meant a lack of soil moisture. Moreover, by the late 1930s even local newspapers recognized the harmful effects of soil exploitation in Indiana's northwest corner. Despite the implementation of terraces and wind breaks in northwestern Indiana, erosion would continue under industrialized farming. The continued plowing and draining of industrialized farming during the 1940s and 1950s would result in severe erosion that by the 1980s amounted to a loss of more than a foot of topsoil. In addition, tile drainage would generate a new and potentially more deadly ecological disaster by the 1970s.

CHAPTER 3 THE RENEWED EXPANSION OF AMERICAN INDUSTRIALIZED AGRICULTURE: GLOBALIZATION AND MIDWESTERN AGRICULTURE FROM 1970-1990

“What was being conserved was not so much the natural world, but a socioecological order...”

~ Ted Steinberg, *Down to Earth*

Since World War II, agriculture and the use of socio-ecological technologies within northwest Indiana was both localized and characteristic of a national and global agriculture enterprise. This enterprise sought to make nature increasingly work for human desires for market wealth, recreation, and food supplies. During the second half of the twentieth century, the Benton County Soil and Water Conservation District worked alongside local farmers to implement and promote new regulations and ecological technologies, which revolved around crop yields, soil conservancy, and hunting. Their actions did not coalesce inside of a bubble, but rather derived from a convergence of national and international economics with local politics. Local individuals became key actors in the changing global capitalist economy after 1970. Their experiences both within the Midwest and overseas illuminate the interdependency of the global market and the power of non-state actors. The agricultural practices in the Big Pine Creek watershed, within the Mississippi drainage basin, affected the abundance of life found in the Gulf of Mexico. From 1970 to today the federal government has recognized a growing hypoxic zone in the Gulf. The roots of this ecological problem lie not at the confluence of the Mississippi River and the Gulf of Mexico, but rather in the drainage infrastructure buried across the midcontinent’s agricultural lands.

A Complex Industrial System

Though the main production in northwest Indiana was extensive agriculture such as grain production, the environment consisted of much more than such kinds of farming. In the late twentieth century, farmers in the county produced new grains, such as soybeans, while also maintaining feedlots of cattle and pigs.¹ Chicago and New York markets during the 1970s continued to influence production in the area. However, individual members of the Benton County community created international links to the agriculture of the county as well as redefined transnational agriculture imports. By looking at the local level, the power structures which defined how humans shaped the landscape become clear. As many recent American history scholars have argued, changes to the physical structure of American life tend to occur when local powers enforce such action.²

Initiatives developed during the New Deal era in response to the Dust Bowl set in motion the first sizeable national movement to recreate and maintain habitat for wildlife and conserving soil for agricultural production. With the establishment of the Soil Conservation Service (SCS) within the U.S. Department of Agriculture (USDA) in 1935, Benton County began to develop soil conservation practices. As witnessed in the previous chapter, however, their efforts sought to minimize the impact of only some human practices while ignoring tile drainage technology. Despite national moves to generate and maintain properties for wildlife during the first half of the twentieth century, it would not be until 1985, when the Indiana Department of Natural Resources

1. U.S. Department of Commerce Bureau of the Census, *Census of Agriculture-Indiana County Data*, by Bruce Chapman and Malcolm Baldrige, 1982.

2. See William P. Jones, *The Tribe of Black Ulysses: African American Lumber Workers in the Jim Crow South* (Chicago: University of Illinois Press, 2005); Lance Hill, *The Deacons of Defense: Armed Resistance and the Civil Rights Movement* (Chapel Hill: The University of North Carolina Press, 2004). While these histories are focused upon the history of African Americans they each argue that change did not happen after national legislation occurred but rather when local efforts solidified them into practice.

(IDNR) division of Fish and Wildlife purchased the Deno Gamebird Habitat, that the county witnessed its first habitat reclamation project.

Once a county made up almost entirely of wetlands, by the 1980s Benton contained, through both private and public lands, less than 0.6% of wetland habitat.³ Such a dramatic change over time proved detrimental to the biodiversity of the landscape. Like other places in North America, the government-led reconstruction of wetlands in Benton County began long after the destruction of almost every single seventeenth century wetland habitat. Benton County, in comparison to other locations in the continent, arrived late to the national initiative of recreating wetlands and native habitats. By studying places like Benton County, we can understand not only how national shifts shaped local areas, represented here through legislative change and the work of agencies, but also how local people contributed to further environmental change in the midcontinent.

The industrialization of agriculture, which exploded after WWII, increased competition amongst farmers and resulted in drainage tile systems being increasingly embedded into the landscape.⁴ New roadways, bridges, dams, farm equipment, pesticides, and chemical fertilizers all transformed the environment and were the physical representation of human networks. However, humans had created drastic change by placing their networks within the confines of the pre-existing network of the environment. The farmer still relied upon rain and warm temperatures for their crop production. The North American mid-continent became a complicated space, one in which both wildlife and Americans affected each other's social life. People in northwest Indiana exploited the rich soil of the land for their benefit by imposing structures of their own creation and

3. Statistic calculated based on acreage published by the Indiana Department of Environmental Management.

4. J.L. Anderson, *Industrializing the Corn Belt*, 5-7.

communicating who or what could occupy that space. However, water, wildlife, and climate would also actively change that space.

Post-WWII Agriculture and the Soil Conservation Service

The story of how the United States industrialized agriculture during World War II and in the decades that followed has been the subject of many historical works.⁵ How the Midwest industrialized during the twentieth century is crucial to understanding the landscape of northwest Indiana prior to conservation efforts in the late twentieth century. A brief overview of what that regional landscape looked like and what the national Soil Conservation Service advocated follows.

The Corn Belt is a small region in the U.S. which spans from eastern Ohio, through northern Indiana, and to Illinois and Iowa. Perhaps unknown to those who have never frequented the area, the Corn Belt is one of the most developed landscapes in all of the U.S.⁶ With its fields upon fields of corn, this region's previous diverse flora were replaced with an industrialized monoculture during the post-WWII era. After the war, farmers began to cultivate mostly with heavy machinery and planted hybrid crop seeds.⁷ By transitioning to the energy of fossil fuels rather than horses these crop row farmers could reduce the cost associated with feeding horses year round. When the U.S. government supported commodity prices and financially incentivized industrialization in an effort to raise production levels during the war, farmers were able to increase

5. See J.L. Anderson, *Industrializing the Corn Belt: Agriculture, Technology, and Environment, 1945-1972* (Dekalb: Northern Illinois University Press, 2009); J.L. Anderson, *The Rural Midwest Since WWII* (Dekalb: Northern Illinois University Press, 2014); Wenonah Hauter, *Foodopoly: The Battle Over the Future of Food and Farming in America* (New York: The New Press, 2012); and R. Douglas Hurt, *Problems of Plenty: The American Farmer in the Twentieth Century* (Chicago: Ivan R. Dee, 2002).

6. J.L. Anderson, *Industrializing the Corn Belt*, 6.

7. J.L. Anderson, *Industrializing the Corn Belt*, 7.

crop yields. They did this by cultivating as many rows of corn as possible and planting genetically selected hybrid seeds which would germinate more bushels of corn per acre. In addition to the use of machinery and select hybrids, farmers began to use herbicides, "...unleashing pesticides (which for farmers and aerial sprayers included both insecticides and herbicides) meant remaking the production landscape."⁸ By spraying chemicals farmers eliminated plants, insects, and animals they deemed a threat to their desired environment.

As historian J.L. Anderson notes in the first chapter of his book, *Industrializing the Corn Belt: Agriculture, Technology, and Environment, 1945-1972*, insects reshaped the human-manufactured monocultural landscape of Iowa. By 1943, the European corn borer had arrived in Iowa farmlands. This insect successfully made its way first from Europe to Massachusetts as a stowaway, and then from there to Ohio and Indiana before reaching Iowa.⁹ By burrowing into the stalk of the corn during its larvae state, the insects in mass numbers could significantly decrease the amount of corn produced. As a new technology, insecticides offered a seemingly easy answer to the problems caused by such pests. However, the chlorinated hydrocarbons and organophosphates used to eliminate pests in farmlands, such as 2, 4-D and DDT, proved to be not only harmful and deadly to a wide range of broadleaf plants and to insects, but also to a whole host of animals including humans and livestock.¹⁰ Some plants and insects, however, did not succumb to the chemicals used by farmers during the post-WWII era. These "weeds" and "pests" would

8. David Veil, *Chemical Lands: Pesticides, Aerial Spraying, and Health in North America's Grasslands Since 1945* (Tuscaloosa: The University of Alabama Press, 2018), 2.

9. J.L. Anderson, *Industrializing the Corn Belt*, 15.

10. J.L. Anderson, *Industrializing the Corn Belt*, 31-32. For more on these chemicals see Pete Daniel, *Toxic Drift: Pesticides and Health in the Post-World War II South* (Baton Rouge: Louisiana State University Press, 2005); Fredrick Rowe Davis, *Banned: A History of Pesticides and the Science of Toxicology* (New Haven: Yale University Press, 2014); or David Vail, *Chemical Lands: Pesticides, Aerial Spraying, and Health in North America's Grasslands Since 1945* (Tuscaloosa: The University of Alabama Press, 2018). Additionally, 2, 4-D can still be purchased and used today by individuals who have a pesticides license.

multiply in the reduced competition created by the elimination of other broadleaf plants and insects. Inevitably this meant the death of many species in these areas while others' populations increased. Resistance to chemicals and the increased presence of pests affected farming across the Midwest and the battle between chemicals and nature continued into the late twentieth century.

In the midst of the arms race between manufactured chemicals and pests, Benton County SCS worked to control erosion while also supporting increased production levels. In a map of the county prepared by the Benton County Land Use Planning Committee and produced by the Bureau of Agricultural Economics between 1922 and 1953, land use suggestions were listed, and color coordinated to places throughout the county (See Figure 15). This map consistently denoted that corn was one of the crops suitable to produce in every type of land in the county.¹¹ The color reproduction presented more than just what crops should be propagated. It illustrated the desires of humans to use almost every possible land in the county for their agricultural, economic, and personal gain. Within the map, even zones classified as “drainage” were noted as locations for potential harvesting. Much like other places in the Corn Belt, Benton County increasingly industrialized over the mid-century.

11. Benton County Land Use Planning Committee, “Benton County Preliminary Land Use”, map, 1922-1953, 27.94 x 38.1 cm, Benton County Soil and Water Conservation District, Fowler, Indiana.

