ABSTRACT

PREPARING FOR THE FUTURE:
CREATING OUTREACH MATERIALS FOR
EDGE OF THE FARM CONSERVATION AREA

by Sandra Rose Tyler

This practicum involved creating a map, interpretive signage, and outreach materials for Edge of the Farm Conservation Area (EFCA) in Oxford, Ohio. EFCA is a natural gem amid farmland whose goal is to educate people of all ages about today’s environmental issues. In order to accomplish this, EFCA needed an accurate map that is easy to navigate as well as interpretive signage. This interdisciplinary practicum connects Ohio’s Revised Science Content Standards with art by utilizing original artwork created with pen and colored pencil and gives ideas for making connections to other subjects such as History, English, and Math as well as Girl and Boy Scout badge requirements. To encourage visitors from the general public to visit, the signs discuss topics relevant to each location at EFCA as well as Ohio and contain whimsical imagery that is visually stimulating and includes questions that promote inquiry and further study.
PREPARING FOR THE FUTURE:
CREATING OUTREACH MATERIALS FOR
EDGE OF THE FARM CONSERVATION AREA

A Practicum Report

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Faculty of Miami University
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by
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To Rob, Nubz and Jasper –
For guiding me through the dark

“Be the change you wish to see in the world.”
Mahatma Gandhi

“Imagination is more important than knowledge.”
Albert Einstein
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Chapter I: Introduction to Edge of the Farm Conservation Area

Requirements for Masters in Environmental Science Program

This practicum was completed as part of the requirements for a Masters in Environmental Science degree from the Institute for the Environment and Sustainability (IES) at Miami University in Oxford, Ohio.

This chapter discusses my work with Edge of the Farm Conservation Area (EFCA) in which I was responsible for three separate, but connected projects:

- Creating a map
- Designing interpretive signage
- Constructing marketing materials including a brochure, Facebook page, and blog

All of these materials combine to make EFCA more visitor-friendly and achieve their goal of creating more educational opportunities for people of all age groups.

All first-year students at IES are required to complete a Professional Service Project (PSP) with a group of students that provides solutions to environmental problems for clients. I was part of a group assigned to work with the Union County Parks and Recreation Board (UCPRB) in Liberty, Indiana to design a park for their recently purchased fifteen-acre property.

To get the project started, we had to create a proposal outlining our goals and objectives and present this to the UCPRB. Afterwards, we consulted Miami University faculty as well as local park and government officials to analyze possible solutions and learn more about the area. We took our findings and created a poster to share at the IES Symposium and submitted an interim report to our clients. In order to assure that the community was involved with the preliminary park plan, we organized two community planning meetings. Architecture students from Miami University were present to visually present ideas and assist with planning the park. After getting their feedback together and doing more research, we created a final report and design that included a Park Master Plan that was submitted to Indiana Department of Natural Resources for funding. Through the course of the yearlong PSP, I gained a great appreciation for helping clients, creating presentations, how to create sustainable developments, and a love of native plants and landscapes.

In addition to the PSP, students have to complete a six hour professional experience. This could be a thesis, practicum, or internship. A thesis is original research, an internship must be at least four months at a paid position with an environmental firm, and a practicum involves developing solutions to environmental problems similar to that of a PSP (IES, 2012).

Though getting more experience in the environmental field through an internship would be a welcome opportunity, most internships are not interdisciplinary by nature. They are more of an in-depth, on-the-job experience and many involve doing field work as well as research and writing reports.
Unlike the rest of my classmates, I come from a fine art background and wanted to explore how my varied skills could be connected. Throughout my coursework, I often saw a disconnect between what needed to be expressed and how to say it in a way that anyone could understand. This is why coming from a different background comes in handy as it allows me to understand many viewpoints and creatively solve problems in an aesthetically pleasing way. I wanted to gain more experience using my art skills to solve an environmental issue which necessitated that I complete a practicum instead of an internship. So I designed a project that helps communicate environmental issues with the general public and creates more educational opportunities at Edge of the Farm Conservation Area (EFCA). In order to complete the project and understand what was needed, I did a thorough review of its history and background which involved learning about maps as well as what educational opportunities and visitors were wanted. But before I could really delve into that, I felt I needed to understand why natural areas are so desperately needed as well as public engagement. Therefore, I did a thorough review of the history of the lawn and its environmental impacts as well as why there is such a disconnect between us and nature nowadays. This report describes my research and work and over the past year and a half.

**Why We Need More Natural Areas and Public Engagement**

We all live in communities, and often in suburbs, most of which have lush green lawns. Most of us drive a car to work every day and get our food from the local supermarket. But how often do we think about where our food or the gas we pump into our cars comes from? Or why do we have lawns? For many Americans, lawns are the only regular exposure to nature and thus they are a good starting point for illustrating not only where our disconnect for where things come from originated but also why wild areas are important and what we can do to create more awareness.

**A Summary of the Lawn’s History in the United States**

A quick study into the history of lawns ascertains that they were not always commonplace. Researcher John Falk found that people love open spaces and enjoy scattered vegetation with short grass, such as that from African savannas where the first people lived (Bormann et al., 2001, p. 10). Presidents Jefferson and Adams wanted every American to own land since the home is often a source of wealth (Bormann et al., 2001, p.11). But the idea of an open, grassy lawn did not originate in the United States.

Instead, Bormann et al. (2001) state that the concept of lawns arose in France and England and was spawned from their ideas of controlling nature. In the days of fiefdom and wars, castle walls surrounded towns and grass was planted within these walls, providing a sanctuary for townspeople (Figure 1 provides an example). As political tensions decreased, walls came down and cities increased as well as pollution and disease. This resulted in creating cities in uninhabited areas with beautiful views of nature “devoid of human intervention” (p. 15). But in reality, the immense vistas created by landscape artists such as William Kent, which...
were intended to flow directly into nature, were manufactured visions of nature since forests and hills were razed in the process (pp. 12-15).

The mowed lawn did not appear until the mid-19th century as the Industrial Revolution inspired many middle class families to move away from polluted urban neighborhoods into suburbs (Bormann et al., 2001, p.19). Home builders created landscaped green areas around lawns, believing they created clean air and a healthy home. These families wanted their own lawn and this became the norm by 1870 (Bormann et al., 2001). In turn, more open areas around urban neighborhoods called “commons” were established (Bormann et al., 2001, p. 20).

Along with the creation of all these lawns came the need for maintaining them. Sheep and deer were used at first but Edwin Budding’s creation of the lawn mower in 1830 drastically changed the face of America (Bormann et al., 2001, p. 21): the lawn was viewed as something that could unify neighborhoods. Frederick Law Olmsted, the visionary responsible for landscaping New York City’s Central Park, believed that “the front lawn of a house in a suburb unified the residential composition as one neighborhood, giving a sense of amleness, greenness, and community” (Bormann et al., 2001, p. 23). These lawns became really popular and with that came the establishment of the lawn care industry that praises bright, plush carpets of lawn demanding the use of fertilizers and pesticides to maintain, many of which have environmental impacts on us all.

**Environmental Impacts of Lawns in the United States**

Suburban landscapes present a variety of environmental concerns such as sterile lawns, the predominance of non-native species, habitat removal, loss of wildlife, and
pollution (Figure 2). The first concern is the ecological sterility of lawns. Since the few species of grass that dominate suburban ecosystems, communities of living and non-living things, are typically cut before they are allowed to bloom, they provide no seed for wildlife, making them ecologically sterile. As Michael Pollen (1991) wrote, lawns are a “totalitarian landscape” devoid of any change (p. 62). They play no role in the circle of life. If these grasses were allowed to bloom, their propagation into other areas where they are not currently predominating would be encouraged.

Another issue with lawns is the predominance of non-native species. These species are typically called “alien” or “exotic” because they are not found in local natural systems. Since they are typically from other parts of the world and different climates, they usually have few local predators, allowing some of them to expand without control and become invasive, or conquer local ecosystems, due to their lack of edibility by local organisms and insects. Since these exotic plants have no predators, local insects congregate to the remaining native plants, ultimately creating food shortages as well as further reducing their populations.

The third concern of the conversion to suburban and urban areas is the intense habitat removal and fragmentation it causes. Rather than vast expanses of forest, prairie or wetland, where plants and animals can find food and shelter, suitable habitat is left only in islands scattered through a milieu of unsuitable habitat (Tallamy, 2007, p. 29). It is strange to think how often we hear about how much forest is being lost in the tropical rain forest but have no idea how destructive we are to forests in the temperate zone. In reality, only fifteen percent of the Amazon basin has been logged, but over seventy percent of the once massive forest covering the eastern United States has disappeared (Tallamy, 2007, p. 29). Added to this, Orr (2002) found that “more than 90 percent of Ohio wetlands have been drained” (p. 44). The loss of forests and wetlands means the loss of ecosystem services as well. Ecosystem services, according to Cardinale et al. (2012), are services the environment provides for humanity which include food production, flood control, and clean water (p. 60).

The fourth concern is the loss of wildlife. As Tallamy (2007) reported, with few places for animals to immigrate from or emigrate to, what remains are isolated habitat sinks with high death and emigration rates. These small populations are disproportionately prone to extinction. Since species diversity is a function of suitable habitat availability and the time needed to reach equilibrium, these fragmented habitats offer little for any species other than humans. Scientists are gradually beginning to learn that there may be an extinction debt, a lapse of decades or centuries between human actions and extinction, for some species and as the debt nears its payment, less species will remain. Tallamy suggests that as we advance into the future, the number of species able to survive anthropogenic habitat destruction will equal
the percent of land left undisturbed. In other words, at our current thirty percent of remaining forest, this means only thirty percent of our current species will survive (pp. 29-31).

The final, though surely not the last, concern is pollution. Removing forests and maintaining lawns releases air pollution due to emissions. The “EPA estimates that the amount of pollution emitted by a lawnmower operating for one hour is equivalent to the amount of pollution emitted by a car driven for approximately 45 miles” (EPA, 2012). Bormann et al. (2001) stated that nearly 30 to 60 percent of fresh water is used to water lawns. This water, which is often contaminated with pesticides and fertilizers, moves throughout the watershed. Rachel Carson (1962) drew attention to the effects of the pesticide DDT which worked miraculously well for farmers controlling insects and was used virtually everywhere after World War II. Since the pesticide covers the soil as well as the corn, earthworms that live in the soil get contaminated. The pesticide will then be transferred up the food chain to birds who store it in their fatty tissues and when this tissue is metabolized, it can make them very sick (Carson, 1962). Further downstream, the runoff containing the pesticide can also kill fish and other riparian creatures and plants. If a predator, including humans, eats the contaminated fish or birds, the pesticide is transferred to their tissues. Other impacts related to lawn care include: accidents, noise pollution, and hearing loss (EPA, 2012).

**Why We Need More Native Plants**

So what kinds of habitats are needed for animals if suburban yards and gardens are basically exterminating them? They need to be native. Just like humans, Tallamy (2007) insists that plants and animals do not grow in a bubble: they interact with their environment and co-evolve together. This concept leads to his suggestion that native plants (and animals) are those that evolved together in an area over time. Regionally local plants of the same family, such as an azalea from Tennessee, might be used by insects in New Jersey since they evolved in a similar climate on the same continent. But if an azalea from China is planted in New Jersey, it likely has developed different chemical defenses since it was isolated from North America for millions of years which make it difficult for insects searching for a host to find it, or if they do find it, to eat and digest it (pp. 51-53).

The lack of food for insects due to these non-native plants leads to a decline in insects, which many humans view as advantageous. To many of us, insects are simply creepy crawly creatures whose only purpose is to sting, bite, or generally irritate us. The lack of palatability of exotic plants to local insects also makes them more aesthetically pleasing since there are no holey leaves or caterpillar tents in tree branches.

Though this sounds great at first, the inability of our local insects to eat these plants is an immense problem. Tallamy (2007) wrote that it takes insects a long time to adapt to the new chemical mix of exotic species. This means that exotics can out-compete natives because
insects cannot use them as hosts. For instance, a Eurasian genotype of *Phragmites australis* supports over 170 species of insects in its home country but only five of our native herbivores (pp. 50-51). Lastly, most insects are *specialists*; they can only eat vegetation from plants that share an evolutionary history, such as a specific genus (p. 52). Though there are some exceptions of insects adapting to an alien plant after short exposure, the majority are specialists. Indeed, the hardest thing for insects to overcome is leaf chemistry. Though all plants have the same chemicals that allow them to fix energy from the sun during photosynthesis, they have different leaf chemistry due to secondary metabolites that affect its digestibility as well as toxicity and taste (p. 56).

Bringing in alien plants also tends to bring in harmful diseases and insects. A powerful example, according to Tallamy (2007), is the Chestnut blight that was first noticed in the Bronx Zoo in 1904. Willis and McElwain found that in the short span of 50 years, *Castanea dentata* was eliminated from all Eastern deciduous forests (as cited in Tallamy, 2007, p. 73). This meant less nuts for black bears, chipmunks, elk, blue jays, and mice as well as many other animals and insects that supported songbirds and illustrates how the elimination of one important species can completely change an ecosystem (p. 73).

**The Effect of Our Limited Exposure to Nature on Us**

In addition to Mother Nature’s need for more native plants and wild spaces, exposure to nature is essential for our well-being. Kellert and Wilson’s (1993) *biophilia hypothesis* states that all humans possess an inherited attachment to nature (p. 31). This is even more important since urban living created an immense gap in nature experience.

According to Richard Louv (2008), children, and many adults, are experiencing “nature-deficit disorder” (p.10). Children tend to play indoors due to all the electrical outlets for our technical devices being in the walls. We constantly watch television or play videogames and have become a lethargic society. As a result, Orr (2002) stated that a quarter of children under 19 are overweight and many children, especially those from lower income families, have a junk food diet (pp. 200-201). Healy found that, since 1900, physical activity decreased 75 percent for the average child (as cited in Orr, 2002, p. 201). The results of a study by Fishman of children between ages 3 and 12 and the time spent outside is startling: In 1981, they spent about 90 minutes outside, but by 1997, they spent only 42 minutes (as cited in Orr, 2002, p. 201)!

But the fact of the matter is that our health truly depends on nature. According to Rachel and Steven Kaplan, natural settings have restorative effects due to four attributes (as cited in Grill, 2003). For starters, they elicit a sense of “being away” because it is different than typical surroundings, such as urban areas or an office. The second reason is “extent” since natural areas hold one’s attention. “Fascination” is the third attribute; it means that natural areas require “effortless attention which can come from objects in the environment or processes related to making sense of the environment.” Finally, “compatibility, which is the
match between a person’s purposes and inclinations within an environment and the demands and resources of the environment itself” and ensures that humans will always have a space in nature (p. 21). In other words, no matter how long we have been away from nature, it will always welcome us. The problem is getting people back to nature.

**Public Engagement with Natural Areas and the Need for Education**

Public engagement is a necessity for creating individuals who are more sensitive to *biodiversity*, the diversity of all life. As Hawken found, the average American can identify over 1000 corporate logos, but fewer than 10 native plant species (as cited in Orr, 2002, p. 54)! People are simply not paying attention. The widespread ideas of lawns and advertisements from television and so many other unifiers created a homogenization of culture much like fields of invasive plants (Kellert & Wilson, 1993, p. 242). These unifiers monopolize biodiversity as well as cultural diversity, creating individuals who can no longer appreciate or remember their native tongue and traditions (Kellert & Wilson, 1993).

One of the issues may be that many scientists simply do not know how to communicate, which makes it difficult for the general public and legislators to make informed decisions (Dreifus & Alda, 2014). Alan Alda, who played Hawkeye on MASH, created a program that utilizes exercises he learned from acting to teach how to communicate better (Dreifus & Alda, 2014). This basically requires simplifying information so that everyone can understand it (Dreifus & Alda, 2014). “Science and art are two long-lost lovers, yearning to be reunited,” Alda said. “And now I get to be a matchmaker” (Dreifus & Alda, 2014). Not realizing that we all need nature, and that nature needs us, is very disconcerting but can be resolved by creating more awareness.

In order to promote more awareness of our need to become more connected to nature, education, and more specifically, science education, needs to focus more on inquiry, communicating to groups, and using alternative assessments (Fortner, 2001). Feinsinger (2001) observed that “inquiry begins with an observation about one’s surroundings. The observation never stands alone, though. Consciously or unconsciously, the observer always places it in the context of a broader concept or concern” (p. 13). As Hodson (1994) wrote, “science is [a] holistic and fluid activity, not a matter of following a set of rules that requires particular behaviors at particular stages” (p. 82). By inquiring about one’s surroundings and asking questions, students seek their own answers. This develops learning that can last a lifetime.

**Creating Awareness at Edge of the Farm Conservation Area**

Overall, environmental problems are due to a matter of design (Orr, 2002, p. 14). If we do not include ecosystems in our designs, in our marketing campaigns and project proposals, there is no way to foresee the *externalities*, the side effects, or ensure there will still be an earth with clean air and water as well as flora and fauna for future generations to enjoy. In
order to become more aware of the effects we all have on Mother Nature, the best place to begin is locally.

A wonderful place to do this is Edge of the Farm Conservation Area (EFCA). It is just seven miles from Miami University and only seven years old but it has many stories to tell all of us if we will take the time to listen. Since EFCA’s mission is the conserve, restore, and manage as much land as possible as well as create educational opportunities and exposure to Ohio’s ecosystems, making connections to local history and issues will encourage visitors to change their opinions and hopefully do their part to help the environment. As all of us are surrounded by lawns and urban environments, we often lose sight of how we got here and what we can do to change the future. Creating more educational opportunities for a wide range of visitors will do just that!

EFCA plays a key role in helping visitors understand all of these impacts and changing their minds about the place of lawns in their hearts and yards. Seeing as it is surrounded by farms and the creek is monitored by Butler County Stream Team, it is a great place to see the impact of farms downstream and see how wetlands and prairies help filter the water. The fire breaks are the only remaining lawn areas and these act as a trail and serve a purpose as they are a buffer should the prairie be burned. Several invasive species, such as honeysuckle, have wreaked havoc throughout EFCA and the battle to grow more natives provides lessons to all homeowners on how to grow natives in their backyard as well as create more habitats.

In order to create more awareness of our local ecosystems, I created a variety of materials that would promote more visitors and further their mission. These materials included a map, interpretive signage, and marketing materials. All of these materials use the same design elements and have a recognizable brand identity that will stand out to others and characterize EFCA as a unique place.
The Beginning of My Adventure

My story with EFCA began February 2012 when I went on my first tour with its owners, Dr. R. Hays Cummins and Dr. Donna McCollum, as part of my Conservation Biology class with Dr. Chris Myers. Since Dr. Myers requires students to complete a project for the class that promotes conservation issues, my group of four students decided to work at EFCA to study reptiles and amphibians and create educational materials about them (Figure 3).

The lush forests and wetlands enchanted me and, after several more trips and taking many gorgeous pictures, I was hooked. Being an artist at heart, I was constantly imagining drawings and paintings of various locations and animals at EFCA and wanted to share it with others. Creating a children’s book as part of that project made me really appreciative of reptiles and amphibians, both for the role they play in our local ecosystems and for their beauty.

That project ignited a fire within me. After completing the PSP and oral comps, which are required of first years at IES and involve solving an environmental problem in front of a committee, I was like a phoenix rising from the ashes, knowing that I had a purpose. I knew that I needed to do what I could to help Dr. Cummins and Dr. McCollum share this magical place with others.

This innate feeling roared to the surface while in Costa Rica for a class with Drs. Cummins and McCollum because both were introduced to my art and photography skills and I learned more about them and their work. They are both very encouraging and inspiring people who have so much to teach others and need the materials to do so. In order to spread the word and inspire more visitors, they needed more educational materials and signage since they have none save for one painted sign with the name of EFCA and a few images (Figure 4). My role in this practicum has been of many hats: from surveyor to GIS analyst, artist and designer, to that of a curriculum planner and marketing assistant.

Practicum Study Area

Edge of the Farm Conservation Area (EFCA) is located at 5398 McCoy Road, Oxford, Ohio in Butler County. Since the main goal of this project is to encourage visitors, it is necessary to see what they can learn at EFCA as well as why educational materials are needed.

An Overview of Ohio’s Natural and Environmental History

In order to see what educational opportunities exist at EFCA, it is necessary to take a step through history. A visit to the Karl E. Limper Geology Museum at Miami University confirms that Ohio was once a very different place. The local sedimentary bedrock is from the Ordovician Period and between 475 and 443 million years old (Geology of Oxford, n.d.; Camp, 2006, p. 35).
During this time, Ohio was inundated by warm, shallow seas containing a variety of invertebrate creatures such as coral reefs and trilobites (Geology of Oxford, n.d.). Tempests and movement from the ocean floor forced a volcanic mountain chain, the Taconic Highlands, to rise to the surface, causing periods of turbulence and peace, and the creation of bedrock consisting of mudstone interspersed with limestone as well as ash from volcanic eruptions (Geology of Oxford, n.d.; Camp, 2006, p. 35). Since the water had to drain somewhere, it took the form of the Teays River that flowed northwest across southern Ohio and then westward into Indiana nearly 2,000,000 years ago (Hansen, 1997; Sanders, 2000).

This period was followed by the Pleistocene Epoch: the Ice Age (Geology of Oxford, n.d.). The first glaciation, the Wisconsinan, occurred about 300,000 years ago and left glacial erratics, deposits from other areas, throughout the state as it melted during a warm period (Figure 5) (Hansen, 1997; Geology of Oxford, n.d.). The last glaciation, the Illinoian, reached Ohio around 24,000 years ago and receded about 14,000 years ago (Hansen, 1997). Now that Ohio was becoming warmer, the first Native Americans began to call it home (Sanders, 2000). European settlers followed and began to develop the land into farms and cities.

As time progressed, European settlers entered into the picture and erected settlements. Hedeen (1994) stated that Manifest Destiny, the westward movement, encouraged the creation of farms and progress. But settlement came with a price. For instance, in Adams County, Ohio, where Edge of Appalachia Preserve is now, tobacco farmers razed the super steep hillsides and had no idea how quickly the rain would wash away the soil (Laycock, 2003, p. 35). Unfortunately, they did not know that undisturbed forests have an incredibly low erosion rate of less than 50 tons per square mile whereas cleared forests erode more than 500 tons of soil per square mile per year (Hedeen, 1994, p. 32). In addition to the loss of soil, there were many other environmental impacts, many of which were previously discussed in this chapter including: deforestation, lack of food for insects, and pollution.

**History of Butler County, Ohio**

As the USDA Soil Conservation Service (n.d.) reported, Butler County was founded September 1791 after Fort Hamilton, a frontier outpost along the Miami River, was built by General Arthur St. Clair’s crew (p.1). After the Treaty of Greenville was signed in 1795, the outpost was deserted (p. 1). By the time Butler County was founded in 1803, the area was full of settlers and the present county boundaries were created in 1815 (p.1). Nowadays, nearly two-thirds of Butler County is farmed and is gradually becoming more metropolitan (p. 1).
variety of industries, such as steel and paper, are taking over farmland. In 1975, nearly half of
farmers made their livelihood from the sale of cattle and swine products and the rest raised a
variety of plants such as corn and soybeans (p. 1).

Butler County, like much of Ohio, consists of a patchwork of farms and suburbs mixed
with urban areas, such as Oxford, which is home to Miami University. Due to the desire to
protect family farms and conserve land, farmers and private property owners in the area are
utilizing the aid of Three Valley Conservation Trust (TVCT) to place their land in agricultural and
conservation easements. These easements limit property uses, keeping the land in agriculture
or natural landscapes, as determined by the owners.

What are the Differences between a Conservation Easement and an Agricultural Easement?

A conservation easement preserves ecological and/or man-made aspects of the
property and limits development (OSU Fact Sheet, 2013). For instance, if there is a lovely forest
near a stream, such as the one at EFCA, the conservation easement may restrict uses that could
impair the stream and wildlife habitats. A typical restriction could be prohibiting logging and
hunting overall but allowing some deer hunting if the population explodes. This easement
agreement is a legally binding agreement and a deed restriction, which stays with the property
in perpetuity or for a specified time (OSU Fact Sheet, 2013).

Agricultural conservation easements are useful because they remove any threat of
development in the future (State of California Department of Conservation, 2013). This forbids
any uses of the property that will cause destruction or inhibit the agricultural use of the land
(State of California Department of Conservation, 2013). Since this kind of easement is also a legal
restriction on the property deed, it is still valid after the land is sold to new owners.

Site Characteristics

EFCA is protected by a conservation easement which ensures that its unique history and
variety of habitats will be preserved in perpetuity. Most visitors to Oxford may not realize
what effect farms have on the area or how they began and much of this is inherent at EFCA. In
addition to this are the diverse habitats: there are two types of forests, five wetlands, two types of
prairies, a creek and several

Figure 6: EFCA (gray marker) is positioned within several miles of schools
including: Maude Marshall Elementary School, Talawanda Middle School,
and Miami University (Google Maps, 2014).

tributaries, all within a meager 31 acres! Its natural and social history makes it an incredible place
to learn about our own history.
According to Dr. McCollum, EFCA’s mission is to conserve, restore, and manage as much land as possible today and to lay the groundwork for the future. In addition to their mission, they have the following goals: to provide opportunities for students and the public for research, informal learning, and connection with Ohio’s native ecosystems, and to enjoy their property and some of Ohio’s beautiful native ecosystems (D. McCollum, personal communication, 2013).

What makes EFCA a great recipient for this project is its proximity to several schools within Talawanda School District (Figure 6), Boy and Girl Scout troops, Miami University, and its incredible diversity of local flora and fauna. Due to the many natural developments at EFCA, it is easy to imagine what Ohio was like prior to civilization and urban sprawl and learn to see nature in a new way.

**EFCA before Its Creation**

There are relics of farming at EFCA in the ravines where shards of steel fences once kept cattle at bay. These ravines were shaped by glacial melt waters that drained the water and brought in nutrient-rich till that is ideal for farming. Since the land was farmed for approximately 150 years, most of its nutrients were stripped and only clay remains (D. McCollum, personal communication, 2013-2014). This clayey soil holds water well, preventing it from sinking in. Due to this, many farmers installed drainage tile that drains the water into drainage ditches.

Though drainage tile prevents wet spots, it causes soil erosion. As noted in a soil survey (Appendix D), most of the soils are moderately eroded already and adding something that forces the water to drain even faster is definitely not beneficial. This causes rivers and streams to be inundated with sediments (BSWCD, 2013). Soil is really important because plants need it to grow and the more nutritious the soil, the healthier they will be (ODNR Division of Soil and Water Resources, 2013). It also cleans water by allowing it to trickle slowly through its surface,
filtering out any impurities such as fertilizers from farms (ODNR Division of Soil and Water Resources, 2013).

The forest that remains in Butler County, including at EFCA, was likely preserved due to steep slopes (Figure 7). Flatter, drier areas were often row cropped and huge oaks were able to grow in sunny areas that were open due to pasture and grazing.

Besides the natural and economic history of Butler County, there are other relics of history at EFCA, such as stone dams and a railroad wanderer’s cabin that he built during the Great Depression. Like many people during the Great Depression, a wanderer hitched a ride on a train and stopped near EFCA and worked in the neighboring farms. After several years, he built a cabin in what is now the East Woods (R. H. Cummins & D. McCollum, personal communication, 2013).

South of Vollmer’s pond, the original farm pond at EFCA, is the waterway that drained the original property (Figure 8). Runoff from the land drained into brush and was loaded with fertilizer from the fields of corn and soybeans. Though the farms were not tilled, copious amounts of sludge (sterilized human sewage) were used as fertilizer since it was free. Fertilizer containing nitrogen was also used as well as Round-up to kill nuisance weeds.

**The Story of EFCA’s Inception**

Every place has a story and EFCA is no different. These stories play an integral role in helping visitors make connections and become inspired to find their own way to preserve land and live a more sustainable life with a smaller footprint on the earth. EFCA’s story began when Dr. Donna McCollum and Dr. R. Hays Cummins purchased their five-acre homestead at 5398 McCoy Road in Oxford Ohio in 2004. According to Dr. McCollum, “the house was a shambles” (D. McCollum, personal communication, 2013). Since then, the kitchen has been extended, new floors were installed, and a new front porch was recently finished.

EFCA began with removing the wall of honeysuckle behind their cabin (Figure 9). After several years of thrashing, Dr. Cummins discovered a web of wet cropland at the top of the hill above their woods and felt it might be a great place for wetlands (R. H. Cummins, personal communication, 2013). In order to create wetlands, Dr. Cummins wanted to buy more land, to which Dr. McCollum was initially opposed. He walked with her to the top of the hill and after he told her how he wanted to create a wetland and prairie complex out of land used for row crop agriculture, she changed her mind (D. McCollum, personal communication, 2013). She decided that this was her chance as a stream ecologist “to put [her] money where [her] mouth
was: [this was her] chance to help mediate the impact of the row crop agriculture on the stream that runs behind [their] house” (D. McCollum, personal communication, 2013). It was also her chance to do something aesthetically pleasing with the property. For Dr. Cummins, this was an opportunity to bring a little piece of the swamps of New Orleans home (D. McCollum, personal communication, 2013). He craved the variety of nature that he was surrounded with as a child and has never been disappointed by their choice to purchase additional land.

In December 2007, EFCA was placed into a conservation easement with the Three Valley Conservation Trust (EFCA, 2013). Much-needed inspiration and funding for restoring the land and creating wetlands came from U.S. Fish and Wildlife Service (USFWS), Miami Valley Pheasants Forever, and Cardno J.F. New, an Ecological Consulting and Ecosystem Restoration firm (EFCA, 2013). USFWS assisted in building Willows in the Wind wetland and Pickerelweed Pond by breaking drainage tiles and creating berms to hold the water back. They also established the prairie buffer that consists of grass fire breaks, which are part of the USFWS berm program. Turkey vultures and osprey are often seen along the fire breaks. USFWS also contracted with Miami Valley Pheasants Forever to plant the prairies. Cardno J.F. New contributed an abundant amount of technical assistance and planting advice.

All of the wetlands, except for Vollmer’s Pond, were built. Pickerelweed Pond, which faces Garver-Elliot Rd., began after Cardno J.F. New planted sedge meadow mix nearby after flattening everything out with an earth mover and erosion blankets were used to stabilize the banks and slow down water runoff (Figure 10). During the first year, it was mostly weeds but the following year, natives had to out-compete the weeds, and by the third year, the native plants were dominating and looking wonderful. Growing prairies takes a few years because

Figure 10: Pickerelweed Pond in early spring (photo by author).

Figure 11: The drainage control structure at Willows in the Wind (photo by author).
during the first year, the natives are putting in roots. A blade of a grass is about 4 inches long and its roots are about 2-3 feet long in order to survive harsh prairie conditions.

There is a 200 foot berm at Rush Run and after it was created, the nutrients from local farms caused the plants to grow quickly. Nowadays, muskrats are invasive there. The berm keeps the wetland in place and muskrats like to burrow down into it, so if they went far enough, it would wreak havoc on the entire drainage system. As a result, it is common to see traps at Rush Run during the spring.

Later in the process, Cardno J.F. New provided funding for a drainage control structure at Willows in the Wind wetland (Figure 11). This structure can increase or decrease the amount of water depending on seasonal changes. Meanwhile, much of the restoration work was accomplished by Dr. Cummins and Dr. McCollum with the help of Dr. Cummins’ Restoration Class and Western College peer science tutors and community members (EFCA, 2013).