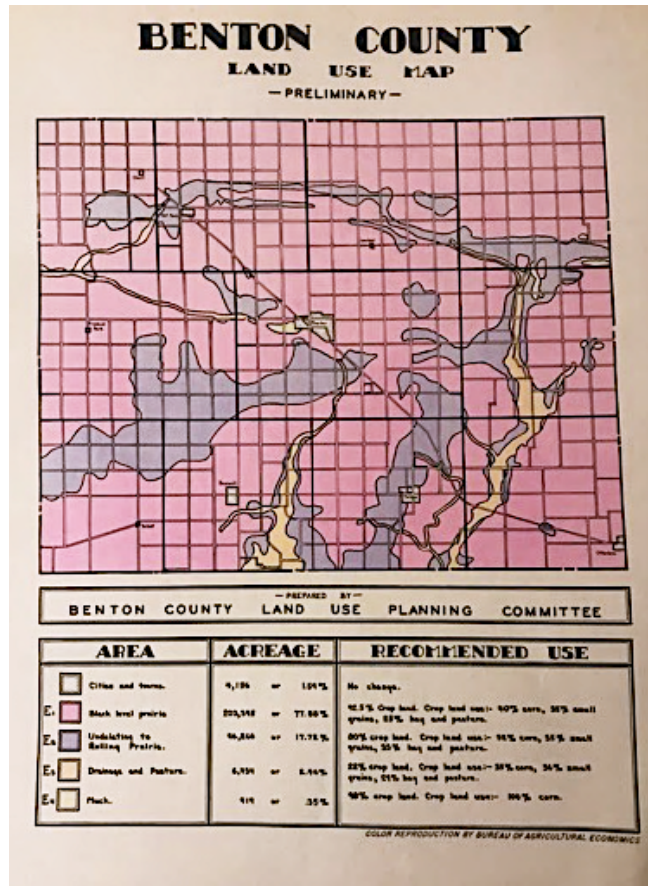


Figure 15. Benton County Land Use Map, Benton Co. Land Use Planning Committee, c. 1922-1953.

In response to conservation concerns, the SCS wrote on agriculture related issues ranging from water conservancy and tree windbreaks to drainage throughout the second half of the twentieth-century in their magazine titled, *Soil Conservation*. Within these publications, numerous articles warned about the soil compacting effects of heavy machinery on farmland and explained the numerous nation-wide projects conducted by farmers and the SCS.¹² The vast majority of these articles were focused upon soil management and how to maintain productive lands. Very few of these expressed interest in the use of pesticides on farmlands. While such concerns for soil

12. See articles throughout Volume XXIII of *Soil Conservation* from 1958.

conservation were paramount in encouraging the minimization of environmental issues such as soil depletion and erosion, slight attention was given to the impact of manufactured chemicals.

The national SCS had a complicated character. As one of the main organizations working with farmers and in American agriculture, the SCS was at the center of conservation advocacy and implementation. The organization encouraged farmers to, among other things, implement practices such as no till, filter strips, and terracing in effort to stop soil erosion. Advocacy took many forms within the organization. SCS employees ranged from field specialists like soil scientists and horticulturists to district conservationists in charge of local projects and journalists who wrote for the organization's publication. Within *Soil Conservation*, readers were told tales of successful projects and soil surveyors published their research.

One particular article from January of 1958, embodies the nature of conservation during the second half of the twentieth-century. Titled, "Farm Hunting Deluxe", the article discussed the hunting operations a farmer implemented alongside his conservation farming practices. The character of conservation during the second half of the twentieth century is found within the article's explanation of its hunting practices. The Ringed-Necked Pheasants of the farm were no more natural than the crop rows planted on the property. Ring-Necked Pheasants hunted on the property were "stocked daily".¹³ This meant that the land in which hunting trips occurred did not produce the gamebirds and such wild abundance was a falsehood. Secondly, the property was managed for hunting purposes not to increase habitat for wildlife more broadly. Finally, the article explained that several species of plant and animal life were introduced to the landscape.¹⁴ The use of new species in conservation projects also occurred in places like Benton County, Indiana

13. Hal Jenkins, "Farm Hunting Deluxe," 115.

14. Hal Jenkins, "Farm Hunting Deluxe," 116.

changing to ecological interactions between organisms. Like the property described in 1958, the first conservation properties in Benton County would be gamebird habitats.

Literature on conservation was not the only representation of what the SCS was documenting and advocating. Within piles of maps, government documents, and assorted soil surveys located at the Benton County Soil and Water Conservation District, reside a series of cartoons on conservation. Created by the artist Felix Summers during the 1950s, these cartoons depicted visually what the SCS advocated conservation did and why it was important (See Figures 16-17). While providing visual arguments for why farmers should have changed their agricultural practices, these images also imagined what creatures should inhabit conservation environments. In several of these cartoons the representative animal for this altered environment was the Ring-Necked Pheasant. A Eurasian species of gamebird, these pheasants were first introduced to Benton County in the 1970s, but their introduction had already been imagined decades before. The cartoons by Summers illustrated the introduction of Ring-Necked Pheasants to an imagined agriculturally-minded environment.

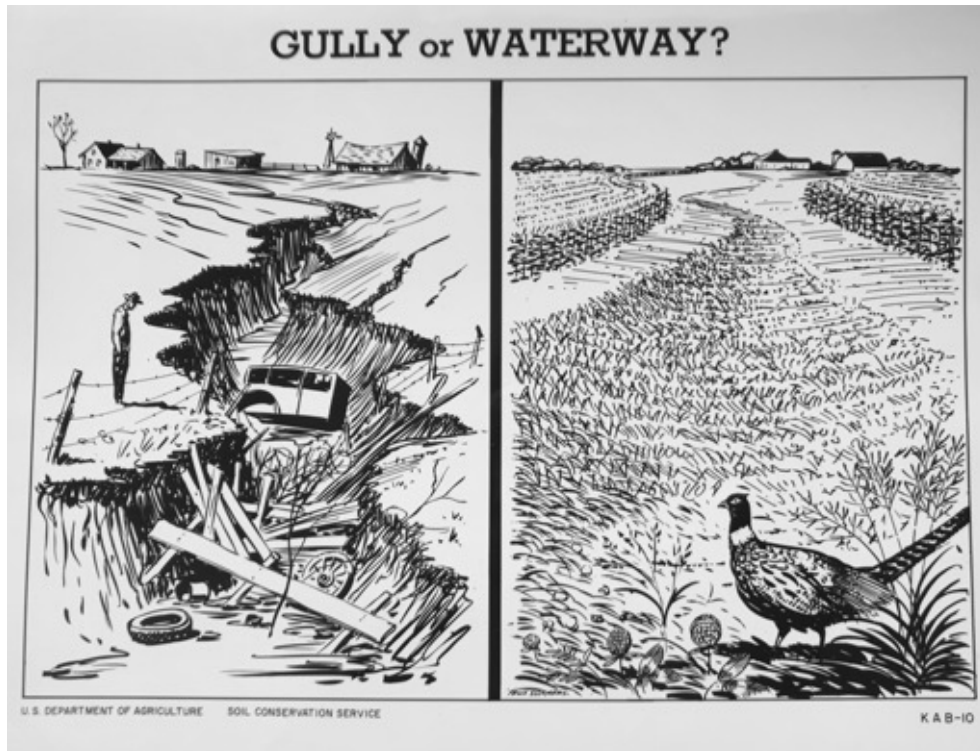


Figure 16. “Gully or Waterway?”, Felix Summers, U.S.D.A Soil Conservation Service, c. 1950s



Figure 17. “Food and Shelter Galore,” Felix Summers, USDA Soil Conservation Service, c. 1950s.

Such ideas about conservation and what it should look like represented a new imagined space. As conservation practices like terraces and filter strips were implemented, the extensive agricultural zone of the nineteenth-century, described by historian William Cronon in his book *Nature's Metropolis*, was reimagined and reshaped once again. This time conservation sought to organize a landscape which catered to recreational desires and erosion prevention. In order to analyze the environmental change within Benton County attention must be given to the practices of industry as well as the conservation projects within the county. While conservation efforts sought to minimize soil erosion and depletion in the late twentieth century, other issues such as the effects of tile drainage received far less attention.

Late Twentieth Century Benton County, Indiana

Tile drainage was one of many technological transformations in agriculture. Tractors, combines, plows, fertilizers, pesticides, herbicides, and a while assortment of advanced machinery radically altered the practice of farming. By the mid-twentieth century, the agriculture community was significantly decreasing in population as many sought a better standard of living in urban areas. Why Americans sought different occupations is a complex history. Part of the movement was linked to the economic hardships caused by market collapses. As farmers over-produced crops and goods in response to federal recommendations, the market became flooded with surpluses.¹⁵ This surplus lowered the market price of grains. As historian R. Douglas Hurt discussed in his book *Problems of Plenty*, the drop in market price meant farmers made less profit and therefore could not pay off the large loans which they had taken to afford large farm implements. This led to

15. R. Douglas Hurt, *Problems of Plenty: The American Farmer in the Twentieth Century* (Chicago: Ivan R. Dee, 2002), 133-135.

foreclosures and bankruptcies, and eventually, the federal government increasingly subsidizing agriculture by paying higher than market prices to remove excess agricultural products.¹⁶ During the 1970s and in response the lower prices which had resulted from increased efficiency, farmers had to adapt their farming operations. “Unable to control prices or to organize collectively, farmers believed they had no choice other than to increase production in order to lower unit costs and thereby maintain a profitable business.”¹⁷ This, however, led to even more surpluses and by the mid-1980s a vast number of farmers were in financial distress. Embodied by slogans such as “Get bigger, get better, or get out” made by then Secretary of Agriculture Earl Butz, the character of the 1970s was that of over production, a decline in the number of farms, and the rise of thousand acre operations.

Farming across the Midwest maintained its American industrialized nature, but there were fewer and fewer farm families involved in the process. In Benton County, the farm crisis of the 1980s meant the loss of small family farms. Within plat books of the county during the decade, the number of bank trustees owning lands within the county was high.¹⁸ Bank trustees owning farming properties during this time can be interpreted in two important ways. First, they can be a sign of increased connection to the national agriculture market, and from there international markets. As bank associates became shareholders, the economics of one farm became connected to stocks and trade far more than the previous farming structure, which mostly followed the sale of crops grown during the previous year.

16. R. Douglas Hurt, *Problems of Plenty: The American Farmer in the Twentieth Century* (Chicago: Ivan R. Dee, 2002), 133-135.

17. R. Douglas Hurt, *Problems of Plenty*, 134.

18. Town and Country Publishing Co., *Benton-Newton Counties 1981 Plat Book* (LaPorte, IN: DataSearch, Inc., 1981). Town and Country Publishing Co., *Benton-Newton Counties Indiana 1985 Plat Book* (LaPorte, IN: DataSearch, Inc., 1985).

Secondly, and significant given the agricultural economic climate of the 1980s, the select number of properties which entered bank trustee ownership indicate financial trouble within the county such as farm foreclosure or bankruptcy. In fact, there are countless newspaper notices of sale. In the *Lafayette Journal and Courier*, there were many reports of local banks putting up 100-200 acre farms for sale to the highest bidder. The sale of one particular farm in December of 1985, demonstrates how these auctions occurred. The advertisement informs readers that, “160 acres, more or less, with approximately 95% tillable” will be sold by the Purdue National Bank.”¹⁹ Along with that tract of land, two other separate tracts of land would be sold. The most important note, however, is that while each of these tracts would first be sold separately to the highest bidder, they then would be put up for sale as one whole tract. If a bidder outbids the total accumulative amount bid on all three tracts of land, then they would become the sole owner.²⁰ This was the process of many land sales of the time and often resulted in financially well-off farmers buying their competition’s land. The result was a further increase in the size of farming operations and a decrease in the number of individuals involved in the agriculture practices of the community.