The most recent purchase of nine acres in January 2013 from Charles and Marjorie Bowers plays an important role in future goals. Dr. Cummins and Dr. McCollum need to be able to get equipment to the East Woods from Garver-Elliot Road and would like to eventually build

![Figure 12: This was the first map of EFCA (EFCA Map, 2013). This map was designed by Dr. McCollum using an image from Google maps.](image-url)
a shelter and bathrooms. The Bowers and Larry Frimerman at TVCT assisted in writing the conservation easement for the property and wrote that part of it will eventually be a nature center, will contain an outdoor classroom, and a planetarium.

The Need for a Map

The son of Bill Vollmer, who currently farms a neighboring property, wants to add more drainage tiles. He currently has a parabolic ditch with a grass waterway and rock. Adding more drainage tiles could impact the drainage pattern at EFCA. Creating a map that includes contour lines and hydrology will help him, and others, understand how farming can impact EFCA much better than the existing map could have.

The first map of EFCA was created by Dr. McCollum utilizing an image from Google maps (Figure 12). While it provides an overview of EFCA, it does not show the latest purchase of land from Charles and Marjorie Bowers that is located north of the East Woods. It also does not give an idea of elevation or hydrology, both of which are very important due to the wetlands and in seeing how the wetlands filter the runoff from the farms nearby. The tributaries at EFCA drain 100 acres of farm fields that flow to Reserve Run and Indian Creek and eventually flow into the Ohio River and then the Gulf of Mexico so it is very important to see hydrology (D. McCollum, personal communication, 2013). This means that a new map was desperately needed to help Mr. Vollmer as well as help visitors find their way through the property. The map I created is addressed in detail in Chapter II.

Why EFCA is a Great Place for Educational Opportunities

As previously mentioned, EFCA is a place to visit due to its natural, economic, and social history, but it is especially magical due to its flora and fauna. Every year since EFCA was created, more wildflowers, mushrooms, and wildlife arrived.

Due to the sediments from farms, such as the one near Toad Hall, the streams were once inundated and very unhealthy (Figures 13 and 14). Sediments and nutrients from farms were due to fertilizer and pesticide use. Every time it rained, excess nutrients flowed downward toward the streams, carrying soil with it. Nowadays, salamanders call them home. Salamanders breathe through gills in the skin, so their presence is a great indicator of water quality. Several species, including longtail, red back, and streamside salamanders are often found in or near around the main creek. In the spring of 2013, thousands of streamside salamander eggs were found in the East Woods stream.

Though it may seem kind of out-of-place, even the dogs at EFCA think it is paradise. One of Drs. Cummins and McCollum’s dogs, Cooper, loves to explore the piles of dead honeysuckle...
and twigs that are throughout EFCA. These provide homes for many creatures but, in Cooper’s case, he gets really excited about rabbits. These rabbits provide food for predators, such as red foxes so they are certainly worth the excitement. Though red foxes were found in the past, they are not common since coyotes entered the premises.

As a requirement for funding from Miami Valley Pheasants Forever, the Shortgrass Prairie near the East Woods was built. This provides habitats for ground nesting birds but is often full of honeysuckle. Thanks to Dr. Cummins’ trail camera by Vollmer’s Pond, they know that coyotes, deer, skunk, opossums, and raccoons are often found there nowadays.

Vollmer’s Pond was named for its previous owners and is truly an ephemeral farm pond. It is over thirty years old and is home to cottonwood, sycamore and black willow trees, wood duck nests, blue flag, water plantains, swamp milkweed, and sedges. During the spring, spring peepers are found there and are a thrill to listen to at night. Spring peepers are followed, at Vollmer’s Pond and the other wetlands, by leopard frogs, green frogs, American toads, bullfrogs, cricket frogs and grey tree frogs, all journeying to the ponds to find mates and lay eggs.

Flora and Fauna Commonly Found at EFCA

Since this is just an overview of why EFCA is a great place for environmental education, a list of species currently found at EFCA was compiled. Many of these species are fairly common throughout Butler County, but several are rare. The fact that these rare creatures visit attests to how wonderful EFCA is for raising young, grazing, and living. It is a healthy bed and breakfast amid a web of farmland and urban areas. This list was separated out into groups of flora and fauna. In many ways, it speaks for itself and shows the immense diversity that can be witnessed there each year.

Drs. Cummins and McCollum are avid bird watchers, so it makes sense that they noticed more birds and thus, the number of birds currently outweighs other species (Table 1). But with time, and more visitors, more thorough lists will be developed as more observations are made. Many of these birds are rare, such as the American Bittern.

Table 1: Common avian species at EFCA.

<table>
<thead>
<tr>
<th>Bird Species at Edge of the Farm Conservation Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Bittern</td>
</tr>
<tr>
<td>American Goldfinch</td>
</tr>
<tr>
<td>Baltimore Oriole</td>
</tr>
</tbody>
</table>
Most of the mammals in this list are regular visitors or stopped to have their picture taken by the camera trap near Vollmer’s Pond (Table 2). This list illustrates the food web among mammals. Though this list does not perfectly illustrate a food web because it is in alphabetical order, the Northern short-tailed shrew is at the bottom and Coyotes are at the top.

Table 2: Common mammals found at EFCA.

<table>
<thead>
<tr>
<th>Common Mammals at Edge of the Farm Conservation Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coyote</td>
</tr>
<tr>
<td>Eastern Cottontail Rabbit</td>
</tr>
<tr>
<td>Eastern Gray Squirrel</td>
</tr>
<tr>
<td>Northern Short-tailed Shrew</td>
</tr>
<tr>
<td>Opossum</td>
</tr>
<tr>
<td>Raccoon</td>
</tr>
<tr>
<td>Red Fox</td>
</tr>
<tr>
<td>Striped Skunk</td>
</tr>
<tr>
<td>White-tailed Deer</td>
</tr>
</tbody>
</table>

Reptiles and amphibians are excellent indicators of habitat quality since they rely on water for their livelihood and the presence of the rare Northern leopard frog is a great sign (Table 3).

Table 3: Common reptiles and amphibians found at EFCA.

<table>
<thead>
<tr>
<th>Common Reptiles and Amphibians at Edge of the Farm Conservation Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Toad</td>
</tr>
<tr>
<td>Bullfrog</td>
</tr>
<tr>
<td>Eastern Box Turtle</td>
</tr>
<tr>
<td>Eastern Gartersnake</td>
</tr>
<tr>
<td>Midland Painted Turtle</td>
</tr>
<tr>
<td>Northern Cricket Frog</td>
</tr>
<tr>
<td>Northern Green Frog</td>
</tr>
<tr>
<td>Northern Leopard Frog</td>
</tr>
<tr>
<td>Redback Salamander</td>
</tr>
<tr>
<td>Snapping Turtle</td>
</tr>
<tr>
<td>Spring Peeper</td>
</tr>
<tr>
<td>Streamside Salamander</td>
</tr>
</tbody>
</table>

Though insects are certainly important, they are harder to spot and identify than birds and larger creatures (Table 4). Hopefully this list will grow as more future entomologists visit and add to it.
Table 4: Insects that are commonly found at EFCA

<table>
<thead>
<tr>
<th>Common Insects at Edge of the Farm Conservation Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue-eyed Darner</td>
</tr>
<tr>
<td>Carpenter Bee</td>
</tr>
<tr>
<td>Eastern Tiger Swallowtail</td>
</tr>
<tr>
<td>Ladybug</td>
</tr>
<tr>
<td>Snail (unknown species)</td>
</tr>
<tr>
<td>Widow Skimmer</td>
</tr>
</tbody>
</table>

There are many plants and trees found at EFCA (Table 5). Though this list is quite diverse, the number of plants grows each year as more and more animals visit and bring seeds.

Table 5: Plants and trees found at EFCA.

<table>
<thead>
<tr>
<th>Common Plants and Trees at Edge of the Farm Conservation Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Beech</td>
</tr>
<tr>
<td>Ash (unknown species)</td>
</tr>
<tr>
<td>Bee Balm</td>
</tr>
<tr>
<td>Black Cherry</td>
</tr>
<tr>
<td>Black Willow</td>
</tr>
<tr>
<td>Blueflag</td>
</tr>
<tr>
<td>Canada Rye</td>
</tr>
<tr>
<td>Cucumber Magnolia</td>
</tr>
<tr>
<td>Giant Bulrush</td>
</tr>
<tr>
<td>Illinois Bundleflower</td>
</tr>
<tr>
<td>Kentucky Coffeetree</td>
</tr>
<tr>
<td>Mayapple</td>
</tr>
<tr>
<td>Obedient Plant</td>
</tr>
<tr>
<td>Persimmon</td>
</tr>
<tr>
<td>Poison Ivy</td>
</tr>
<tr>
<td>Red Oak</td>
</tr>
<tr>
<td>Rue Anemone</td>
</tr>
<tr>
<td>Silphium (unknown species)</td>
</tr>
<tr>
<td>Spring Beauty</td>
</tr>
<tr>
<td>Swamp Milkweed</td>
</tr>
<tr>
<td>Switchgrass</td>
</tr>
<tr>
<td>Virginia Bluebell</td>
</tr>
</tbody>
</table>

Though there is an immense diversity of native plants and animals at EFCA, there are also a few invasive plants and animals (Table 6). These creatures and flora were brought to Ohio from another climate or are native and wreak havoc on EFCA’s ecosystem. Muskrats, for instance,
are native to Ohio but the creation of their dens can cause leaks in the wetlands that could drain them and destroy the habitat.

Table 6: Invasive plants and animals found at EFCA.

<table>
<thead>
<tr>
<th>Common Invasive Plants and Animals at Edge of the Farm Conservation Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bush Honeysuckle</td>
</tr>
<tr>
<td>European Starling</td>
</tr>
<tr>
<td>Muskrat</td>
</tr>
</tbody>
</table>

As you can see, there is an immense variety of flora and fauna at EFCA. But in order to help people become more aware of them, educational materials are needed.

Preparing for the Future: the Need for More Educational Materials

Since the educational mission of EFCA requires the creation of interpretive materials that engage a diverse group of visitors, with a goal of attracting even more diverse visitors, it is important to make EFCA more visitor-friendly. Many groups currently visit EFCA including: classes from Miami University, Butler County Stream Team volunteers, and Scout groups. But looking ahead, Drs. Cummins and McCollum want to create a nature center, outdoor education areas, and a planetarium, so they need materials that are relevant for Scouts, schools, and as many groups as possible.

This was accomplished through my goal of creating interpretive materials for EFCA that will make it more visitor-friendly. Along with the goal are three objectives: create a user-friendly map, design signs that connect to K-12 Learning Standards and Scout requirements, and construct marketing materials including a brochure and Facebook page. All of these materials will make EFCA more visitor-friendly by providing a map that visitors can use to navigate the property themselves as well as interpretive materials that help them learn something about Ohio’s flora and fauna and see how it connects to local issues. On top of this, all materials have similar colors, fonts, styles, and a welcoming appearance that enforces a recognizable brand identity.

The first objective was completed by using Geographic Information Systems (GIS) to map out the property and two GPS devices – a Garmin 62 and a Trimble – were used to test accuracy and make a trail as well as map topography and streams. The second was accomplished by using education requirements as guidelines and connecting relevant material about each important part of EFCA (flora and fauna, land cover types, history, and more). The third, by making a Facebook page, blog, and brochure.

Drs. Cummins and McCollum were consulted every step of the way to ensure that materials aligned with their goals as well as the requirements for K-12 Learning Standards and Scout groups but still relevant for any visitor. In order to assure that the audience is engaged, whimsical drawings were used in all interpretive materials as well as bright colors and guidance from literature reviews as well as signage from a variety of parks. All of these deliverables are addressed in detail in the following chapters:
• Chapter II is about creating the map;
• Chapter III discusses the inspiration, educational requirements, and creation of the interpretive signage;
• Chapter IV addresses the creation of marketing materials.
Chapter II: Creating a Visitor-Friendly Map for EFCA

Unlike the days of the great explorers like Christopher Columbus and Sir Francis Drake, maps are no longer made by hand (Figure 15). Geographic Information Systems (GIS) software is used instead. A huge benefit of GIS is that it allows a variety of disciplines to analyze everything from demographics to pollution and land cover types (Penn State Public Broadcasting, 2010). Since it is developed on a computer, it allows users to save and e-mail files to other users throughout the world and easily share information with one another.

On top of this, Geographic Positioning Systems (GPS) are used to help us see where we are located in relation to our surroundings. A common use for GPS is looking up directions as well as navigating from Point A to Point B with a hand-held GPS unit or cell phone. GPS was first used in 1957 after Russia launched Sputnik, its first man-made satellite, into orbit (USDA Forest Service, 1999; Jensen, 2007; TomTom, 2013). Since the US and Russia were in the midst of the Cold War at the time, it was necessary to keep track of its orbit. This was accomplished by “measuring the Doppler shift in frequency received from the satellite” (USDA Forest Service, 1999, p. 3). As objects, such as a police siren, get closer, they become louder and are loudest when perpendicular, or next to, the listener; however, once the siren travels away, the sound suddenly drops (Jensen, 2007). This is the Doppler Effect. The Doppler shift measures the difference in sound, or frequency, and if it is reversed, it is possible to detect where an object, such as Sputnik, is located in space (USDA Forest Service, 1999; TomTom, 2013).

Since the inception of the first GPS satellite system consisting of twenty-four satellites in 1978, the US military was the primary user of GPS (USDA Forest Service, 1999). These satellites played an immense role in military operations, so the Department of Defense utilized Selective Availability to ensure that civilians could not access top-secret information (USDA Forest Service, 1999). Nowadays, the general public can now access GPS since President Clinton permanently turned off Selective Availability (TomTom, 2013).

As more and more people started using personal GPS, they have become useful far beyond what was originally envisioned by the US military. Everyone from truck drivers to sailors to people who just want to ensure a safe trip through an unknown part of town,
regularly use GPS (TomTom, 2013). All that is needed is a GPS device and a clear view of the sky.

Since EFCA does not currently have a user-friendly map that includes trails, elevation, and hydrography, GIS and GPS were used to create one. A map that is simple and easy to navigate will allow visitors to find their own way through the property and travel at their own pace. In order to ensure that the map was as accurate as I could make it, I used two GPS brands: a Garmin and a Trimble. Though there are many brands of GPS available, Garmin’s GPSMAP 62 and Trimble’s GeoXT were used for this study (Figures 16 and 17). Accuracy is really important when making a map and since both of these units have different features, it was important to compare them. Carver (n.d.) contended that the Garmin’s accuracy is within 10 meters and it fits easily in the palm of your hand, is light weight, waterproof, easy to download points, and really easy to use. Trimble’s accuracy can be as close as a half meter when post-processed with Trimble GPS Pathfinder Office software (Trimble, n.d.). What really separates Trimble from the Garmin is its antennae that raises the satellite signal above the user’s head and supposedly increases its accuracy since it is a resource grade GPS whereas the Garmin is primarily used for recreation. In addition, the Trimble has a higher price tag than the Garmin but it allows you to take notes at each point which can be really useful. It is heavier and the antennae can be bulky and get in the way.

Data Collection

In order to see exactly where EFCA was in relation to its surroundings and within the confines of Butler County and Oxford, GPS data as well as data from many other sources was used. Multiple data sources promotes accuracy by ensuring that they all line up well in the software program and in relation to an aerial photo layered beneath the data layers.
Data Sources

Data came from a variety of GIS suppliers. The parcel data came from Butler County Engineer’s Office (BCEO) via their link for downloading zipfiles (see Appendices A through C for hard copies of the parcel data). The creek data came from U.S. Geological Survey (USGS)’s National Hydrography Dataset (NHD). Since the new parcel is not currently part of the parcel data at BCEO, this information came from a recent survey from Three Valley Conservation Trust (TVCT) (Figure 18). Road data also came from BCEO. Elevation, soil, and land cover data came from U.S. Department of Agriculture’s Natural Resources Conservation Service (NRCS) GeoSpatialDataGateway. Finally, the inset map of Ohio and Butler County came from U.S. Census’ TIGER/Line.