The number of bank owned properties and auctions of farms denotes ways in which the human networks of Benton County changed. Over the decade farms would grow significantly larger and require teams of equipment to manage. In response to the changing economic stability of American farming, local women organized themselves to understand the situation. A group called Agriwomen organized itself in Benton County during the 1980s. This group consisted of local wives of farmers and met on a regular basis to discuss the financial landscape of their families’

19. Purdue National Bank of Lafayette, “Benton County Farm Auction”, *Lafayette Journal and Courier*, Nov. 22, 1985, Newspapers.com.

20. Purdue National Bank of Lafayette, “Benton County Farm Auction”, *Lafayette Journal and Courier*, Nov. 22, 1985, Newspapers.com.

farms and the U.S. economy.²¹ Not only did farmers seek to combat the financial troubles, but women in particular sought to address how to move forward at meetings separate from their husbands. Farming was changing yet again in this small rural county, and wives, often involved in the finances of the family business, had a vested interest in understanding the 1980s farm crisis.

Alongside farm foreclosures, bankruptcies, and financial hardship, lay another difficulty. Throughout the 1980s, Benton county witnessed a sustained drop in population and the loss of several major businesses. Since the community almost entirely rested upon an agricultural base, what happened to farmers in the county sent a ripple effect out into the entire community. Many shops, companies, and stores in the area either moved their operations closer to more populated locations, such as Lafayette, Indiana, or closed their doors. In an article printed in the *Lafayette Journal and Courier* from August 30, 1983, staff writer Jim Cox wrote, “In recent years, folks in Benton County have mourned the demise of two car dealerships, a drycleaners, the Illinois Canning Co., a bakery, a lumberyard, a farm co-op, and a motel.”²² In addition to these losses, the community witnessed a consist drop in population over the 1980s. Population projections in 1983 stated that, “Thirty seven years hence, the county will be inhabited by 17.5% fewer people”.²³ This projection was the largest percentage of population decrease for any county in the state at the time. The loss of businesses, the decline in community population, and a decrease in the number of people owning farm ground in the county all contributed to the reshaping of human networks. Reporters warned of the ramifications such a reorganization of agriculture might bring for the future. According to an *Indianapolis Star* news article from September of 1986, “The farms in

21. Theresa Grimaldi, “Wives Join Together to Learn Farming”, *Lafayette Journal and Courier*, March 13, 1986, Newspapers.com.

22. Jim Cox, “Population study bewilders Benton, Newton, Jasper”, *Lafayette Journal and Courier*, Aug. 30, 1983, Newspapers.com.

23. Jim Cox, “Population study bewilders Benton, Newton, Jasper”.

Benton County are fewer and bigger than they were years ago and among the largest in the state...so when one fails, it hits hard.”²⁴ Once fewer and fewer individuals controlled what human actions taken in the county’s landscape, material power became further consolidated. National and international trends may have dramatically affected the farming economy, but the actions during and after the Farm Crisis by local individuals with increased power greatly affected changes made to the land.

The overproduction of crops also took a toll on the rich earth found in Benton County. As farmers continued to till the soil and increase tile drainage, the depth of topsoil drastically decreased not by inches, but by feet due to erosion. In 1983, U.S. Soil Scientist James Barnes, while conducting a soil survey for the county, discovered a 12 acre space in the Oak Grove Township which he said contained “pure black, silt loam...Black Gold is really what it is. It’s our equivalent of Texas oil.”²⁵ This “black gold” is the reason Benton County farm ground was able to produce some of the highest yields in the entire state at the time. This black rich soil is what defined the agricultural production in the county. According to Barnes this “black gold” went on for forty inches, before reaching the subsoil.²⁶ However, just on the other side of the fence, which was farmed for generations, Barnes discovered that the topsoil was only 1¼ feet deep. The study demonstrated the dramatic loss of more than 2 feet of topsoil due to industrialized agriculture practices. In the same article, staff reporter David Smith discussed how the soil, which produced “150 bushels of corn per acre and produced 18 million bushels of corn” and “\$72 million worth of corn and soybeans” in 1982, would no longer be able to support such production levels if

24. Susan Headden, “Problems cause exodus from ‘great prairie’, Nations farm problems hit Benton County hard”, *The Indianapolis Star*, September 30, 1986, Newspapers.com.

25. David Smith, “‘Black Gold’ Erosion Victim”, *Lafayette Journal and Courier*, Nov. 20, 1983, Newspapers.com.

26. David Smith, “‘Black Gold’ Erosion Victim”.

conservation measures were not taken.²⁷ The overproduction of crops after World War II and the practice of tilling soils twice a year not only had repercussions for the farming economy, but also permanently changed aspects of the physical landscape.

The late twentieth century witnessed a great deal of legislative change with the passage of the Clean Water Act of 1972, the Food Security Act (FSA) of 1985, and the 1990 Food and Agriculture Conservation and Trade (FACT) Act. The FSA through its language sought to delineate the classifications and descriptions of what was a wetland. All three acts had profound impact on the conservation efforts advocated by local SCS districts to farmers. After the passage of the 1985 FSA, the Soil Conservation Service was required to assess and determine where wetlands existed. In Benton County and other locations across the U.S., SCS utilized new definitions of what constituted the presence of a wetland.

One of the key results of this farm bill was that past drainage projects, like the channelization of Big Pine Creek and the creation of countless ditches and subterranean tiling, were *grandfathered* in.²⁸ This meant that human alterations to the environment became naturalized as an everyday part of reality despite their very artificial character. Grandfathering the drainage apparatuses meant solidifying that control system into the socio-material landscape of America. Once signed into law, the bill did grant conservationists greater oversight and regulation of future activity involving wetlands. However, the enforcement and assessment of land came down to local Soil Conservation Services.

According to typed correspondence from the district conservationist for Benton County, Greg Hofmeister, these new definitions sought to delineate places that were currently wetland

27. David Smith, "'Black Gold' Erosion Victim".

28. Ann Vileisis, *Discovering the Unknown Landscape*, 300.

habitat and places that were historically once wetland. For the recipients of such letters, seven classifications were outlined. “Soils historically were wetlands but are now determined to be Prior Converted Cropland. Other areas may be outlined and labeled as W (wetland), FW (farmed wetland), CW (converted wetland), AW (artificial wetland), or NW (non-wetland).”²⁹ Local conservationists determined which category surveyed land would fall into. These assessments were completed based on data collected during past aerial photography, soil surveys, National Wetland Inventory maps, field visits, and any additionally required maps and records. On a National level this legislation appeared to be a step forward in the protection of the environment, but the reality at the local level provided a much different story. As historian Ann Vileisis has noted, “SCS agents would have to report suspected Swampbuster violations to Agricultural Stabilization and Conservation committees—groups of local farmers—that made the ultimate decision regarding loss of eligibility for Agricultural Stabilization and Conservation Service subsidies.”³⁰ This meant that farmers, those being reviewed for potential violations, were also the individuals who held the power to enforce such provisions. In small communities across the U.S., similar in character to Benton County, pressure to not police the actions of farmers with regards to wetlands was intensely high.³¹

Moreover, not only did the SCS in Benton County only propose and not decide where violations occurred, but they also allowed for the contestation of wetland classifications on individual farms. In a master copy of a 1990s form letter from the Benton County SCS office, district conservationist, Greg Hofmeister, wrote, “If you do not agree with this determination, you

29. Food Security Act Wetlands form letter by Greg Hofmeister to Local Farmers, 1990s?, District Soil Conservation Service of Benton County, Indiana, United States Department of Agriculture, Benton County Soil and Water Conservation District Archive.

30. Ann Vileisis, *Discovering the Unknown Landscape*, 301.

31. Ann Vileisis, *Discovering the Unknown Landscape*, 301-302.

may request a reconsideration in writing within fifteen (15) days.”³² In Benton County, decisions about the violation or non-violation of the FSA’s regulations came down to local farmers and moreover local farmers could contest the wetland classifications which were foundational to determining whether or not actions were in violation or not.

The soil surveys and recommendations conducted or sent out by the Benton County SCS also were motivated by agricultural production incentives. Time and again the characterization of soil in soil surveys of Benton County and the surrounding counties rested upon the soil’s effectiveness to produce crops. Among the assessments of the soil in the 1980s soil survey is a table on the “Land Capability Classes and Yields per Acre of Crops and Pasture.”³³ Within this table the SCS outlined the number of bushels and tons of corn, soybeans, winter wheat, and hay able to be produced in each soil type found in the county. In addition, table 5 offered recommendations for where prime farmland lay. Most importantly, this section offered not just distinctions between what soils were prime for farming and not, but also noted that some of those lands *required* drainage. Among the list of 51 soil types and their descriptions almost every single type had the preposition added “where drained”.³⁴ By focusing on the productivity of land for profit, soil surveys were conducted with agriculture production solely in mind.

This perspective on the natural world denotes an inherent investment in crop yield ideology rather than ecological knowledge. The soil surveys of the past did not express the ways in which such soils could benefit wildlife or biodiversity but promoted a view of the natural world as merely

32. Greg Hofmeister, Form letter to David Wetli, June 3, 1994, District Soil Conservation Service of Benton County, Indiana, United States Department of Agriculture, Benton County Soil and Water Conservation District Archive.

33. Benton County Soil Conservation Service, *Table 6. Land Capability Classes and Yields Per Acre of Crops and Pasture*, Benton County, Indiana, 1970-1990, 136.

34. Benton County Soil Conservation Service, *Table 6. Land Capability Classes and Yields Per Acre of Crops and Pasture*, Benton County, Indiana, 1970-1990, 137.

a machine for human productive gain. Understanding the way in which scientific classifications of the landscape occurred at the local level and the ways in which local power dictated the enforcement of the 1985 FSA, recognizes the potential for a wide-ranging amount of historical change which happened at the local level and with minimal relation to the national level. Changes to the landscape and the relationship between the non-human world and humans occurred at the local level, even if ideology was promoted at the top.

In addition to the local desire to increase crop yields, during the late twentieth century members of the Benton community and surrounding areas witnessed plans for a different kind of landscape transformation: the creation of a reservoir. In the 1960s, plans to construct a dam on Big Pine Creek in northern Warren County, which would generate a substantial lake within parts of Benton and Warren counties, was brought forward to the state government. The 1,126 acre planned Big Pine Lake met significant outcry from community members in both Benton and Warren Counties. Among those protesting was Helen Fry, who actively protested the dam construction going so far as to follow then U.S. Representative John Myers around a local golf course with anti-dam pickets.³⁵ While the construction and funding for the dam was stalled several times over the 1970s and 1980s, it was not until 1990 that the plans were officially withdrawn from all consideration.

The proposed dam created commentary on Big Pine Creek and its condition like never before. Other locals had voiced concerns ranging from human displacement, damage to fish and animal populations, destruction of natural waterways and filtration, and the attraction of more recreation seekers from outside the area. The U.S. Fish and Wildlife Service's third study over the years of the plan's consideration noted, "It said the reservoir would destroy 1,126 acres of wildlife

35. Joe Gerrety, "Wildcat and Big Pine reservoirs Deauthorized", *Lafayette Journal and Courier*, Jan. 13, 1990, Newspapers.com.

habitat and would damage an additional 6,104 acres of wildlife habitat.”³⁶ Considerations for the lake and others in Tippecanoe county reached all the way to the nation’s capital. Amidst the opinions published in the *Lafayette Journal and Courier* about the dam over the years, one key theme emerges. Several times individuals mentioned the natural status of Big Pine Creek. One particular opinion piece written by Harold C. Dimmich in 1987 stated, “From the beginning of time, Big Pine Creek has been a beautiful, unmolested, scenic stream...Unspoiled, never tampered with, it fitted into the lifestyle of the area, and for miles around.”³⁷ Of course, what such arguments failed to notice was the quite real ways farming in the area had changed this waterway and how dredging had forever reshaped the way water flowed through the watershed. In fact, individuals continued to alter that landscape throughout the late twentieth century.

The expansion of ditches and implementation of terraces in Benton County led to further alterations. As late as 1987, the local SCS department of Benton County was creating plans for the expansion of drainage ditches in the county.³⁸ Alongside the construction of terraces, a technology meant to control the flow of water through the creation of elevation levels in the landscape, the maintenance and expansion of ditches further shaped the plant and animal habitat available throughout the county. This acknowledges that changes occurred from both crop farmers and from conservationists. Industrialized agriculture was being grandfathered in as an unquestionable system. While the production of food is vital to the lives of humans across the globe, the United States has long been the site of overproduction for market gain rather than subsistence. So, when

36. *Lafayette Journal and Courier*, Regional Report, “State League Plans to Fight Reservoirs”, Dec. 29, 1975, Newspapers.com.

37. Harold C. Dimmich, “Leave Big Pine Creek Alone!”, *Lafayette Journal and Courier*, Feb. 20, 1987, Newspapers.com.

38. Benton County Soil Conservation Service, *Blueprint of Blake Ditch*, June 1978, Hand-drawn blueprint, Benton County Soil and Water Conservation District.

we consider arguments made for the continuation of industrialized agriculture for the preservation of human life, it is important to recognize that the United States produced more crops and food than needed in the twentieth century.³⁹

Beyond Borders: Sam Washburn, the Transnational Market, and Agribusiness

In the early months of 1974, Secretary of State Henry Kissinger said, “We are now living in a never-never land in which tiny, poor, and weak nations can hold up for ransom some of the industrialized world.” What had transpired in the new year to prompt such an emotionally charged statement of contempt from the U.S. Secretary? In short, it was the U.S.’s shocking dependence upon international energy sources. In the fall of 1973, Saudi Arabian Arab Petroleum placed a trade embargo upon oil shipments to the United States. The embargo increased the price of petroleum products from OPEC in the U.S., including gasoline, by seventy percent. For the first time, Americans found themselves lined up for hours at gas stations across the country paying heavily for their dependence upon oil.⁴⁰ Energy, in this case, oil, was the foundation by which the American nation-state had expanded.

What had prompted such an embargo from Saudi Arabia? Kissinger and President Richard Nixon in the fall of 1973 gave U.S. support to Israel in their war with Egypt. Their decision to aid the Israeli state was made without considering the potential for economic ramifications and by deeply underestimating the power of the middle east.⁴¹ However, they soon recognized the power of middle eastern countries and the new global economic world birthed by two decades of policies

39. R. Douglas Hurt, *Problems of Plenty*, 124-127.

40. Daniel J. Sargent, Naill Ferguson, Charles S. Maier, and Erez Manela, *The Shock of the Global: The 1970s in Perspective*, (Cambridge, MA: Harvard University Press, 2010), 50-51.

41. Daniel J. Sargent, Naill Ferguson, Charles S. Maier, and Erez Manela, *The Shock of the Global*, 51.

under U.S. Liberalism. Such policies transformed ag. business thereby forming a new global order with non-state actors playing the pivotal role in international trade rather than state agents.

During the World War II era, agriculture was subsidized by the U.S. government to promote an expansion and further industrialization of food production. After the end of the war, the U.S. government feared a recession as military manufacturing needed to be transformed into civil production, and economists sought to maintain war-time food production levels.⁴² To counter any kind of profit reduction, the U.S. continued to urge farmers to farm more and more land and funded immense technological advancements in farming operations. The government's motivations for such economic policies were two-fold. First, it hoped to undercut any decrease in farming salaries before it began, and secondly, it sought to increase profit by supplying the war torn world and the decolonizing world with the country's excess products.

In *Gateway State: Hawai'i and the Cultural Transformation of American Empire*, historian Sarah Miller-Davenport provides a history of the changing social ideologies of America during this transitional period. "Liberal corporate multiculturalism emerged," just as U.S. state and non-state actors sought to prove "American good intentions to people of color around the world, and particularly in Asia."⁴³ Not only did this promote a narrative in which the U.S. was the protector of the free world in the context of the Cold War, but it also allowed the U.S. to expand its economic dominance. "Thus the new inclusionary ethos...was not simply the product of moral or intellectual enlightenment; it also fulfilled the strategic demands of American empire."⁴⁴ America continued

42. Food and Agriculture Organization of the United Nations, "The State of Food and Agriculture 1955: Review of a Decade and Outlook," (Rome, Italy: United Nations), September 1955.

43. Sarah Miller-Davenport, *Gateway State: Hawai'i and the Cultural Transformation of American Empire*, (Princeton, NJ: Princeton University Press, 2019), 15.

44. Sarah Miller-Davenport, *Gateway State*, 15.

its dominance of the global south by perpetually characterizing itself as the benevolent supplier of food and goods to the world's hungry and misfortunate.

In the short term, this worked exceptionally well for the national economy, funneling money into the booming 1950s American consumer culture and thereby helping to produce a life of newfound prosperity for a large portion of white Americans. However, slowly war-torn countries and the global south became economically stable. As part of decolonization new nation-states entered the global market as they industrialized, producing many basic products previously produced only in "the West."⁴⁵ Throughout the 1950s and 1960s, the economies of the first world and third world slowly became entangled through economic interdependence. And it was that relationship, built through multiculturalism and trade deals, that abruptly showcased the new globalized economic world in 1973.

In the early 1960s, a young man named Sam Washburn, having return home to rural Benton County, Indiana started farming 400 acres on his own in Gilmore Township. This was only the beginning of Mr. Washburn's involvement in meat production. Over the next decade, this young farmer from the rural Midwest became a crucial actor in the global beef trade in the U.S. His journey from lamb, beef, and crop farmer to President of the National Cattlemen's Beef Association (NCBA) in 1980 and on would bring him to the oval office to meet with 5 different American Presidents from Jimmy Carter to George W. Bush. Washburn was a part of a growing number of non-state actors who became the agents of international economic flows during the 1970s.

Historian Daniel J. Sargent argues in the second chapter of *The Shock of the Global* that even though, "cross-border flows and the proliferation of non-state actors are symptoms of

45. Daniel J. Sargent, Naill Ferguson, Charles S. Maier, and Erez Manela, *The Shock of the Global*, 45,146.

globalization, they are not the full story. Globalization...involves politics and governance...”⁴⁶

The nation-state and elected officials did continue to influence transnational relations as witnessed by the Oil Crisis of 1973. However, as this paper seeks to demonstrate, Sam Washburn’s story showcases just how significant individuals were to global trade and the transportation of American agricultural products.

Sam Washburn grew up in Kentland, Indiana the second son of a local farmer. As the second son, he was not considered to inherit the family business by either his father or older brother.⁴⁷ After graduation, he left the farm and attended Hanover College located in southern Indiana in the fall of 1951. During his senior year, Washburn, majoring in business and economics, decided that he wanted to try farming on his own. Not having courses in agriculture he decided to apply to graduate school at ten of the country’s top agricultural schools. After successfully being admitted into the University of California-Berkeley he was drafted for the Korean War. Ultimately, because he was a graduate student, married, and expecting a child, Washburn was never officially drafted and did not serve in the war.⁴⁸ This, however, had brought him back to Benton County where he decided to gain a Master of Science degree from Purdue in Agriculture Production in 1959.

He purchased some ground from his Aunt in Benton County and began farming by raising lamb and planting row crops. It was “luck and inflation” that helped put him in business allowing him to purchase more land over time based upon the equity of the first.⁴⁹ After several years, Washburn expanded from a couple hundred heads of lamb to 5,000 towards the end of the decade.

46. Daniel J. Sargent, Naill Ferguson, Charles S. Maier, and Erez Manela, *The Shock of the Global*, 53-54.

47. Sam Washburn, interview by Phillip A. Voglewede, West Lafayette, November 13, 2020.

48. Sam Washburn, interview, West Lafayette, November 13, 2020.

49. Sam Washburn, interview, West Lafayette, November 13, 2020.

This level of production was bolstered by his innovative use of vegetable byproducts such as below-grade peas which he used as a source of protein-rich powder. According to Washburn the farmers around him, “Just didn’t get what I was doing. They kept on farming the way their father and his father before him had farmed. They were not willing to change.”⁵⁰ He relied upon visits from Purdue agriculture professors and experimentation to determine the best ratio of silage and byproducts to provide an efficient dietary balance, which eventually earned him an honorary doctorate from Purdue. As his lamb production grew too large for the local markets, he found access to New York City markets by shipping the lambs to slaughter at a New York kosher meat processing plant. His involvement in new feeding strategies and his presence in large national markets gave him recognition in the NBCA and the National Lamb Feeders Association (NLFA).

In the late 1970s, he became influential in international trade deals such as the High-Quality Beef Deal with Japan and the U.S. Meat Import Act of 1979, which included the countries of New Zealand, Australia, Canada, and the U.S. He was among the team which brokered the deal with Japan to place quality beef imports at 10,800 metric tons per year. However, the deal which brought much more attention and eventually led to him becoming President of the NCBA in 1980, was his controversial meeting with New Zealand, Australia, and Canada at the Calgary airport in 1978. Until that meeting, the NCBA had been lobbying forcibly for restrictions on meat imports which they believed flooded their markets at home. It was there at the bar in the Calgary airport that Sam Washburn bought a fifth of whiskey for each delegation, instructed his delegation to not drink more than two drinks, and eventually brokered an interdependency deal.⁵¹ Afterward, Washburn testified in congress several times and helped draft a bill to make that very deal U.S.

50. Sam Washburn, interview, West Lafayette, November 13, 2020.

51. Sam Washburn, interview, West Lafayette, November 13, 2020.

law. The bill passed Congress in 1978 but was vetoed by President Jimmy Carter because it did not allow enough beef imports and stripped the presidency of regulation of meat imports established during the WWII era.⁵² Finally, on the last day of the year 1979, President Carter signed into law a revised version of the 1978 bill.