Collecting Waypoints and Tracks

Reference points were taken on two separate trips at trail intersections as well as the stream and ravines in the East Woods (Figure 19). A visual accuracy test between the two was completed to assess how close they were based on an aerial photo. Waypoints, or points of interest, were first collected in February 2013 before leaves prevented the GPS from getting a clear signal from satellites. These initial points were taken with a Garmin 62 GPS. All points were recorded, as well as what the point was of, in a notebook, and pictures were taken of most points (such as trees and bends in the path). A total of fifty-seven points were collected.

Garmin’s GPS also recorded the track, or path, we walked. This is collected without stopping at various

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1 http://maps.butlercountyohio.org/index.cfm?page=zipfiles
2 http://nhd.usgs.gov/data.html
3 http://datagateway.nrcs.usda.gov/
4 http://www.census.gov/geo/maps-data/data/tiger-line.html
intervals. It includes many more points than the waypoints (618, to be exact) and they are not taken at the same time as the waypoints. In other words, if the waypoints file is accidentally damaged, there is no record of them. You can see where you walked, but nothing more.

Points were collected with the Trimble GPS in March 2013 immediately after learning about it in Advanced GIS class. Since the riparian areas at EFCA are sheltered by tree cover, the Trimble GPS seemed like a really good idea due its antennae. Points were also taken with the Garmin GPS to verify accuracy against aerial photos (Figures 20 to 22).

Waypoints and tracks for the Garmin GPS were downloaded by utilizing Minnesota Department of Natural Resources’ free DNRGPS software. After they were all downloaded, these points were opened in ArcGIS 10.1 software.

This data from the Trimble GPS was downloaded with Trimble’s GPS Pathfinder Office software and entered the same way as the Garmin, but it was more difficult to add the spatial reference data. For some reason, it just did not want to line up properly. The points kept appearing somewhere else in the map due to needing to convert the coordinate system of the data. Dr. Adam Berland and a fellow IES graduate student, Travis Drury, were consulted for their assistance in getting the data to line up properly. After much trial and error, the data was converted correctly and aligned properly.

**Data Compilation and Analysis**

All data was projected to be in the Ohio State Plane South coordinate system.

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5 [http://www.dnr.state.mn.us/mis/gis/DNRGPS/DNRGPS.html](http://www.dnr.state.mn.us/mis/gis/DNRGPS/DNRGPS.html)
with linear units in feet and North American Datum (NAD) 1983. By projecting all the data to the same coordinate system, it ensures that it will line up correctly. After putting everything from the Garmin GPS in ArcGIS, it was noted that some points were not part of EFCA. These were removed by selecting the points that were part of EFCA and exporting them to a new data file. Once these points and tracks were added, the calculate geometry tool was used to see how long the line, or trail, was that I walked that day. It was a total of 8955.63 feet, or 1.7 miles.

Once all the data was added and initial maps were created, Dr. Cummins noted that a better aerial photo for the property that showed the ravines at a finer scale was needed so that they could be shown as accurately as possible.

Creating the Property Boundary for EFCA

Since there was no geospatial data available for the new parcel, the latitude and longitude points were obtained from TVCT. A spreadsheet saved as a comma delimited text file (csv) displayed the data as xy in ArcMap. The project tool had to be used to ensure the correct projection was used. The points were then displayed as lines, a new feature was created, and voila!

Even though the data for the new parcel lined up well, some edits were still necessary and the twenty foot easement for the property (the long, skinny line in Figure 18 that meets with Garver-Elliot Rd.) had to be created and merged with the other file for the new property. When that was accomplished, the parcels were merged with the original parcels from BCEO to create the complete 31- acre property.

Creating Contour Lines

In order to create an accurate trail map, the elevation needed to be included. Since National Elevation Dataset (NED) files are raster files that represent elevation at different scales, they need to be merged together to get the full view of a landscape. NED data with a 10 meter resolution was utilized, which is the smallest currently available for free. And since it is in meters and the rest of my data was in feet, this data had to be converted to feet. In order to save time, the merged NED files were trimmed down to just what was within the boundaries of EFCA’s property. Since the NED files contain elevation, these were used to create contour lines.

Creating Files for Each Feature

In order to make the shapes of the wetlands stand out, new shapefile features were generated utilizing the create features tool (Figure 23). These are all polygons. After this, lines were produced utilizing the create features tool for the creek in the East Woods as well as the trail. The creek was based on the track as well as points and an aerial photo. It is likely not perfect but very close to reality. The trail was based on the track and guesstimating where it is in places since each visit to EFCA was walked on a slightly different path.
Results

This section displays the final maps. These first maps show how the map styles changed. It all started with the one on the right (Figure 24) and it initially seemed that saying something about EFCA and including a map that showed how to get there would be a good idea. The different vegetation types were nice and yet the contour lines and elevation still needed to be shown. On top of this, the overall look was not satisfying.

So many ideas were experimented with until a fitting design was created. The title font was changed to Times New Roman and a background was added to it as well as directions on how to get to EFCA. Contour lines and a hiker image to signify the trail entrance, which was found in the US Forestry labels in ArcGIS, were also added (Figure 25). The next map utilizes a new font that is inspired by Art Nouveau, one of my favorite periods in art history, as well as the same overall font that is used in this report (Figure 26). Art Nouveau was inspired by nature, so it utilized natural forms and curves and was very elegant and sophisticated (Arnason, 2004, pp. 82-83). Tiffany lamps were from this period. Since Art Nouveau was inspired by nature, it seemed appropriate to bring it into the project so the font, Colonna MT, was utilized for the title font. The font choice was also informed by my own writing as well as the font on the original EFCA sign. The Calibri font was used for this report as well as all informational sections of signs as well as the map and brochure. It is a very simple, easy-to-read font at varying sizes and adds a modern touch. The earthy colors (yellow-green and blue-green) and font are the same as those used in signs which creates a consistent look and brand identity.
Once I developed the design concept, I submitted the map to Dr. McCollum and Dr. Cummins. Dr. McCollum noticed that the stream line (the dark blue line) was not entirely accurate and helped me correct it, which involved having to digitize the entire stream (Figure 27). The issue was due to the scale of the data being greater than that of the image. Dr. McCollum also felt that the rest of the tributaries (bright blue lines) needed to be added and suggested some minor changes that made the map easier to understand such as moving the scale and Ohio map to where the Legend was, making it easier to see where the contour lines were as well as the main stream. Dr. Cummins also noticed that the trail in the East Woods was not correct and he suggested changes.

Their assistance made the map really come to life and helped ensure that as much information as possible was included while maintaining a simple design. Instead of foliage shown by various textures, the different land cover types are different colors with a 70% transparency that allowed the contour lines to show through. When everything was finalized, the map geometry tool was utilized to add up the trail length and it claimed that it was 1.04 miles long and there are a total of 31 acres.

The final map is elegant and sophisticated and easy to navigate (Figures 28 and 29). This encourages more visitors as well as saves some time for Drs. McCollum and Cummins because it allows visitors to travel at their own pace and prevents Dr. McCollum and Dr. Cummins from having to take every visitor on a personal tour and discussing trail guidelines every time. The fonts and colors

Figure 26: This map’s title font is inspired by Art Nouveau.

Figure 27: This map utilized solid colors to show land cover types. The red lines are tributary corrections suggested by Dr. Cummins. Adding them increased the accuracy and overall movement in the map.
used in the map are also used in the interpretive materials, such as the signage and brochure, which are discussed in Chapters III and IV.

Figure 28: The final map of EFCA. This features the discussed design elements, land cover types, hydrology, and elevation.
Figure 29: This map has a few minor corrections as well as a thicker border that make it more polished.
Chapter III: Creating Interpretive Signage

This chapter is about the process used to create interpretive materials and describes how the signage was created. It begins with a review of different types of signs and what inspired the design and concludes with how this information fits into current educational approaches in order to ensure that various groups will have a reason to visit in the future. In order to do so, place-based learning is examined as well as current K-12 science curriculum requirements and the requirements of Girl and Boy Scout badges.

Before delving into the inspiration and educational requirements, here is a list of topics that can be discussed at EFCA based on the information in Chapter I. Besides discussing ideas with Drs. Cummins and McCollum, these topics were generated from my observations as well as looking at all the pictures and videos on their website.\(^6\)

- Different Habitat Types
- Earth’s Geologic and Hydrologic Processes
- Ecosystems
- Food Webs
- Making Observations
- Ohio’s Natural and Environmental History
- Plant and Animal Identification
- And much more!

Furthermore, to reiterate what was discussed in previous chapters, each of the ten signs and brochure feature whimsical drawings as well as fonts and colors that are the same as those in the map. This will create a noticeable brand identity that will help visitors identify EFCA and be interested in learning more about their local communities. This brand identity includes:

- Using the same blue-green, yellow-green, and Earth tones throughout
- Using the same two fonts: Colonna MT and Calibri
- Using whimsical drawings done in pen and ink and colored pencil

While thinking about where to begin the journey toward creating signs and educational materials, I completed research to learn what makes an effective sign as well as what may detract from the landscape. Since many people do not view Ohio as being especially beautiful, it was my mission to show the natural, rugged beauty as a way of educating and encouraging others to visit. However, inviting more visitors generates questions about what actions will and will not be encouraged at EFCA. Most groups are currently supervised by Dr. Cummins and/or Dr. McCollum and thus they usually are told not to trample plants, for instance, but what if visitors eventually come on their own?

\(^6\) http://jrscience.wcp.muohio.edu/edge-farm/TOC.html
Trail Etiquette

In order to promote proper actions at natural areas or parks, there is a need for some sanction signs as well as interpretive signage (Duncan & Martin, 2002). Knudson et al. wrote that interpretive signage encourages comprehension as well as awareness (as cited in Duncan & Martin, 2002, p. 20). Sanction signs, on the other hand, promote specific behaviors, or etiquette, such as staying on trails and not trampling wildflowers, by warning that insensitive behavior will be reprimanded (Duncan & Martin, 2002, p. 21; Figures 30 and 31). By stating the reasoning behind the rules, Gramann et al. stated that it creates an “awareness of consequences” that promotes positive behavior (as cited in Duncan & Martin, 2002, p. 21). Orams (1997) wrote that providing more signs makes parks more visitor-friendly as well as enables visitors to more thoroughly experience the park.

Currently, sanction signage is not appropriate at EFCA due to no enforcement currently being in place, so interpretive signage makes more sense. But stating rules could be communicated through a brochure or in person instead of signs. The brochure is discussed in Chapter IV and includes some guidelines for proper actions at EFCA whereas the interpretive signage will focus on being educational.

Guidelines for Interpretive Signage at EFCA

Since one of EFCA’s goals is to have more school groups visit, these signs must stand as an idea generator for educators. As Wandersee and Clary (2007) noted in their study of park signs, field trips “provide experiential learning opportunities for students that support or enhance classroom science learning, as well as increase students’ motivation to learn” (p. 16).

These signs should include some questions that promote inquiry. An immense part of this is to create signage that is easy to understand and does not take much time to read. One way of
Guidelines for Interpretive Signage

- Only 70 words per sign, with an average of eight words per sentence
- Sentences written in an active voice with an eighth-grade reading level
- Only one main topic, or take-home message, per sign
- Topics should be diverse and multidisciplinary
- Signs should promote interaction with surroundings and ask questions

Figure 32: Signage guidelines from Wandersee & Clary (2007). These are just a selection of criteria from Figure 5 (p. 22).

So how much information should be on each sign (Figure 32)? According to Wandersee and Clary’s (2007) findings, each sign should contain a maximum of 70 words that are “concise and memorable” (p. 19). Chall and Dale as well as Stilson wrote that shorter sentences, with an average of eight words, were easier to read and understand (as cited in Wandersee & Clary, 2007). An active voice should also be used more often than a passive voice, ensuring that the signs will be interesting to readers. On top of this, a maximum of an eighth-grade reading level should be used since The University of Michigan Health System observed that an Adult Literacy survey in 1992 found most adults in the United States read at, or below this level (as cited in Wandersee & Clary, 2007, p. 20). To promote curiosity, each sign should contain information from various disciplines like geology and botany and perhaps even link science with human history (Figure 33 is a good example of this). This will help captivate the interest of those who are not into science by including historical, botanical, and aesthetic material (Wandersee & Clary, 2007). This will also help make a field trip more meaningful.

Figure 33: This sign is from the Badlands trail at Miami Whitewater Forest in Harrison, OH. Many of the signs at this park are beautifully illustrated (photo by author).
But there are caveats to utilizing signs as they can be distracting attention grabbers. Gopnik wrote that visitors at the Museum of Modern Art spent approximately 50 seconds reading a sign and only four seconds viewing artwork (as cited in Wandersee & Clary, 2007, p. 22)! Due to this, the National Park Service specified that only signs which are absolutely necessary for safety or protecting resources should be used in wilderness areas (as cited in Duncan & Martin, 2002, p. 24). This means that at EFCA, the signs should be featured in areas that are more open, such as the prairies, and not be so bright and colorful that they detract from the beauty of nature. An example of a sign that should not be used there is the image on the right in Figure 34 as the colors are a little too bright. Figures 35 through 37 do not distract due to their Earth tones and green hues. The number of signs should be limited in the woods unless absolutely necessary, such as mentioning to watch out for salamanders, so that visitors can fully soak in nature without feeling burdened by several signs to read.

Over the course of this project, and throughout my studies at Miami University, I traveled to various parks and took pictures of signs that interested me.

Figure 34: The sign on the left is about redwoods at Pfeiffer Big Sur State Park in Big Sur, CA. This sign is a great example of one made with wood and Plexiglas. The sign on the right is from Julia Pfeiffer Burns State Park, also in Big Sur, CA. This sign was professionally made with metal and laminated materials (both photos by author).

Figure 35: This sign states that EFCA is protected by TVCT (photo by author).

Figure 36: A sign from Fernald Preserve in Harrison, OH (photo by author).

Figure 37: The welcome sign to The Wilderness Trail at Edge of Appalachia Preserve in Adams County, OH (photo by author).
me for a variety of reasons. Most of these signs feature illustrations and Earth tones as well as small multiples and other guidelines from Wandersee and Clary (2007). The use of art as part of the signs makes sense because, as discussed by Peter London in Drawing Closer to Nature (2003), “art is a holistic language that is uttered from the mind, body, and spirit. In this way, art is a perfect form of expression with which to imagine, investigate, propose, and engage in a new worldview” (p. 2). Art allows us to see the world, and ourselves, in new ways. The world takes on more mystery and value as we become more intimate with it. Michael (2005) nailed it when she wrote that science and art “rely on observation, pattern recognition, problem solving, experimentation, and thinking by analogy. Both artist and scientists observe, record, imagine, and create” (p. 116).

Of all the signs I gazed upon, I felt some were more effective than others and really enjoyed the ones with drawings best. This may be due to being an artist but based on my own experiences, people relate more to drawings as they show the soul, the raw beauty and life more than just a photo. Reference photos were used primarily to help capture as much detail as possible, especially since most of the subjects are fleeting such as spring ephemerals and mysterious animals. I started with a goal of thirty drawings since I figured there would be three on each of ten signs and it grew from there (Figure 38).

**Sign Inspiration**

![Figure 38: This is one of the first ideas for signs that utilized three images with information about each (photo by author).](image)

![Figure 39: The current sign at EFCA. This picture was taken in March 2012. The top left corner of the sign by the bird was beginning to split apart due to outdoor exposure (photo by author).](image)

![Figure 40: The sign in November 2013. The color is wearing off and more of the sign is splitting apart (photo by author).](image)
The current sign at EFCA was painted by one of Drs. Cummins’ and McCollum’s children and is emotionally significant to them (Figures 39 and 40). It is simple, yet sophisticated by utilizing colors found at EFCA as well as abstract (simplified, exaggerated) images of wildlife and prairie. It is reminiscent of Charley Harper’s work which is very modern and simplified to its core elements and well-loved (Oldham, 2009, p. 29). Instead of counting every feather on a bird, he created the personality (pp. 24-25). His images were flattened, using linear elements and simple colors, often with just one hue of a color, and were ideal for creating prints and silk screens (p. 29). The artwork is also evocative of folk art that is often created by artists who never went to art school and are often the purest of artists since they were not exposed to the direct teachings and critiques of a formal class. Due to this, I wanted to ensure that whatever I created reminded viewers of this sign. In addition to Charley Harper, several other artists inspired my work from a variety of genres (Figures 41 and 42). Gustav Klimt’s work is Art Nouveau inspired, just like the font used for the title in all the interpretive materials. Rembrandt is well-known for his paintings, but his prints are what really inspire me as they are very sketchy like my drawings. Though I can replicate imagery in a photo-realistic style, I prefer that of Rembrandt, Klimt, and others that is sketchy and full of emotion. Hannah Hinchman, Claire Walker-Leslie and several other artists that utilize field journals also provided inspiration.