The majority of this law has stood for the last 39 years as the basis for meat importation from New Zealand, Australia, and Canada. More importantly, Washburn's efforts did not go unnoticed and his presidency of the NCBA launched him into national politics for decades as well as led to his employment with the United States Agency for International Development (USAID) and independent banks and investor groups. He traveled the globe reviewing failed agriculture projects in South Africa, Somalia, South Korea, Jamaica, Taiwan, and according to him "Anywhere you can make a deal."⁵³ His work entailed the sale of agricultural goods and machinery to these nations as well as the shipment of animals and creation of industrialized facilities. "On each project, we'll have our own employees operating and living on site.' The company employs both Westerners and Chinese, so training in U.S. farm technology and methods is a part of the deal, too."⁵⁴

In the 1980s, Heifer International (HI) was shipping two-year-old beef heifers to a Jamaican facility. Each time the company sent cattle every single one would die within two weeks. By this time Sam Washburn had traveled to South Africa and completed work in multiple countries. HI asked Washburn to become a board member to overlook the project and make it successful. Washburn declined the position but knew exactly what the problem was. It was something he had

52. Jimmy Carter, Memorandum of Disapproval of the Meat Import Bill Online by Gerhard Peters and John T. Woolley, The American Presidency Project, <https://www.presidency.ucsb.edu/node/244087>.

53. Sam Washburn, interview, West Lafayette, November 13, 2020.

54. Betsy Liley, "Farmer Finds Success Overseas".

already experienced in Taiwan. Common Euro-American breeds of cattle such as Angus and Herford, could not withstand the heat of the tropics. The moisture and heat caused hoof rot, and many were not immune to the kinds of diseases known to the Jamaican environment.⁵⁵ In addition, attempting to bring pure breed American cattle to the Jamaican countryside without quarantining for two weeks, Washburn knew, created an environment able to induce shock and spread illnesses. Washburn's advice was what he had been practicing for the last decade. To generate large beef operations the cattle from America needed to be cross-bred with Zebu cattle, a breed from South Asia and Africa, so that they could survive drought-like or tropical climates.⁵⁶

Sam Washburn was never an elected official, yet his work overseas illuminates how attempts at recreating American beef operations in developing countries, by independent investors and the U.S. government, sometimes failed for environmental reasons. He worked in over twelve different countries selling and distributing cross-bred cattle, selling lambs, and reviewing projects ranging from fishing operations on the coast of Somalia to a water buffalo milking facility in India. At all of the successful operations he reviewed, the main reason they remained operational was that the managers at each often stole a percentage of the profits on top of their salaries. This kind of larceny was common practice. Washburn noted that often the reason locations failed was because they were not efficient and did not try to innovate the type of feeding or conduct blood testing to ensure survival.

At every turn, he brought a team of linguistics and veterinarians with him.⁵⁷ So while his story demonstrates the power of one individual to transform global trade agreements for over thirty

55. Sam Washburn, interview, West Lafayette, November 13, 2020.

56. Sam Washburn, interview, West Lafayette, November 13, 2020.

57. Sam Washburn, interview, West Lafayette, November 13, 2020.

years, he was not alone. The ability to distribute American agriculture rested upon advancements in science, genetic experimentation, and communication between non-state actors such as businessmen, translators, veterinarians, pilots, and locals. Networks were established between Benton County and other parts of the world, bringing with it the same industrialized processes used to transform the landscape of the American mid-continent. More than that, however, Washburn's business adventures illuminated how he viewed the United States agriculture compared to other countries' systems. Washburn emphasized, "We're coming in with technology that far exceeds anything they have."⁵⁸ The ways in which humans had changed the land of Benton County would clearly find their way to places far beyond the North American continent.

Establishing Local Conservation Systems

In response to soil erosion data and to national incentives, the Benton County SCS during the late twentieth century assisted in the construction of a series of terraces in the county. Terraces are human made structures intended to diminish the level of surface soil erosion by slowing the movements of water. The creation of such structures requires the building of levels of waterways adapted with spill ways. These required extensive disruption of soils for their implementation and required the use of ecological technologies such as tile drains (See Figures 18-19). In Benton County, these were largely made in places of higher elevation where the levels of terraces could be created to slow the erosion of soil from higher to lower elevation.⁵⁹ At least five of these were constructed within the Big Pine Creek Watershed and altered the landscapes physical appearance (See Figure 20). These systems were evidence of yet another way in which humans sought to

58. Betsy Liley, "Farmer Finds Success Overseas".

59. Found through the comparison of Figure 19 and topographic maps of Benton County.

control the flow of water and the natural world. The terraces, while partially successful in slowing the rate of soil erosion from runoff, were constructed as a method of continuing high levels of cash crop production.



Figure 18. Photographic negative depicting the construction of a terrace in Benton Co., Indiana, Benton County SWCD

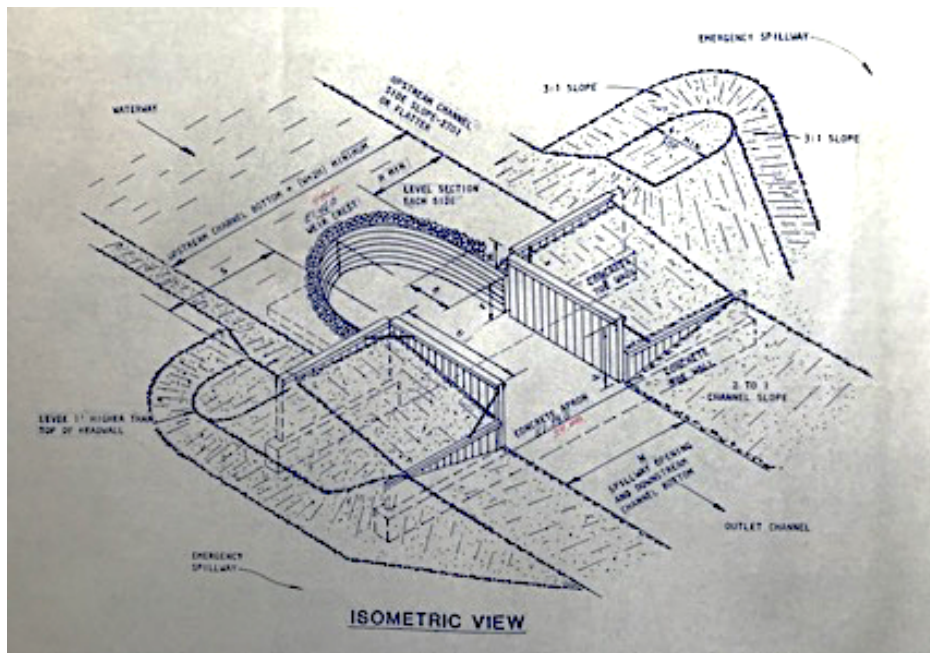


Figure 19. Isometric View of 1984 Plan for Terrace, 1984, Reproduced with permission of Benton County Soil and Water Conservation District (SWCD)



Figure 20. Map of Benton County with sites of terraces marked, Benton County SWCD

Amidst plans for a terrace from 1984, conservationists noted what plant life was acceptable for planting in the disturbed topsoil caused by machinery. There they listed three plant species: Kentucky Bluegrass (*Poa pratensis*), Tall Fescue (*Festuca arundinacea*), and Emerald Crown Vetch (*Coronilla varia*). Kentucky Bluegrass is not a North American species of grass, despite what its name may imply. Furthermore, all of these species were never a part of the centuries of plant evolution which had developed the pre-colonial era plant life of Benton County. Due to adaptations to places with the low competition and disturbed topsoil these species are especially adept at spreading in environments in which they are introduced.⁶⁰ This was the intent of their introduction to disturbed soils. The dispersal of such species introduced new relationships to the biological competition amongst plant life in Benton County. The ability of such plants to migrate to other parts of the county was high; so, too, was the potential for seeds to travel by water to other places in Indiana.⁶¹ In addition to the introduction of such species, the plans from 1984 also cite the use of broadleaf herbicide to the terraces. While these conservation practices answered the need to stop soil erosion, they failed to recognize the potential side effects of introducing new species and applying chemicals to pipelined waterways.

During the 1980s, chemical use continued to be a regular appearance in the crop fields of Benton County. Faced with depleting soil fertility, chemical fertilizers offered a technological fix to soil erosion and overproduction. Chemicals were manufactured hundreds, if not thousands, of miles away from fields. And tons of chemical fertilizers and insecticides traveled that distance along millions of miles of steel railroad tracks, which crisscrossed the continent forming yet

60. Gucker, Corey L. 2009. *Securigera varia*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <https://www.fs.fed.us/database/feis/plants/forb/secvar/all.html> [2020, April 10].

61. For more details about the history of plant migrations see Alfred Crosby *The Columbian Exchange: Biological and Cultural Consequences of 1492* (Westport: Praeger, 1972) ; Alfred Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900-1900* (Cambridge: Cambridge University Press, 1986).

another human network. The dangers of locomotive travel expressed in Cronon's *Nature's Metropolis* only expanded once large quantities of corrosive and sometimes lethal chemicals began to ride the rails. No longer did individuals and city officials solely have concern for traffic incidents between trains and residents, as there was now greater concerns about what derailment with chemicals might bring. In fact, so many derailments occurred in the area over the span of three years from 1980-1983, that calls for better rail plans for Warren, Tippecanoe, and Benton Counties arose.

While some derailments did not occur in places of high human populations and most did not involve any human deaths, the potential for catastrophe was high. No single event better proves this point, than a train derailment in Benton County outside the city of Fowler in 1981. Early in the morning on Tuesday, March 24th, a train pulling 80 rail cars jumped the rail and crashed spilling, "more than 36,000 gallons of caustic poisonous crop fertilizer..."⁶² The fertilizer in question was phosphoric anhydride-77 percent, otherwise known as phosphorus pentoxide. Initially a white powder, the chemical reacts violently with water and once introduced to moisture in the air, begins to turn into a gel or a liquid.

Phosphorus pentoxide (P_4O_{10}), a common component for crop fertilizers at the time, was transported inside thick rubber bladders within train cars. This was done in order to prevent the corrosive chemical from critically damaging the metal hulls. Occurring at 3:30 in the morning, eight cars of the train derailed and collided rupturing two of the hulls.⁶³ A caustic and corrosive material, phosphorus pentoxide can create significant damage to the respiratory system, generate chemical fires when in contact with water, form toxic gases, raise the acidity of waters, and create

62. Kevin Cullen, "Train Spills Dangerous Chemical", *Lafayette Journal and Courier*, March 24, 1981, Newspapers.com.

63. Kevin Cullen, *Journal and Courier*, "Train Spills Dangerous Chemical".

severe burns when in contact with organic material. Luckily for the human population of the county no one was injured or killed as the spill occurred a quarter mile away from any homes. As a member of the Benton County Civil Defense, Dr. Dwight Cochran, noted, “If this had to happen, it couldn’t have happened in a better place. It’s ideal.”⁶⁴ It was ideal for human populations. Had the derailment occurred in a city and the chemical spilled into a sewer system an explosion due to the release of hydrogen gas would have been extremely plausible.

Noticeably lacking in news reports and in comments made by those in charge of cleaning the wreckage, was mention of how this incident would impact the environment surrounding the spill. While limestone, a base commonly used to neutralize acids, was able to be quickly brought to the sight from nearby Fowler, the chemical had spilled “into deep drainage ditches on either side of the track.”⁶⁵ A description of how much water those ditches contained at the time was never made. Despite this, it is likely that any drainage ditch characterized as “deep” was designed to hold a certain amount of water, given that this is the entire purpose of their formation. If it was holding water, then the spilled chemical would have drastically affected the aquatic life found therein simply by quickly raising the pH level, if not by generating chemical burns. While local bulldozers moved soil to contain the spill, getting that kind of equipment to the scene so early in the morning would have taken time.⁶⁶ Furthermore, if the ditch was connected to other waterways, then the potential that this hydrophilic acid traveled beyond the wreck was extremely high.

Still manufactured today, the results of exposure to phosphorus pentoxide are still not well known. Four different Material Safety Data Sheets (MSDS), including one made by the Environmental Protection Agency (EPA), all denote that the long term toxicity of the chemical

64. Kevin Cullen, “Train Spills Dangerous Chemical”.

65. Kevin Cullen, “Derail”, *Lafayette Journal and Courier*, March 24, 1981, Newspapers.com.

66. Kevin Cullen, “Derail”.

cannot be fully determined since there is inadequate information to do so.⁶⁷ This is because there has never been a conclusive and comprehensive scientific study on the adverse effects of phosphorus pentoxide. A MSDS printed in 2010 by Santa Cruz Biotechnology, Inc. states, "...the material may present a danger, immediate or long-term and/or delayed, to the structure and/or functioning of natural ecosystems."⁶⁸ All four of the MSDS specifically mention to not allow the chemical to enter aquatic environments. One potential outcome of the chemical's interaction with water is the creation of phosphoric acid. This particular acid is corrosive to skin, eyes, and the respiratory system as well as in excessive amounts can lead to long term effects such as heart disease and osteoporosis. The phosphorus released by the chemical generates one key problem for aquatic life, eutrophication. "...eutrophication shows a rapid growth of algae in surface waters...these algae cause oxygen depletion in deep water and shallow water..."⁶⁹ Oxygen depletion can lead to the death of fish and other aquatic life and eutrophication today is the biggest contributing factor to the Gulf of Mexico's hypoxic zone.

While it is impossible to calculate the environmental effect which the 1981 spill created, some aspects of the few studies completed provide a glimpse at the threat of such high quantities of the chemical. The EPA's MSDS specifically notes this research:

"The only data regarding inhalation exposure to phosphorus pentoxide are acute toxicity data provided by Ballantyne (1981) in an abstract. The investigator exposed male rats, rabbits, mice, and guinea pigs for 1 hour to phosphorus pentoxide smoke...followed by a 14-day observation period...Most deaths occurred within 24 hours of exposure. In all species, the respiratory tract was the target of toxicity."⁷⁰

67. See, Santa Cruz Biotechnology, Inc., *Phosphorus Pentoxide* (Santa Cruz, CA: Chemwatch, 2010), Sigma-Aldrich, *Phosphorus Pentoxide Safety Data Sheet* (St. Louis, MO: Sigma-Aldrich, March 19, 2014), ThermoFisher Scientific, *Safety Data Sheet* (Fair Lawn, NJ: Fisher Scientific, April 19, 2018), and U.S. Environmental Protection Agency, *Provisional Peer Reviewed Toxicity Values for Phosphorus pentoxide* (Cincinnati, OH: National Center for Environmental Assessment, Sept. 2007).

68. Santa Cruz Biotechnology, Inc., *Phosphorus Pentoxide MSDS* (Santa Cruz, CA: Chemwatch, 2010).

69. Santa Cruz Biotechnology Inc., *Phosphorus Pentoxide MSDS*.

70. U.S. Environmental Protection Agency, *Provisional Peer Reviewed Toxicity Values for Phosphorus pentoxide*.

While the data sheet mentions that this is not enough data to adequately understand the effects of phosphorus pentoxide, the results of the test are shocking. The MSDS from the EPA in 2007, Santa Cruz Biotechnology, Inc. in 2010, Sigma-Aldrich in 2014, and ThermoFisher Scientific in 2018 all inform that the chemical causes contact burns to the skin, lungs, mouth, throat, and eyes when exposed. The full damage caused by the 1981 spill is unknown, however, the chance that the flora and fauna of the ditch were exposed to the chemical is almost certain.

There is no data on the longevity of this chemical in the environment. Additionally, the report of the derailment cited that this was not the first spill of its kind. "...a similar incident occurred 1 ½ miles south of here three years ago."⁷¹ How well these spills were cleaned is difficult to determine, since it was tasked to chemical companies to make sure the phosphorus pentoxide and contaminated soil was removed. Outside of these spills, however there was another chemical threat emerging from tile drainage technology.

Recent research in the twenty-first century has noted a growing zone of hypoxia in the Gulf of Mexico. In an article published in 2015 by the American Society of Agronomy, two new studies have demonstrated that algae blooms in aquatic environments have been linked to higher phosphate and nitrogen levels in water sources. In the Gulf of Mexico, a region of the waters at the confluence of the Mississippi River and the Ocean, hypoxic conditions have continued to develop.⁷² Hypoxia is a condition where oxygen levels in the water are reduced hindering aquatic life which rely on substantial amounts of oxygen. As excess nutrients enter the Mississippi River

71. Kevin Cullen, "Derail".

72. Rabalais, Nancy N., R. Eugene Turner, and William J. Wiseman Jr. 2001. "Hypoxia in the Gulf of Mexico." *Journal of Environmental Quality* 30 (2): 320–29. doi:10.2134/jeq2001.302320x.

from agriculture in the midcontinent, hypoxic zones in recipient bodies of water develop.⁷³ These excess nutrients promote algae blooms which in turn reduce the oxygen levels found in large bodies of water such as the Atlantic Ocean and Lake Erie. These studies have found that subterranean agriculture tiling transports fertilizers from farm fields to ditches and creeks. From there those watersheds deposit percentages of added nutrients to the major rivers of the midcontinent. The exact number and placement of agricultural tiling is unknown; however, estimates have shown that at least 40% of the Midwest has been tiled.⁷⁴ Although that is a very low estimate. These tiling systems have altered not only the farming landscape of the Corn Belt but led to environmental problems thousands of miles away.

In 2013, the Big Pine Creek Watershed was selected from among a list of tributaries to the Wabash River, which contributed the highest amounts of river contaminants, for environmental management. A management plan was created for the watershed in 2015. This plan noted that several areas in the watershed had above state regulation levels of supplemental nutrients, E. coli, and eroded soil sediments.⁷⁵ This plan notes that drainage tiling has contributed to the contamination of Big Pine Creek and its headwaters. So far, no federal regulations have been made on the construction of agricultural tiling systems. Because of this it is likely that the expansion of such systems will continue into the future. Today, the Benton County Soil and Water Conservation District and the Natural Resource Conservation Service aim to educate the population of Benton County about sustainable practices and environmental awareness.

73. Madeline Fisher, "Tile Drains A Major Path for Phosphorus Loss, Studies Find," Science News, American Society of Agronomy, October 10, 2014, <https://www.agronomy.org/news/science-news/tile-drains-major-path-phosphorus-loss-studies-find>.

74. Madeline Fisher, "Tile Drains A Major Path for Phosphorus Loss, Studies Find".

75. Big Pine Creek Steering Committee and The Nature Conservancy, *Big Pine Creek and Mud Pine Creek Watershed Management Plan*, 2015.

During the late twentieth century, Benton County was shaped by conservation and agriculture alike. It acquired its first reconstructed habitats in the 1980s and saw its first reconstructed wetland in 1995. Humans in conservation and industrialized agriculture reshaped the landscape over and over. These physical changes occurred in response to national and state action, but they required local level interest and action. As this study has sought to demonstrate environmental changes occur largely in response to local decision-making.

Beyond the threats of overproduction, crop field chemicals, and continued human intervention, the history of the reconstruction of wetland habitat offers insights into the motivations behind conservation activism. As historical geographer Robert Wilson and historian Philip Garone have pointed out, leisure culture has a long history at the center of wildlife habitat creation.⁷⁶ Because the majority of naturally occurring wetlands across the continent were destroyed by the mid-twentieth century, conservationists had to build new ones out of the grid of irrigation and water drainage systems which farmers had constructed.⁷⁷ While Wilson assessed the Fish and Wildlife Services' construction of the Wildlife refuge system, conservation efforts in Benton County occurred in the 1980s through the Indiana Department of Natural Resources. In common with Wilson's and Garone's historical narratives, however, is the presence of Ducks Unlimited. The aim of that organization was and still is today, to fund the set aside of property for wildlife use and the practice of hunting. Ducks Unlimited, as well as the Indiana DNR, helped establish crucial new wildlife habitat areas in the county.

Moreover, the creation of those habitats was complicated and not without side effects. The vast majority of the wildlife habitats constructed during the late twentieth century were made for

76. Garone, Philip. *The Fall and Rise of the Wetlands of California's Great Central Valley* (Los Angeles: University of California Press, 2011), 156-158.

77. Robert M. Wilson, *Seeking Refuge*, 5-6.

Ring-Necked Pheasant hunting. These “gamebird” habitats, as they came to be named, serve as a reminder that conservation in the county rested upon human gain. The side effect of such ideological underpinnings is that the habitats were rarely created for the reestablishment of biodiversity and often included the introduction of new species, like Ringed-Necked Pheasants, for sport hunting (See Figure 21). However, their creation did mean that fewer acres continued to be plowed and wildlife could find places to breed, travel, and develop.



Figure 21. Ring-Necked Pheasant Cock, Benton County, Indiana, c. 1980s, Benton County SWCD

By studying the reconstruction of habitats in Benton County, human motivations for change become clear. Since the first reconstructed habitats in Benton County were created for gamebirds, it is clear that hunting was used to incentivize set aside practices. Despite the dispersal of introduced species, the construction of any kind of habitat within Benton County is crucial to the migration and potential habitation of birds, insects, and plants within the county.

Since local politics influenced the physical landscape of the American midcontinent, more historical work needs to examine the local areas and watersheds of the Midwest. To understand the origins of such interventions, however, one must look to the effect of local affairs on global issues.

No matter how diligently the state and county worked in the 1980s to recreate lost habitats, some species never returned. The loss of the Greater Prairie Chicken (*Tympanuchus cupido*) in the entire state of Indiana by the late 1960s occurred without much notice.⁷⁸ For if many Hoosiers had noticed, then perhaps their decline would have reversed. Over the years, their vast numbers living in the northwest Indiana prairies witnessed the destruction of habitat by the plow and decreased in the face of excessive hunting. As one account goes, “The number of these birds were simply incalculable...So plentiful they were that one hunter...is said to have killed 144 birds in one day in the 1840s.”⁷⁹ Many prairie chickens were sold for a profit at Chicago markets where buyers showed interest in their meat as well as their feathers. By the late 1920s, environmental writers and advocates began to voice the need to preserve space for the Greater Prairie Chicken. “After his game survey of Indiana in 1929, Aldo Leopold stressed the need for a refuge system to preserve the prairie chicken in Indiana. It never happened.”⁸⁰ The Greater Prairie Chicken was the victim of the plow and the assumption that they were nearly limitless in number. And while the county’s gamebird habitats of the 1980s provided spaces for other species, not a single Prairie Chicken existed in the county nor was there enough habitat in order to successfully reintroduce them.

78. John McMahan, “Prairie Chicken Loses Out as Settlers Gobble Up Space”, *The Republic* (Columbus, Indiana), Jan. 9, 1982, Newspapers.com.