The subject matter of the drawings I created are based on my own observations over nearly
three years of visiting EFCA as well as the pictures on EFCA’s website and the flora and fauna lists from Chapter I. Since each of the ten places has a specific name, I used that as the main inspiration for images and added a couple common plants or animals from that area with interesting facts about each.

Colors are limited to that of a set of twenty-four Prismacolor colored pencils (Figure 43). Though I have a set of 132 Prismacolor pencils, and used to utilize most of them, I learned from my studies that using a simple set of colors forces you to really look and find ways to make the colors you need. The limitation of colors helps you focus more on the subject instead of finding the exact color which is typically more truthful anyway. Only a black pen was used as well which helps the drawings speak for themselves through their lively simplicity. Colors are only those found in nature and a whimsical echo of reality. Since I planned to copy these, it was important to keep them simple but approachable and full of enough detail to be useful in identification. Doing drawings with primarily pen makes them easier to scan as well as using a spiral-bound sketchbook with heavy paper.

All the interpretive materials rely on several key design concepts including: balance, repetition, and rule of threes. Colors are often contrasting and complementary – or directly across each other on the color wheel - which promotes as much life as possible while staying approachable and relevant (Figures 44 and 45).

- **Analogous colors**: utilizing shades (black added), tones

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Figure 43: My drawing materials consisted of only pens, colored pencils, and a sketchbook (photo by author).

Figure 44: A color wheel is a useful tool for creating a color scheme (photo by author).

Figure 45: An example of an analogous color scheme. This means that tones, tints, and shades of colors next to each other on the color wheel was used (photo and artwork by author).
or tints (white added) of hues (colors) next to each other on the color wheel

- **Balance:** can be achieved via a variety of means, but basically means that everything has its place in the image and looks like it belongs there

- **Complementary colors:** colors are complementary if they are across from each other on a color wheel. For instance, green complements red, blue complements orange and yellow complements violet.

- **Repetition:** elements are repeated in order to achieve balance. For instance, repeating colors and linear elements.

- **Rule of threes:** this is another way to achieve balance. This means that there are three elements in the image – such as three leaves or three frogs.

Once the goal of thirty drawings was reached, I traced them onto Grafix Dura-lar which is clear and able to take a variety of wet media on both sides (Figures 46 through 48). I used a drawing pen and very small nibs to trace my drawings onto it. These were then scanned, edited in order to remove any inconsistencies

The signs were then created in Microsoft Publisher. As previously mentioned, all information on the signs came from my own observations as well as Drs. Cummins and McCollum and their website and since there are ten specific places, only ten 3’ x 2’ signs were created. After playing with some ideas, I decided that quadrants were better than the previous idea of the signs divided into thirds. This would allow for more information to be included in each sign. The colors and fonts are the same that are used in the map. The repeating design elements include:

![Figure 46: An example of the drawings. This is of an American bittern (art and photo by author).](image)

![Figure 47: Another example of the drawings. This is of a bullfrog (art and photo by author).](image)

![Figure 48: Here is a photo of me tracing a drawing onto clear Dura-lar (photo by Rob Tyler).](image)
• Colonna MT and Calibri fonts
• Repeating analogous colors (yellow-green and blue-green)

In addition to these, the following guidelines were incorporated:

• Small multiples
• One take-home message per sign
• Diverse and interdisciplinary topics
• Ask questions

Now it is time to reveal the signs!

The Interpretive Signage

Though these signs may appear simple, they are full of wonderful information that is intended to increase interest in natural areas in Ohio and promote inquiry by asking questions. In addition, they contain information about various plants and animals as well as other subjects.

Though Wandersee and Clary (2007) recommended only 70 words per sign, all of these contain an average of 124 words per sign. But the middle section that contains the take-home message averages 42 words per sign. They are divided into quadrants on the outside that typically contain an image and interesting information about it that may help viewers identify it and make a connection. They are written at, or below an Eighth grade reading level as suggested by Wandersee and Clary (2007) and each one is multidisciplinary. The National Assessment of Educational Progress (2011) states that eighth-graders should be able to interpret text and grasp its meaning as well make connections to text. So basically, the signs are written simply and utilize one-syllable words as often as possible and are as short and concise as possible as Hocut (2014) advises.

East Woods

The sign for the East Woods talks about what can be found in typical Ohio forests and makes visitors think about where they would live and eat if they lived here (Figure 49). Animals and plants discussed include: Eastern box turtle, Red-bellied woodpecker, flowering dogwood, and white trillium (The Cornell Lab of Ornithology: All About Birds, 2014a; Lady Bird Johnson Wildflower Center, 2014b; State symbols USA, (n.d.); Peterson & McKenny, 1996, p. 10).
Figure 49: The East Woods sign discusses what being an explorer (art by author).

**Heart of the Woods**

This sign is one of the most complicated because it discussed a variety of water quality issues (Figure 50). Though the take-home message is about salamanders and their importance, it also discusses channelization as well as natural history (Denny, 2002, p. 10; Davis, 1998, p. 43).
McCoy Woods

Since McCoy Woods was covered in honeysuckle, and the neighbor’s woods still are, it is a great place to discuss invasive species (Figure 51). Though some of these may not necessarily be invasive at EFCA, they are found throughout Ohio (Missouri Botanical Garden, n.d.; Tallamy, 2007).
Figure 51: McCoy Woods is a great place to discuss invasive plants (art by author).

Pickerelweed Pond

Pickerelweed Pond discusses the varied uses of pickerelweed (Figure 52). This information could be useful for other discussions about how you would live if you were an explorer or Native American and what you would eat which connect easily to history (Lady Bird Johnson Wildflower Center, 2014f; Fairfax County Public Schools, n.d.; Peterson & McKenny, 1996, p. 316; McShaffrey & Glotzhober, 2008, p. 51).
Figure 52: Pickerelweed Pond is a great place to discuss the uses of this interesting plant (art by author).

**Rush Run**

Rush Run, like Pickerelweed Pond, discusses variety of uses of its namesake plant (USDA: NRCS, 2003; Figure 53). In addition, it discusses why bullfrogs and muskrats are problematic at this wetland (Robertson, 2009).
Rush Run discusses the many uses of rushes (art by author).

Shortgrass Prairie

The uses of camera traps is the take-home message for the Shortgrass Prairie sign (Figure 54). Camera traps are useful for seeing what wildlife frequent the area and to get a sense of populations of various animals (ODNR: Division of Wildlife, 2012; The Cornell Lab of Ornithology: All About Birds, 2014b.; Mammals of Ohio Field Guide, 2007, p. 12).
Tallgrass Prairie

This sign discusses why prairies are important and helps visitors identify a few common prairie plants (Figure 55). These plants include: big bluestem, bee balm, Maximillian sunflowers, and purple coneflower (Lady Bird Johnson Wildflower Center, 2014a, e, d, c).
Toad Hall

Toad Hall discusses what wetlands are since it is the first wetland on the trail (Figure 56). Animals that are often found there are also pictured and feature some interesting information about each of them.
Figure 56: Toad Hall discusses the importance of wetlands (art by author).

**Vollmer’s Pond**

This sign discusses the importance of nesting areas (Figure 57). Some common flowers and trees as well as a spring peeper are mentioned and pictured.
Willows in the Wind

Willows in the Wind is one of the most beautiful wetlands at EFCA and is a frequent pit stop for a variety of wildlife (Figure 58). Black willows are incredibly important as the take-home message in this sign states (USDA: NRCS, 2010, McShaffrey & Glotzhober, 2008, p. 52).
Now that what material is in each sign was addressed, it is time to show how it connects to K-12 Science Curriculum as well as Boy and Girl Scout Badge Requirements. Since this practicum focuses on one place, and there is an immense need for connecting more to one’s local area, place-based education is the guiding method for every lesson plan idea.

Place-Based Education and Learning

According to Bennett (2009), place-based education is “experiential teaching and learning that engages students in their own local environment” (p. 164). This is what Dr. Cummins does in his Restoration Ecology class and is an integral part of EFCA, so ensuring that place-based learning continues into the future is definitely a goal. David Sobel, the director of Antioch New England Institute’s Center for Place-based Education stated that there are ten guidelines for place-based education:

1. Learning takes place outside in the schoolyard, the local community, and environment.
2. Learning focuses on local themes, systems, and content.
3. Learning is personally relevant to the learner.
4. Learning experiences contribute to the community’s vitality and environmental quality and support the community’s role in fostering global environmental quality.

5. Learning is supported by strong and varied partnerships with local organizations, agencies, businesses, and government.

6. Learning is interdisciplinary.

7. Learning experiences are tailored to the local audience.

8. Learning is grounded in and supports the development of a love for one’s place.

9. Local learning serves as the foundation for understanding and participating appropriately in regional and global issues.

10. Place-based education programs are integral to achieving other institutional goals. (as cited in Bennett, 2009, p. 164).  

Nowadays, it is critical that children are connected to nature and especially to their own localities. One of the most discussed individuals who practiced place-based education was Henry David Thoreau who wrote *Walden* about his attempt to live completely off the grid and away from civilization (Orr, 2005, p. 86). Thoreau wanted to live “‘deliberately’” and sought out “the ordinary, ‘the essential facts of life’” (Orr, 2005, p. 86). He made careful observations and revealed the “potential lying untapped in the commonplace, in our own places, in ourselves, and the relation between all three” (Orr, 2005, p. 86).

Michael (2005) “sought to help children to become keen observers of their own ‘place in space,’ as Gary Snyder calls it, in the hope they would develop a sense of belonging to a particular place” (p. 113). She accomplished this through her River of Words art contest and the Watershed Explorer program for educators which help children explore their own backyards and communities with their entire selves (pp. 111-113). It was especially important to her that they learned the history of their local areas as well as where their trash goes, where their water flows, and what pieces of art were inspired by their places (p. 114).

River of Words is an annual art and poetry contest that encourages children to explore and understand their watersheds. In doing so, Michael (2005) “discovered an un-met need. [Her] curriculum helped children experience the world with curiosity and wonder, enhancing their expressiveness in responding to the environment” (pp. 115-116). Watershed Explorer is


useful for teachers since it helps students understand ecology in a very hands-on way and, as one teacher stated, “finally, someone put some art, some heart, into environmental education” (pp. 115-116). What really makes this program work is the fact that it is designed to fit “into the tightly scheduled and protected classroom environment and into the annual routine of schoolchildren around the world” (p. 118).

Since this project focuses on creating interpretive materials for EFCA, place-based learning is especially needed. Instead of discussing environmental issues that are nationwide or worldwide, the focus is in Oxford and in Ohio which makes the knowledge gained from a visit to EFCA relevant for every visitor. Though all topics can be related to something greater that affects us on a larger scale, they are easier to notice on a smaller, more observable scale. For instance, learning about rare and endangered animals in our backyards is more relevant than learning about polar bears in the Arctic which many people may never see or experience their habitat in person. But by learning about animals right here at home, in their places, students have a better chance of making a personal connection that will guide their decisions and make them better informed individuals with real experiences.

**Current Standards for Science Education**

Education standards have changed immensely since I was in school. President Obama eliminated the No Child Left Behind approach in favor of improving education through a “race to the top” approach (J. Winslow, personal communication, March 8, 2013). These new standards, the Next Generation Science Standards, are more rigorous and were adopted throughout the United States June 2013.

The Next Generation Science Standards (NGSS), developed by Achieve, a non-profit, impartial organization dedicated to educational reform, are the first significant change to science curriculum nationally since 1996 (Achieve, 2014). They “were designed to combat widespread scientific ignorance, to standardize teaching among states, and to raise the number of high school graduates who choose scientific and technical majors in college” (Gillis, 2013, p. A15). Some of the changes include teaching about evolution as well as climate change (Gillis, 2013). Gillis (2013) reported that “states are not required to adopt them, but 26 states have committed to seriously considering the guidelines” (p. A15). Ohio is one of these states and “will review the document to determine what future action should be taken” in regards to further changes to learning standards (ODE, 2014).

As Jeff Winslow, the Science Instructional Leader at Talawanda School District (TSD) in Oxford, Ohio noted, it is unlikely that Ohio will implement the NGSS in the near future since it has already devoted its resources to penning new assessments for curriculum through their Ohio Revised Science Content Standards (J. Winslow, personal communication, March 19, 2014; ODE, 2013c). And once these assessments match that of NGSS, Ohio will decide if it is more cost effective to keep writing its own assessments or approve the use of NGSS (J. Winslow, personal communication, March 19, 2014). The NGSS will basically do what the Common Core Standards do for Language Arts and Math as both are more rigorous and will help students
become more competitive with the rest of the world (J. Winslow, personal communication, July 30, 2013; ODE, 2013c). If the NGSS are adopted, science curriculum may change again in the near future. This is an important consideration as it affects all teachers and any assistance in helping children understand topics such as evolution and climate change would be beneficial. EFCA can do this by ensuring that their interpretive materials make some of these connections and assist teachers that want to visit by helping them design their lesson plans.

**An Overview of Ohio’s Revised Science Content Standards**

Ohio’s current science standards, the Ohio Revised Science Content Standards, are a tremendous leap in the right direction. Based on a thorough literature review of education, these standards will encourage more inquiry, alleviate ignorance, and encourage personal learning. They encourage teachers to help students ask their own questions and make their own connections, which will increase understanding.

These science standards make it easy for teachers to search for what the topics are as well as what students are expected to learn at each grade level (Figure 59). As Jeff Winslow pointed out, they are organized primarily by strands, themes, topics, and content (J. Winslow, personal communication, March 8, 2013). Strands are the individual science disciplines such as earth, life, and physical (ODE, 2013a, p. 281; J. Winslow, personal communication, March 8, 2013). These strands are written in italics next to each grade level in the example (Figure 59). Grade Band Themes are the central concepts that link everything together and become more complex with each grade level (ODE, 2013a, p. 281). Topics are written in blue above and are

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**Figure 59:** This is the first page of the new Science Standards. It gives an overview of what children need to learn at each grade and is easy to navigate (ODE, 2013a, p. 1).
the basis for content, which is what must be taught (ODE, 2013a, p. 281). According to Jeff Winslow, there is a push for looking at systems – how everything is connected - nowadays in Science (J. Winslow, personal communication, March 8, 2013). This is especially noticeable in the High School curriculum as it is still divided into individual disciplines, such as Biology and Environmental Science, and the syllabus discusses how one system affects another and how it relates to current issues (ODE, 2013b).

The Eye of Integration (Figure 60) plays a key role in identifying connections between subjects. By doing this, students will link their learning together and understand the content in its context (ODE, 2011). Though this will eventually be part of the curriculum, teachers can get a blank sheet from ODE’s Resources tab on their website and make their own connections. Another great addition to the curriculum are common misconceptions for topics that help students understand, for instance, that fog is not a cloud (J. Winslow, personal communication, March 8, 2013).