79. John McMahan, “Prairie Chicken Loses Out as Settlers Gobble Up Space”.

80. John McMahan, “Prairie Chicken Loses Out as Settlers Gobble Up Space”.

A Partial Success Story

In the early 1990s, a section of 700 acres of previously farmed land was purchased by the Indiana DNR. While the original purpose of this habitat was to provide space for quail and pheasants, in 1995 Ducks Unlimited and the Indiana DNR worked together to restore part of the property into open wetlands.⁸¹ This led to the creation of 100-150 acres of wetland which in 1997 became known as the Robert Feldt Marsh. This property was planted with crops to promote the presence of waterfowl species such as Mallard Ducks (*Anas platyrhynchos*), Northern Pintail (*Anas acuta*), and Snow Geese (*Chen caerulescens*). Most importantly though the construction of this artificial wetland was made possible by the reengineering of the agricultural tiling system which had previously worked to drain the landscape. By damming the original drainage ditch with a levee system the acreage was able sustain water levels. A bird survey from the late 1990s shows the presence of aquatic species once again visiting this area on migratory travels.⁸²

Like the complicated nature of the SCS mentioned earlier, Benton County conservation efforts advocated for the protection of the soil to preserve the ability to farm rather than to create biodiverse environments. Most achieved conservation measures, in Benton County during the second half of the twentieth century, were intentionally aimed at human leisure culture and to sustain industrial agricultural production. Industrialized agriculture was not the only human practice which had altered the landscape of the twentieth century. While conservation efforts did help to reduce the rate of soil erosion in the U.S., they did not reconstruct wetlands or habitats with the sole purpose of increasing the health of the environment for native wildlife largely until the

81. John B. Dunning, Jr. and Thomas M. Braile, *Checklist of the Birds of Benton County, Indiana*, (West Lafayette: Purdue University Cooperative Extension Service, 1998), <http://www.agcom.purdue.edu/AgCom/Pubs/menu.htm>.

82. John B. Dunning, Jr. and Thomas M. Braile, *Checklist of the Birds of Benton County, Indiana*, 3-5.

late 1990s. Due to agriculture practices species of native birds such as the Greater Prairie Chicken (*Tympanuchus cupido*) no longer exist in Benton County. Instead conservation has brought the Ring-Necked Pheasant in its place.

The Agency of Nature in Benton County

Despite the long list of human interventions and environmental harm consistent across the history of Big Pine Creek, nature has defied the boundaries placed upon it at every turn. Evidence of this can be seen in the changes in the flow of Big Pine Creek Ditch since its original channelization in 1923. Over time the waterway defied the straightened path made by human ecological technologies (See Figures 22-24). Flooding and shifting waterflow continued to reshape the trajectory of the creek across the county to the chagrin of farmers along its path.⁸³ Floods occurred throughout the second half of the twentieth century in Indiana to which SCS often sought to find solutions.⁸⁴ However, it is important to note that such flooding and shifts occurred ,and continue to occur today, not only because of natural movements, but also as a result of human manipulation of the water system.

83. Big Pine Creek Steering Committee and The Nature Conservancy, *Big Pine Creek and Mud Pine Creek Watershed Management Plan* (Fowler: Benton County Soil and Water Conservation District, 2015).

84. US Department of Agriculture Benton County Soil Conservation Service, *Legend Sheet for C.L. Baum's Set of Watershed Slides*, by Benton County SCS. 1961.

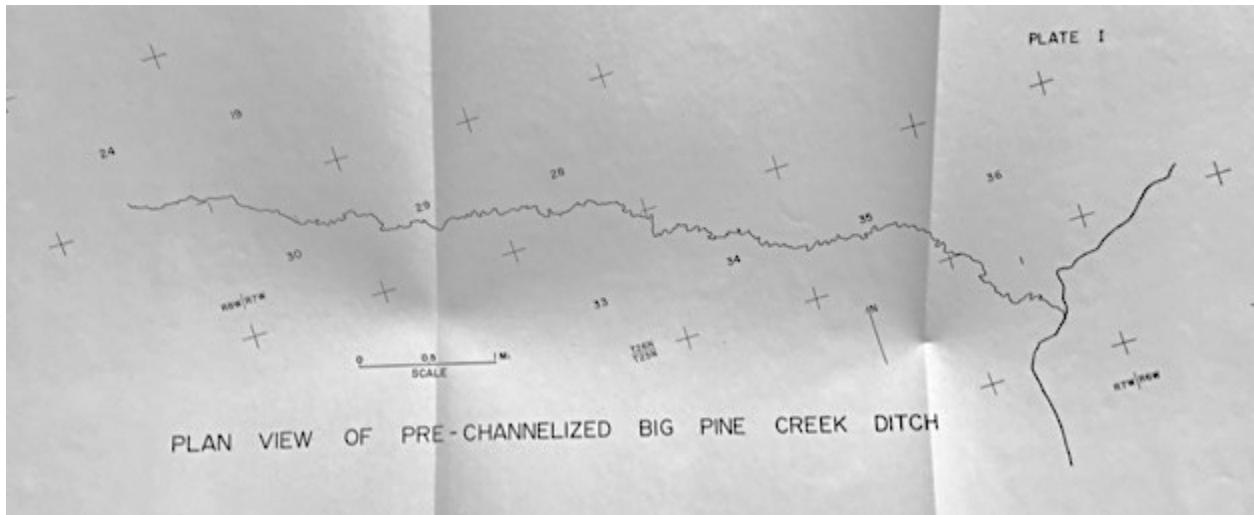


Figure 22. Plan View of Pre-channelized Big Pine Creek Ditch, by Robert S. Barnard, c. 1976.

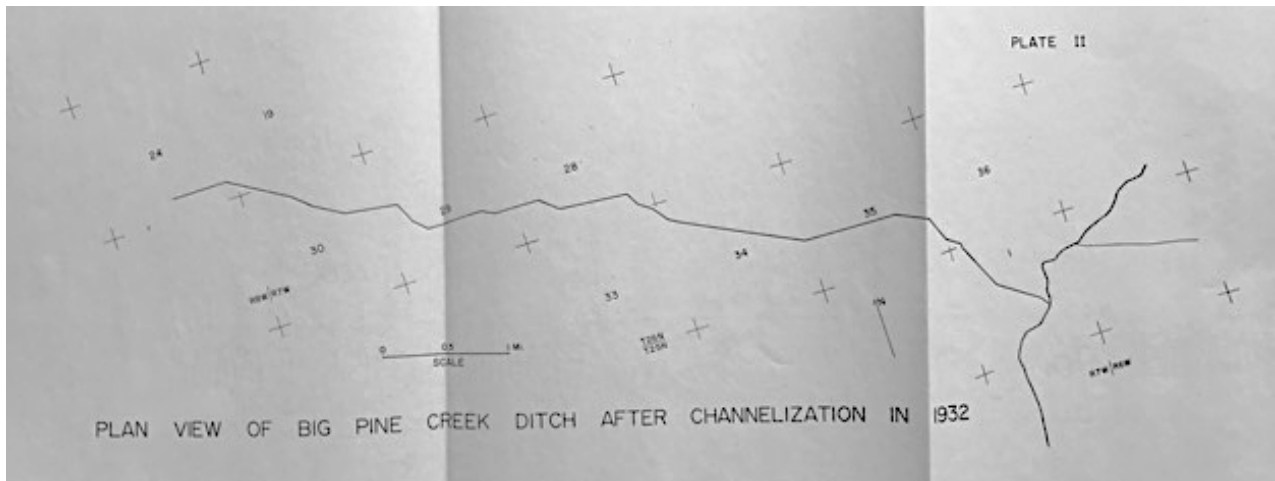


Figure 23. Plan View of Big Pine Creek Ditch After Channelization, by Robert S. Barnard, c. 1976.

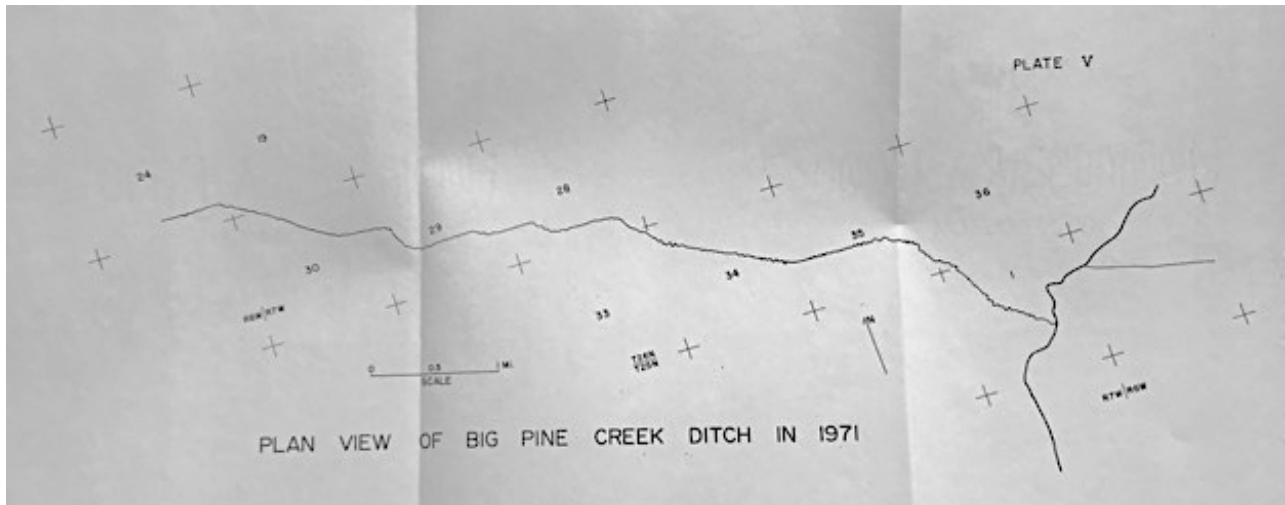


Figure 24. Plan View of Big Pine Creek Ditch in 1971, by Robert S. Barnard, c. 1976.

In addition, plant life and animal life also defied the manmade constructions implemented in the county. When conservationists and officials created plans for terraces and other technologies, they included important information about the maintenance of such structures. The lists of maintenance advice for human-made structures illuminates the potential for nature to counter them. “5. Check for destructive action of burrowing rodents under the structure and through adjacent earth embankments.” Furthermore, they advised, “Protect the structure from livestock. Maintain...good sod by mowing, reseeding, and fertilizing. Trees, brush, and weeds should be controlled by cutting, mowing or spraying.” Such language expressed the continued agency of nature albeit the human view of nature as a threat or pest.

These maintenance lists informed the reader what was allowed and what was not allowed to occupy these spaces. The above mentioned advice was derived from a 1984 plan for a terrace waterway. They inform us that not only was the use of fertilizers and herbicides seen as acceptable for use in a waterway space, but they were also advocated. By analyzing the various conservation projects of Benton County during the late twentieth century the “double narrative” of the SCS,

previously mentioned in this paper, becomes blatantly clear. The advice of SCS project managers to prevent the erosion of soil by water while advocating the clearcutting and spraying of waterways came in direct conflict with one another.

Conclusion

Why did the local SCS officials seek to inhibit soil erosion while promoting the use of chemicals and show indifference to continued tile drainage? Conversations with local conservationists active today provides the first possible answer to this question. Much like the history of the implementation of the FSA of 1985, local conservationists have cited the power of local farmers in determining what projects are executed in the county. In addition, the introduction of new species in conservation practices was prominent in both urban and rural spaces across the United States.⁸⁵ This suggests that there was a lack of knowledge about the potential ecological impact of introducing new species. The second answer is that property ownership grants farmers the greatest oversight on what land practices occur. The government's ability to regulate the actions of large landowners is consistently hindered by the countless acres of agricultural land residing within its borders. Furthermore, through monetary subsidies the U.S. government continues to support large scale agricultural production for market profit.

85. Gucker, Corey L. 2009. *Securigera varia*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <https://www.fs.fed.us/database/feis/plants/forb/secvar/all.html> [2020, April 10].

EPILOGUE: THE TWENTY-FIRST CENTURY AND THE ECONOMIZATION OF THE GLOBAL CHANGE THAT DARE NOT SPEAK ITS NAME

In the late-2000s, my family found itself in two legal battles. In both cases we fought to substantiate the boundary lines for our private property located in southern Benton County, Indiana. More than once the neighboring rental farmers argued that the property line lied some six to twelve feet into the woods residing on my family's land. One legal challenge led lawyers further and further back into the history of the area, eventually landing upon a property map drawn some one hundred years prior. As a social construct with physical manifestations, ownership lied, and continues to lie, at the intersections of cultural and material change.

Though my family's claim was deemed historically accurate, and our property line affirmed by the court, the events never left our memories. At the time of the case, I was too young to understand the legal process. However, I was old enough to remember the very real threat that legal challenge posed to the environment I grew up studying. Losing the legal battle would have meant not only the loss of ownership, but also the loss of conservation efforts employed to protect it. In time, I came to understand my family's legal encounters as part of a larger contemporary trend. Almost everywhere in the region, farmers worked to remove fence rows, drain and plow the land all the way up to roads, and cut down pockets of trees to pile up and burn with used motor oil. As an adolescent, I became accustomed to the sight of large plumes of black smoke bellowing up into the Benton County sky. My family remembers the events because we understood the risk involved in losing beyond ourselves.

Those events felt rather isolated to my young mind. I was ignorant of how connected rural life was to the modern nation-state. While rural America shared differences with urban centers,

there was continuities between their cultures. Within this body of work I crafted a narrative argument based on evidence, some of it from well-respected national histories others new materials which emphasize the local experience and practices. The events I witnessed ,and indeed continue to witness, are the product of deeply embedded and long-held cultural and economic ideas about the American landscape. As a child, I found it hard to imagine that the landscape of northwestern Indiana used to contain large wetlands, tall grass prairies, Native American populations, and herds of American bison. There is evidence, however, that such environments did exist. And in fact, Native American tribes still exist in Indiana today.

When land ownership was questioned during my parent's court case it was historical, written, and legal documents which became the core evidence used. That practice, itself, is a product of a colonialism which sought to undermine long held Native American forms of record keeping like oral histories. As a result, written evidence and files are central to the American legal system. The arguments made on behalf of my family required the use of artifacts to form a narrative of ownership. Likewise, the research process of the historical and scientific fields relies upon varying forms of artifactual evidence to substantiate theories and claims. History and the American legal process rely upon evidence and story-telling. The stories we tell hold power. The U.S. legal system sustains tile drainage and the overproduction of cash crops through a lack of oversight and increased federal crop subsidies.

What is significant about the memory of land change in America, is that there was a very real threat posed not just to previous ways of life but also to the environment once management power moved hands. In the early 2000s, I recognized from years of intimate study that every little acre of forest, wetland, and meadow found on my family's land was key to the lives of an array of biota in Benton County. Indeed, to this day endangered, threatened, or previously threatened

species call the trees, flood plains, swamps, and grassland of my family's 80 acre property their migratory or permanent home. It is a place where Bobwhite Quail have returned, where American Wild Turkeys raise clutches of young in the spring, where American Woodcocks spiral downward from 50-100 yards in the air during spring courtship, and where Strict Blue-Eyed Grass blooms. The threat of habitat destruction, among others this thesis narrates, is not isolated to Indiana. In order to understand the threats facing humanity and the environment more broadly we must discover the material and cultural context of past management decisions, the environmental history of America.

The twenty-first century acquired a wide range of pressing issues. None more concerning than climate change, which is altering the level of fresh water available globally. Beyond finding sources of renewable energy or finding ways to reduce our current energy consumption, we will need to address global freshwater shortages. In the last ten years, I have witnessed the implementation of irrigation systems where there had previously been none. Tile drains are increasingly being updated and expanded throughout the northwest region of Indiana. The difficulty in writing about tile drainage today, and indeed scientific research on it, is that there is no way of calculating an exact amount of how much tile drainage is currently affecting the midwestern landscape. Since there is no regulation on tile drainage technology itself, the large scale picture of these systems across the Midwest is hard to trace. Undoubtedly though, the EPA has acknowledged since the 1990s that tile drainage is the root transportive technology causing hypoxic zones in the Gulf of Mexico and Lake Erie.

Moreover, farmers are increasingly moving towards corporate operated chemical spraying and tile drainage which is implemented by companies. Landowners, those with legal decision-making powers over changes to the land, are increasingly not the individuals actively engaged in

the production process in crop fields. Rental farming, a system whereby wealthy landowners rent their property for a fee to farmers, inherently encourages land exploitation. Farmers pay rent every year per their contract with the landowner. From there they seek to produce enough cash crop profits to pay the following years rent plus the cost of living for their families. From the beginning of the contract farmers must ensure a specific quota of crop production.

Changing weather patterns, different topographies, varying soil quality, and changing market prices, all continue to effect farming. As witnessed in the 1980s farm crisis, it is often those with enough excess wealth to sustain or expand their farming operations who continue to farm. As soil quality continues to dwindle more chemicals are entering fields to sustain a level of production never before seen. Add to this that fact that corporate farming has increased drastically since the 1990s and it becomes clear that the material activities of farming are being done not by large landowners themselves but by those employed in a corporation or those trying to support their families while paying rent. It is a system eerily similar to that of the tenant farming found in the late nineteenth century and one where working families have little say in the demands for profit.

Farmers, that is to say those doing the annual work of crop production, have and continue to seek to control the rate of water. Their motivations for tile drainage and irrigation are not irrationally formed. It rests upon a simple logic aimed at profit. Too much water inhibits the root growth necessary for large crop yields, while too little stunts growth. As a way to control and generate an imagined “balance” in the amount of water for the maximum number of bushels, farmers implemented irrigation and tile drainage. However, the results of tile drainage as seen throughout this study show the large scale destruction caused by this human technology. Big Pine Creek which meandered quite extensively before the twentieth century now flows faster. Moreover, its waters rise and fall quickly. Embankments are washed out and trees carried downstream. While

creeks of the Midwest historically changed direction over time, human infrastructures and machinery continue to alter the speed with which that change occurs.

In the last decade, changes have continued. Twice residents in the county saw their free flowing wells dry up due to the surrounding crop irrigation systems. Those systems pulled water from the ground and lowered available ground water. Wells are having to be dug deeper into the aquifer as crop production depletes the ground water level. A far more severe aquifer depletion is occurring across the plains portion of the Mississippi River Basin.

In the early 2010s, my family witnessed farmers in the area alter the flow of the creek south of our property. They used a backhoe to remove an extensive log jam which had transformed the creek's path. The path created by the log jam had slowed the flow of water and created a large loop in the creek. This allowed the water levels to remain deeper and benefitted the endangered species of muscels found there. However, after they removed the log jam the force of the water cut a new stream-lined path leaving behind an oxbow without access to water. With tile drains continuing to be used without question by most farmers, Big Pine Creek will continue to be a dumping ground for crop fertilizers, soil particulates, and run-off.

In a final discussion of developing policy and environmental changes transforming our relationship to the midwestern landscape, I turn our attention to carbon emissions. The alternative energy industry arrived in Benton County in the late 2000s and early 2010s in the form of a large wind farm. British Petroleum (BP) built several hundred football field length wind turbines on farms across the county. Every year the property owners receive rent money for allowing the company to collect wind energy. Designed to reduce carbon emissions levels for the company the wind turbines produce electricity in Benton County for sale in large national markets. The local community does not receive any electricity from these turbines directly.

This is part of a growing trend, whereby, the U.S. government ensures that the production of carbon is commodified and placed on a market economy. Production of carbon emissions in one area can be off-set by the purchase of negative carbon emissions from another operation. Carbon economics, labeled “cap and trade economics” under the Obama administration, has already established itself within the giants of energy production, including the alternative energy industry.

In discussion with local NRCS personnel, I learned that soon such stock and trade of carbon will be applied to crop production. In return for not tilling a field or the planting a cover crop, which reduces the amount of carbon emitted into the atmosphere, farmers can receive a specified amount of negative carbon stock. For a profit, farmers can then sell this stock on the market. While this theoretically allows the country to inch towards sustainability, carbon is a hard element to precisely quantify. Indeed, science cannot determine the exact amount of carbon saved by not tilling or by planting cover crops. This raises many questions, not the least of all, the question of who will determine stock amounts for large companies? In addition, other inventions such as tile drainage and agricultural chemicals are continually being used largely uncriticized. Today, much of the spaces planted in a cover crop are sprayed with herbicide in the spring to prepare for cash crop planting. As more agricultural chemicals get used the amount of oxygen within bodies of water will continue to decline to disastrous effect. Half measures will not generate a sustainable form of agriculture in the United States.

CONCLUSION

By telling the story of a watershed and its people, this work has sought to describe how the effects of human interventions during the twentieth century, both in agriculture and conservation, can be found today in the hypoxic zone of the Gulf of Mexico. The inherited cultural knowledge of relationships toward humans and the natural world brought by European colonization was a key part in the creation of the modern American nation-state and environmental degradation. Knowledge and beliefs embedded through the violence, power, and nation building of American colonization shaped the way Americans imagined how they ought to act toward something or someone well into the twentieth century.

As local farmers terraformed the wet prairies of northwestern Indiana, water moved with high efficiency. The utilization of tile drainage to create that desired efficiency led to major pitfalls in the twentieth century not the least of which was increasing the size of flood waters, destroying broad swaths of wildlife habitat, and heightening the severity of drought. The overproduction of cash crops was a partial product of tile drainage. As the buried technology expanded farmland ownership it became unearthed as a central piece to accumulating wealth in the *laissez-faire* modern economy of America. As we move further into a warming twenty-first century with limited amounts of fresh water, we need to consider just what our priorities are and what must be changed to protect all life.

Addressing the local politics involved in the implementation of national legislation and the implementation of new habitats allows the historian to understand why so few wetland habitats exist today within the Midwest. This kind of historical work, however, can be challenging to write. Today, there are no official Benton County records of foreclosures and bankruptcies that occurred in the 1980s. These documents are not kept longer than ten years before they are disposed by

county officials. Many of the primary sources so crucial to this research were also once at risk of being destroyed. This work is indebted to Resource Conservation Specialist and Big Pine Creek Watershed Coordinator, Leslie Fisher, without whom the historic Benton County SCS documents would not exist.

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