Putting in-class lessons in context often requires real-life experiences such as field trips. EFCA is a wonderful place for field trips due to its proximity to several schools as well as its openness and willingness to collaborate with local teachers and scout groups for programming. Scout groups especially utilize real-life lessons and by connecting some of their requirements for badges with K-12 Learning Standards, a more relevant experience will result. These guidelines were the start of deciding what to include in interpretive materials but the focus is also on learning about local issues as well as plants and animals and making their own connection with nature.
There are many considerations for field trips. For instance, all Ohio School Districts require a signed permission slip as well as transportation to the site which can be very expensive and limit the number of field trips. Budget cuts for TSD over the past four years have limited the amount of field trips to one per grade each year (J. Winslow, personal communication, March 8, 2013). Teachers often have to find external funding or grants since they are not allowed to charge students for field trips but it is ok to charge for lunch since it is not a requirement for attendance (J. Winslow, personal communication, March 8, 2013). Since there are some students with disabilities, and not all field trip locations may comply with the Americans with Disabilities Act standards, such as EFCA at this time, Winslow said that it is up to the teachers to decide if the location is acceptable for their students (personal communication, March 8, 2013). For instance, if a student is in a wheelchair, they may only be able to see the prairie complex at EFCA since that is the flattest area. A final consideration is that unlike most Ohio School Districts, TSD requires the presence of a school nurse (J. Winslow, personal communication, March 8, 2013). But by providing guidance for connecting several subjects together, EFCA could inspire teachers to collaborate on field trips and give students a more meaningful experience that relates to real life.

Connecting K-12 Science Curriculum Requirements to Educational Topics at EFCA

As there are many topics to choose from in the current K-12 Science curriculum, it is necessary to choose the most relevant for inclusion at EFCA. Because the standards are very thorough and in-depth, the documents are quite long. So the following pages discuss content standards by grade level, divided into Kindergarten through Eighth Grade and then Ninth through Twelfth Grade (ODE, 2013a; ODE, 2013b).

Connecting Kindergarten through Eighth Grade Science Curriculum Requirements to Educational Topics at EFCA

*Kindergarten* contains several topics relevant to EFCA. These include: noticing weather changes; when the sun, moon, and stars are present; and comparing and contrasting living and non-living things in Ohio (ODE, 2013a, p. 4). Since the sign about the Heart of the Woods, the creek and tributaries at EFCA, contains information about water, salamanders, and fossils, this is a great place to discuss living and non-living things.

Since Life Science is the most relevant subject for *Grade 1*, Basic Needs of Living Things is the topic that can be discussed at EFCA (ODE, 2013a, p. 24). There are many creatures that live there and all require different habitats and resources, which makes this topic observable and relevant. Several of the signs feature some of the needs of different plants and animals.

Students learn about the atmosphere and ecosystems in *Grade 2* (ODE, 2013a, p. 45). Both of these topics are easily incorporated at EFCA as they play important roles in practically everything. Ecosystems are especially relevant and are intimated in several signs since some discuss food webs and different habitat types.

*Third graders* learn about many topics that are relevant at EFCA. For instance, they discuss the Earth’s Resources as well as its uses which are an important part of Butler County
history and helps explain why EFCA was once farmland (ODE, 2013a, p. 65). Another topic is Behavior, Growth, and Changes that affect the survival of different organisms (ODE, 2013a, p. 65). This is really important at EFCA and connects to why different organisms are at different levels of food webs which is discussed in the Shortgrass Prairie sign.

*Fourth graders* learn about Earth’s Surface and Earth’s Living History (ODE, 2013a, p. 99). Since many changes are constantly in motion at EFCA, such as erosion and weathering, and there are creek beds that contain fossils, these topics are easily discussed there. The sign for the Heart of the Woods discusses some of these processes in detail.

Interactions within Ecosystems is the Life Science topic for *Fifth graders* (ODE, 2013a, p. 127). This topic could involve discussing energy transfers within ecosystems at EFCA. For instance, how energy moves from the soil to a rodent upward to a predator like the coyote. The Shortgrass Prairie sign gives a sample food web and could be elaborated upon for a lesson plan.

*Sixth grade* science curriculum involves learning about Rocks, Minerals, and Soil (ODE, 2013a, p. 156). Students could observe the different sedimentary rocks at EFCA and learn why igneous and metamorphic rocks are not common in Ohio. The sign for the Heart of the Woods actually discusses some of the phenomena for this and could be expanded upon during a field trip.

*Seventh graders* learn about the Cycles and Patterns of Earth and the Moon for their Earth and Space Science topic (ODE, 2013a, pp. 202-203). As this involves learning about the hydrologic cycle, EFCA is a great place for a field trip. Its many wetlands, creek, and tributaries are a great place to observe hydrology in motion. Students could even map they cycle all the way to the Gulf of Mexico! The importance of wetlands is discussed in the Toad Hall sign.

In *Eighth grade*, students learn about how the Earth formed as well as geologic process and how species reproduce and inherit traits (ODE, 2013a, p. 241). Though it may be a leap, these could be connected to EFCA. A discussion of how the bedrock and soil formed as well as how different flora and fauna reproduce is certainly possible. Geologic processes often influence what plants and animals live in certain areas too which is noticeable at EFCA. For instance, some birds prefer to mate and reproduce near wetlands and some prefer prairies whereas others prefer woods. This is often due to what food can be found where and what plants live in an area is impacted by the soil as well as many other factors. Habitat types are discussed in several signs.

After reading through all of these topics, it seems like the ones that repeat the most, and could be discussed over the years with added complexity, include: ecosystems, weather, movement of energy in systems (hydrologic, atmosphere, geologic), what characteristics help
flora and fauna survive, and many more depending on whether teachers want to return each year. It would be interesting to see students work on projects that expand in complexity each year as they learn more.

**Connecting Ninth through Twelve Grade Curriculum Requirements to Educational Topics at EFCA**

High school curriculum is divided a little differently since it consists of different options depending on a student’s interest. Possible subjects include: Biology, Chemistry, Environmental Science, Physical Geology, Physical Science, and Physics (ODE, 2013b). Since there are 95 pages of curriculum to sort through, some selections of relevant topics that could be discussed at EFCA include:

- **Biology** discusses evolution, diversity of life, and ecosystems, as well as many more important topics (ODE, 2013b, pp. 2-3). Two of the most observable at EFCA are certainly the diversity of life and ecosystems as there are several different habitat types that have their own personalities and attract different creatures. A study could be done at EFCA that discusses what system draws what creatures and why. All the signs connect to Biology.

- **Chemistry** involves learning about chemical bonds which could involve a project discussing how pollutants, such as fertilizer, attract to water, and how the water is cleaned (such as at a wastewater treatment plant or naturally) (ODE, 2013b, pp. 12-13). Due to its location, the sign for Toad Hall is especially relevant for Chemistry.

- **Environmental Science** is definitely the easiest topic to discuss at EFCA and connects to all signs. This subject involves discussing the biosphere, atmosphere, lithosphere, hydrosphere, and how matter and energy move throughout each of them (ODE, 2013b, p. 25). This is probably the most important subject to take, and relate to real life, as it involves connecting real world examples and learning about specific issues (pp. 29-30). Many issues that are relevant to EFCA were discussed in Chapters I and II.

- **Physical Geology** involves an in-depth look at bonds, as well as atoms and elements, in relation to why they connect together to form minerals (ODE, 2013b, p. 36). A look at bedrock and glacial erratics from the Ice Age might be a good way to connect some of this knowledge to EFCA which is easily accomplished by the Heart of the Woods sign.

- **Physical Science** might initially seem like a stretch at EFCA, but many of the laws of motion are in use every day. For instance, going into the East woods and noticing how long it takes to lose the sound of a train, or the mail man, after first hearing it. Or learning how and why GPS works (as discussed in Chapter II). A discussion on waves, forces and motion (like gravity), bonds (also studied in chemistry), and perhaps even the universe (as Dr. Cummins enjoys astronomy and wants to create a planetarium) could be possible at EFCA (ODE, 2013b, pp. 51-52). The East Woods and Heart of the Woods signs are the most relevant but all signs connect.

- **Physics**, like Physical Science, is another topic that seems like a leap for EFCA. But many of the topics in Physical Science are the same, such as waves and motion, but in much more depth (ODE, 2013b, pp. 70-71). As a student of both Physics 1 and 2 in high school, I can now say that it helped increase my understanding of GPS, photography, electricity, and even why accidents happen. It is a difficult subject, but utilizing real-
world examples would definitely create a lasting impression for students and could be discussed with all signs.

In conclusion, many high school topics could also be discussed at EFCA. I could even see students from different science disciplines working together on a project. For instance, physics students could work with biology students on a project involving learning how GPS works and how it is used for delineating different habitat types. Biology students could identify the flora and fauna while the physics students make simple maps from GPS points. Geology students could also work with them to learn about the minerals that make up the bedrock and why different flora and fauna live in different habitats. All of this knowledge combined would make for an excellent report by an environmental science student that discusses how all of these systems are connected and what policies affect them. There are so many possibilities – they just require a little creativity.

Since so many topics repeat during a student’s school career, it is possible to discuss them in more detail at EFCA as the years progress. A summary of the topics and which signs connect to them is below (Table 7). Many of these could be connected to the requirements for other classes such as English, History, Math, and Art. Several of the signs discuss local history and others give ideas that could be used as writing prompts or perhaps the start of a math project and all of them could inspire an art project!

Table 7: Summary of K-12 Science Curriculum Topics that Connect to EFCA Topics

<table>
<thead>
<tr>
<th>Grade</th>
<th>Science Topics</th>
<th>EFCA Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>• Weather changes</td>
<td>All signs but especially</td>
</tr>
<tr>
<td></td>
<td>• When are sun, moon, and stars present</td>
<td>Heart of the Woods</td>
</tr>
<tr>
<td></td>
<td>• Compare/contrast living and non-living things (ODE, 2013a, p. 4)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>• The needs of living things (ODE, 2013a, p. 24)</td>
<td>Shortgrass Prairie,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vollmer’s Pond</td>
</tr>
<tr>
<td>2</td>
<td>• Atmosphere</td>
<td>Shortgrass Prairie,</td>
</tr>
<tr>
<td></td>
<td>• Ecosystems (ODE, 2013a, p. 45)</td>
<td>Toad Hall, East Woods</td>
</tr>
<tr>
<td>3</td>
<td>• Earth’s resources</td>
<td>Heart of the Woods,</td>
</tr>
<tr>
<td></td>
<td>• Behavior, growth, and changes that affect survival of organisms (ODE, 2013a,</td>
<td>Pickerelweed Pond,</td>
</tr>
<tr>
<td></td>
<td>p. 65)</td>
<td>McCoy Woods, Willows in the Wind</td>
</tr>
<tr>
<td>4</td>
<td>• Earth’s surface</td>
<td>Heart of the Woods,</td>
</tr>
<tr>
<td></td>
<td>• Earth’s living history (ODE, 2013a, p. 99)</td>
<td>East Woods, Tallgrass</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prairie</td>
</tr>
<tr>
<td>5</td>
<td>• Interactions within ecosystems (ODE, 2013a, p. 127)</td>
<td>All signs</td>
</tr>
<tr>
<td>6</td>
<td>• Rocks, minerals, and soil (ODE, 2013a, p. 156)</td>
<td>Heart of the Woods,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Toad Hall</td>
</tr>
<tr>
<td>7</td>
<td>• Cycles and patterns of the</td>
<td>All signs but especially</td>
</tr>
</tbody>
</table>
### Choosing Educational Topics for EFCA that Connect to Boy and Girl Scout Badge Requirements

Since both Boy and Girl Scout troops have visited EFCA in the past, and Dr. Cummins and Dr. McCollum want to encourage them to visit more often, a review of various badge requirements was completed. This will help Scout leaders by showing them how they can connect their vision with what EFCA has to offer and hopefully encourage them to make even more connections. This was accomplished by including information in each sign that links back to badge requirements which is listed with each badge below. What sets Boy Scouts and Girl Scouts apart from many organizations is that being outside is inherent in their mission. In turn, this imparts a love of nature into every scout.

The grade levels for Boy Scouts correlate to the education from K-12 curriculum and each grade level. For instance, Cub Scout Packs are for boys ages 7 to 10, Boy Scout Troops are for boys age 11 to 17 and Venturing Crews are for both boys and girls ages 14 to 17 (Greenwich Scouting, 2013). Girl Scouts are a little more complicated: Daisies are for Kindergarten through

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<table>
<thead>
<tr>
<th>Topic</th>
<th>Grade Levels</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earth and moon</td>
<td>8</td>
<td>All signs but especially Toad Hall</td>
</tr>
<tr>
<td>Heart of the Woods, Toad Hall, East Woods, Rush Run</td>
<td>9-12</td>
<td>All signs</td>
</tr>
<tr>
<td>Biology</td>
<td>9-12</td>
<td>All signs</td>
</tr>
<tr>
<td>Chemistry</td>
<td>9-12</td>
<td>All signs but especially Toad Hall</td>
</tr>
<tr>
<td>Environmental Science</td>
<td>9-12</td>
<td>All signs</td>
</tr>
<tr>
<td>Physical Geology</td>
<td>9-12</td>
<td>Heart of the Woods</td>
</tr>
<tr>
<td>Physical Science</td>
<td>9-12</td>
<td>All signs, but especially Heart of the Woods</td>
</tr>
<tr>
<td>Physics</td>
<td>9-12</td>
<td>All signs</td>
</tr>
</tbody>
</table>

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*ODE:* Ohio Department of Education

*Greenwich Scouting:* Greenwich Scouting, 2013
first grade, Brownies are grades 2 through 3, Juniors are for grade 4-5, Cadettes are grades six through eight, Seniors are grades 9 and 10 and, finally, Ambassadors are grades 11 and 12 (Girl Scouts, 2014a). Something that is really great for girls is that Girl Scout badge requirements are already correlated to curriculum standards for all subjects (Girl Scouts, 2014a)! But since the focus of this practicum is on science education, only connections to EFCA and science are featured here; however, there are many interdisciplinary connections discussed throughout that could be expanded upon by Scout leaders.

Connecting Boy Scout Badge Requirements to Educational Topics at EFCA

Since there are over 130 Merit Badges, it is difficult to connect every one of them to EFCA, so the focus was simplified to the most relevant ones (BSA, 2014). Below are some examples of Merit Badges and how they connect to EFCA:

- **American Heritage**: This badge involves reading the Declaration of Independence and writing about important people as well as learning about local history. It may be a stretch, but imagining the men who settled Butler County as well as the leaders of today and their connection to all of us is possible at EFCA. The East Woods sign discusses being an explorer and Rush Run and Vollmer’s Pond discuss local history.

- **Art**: There are so many beautiful plants and animals and landscapes at EFCA and it would be a great place to learn about art. This badge involves learning about concepts such as form and balance and exploring different mediums. I would recommend limiting mediums to watercolors, pen and ink, pencil, charcoal, and pastels at EFCA due to their ease of use. There are also local art museums in Oxford that would meet other requirements of this badge. The signs themselves could provide inspiration due to their design elements and whimsical illustrations.

- **Astronomy**: Dr. Cummins loves astronomy. He could teach scouts about precautions to take while outside looking for stars as well as proper attire and care of equipment. Other requirements for this badge include looking at planets, constellations, sketching the moon and sun and visiting a planetarium. This does not currently relate to a sign but more could be added in the future.

- **Backpacking**: This badge requires some intense backpacking adventures, but the basics about reading maps, using GPS, what to carry, how to schedule an adventure, and more could be learned at EFCA. Boys could also get some practice carrying their packs over the rough terrain prior to their intense journeys. For example, they could hike through the creek and tributaries of the Heart of the Woods and East Woods and learn what was involved in making the map of EFCA.

- **Bird Study**: Dr. Cummins and Dr. McCollum are both avid birders who can help boys identify birds throughout EFCA. This badge has many requirements, most of which could be accomplished there including learning about birds, sketching them, showing how to use binoculars, listening to bird songs, and taking field notes. There are many drawings of birds on all the interpretive materials for EFCA and scouts could learn about each of these birds and get some ideas for sketching them.

- **Camping**: This may be possible in the future at EFCA. But learning about the hazards related to camping as well as Leave No Trace and planning an adventure are good for everyone to know, especially scouts. Learning how to read a topographic map and using a GPS could certainly be done at EFCA. Scouts could begin by learning how to read EFCA’s map and compare it to other maps and imagine what it would be like to camp in the East Woods.
• **Environmental Science:** There are so many environmental issues that could be discussed during a trip to EFCA which makes it a great choice for accomplishing this badge. Some requirements include: discussing the history of Environmental Science, defining terms, conducting experiments, creating study areas, and more. Every sign relates to Environmental Science so this is easily accomplished throughout EFCA.

• **Forestry:** This is another great one for EFCA. It involves keeping a field notebook, learning about tree anatomy and how trees are used by humans as well as how they enhance our world, learning about forest management, and how disturbances impact forests and more. Trees are regularly being planted and chopped down due to the Emerald Ash Borer at EFCA.

• **Geocaching:** This could possibly be done at EFCA, provided that Scout Leaders furnish the equipment. There are many requirements, but it basically involves learning how to use a GPS, maps, and a compass as well as how to be safe.

• **Geology:** At least part of this badge could be accomplished at EFCA. It involves using maps to locate streams and learning about particulates and stream types as well as water flow and much more. On top of this, it requires learning about different kinds of bedrock and Earth’s history. The Heart of the Woods sign discusses some of the topics that are part of this badge and the creek and tributaries could be explored.

• **Hiking:** This badge requires planning and undergoing 10-20 mile hikes and since EFCA’s trail is only about a mile long, this is not possible there. But perhaps it could be in the future if troops worked with neighbors and were allowed to explore surrounding properties.

• **Mammal Study:** Most of this badge could certainly be done at EFCA since it requires observing animals in different habitats at different elevations. It also involves doing a research project, taking pictures of animals in the wild, creating a food chain, and more. The Shortgrass Prairie sign discusses food chains and pictures from the trail camera could be used as part of a research project.

• **Nature:** This involves learning why plants and animals are important to one another and exploring food chains as well as identifying species, all of which could be accomplished at EFCA.

• **Photography:** Learning the basics of photography will assist boys in creating better pictures. These skills can be used at EFCA for capturing plant and wildlife photos and then sharing them with others. Dr. Cummins is an excellent photographer and he could teach others a lot about taking great wildlife pictures.

• **Plant Science:** Since this requires learning about plant anatomy as well as photosynthesis and native plants, it could be accomplished at EFCA. Other requirements for the field study option include: learning about rare plants, creating and writing about a study site, and more. There are several rare plants at EFCA, a few of which are noted in signs as well as the brochure and more are observed each year.

• **Soil and Water Conservation:** As a stream ecologist, Dr. McCollum is well-versed in the requirements for this badge and can discuss watersheds, why soil is important, the hydrologic cycle, water pollution, and so much more. This would be pretty easy to do at EFCA and Dr. Cummins and Dr. McCollum would love to have some of the 100 trees that are part of this badge planted there. Stream ecology is discussed in the Heart of the Woods sign.

• **Sustainability:** This involves learning what sustainability is as well as how it relates to water, food, communities, energy, waste, stuff, population, and climate change. This might make a really good lecture about how conservation areas promote sustainability.

• **Weather:** Dr. Cummins is also very knowledgeable about weather. This badge involves learning about meteorology, climate change, what the differences are between pressure systems and
fronts, acid rain, and more. It also requires making weather instruments or visiting a National Weather Service Office.

There are many more badges that could be connected to EFCA, but this gives a great overview of what is available to Boy Scouts as well as what they can learn. The requirements to get outside and make their own connections will help these boys be really informed men who hopefully will take this knowledge to heart and help change their world for the better.

Connecting Girl Scout Badge Requirements to Educational Topics at EFCA

For Girl Scouts, there are over a 100 badges as well (Girl Scouts, 2014b). On top of this, scouts can make up their own badge that allows them to explore their personal interests. Here are some examples of badges for each level and their link to EFCA:

**Brownie**

- **Bugs:** Bugs are incredibly important for everyone, as mentioned in Chapter I. Looking for bugs at EFCA and learning about them and their habits and habitats would be a great experience. Girls could even create something about bugs using found materials and make a poster to share with others. A couple bugs are on signs.
- **Hiker:** This badge is about going on an adventure outside. As such, it involves learning about gear, packing good snacks, and looking for animals. EFCA is a great place to go on a fairly easy hike and definitely a great place to look for wildlife! A variety of wildlife are featured in each sign.
- **Painting:** This badge simply involves finding something to paint and painting it. Painting outside is one of the greatest experiences, and challenges, that artists face and it involves learning how to conserve resources (such as paint and water and leaving no trace). This could easily be accomplished at EFCA by utilizing a small set of watercolors and painting on a fire break just about anywhere.
- **Senses:** A good hike involves using the five senses, all of which can be further developed at EFCA. By looking, listening, smelling, touching, and tasting (there are taps on some maple trees for syrup!); girls can more thoroughly explore the world around them. Several of the signs ask questions related to senses.

**Junior**

- **Animal Habitats:** This one is perfect for EFCA! Girls can learn about some of the animals found there as well as their habitat requirements. Then, they could learn how to make a habitat as well as protect it. Some ideas for habitats are mentioned in several signs, especially the one for Vollmer’s Pond, and girls could learn how to make their own backyard habitats too.
- **Camper:** This could be possible in the future at EFCA. I could definitely see girls camping under the stars in the East Woods and going on night hikes. This badge involves learning how to camp as well as how to cook a meal and make a campfire.
- **Digital Photographer:** Dr. Cummins is an incredible photographer who could teach others about cameras. Taking photos and sharing them with others, as well as learning how to edit them is what this badge is all about.
- **Drawing:** What better place to learn about different materials and how to shade as well as see perspective in person than the great outdoors? Colored pencils as well as pen and ink and
watercolor pencils would work well at EFCA. Girls could use their books made as part of the Book Artist badge for their drawings.

- **Flowers:** There are so many beautiful flowers in the spring at EFCA and, since this badge involves learning about them and how they help humans, it would be a wonderful experience and easy to do there. Some flowers have fairly simple anatomy and others are pretty complicated and really interesting, so it would be a great place to explore. Several flowers were drawn and discussed in signs and could provide some inspiration for research.

- **Gardener:** There is always a need for more plants at EFCA and this badge is all about getting your hands dirty and learning how to create a garden. Girls could learn about native plants and figure out what would be best to plant where at EFCA and raise them from seeds and then get the joy of planting it themselves! Some information about native plants is on most of the signs.

- **Geocacher:** Since this badge is all about learning how to use a GPS and going on an adventure, this would also be great at EFCA. Girls could take points at signs or habitats or along creek beds or wherever their heart desired. Some points could come from the ones used to create the map of EFCA.

- **Playing the Past:** This could be really interesting at EFCA since it requires learning about women from the past and then creating a name and costume for them. What if you were a Native American that lives in the woods or Sacajawea, exploring with Lewis and Clark? Or perhaps you’re part of the Civilian Conservation Corps? Girls could imagine living in the different habitats at EFCA such as Willows in the Wind and the East Woods.

- **Scribe:** This badge is about writing poems and short stories. It would be fun to describe what you see at EFCA and how you think and feel about it. Several signs ask that you make observations which could be writing prompts.

### Cadette

- **Digital Movie Maker:** Girls could learn about video and then make a movie about EFCA. How wonderful would that be? It would certainly be fun to learn what others have to say about it.

- **Night Owl:** This badge is all about learning who works at night and what the world looks like at night. So girls could learn about frogs that deliver their mating calls at night and see who else ventures out at night at EFCA.

- **Sky:** This badge involves learning about the sky and making observations as well as pollution. Dr. Cummins and Dr. McCollum are great resources for astronomy as well as pollution.

- **Trailblazing:** This one is like the Camping badge for Brownies and could be possible in the future. There is a trail but it is definitely primitive, so it seems like this one could work at EFCA.

- **Trees:** There are so many different tree species at EFCA, so it is certainly a great place to learn about them as well as our connection to trees.

While the requirements for High School Seniors are a bit more cumbersome, I could still see some of these being explored at EFCA such as: Adventurer, Truth Seeker, Science of Style, Voice for Animals, Traveler, Collage Artist, and Locavore. Here are some of the requirements that are easily connected to EFCA:

### Ambassador

- **Photographer:** This is similar to the Digital Photography badge but more in depth. It involves learning about composition as well as light and motion. Dr. Cummins is an excellent resource for learning how to take good photos as well as how to capture animals in motion.
• **Public Policy:** This is a great badge to get because it involves learning about public policies and becoming better citizens and activists. There are many policies that are in play at EFCA and the surrounding community such as the Clean Water Act.

• **Water:** As a stream ecologist, Dr. McCollum is highly qualified to discuss environmental issues pertaining to water as well as humanity’s relationship to it.

Just like the Boy Scouts, there are many more Girl Scout badges and girls can also create their own.

Since many of the badges for Girl Scouts are similar to those of Boy Scouts, it is fairly simple to create starting points for both. Based on the information about EFCA in Chapter I, a list of possible topics for signs include: geology, all kinds of nature (bugs, flowers, sky, mammals, birds, etc.), policies, conservation (animals, soil, water), making observations, and natural history. All of these topics also connect to Ohio’s Revised Science Standards and Model Curriculum for Grades K-12. A summary of topics and their connections to EFCA signs is in the tables below (Tables 8 and 9).

**Table 8: A summary of Boy Scout Badges that Connect to EFCA Signs.**

<table>
<thead>
<tr>
<th>Boy Scout Badge</th>
<th>Signs that Connect</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Heritage</td>
<td>East Woods, Rush Run, Vollmer’s Pond</td>
</tr>
<tr>
<td>Art</td>
<td>All signs</td>
</tr>
<tr>
<td>Backpacking</td>
<td>East Woods, Heart of the Woods</td>
</tr>
<tr>
<td>Bird Study</td>
<td>All signs</td>
</tr>
<tr>
<td>Environmental Science</td>
<td>All signs</td>
</tr>
<tr>
<td>Geology</td>
<td>Heart of the Woods</td>
</tr>
<tr>
<td>Mammal Study</td>
<td>Shortgrass Prairie</td>
</tr>
<tr>
<td>Nature</td>
<td>All signs</td>
</tr>
<tr>
<td>Plant Science</td>
<td>Tallgrass Prairie, Pickerelweed Pond, East Woods, etc.</td>
</tr>
<tr>
<td>Soil and Water Conservation</td>
<td>All signs</td>
</tr>
</tbody>
</table>

**Table 9: A summary of Girl Scout Badges that Connect to EFCA Signs.**

<table>
<thead>
<tr>
<th>Girl Scout Badge</th>
<th>Signs that Connect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bugs (Brownie)</td>
<td>Pickerelweed Pond, Willows in the Wind</td>
</tr>
<tr>
<td>Painting (Brownie)</td>
<td>All signs</td>
</tr>
<tr>
<td>Senses (Brownie)</td>
<td>All signs</td>
</tr>
<tr>
<td>Animal Habitats (Junior)</td>
<td>All signs with habitat information</td>
</tr>
<tr>
<td>Drawing (Junior)</td>
<td>All signs</td>
</tr>
<tr>
<td>Gardener (Junior)</td>
<td>All signs</td>
</tr>
<tr>
<td>Playing in the Past (Junior)</td>
<td>East Woods, Rush Run, Vollmer’s Pond</td>
</tr>
<tr>
<td>Scribe (Junior)</td>
<td>All signs</td>
</tr>
<tr>
<td>Night Owl (Cadette)</td>
<td>Heart of the Woods, East Woods</td>
</tr>
<tr>
<td>Trees (Cadette)</td>
<td>East Woods, Heart of the Woods, McCoy Woods, Vollmer’s Pond</td>
</tr>
</tbody>
</table>
Now that how the signs were created as well as how they can connect to K-12 Curriculum and Boy and Girl Scout badge requirements was discussed, it is important to remember that many more connections can be made to other subjects and for a variety of age groups depending on their interests. Though the connections may not always seem obvious, it is worth the effort and will increase the chances of creating life-long learning as well as individuals who are sensitive to all kinds of biodiversity (Appendix F contains more resources gathered over the course of this practicum). This will further the mission of EFCA.

The next chapter discusses the final deliverable: marketing materials. These materials contain the same design elements as previously discussed and delve into the realm of social media. This will help promote EFCA and assist them in getting more visitors.
Chapter IV: Creating Outreach Materials

Two of the three deliverables were discussed in Chapters III and IV. Now is it time to discuss the final one: marketing materials. This chapter begins with the brochure, which creates word-of-mouth awareness, and then moves onward to social media, which creates an online presence.

Creating the Brochure for EFCA

Remember those sanction signs from Chapter III? In order to promote some proper actions at EFCA, there is a list of trail guidelines in the brochure. A brochure is better than a sign near the entrance at EFCA as a post with a box holding brochures has a smaller footprint. There is simply not much room between the driveway and the start of the trail for a sign. By being part of a brochure, the intent is that visitors will take it with them and take them to heart. Just like the signs, I collected inspiration for them throughout my travels (Figure 61). The brochure will include the same design elements and imagery as the signs.

The guidelines were compiled after several trips to EFCA and discussing ideas with Drs. Cummins and McCollum. On each visit, I tried to bring someone new with me to get their thoughts and see what they noticed. Most of the guidelines are common sense, such as wearing a good pair of hiking shoes and not throwing trash anywhere, but others may not be. For instance, though there are many great trees for climbing and deer look outs, all actions are at their own risk so it is best that visitors do not climb anything. All the guidelines are intended to be suggestions and fun to read. Below are the guidelines that are part of the brochure:

- Please stay on the trails, no matter how muddy or wet they might be. It is fun to get dirty anyways.
- We recommend that you wear a good pair of hiking shoes or something that can get wet as well as clothes that can get dirty.
- You might want to bring some binoculars so you can look for birds and a camera to document your adventures and wildlife encounters.
- Please do not throw any trash anywhere at EFCA. It is imperative that you leave no trace of your visit behind.
- Though there are many wonderful areas to climb, such as trees and deer look outs, please do not climb anything. Any actions you take here are at your own risk.
- But most of all, please have fun and enjoy your visit!

Figure 61: Brochure inspiration. All of these contain drawn imagery (photo by author).
Now it is time to discuss the brochure!

Brochure for EFCA

This brochure is 11” wide by 8.5” tall and is able to be printed double-sided on any paper. It features the same blue-green and yellow-green as the map and signs as well as similar imagery. The front features what could be called a “logo” since the title is quite distinctive in the Colonna MT font (Figure 62). A quick overview of EFCA’s story is in the inside panel and the trail guidelines are on the back with contact information. The overall design is very simple, fluid, and the drawings help it look livelier. In order to create balance, the rule of threes, an analogous color scheme, and repetition are all used.

Figure 62: The front of the brochure (art by author).

The inside of the brochure features more drawings, the map, and a flora and fauna list (Figure 63). Just like the outside, it is based on the rule of threes, an analogous color scheme, and repetition design elements. There are three main elements – pictures, map, and table area - that each have their own personality but all have similar qualities to them that keep the eye moving throughout. For instance, the drawings are full of movement and intentionally face toward the map to keep the eye inside. The lines of the trail and water bodies move the eye...
around the map and then point it toward the table area. Everything is bordered and very polished. This brochure could easily be handed out at Butler County Stream Team as well as local events and functions to garner more interest in EFCA.

Figure 63: The inside of the brochure (art by author).

**Creating a Facebook Page and Blog**

It seems like everyone is online nowadays which means it is imperative to have an online presence. Since Drs. Cummins and McCollum already have a website, I did not need to create one. But because it does not allow users to interact with each other, and Drs. Cummins and McCollum are already on Facebook, Facebook seemed like a good place to start their social media presence.

**Facebook**

Simmons and Zoetewey (2012) suggested that websites are important for “creating a relationship with the audience” that is not available from print materials (p. 253). An online presence, such as a website or social media page, is also important for place-based learning.
because they “create a space for community and place” (Simmons & Zoetewey, 2012, p. 260). As mentioned in Chapter III, place-based learning encourages connections to community organizations as well as various disciplines. Creating a place where users from various disciplines can interact and feel at home is important for creating civic-minded individuals (Simmons & Zoetewey, 2012). A Facebook page will allow members and users of EFCA to share images as well as interact and collaborate (Simmons & Zoetewey, 2012, p. 273).

Nielson (2009) wrote that posts should not be too frequent because they “crowd out the user’s real friends and become unpopular” but they should be updated fairly often to keep users interested. A casual writing style should be used so that users feel welcome; however, the posts should contain very concise and clear information (Nielson, 2009). Keep it simple. I recommend posting at least once a week, perhaps on Wednesday or Friday. This ensures that the posts are worth reading and do not bombard other important posts for users.

Since volunteers play a huge role at EFCA, social media is a great way to get the word out about opportunities. Potential volunteers like to know what they may be doing and for how long, so write about the hours and conditions in a clear and concise manner (Nielson, 2011). In the case of donations, most users search for the organization’s website and do not follow posts of organizations that are too commercial and greedy (Nielson, 2011).

To get the ball rolling, I created a page and simply named it “Edge of the Farm Conservation Area.” I initially added what seemed like the most important picture: the current sign for the profile picture (Figure 64). I added a quick overview of EFCA as well as its mission to the page and then asked friends to “like” the page. It took some time to get many “likes” but it currently has 68 and is growing.

Figure 64: The initial look of EFCA’s Facebook page.

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9 https://www.facebook.com/EdgeOfTheFarmConservationArea
Facebook has changed since the page was created and is now more streamline and looks more like a typical profile page (Figure 65). This makes it a little easier to create posts as well as find information. Since there are not many regular users at this time, it is hard to say what posts engage the most users, but there were a few that stood out. For instance, a post about meteor showers on May 23 reached 106 people! And a post with pictures of American bitterns reached 50 people. So adding pictures and articles or videos to a post is definitely a good idea.

In order to carry on the design elements, the cover photo was changed and is similar to the top box on the front of the brochure and the profile picture was changed to the leopard frog (Figure 66). Cover photos do not usually change very often and this will promote the brand identity. The profile picture can be updated often to promote or spread the word about something interesting.

Blog

Blogs are websites, but unlike EFCA’s website, they allow readers to interact through comments (Godin, 2005, p. 10). Blogs are intended to grow over time and many teach something to readers, making them follow and regularly read them. Like Facebook, they are easy to create and a “How-to Guide” was also made for guidance (Appendix G).
What I envision for EFCA is either what Godin calls a “boss blog” which is “used to communicate to a defined circle of people” (p. 14) or a “viral blog” that is designed to share or spread ideas (p. 15). Depending on the type of blog, the entries should be fairly short (viral) or can be a little longer since there is an intended audience (boss). Godin gives the advice to: “Be specific. Be clear. Be intellectually rigorous and leave no wiggle room” (p. 16). Regardless of what type of blog is utilized, these words are good advice.

I used Google’s blogger to create the blog and used a basic template and chose imagery (Figure 67). Just like the Facebook page, it is named after EFCA.10 But since the exact font and colors are not available, it looks a little different but a similar font was used. A couple posts about this practicum were written but I did not get far with them due to other commitments.

Jim McCormac’s blog, Ohio Birds and Biodiversity, is a great example of how it could be for EFCA.11 McCormac shares pictures from his travels throughout Ohio and writes about virtually everything that has anything to do with birds and biodiversity. It is full of great information. EFCA could use this blog like a newsletter and share the work of other students and what animals and plants were recently observed. Or it could be a place for Drs. Cummins and McCollum and guest writers to share stories about their work and provide advice and lots of pictures. The possibilities are endless.

The brochure and social media cater to a variety of potential visitors. Brochures are great for leaving at events and can be shared word-of-mouth with others whereas social media directly connects potential visitors with EFCA. In addition, whoever maintains these sites, be they Dr. Cummins or perhaps a volunteer, can personally interact with their audience and learn what they want to hear about and cater more to them. Hopefully with time, both will grow and more and more visitors will come each year.

In order to promote a greater sense of community as well as connect to other organizations, I recommend reaching out to other local organizations. These include:

10 http://edgeofthefarmconservationarea.blogspot.com/
11 http://jimmccormac.blogspot.com/
• Audubon Miami Valley
• Aullwood Audubon Center and Farm
• Butler Soil and Water Conservation District
• Cincinnati Museum Center
• Cincinnati Wildflower Preservation Society
• City of Fairfield Parks and Recreation
• City of Oxford
• Environmental Mobile Unit
• Fitton Center
• Lane Library
• MetroParks of Butler County
• Mount St. Joseph University
• Oxford Community Arts Center
• Public Library of Cincinnati & Hamilton County
• Robert A. Hefner Museum of Natural History
• Ross Local School District
• Southwest Local School District
• Talawanda School District
• University of Cincinnati
• YMCA

There are likely many more, but these are an overview, all of which have something to offer EFCA. A few, like the local school districts, would be great to connect to since EFCA may be a field trip destination in the future. I would love to see teachers get together and create interdisciplinary field trips at EFCA in the future. Many of these organizations are online, so the connection could begin on Facebook or in person since EFCA now has the tools to promote itself and raise awareness.
Chapter V: Project Summary

This practicum involved creating several deliverables intended to encourage attendance at EFCA. These materials included a map, interpretive signage, and marketing materials. All of these will allow EFCA to have more of a presence in the community and further its mission far into the future.

Since EFCA’s mission is to conserve, restore, and manage as much land as possible today and to lay the groundwork for the future, they are already on their way. But since they want to provide more opportunities for students and the community, they really needed to get the word out about all the wonderful things they are doing. In order to do this, they needed a map and signs as well as a brochure that can be handed out as well as a web presence and all of these materials needed to connect together and create a brand identity. I felt that my art skills would come in handy to help them further their mission.

The map involved using GIS and GPS to gather data about EFCA which I learned while working toward a Masters in Environmental Science at Miami University. This was gathered together in ArcGIS and several design elements were utilized to help ensure that everything would connect together well. The map is very simple to read and shows hydrology, elevation, and land cover types. It can now be used to illustrate how water flows throughout the area and the effect of local farms on others.

Since there are currently no educational signs at EFCA, they needed some to allow people to learn on their own and promote inquiry. I first learned about educational signage and inquiry during a Conservation Biology class. This was accomplished by using several guidelines and whimsical imagery.

Finally, the marketing materials further the brand identity. Though I knew some about marketing, creating a poster for the PSP and a grant and proposal writing class added to my knowledge. The brochure can be handed out and now EFCA has a web presence. They already have a website, but they had no logo or something that shouts “EFCA” to people. The Facebook page can help keep people in touch with what is going on and allow them to interact more with EFCA. In addition, the blog can be used to share the work of other students and perhaps act as a newsletter.

When I started out on this practicum, I just wanted to show myself, and others, that art was relevant and necessary in the Environmental Science field. It took some time to figure out exactly what that involved and I did not expect that it would change me.

Creating the map was one of the easiest parts of this project since it was pretty straightforward. The interpretive materials were the most challenging. As mentioned, I started out with 30 drawings. By the end, I had over 70 and completely filled my first sketchbook ever. That is really exciting. It is also my first series. Somewhere along the way, I fell in love with my
local natural areas and started to make more observations in my own backyard. If I can help others in some small way to do the same, my mission would be complete.

This practicum gave me a variety of experiences that will carry into my career. Though I changed my path from Art Education to Fine Art with a minor in Biology during my undergraduate studies at Mount St. Joseph University, I am still interested in educating others. But I learned that I enjoy doing so in a more informal and personal way. Instead of being in a classroom, I want to share my drawing skills with others and teach people how to make their own connections to nature.

In addition to this epiphany, I started to live a greener life (Figure 68). I finally talked my husband into getting a recycle bin and we bought a Prius. The funny thing is that he, the muscle car lover, was the one who did all the research and picked it out. I purchased the start of my own native plant collection too – some purple coneflowers.

But it did not stop there. We started to drive less often and grow our own vegetables. I integrated more recycled materials into my art projects and gifts (Figure 69). We learned to stop and observe nature more, especially in our own small backyard. Even in the smallest of places, there is beauty and an ecosystem of information if we will just stop and observe it. I learned to hope for a bright future for the Earth again. As Jane Goodall stated in Reason For Hope (2003), there are plenty of reasons for hope:

Each one of us matter, has a role to play, and makes a difference. Each one of us must take responsibility for our own lives, and above all, show respect and love for living things around us, especially each other. Together we must reestablish our connections with the natural world and with the spiritual power that is around us. (pp. 266-267)

As long as we are breathing, we have the power to change ourselves and change the world around us. The key is education. My hope is that others will follow suit and do their part to help.
References


Appendix A: Plat Map of EFCA from March 2010
Appendix C: TVCT Map of New Property from December 2012
## Appendix E: Flora and Fauna Lists

### Bird Species at Edge of the Farm Conservation Area

<table>
<thead>
<tr>
<th>Common Mammals at Edge of the Farm Conservation Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coyote</td>
</tr>
<tr>
<td>Northern Short-tailed Shrew</td>
</tr>
<tr>
<td>Red Fox</td>
</tr>
</tbody>
</table>

### Common Reptiles and Amphibians at Edge of the Farm Conservation Area

<table>
<thead>
<tr>
<th>Common Insects at Edge of the Farm Conservation Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue-eyed Darner</td>
</tr>
<tr>
<td>Carpenter Bee</td>
</tr>
<tr>
<td>Eastern Tiger Swallowtail</td>
</tr>
<tr>
<td>Ladybug</td>
</tr>
<tr>
<td>Snail (unknown species)</td>
</tr>
<tr>
<td>Widow Skimmer</td>
</tr>
</tbody>
</table>
### Common Plants and Trees at Edge of the Farm Conservation Area

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Plant Name</th>
<th>Plant Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Beech</td>
<td>American Elm</td>
<td>American Holly</td>
</tr>
<tr>
<td>Ash (unknown species)</td>
<td>Baldcypress</td>
<td>Basswood</td>
</tr>
<tr>
<td>Bee Balm</td>
<td>Big Bluestem</td>
<td>Bitternut Hickory</td>
</tr>
<tr>
<td>Black Cherry</td>
<td>Black Locust</td>
<td>Black Walnut</td>
</tr>
<tr>
<td>Black Willow</td>
<td>Black-eyed Susan</td>
<td>Bloodroot</td>
</tr>
<tr>
<td>Blueflag</td>
<td>Buttercup (unknown species)</td>
<td>Buttonbush</td>
</tr>
<tr>
<td>Canada Rye</td>
<td>Common Blue Violet</td>
<td>Cottonwood</td>
</tr>
<tr>
<td>Cucumber Magnolia</td>
<td>Flowering Dogwood</td>
<td>Fragrant Water Lily</td>
</tr>
<tr>
<td>Giant Bulrush</td>
<td>Grey-headed Coneflower</td>
<td>Hackberry</td>
</tr>
<tr>
<td>Illinois Bundleflower</td>
<td>Jack in the Pulpit</td>
<td>Juniper</td>
</tr>
<tr>
<td>Kentucky Coffee tree</td>
<td>Little Bluestem</td>
<td>Maximilian Sunflower</td>
</tr>
<tr>
<td>Mayapple</td>
<td>Mushroom (unknown species)</td>
<td>Narrow Leaf Sagittaria</td>
</tr>
<tr>
<td>Obedient Plant</td>
<td>Ohio Buckeye</td>
<td>Ohio Spiderwort</td>
</tr>
<tr>
<td>Persimmon</td>
<td>Pickerelweed</td>
<td>Pin Oak</td>
</tr>
<tr>
<td>Poison Ivy</td>
<td>Purple Coneflower</td>
<td>Red Maple</td>
</tr>
<tr>
<td>Red Oak</td>
<td>River Birch</td>
<td>Rose Mallow</td>
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<tr>
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<td>Sedge (unknown species)</td>
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<td>Soft-stem Bulrush</td>
<td>Spicebush</td>
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<tr>
<td>Spring Beauty</td>
<td>Sugar Maple</td>
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<tr>
<td>Swamp Milkweed</td>
<td>Sweetflag</td>
<td>Sweetgum</td>
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<tr>
<td>Switchgrass</td>
<td>Sycamore</td>
<td>Trout Lily</td>
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<tr>
<td>Virginia Bluebell</td>
<td>Water Plantain (unknown species)</td>
<td>White Oak</td>
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### Common Invasive Plants and Animals at Edge of the Farm Conservation Area

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Plant Name</th>
<th>Plant Name</th>
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</thead>
<tbody>
<tr>
<td>Bush Honeysuckle</td>
<td>Canada Goldenrod</td>
<td>Curly-leaf Pondweed</td>
</tr>
<tr>
<td>European Starling</td>
<td>Garlic Mustard</td>
<td>Multiflora Rose</td>
</tr>
<tr>
<td>Muskrat</td>
<td>Narrow-leaved Cattail</td>
<td>Osage Orange</td>
</tr>
</tbody>
</table>
Appendix F: Educational Resources

There are many resources available for educators that can easily be used at EFCA for ideas and activities. Here is an annotated bibliography of some of my favorites that were found during the course of this practicum.

Resources for Educators and Parents

This lovely children’s book contains modern and attractive, bright, and colorful illustrations by Cincinnati artist, Charley Harper. It discusses what can be found in local woods including the sounds various animals make such as a cardinal singing “‘Cheer, cheer!’” This may be a useful read before going through EFCA with kids (of all ages) as it may inspire them to look for the flora and fauna in the book. Besides naturalist types, this book would be great for all kinds of art majors for inspiration.

If you need a beautifully illustrated book for young children – I was introduced to it in third grade – this is a great pick! It is very memorable and full of inspiration. It explains deforestation in a way that children can understand and makes them want to take action!

This book is beautifully illustrated and is by the author of the National Wildlife Federation’s GreenHour.org so it is definitely worth checking out. It fits in well with the signs at EFCA since it discusses looking for animal tracks as well as weather and finding the beauty in our own backyards. All activities are interdisciplinary and promote inquiry and further learning.

There are many reasons to get outside more with kids but obesity is one that every parent and educator can easily do something about by simply promoting movement. By taking the initiative and encouraging children to get outside for just fifteen minutes a day, parents can greatly decrease the risk of obesity. This book is full of simple activities that get children moving and promote their natural curiosity. These activities include growing vegetables, observing animal tracks and the changing seasons and so many more. Cohen found that her children are naturally happy outside in the fresh air and those fifteen minutes often turn into an hour or more and provides lots of stress relief. These activities encourage living in the moment and are simple and often cost little to nothing. For families who are new to outdoor activities, safety and appropriate clothing for each season is also mentioned, making it ideal for everyone. Resources are also listed in the back of products by Rebecca P. Cohen such as Curiosity Cards, 50 Outdoor Activities, and Outdoor Classroom guides as well as websites for more inspiration.

This book is a diamond in the rough. It is beautifully illustrated with pen drawings and photos of children having fun learning about nature. Though small and easily mistaken for something of little value, it is full of helpful information for teachers and informal educators. Each activity is a game, of which there are four types for four different moods and goals, making it easy to find an appropriate game for each goal. Most of these can easily be used at EFCA such as the blind walk.


This delightful book was also introduced to me in third grade and is one of my treasured possessions. It is full of lovely pen and watercolor illustrations and could easily be connected to a variety of subjects. For instance, it takes place at the North Pole and ventures to the tropics. So climate change is a given as well as lack of habitats.


As a requirement for a class in art school, I had to purchase this book. Its incredible sketches are worth checking out as well as the guidance on art materials but it is its connection to a specific place and in gaining knowledge from that place that makes it a great addition to this list. It contains great ideas for keeping a nature journal and shows that even the simplest of sketches are beautiful. Several drawings are maps of what is important to the author and could provide ideas for a class about mapping places.


I first stumbled upon this book at a thrift store and was enchanted by its illustrations. But after learning more about Aldo Leopold and reading this book, I am convinced that it needs to be shared with the next generation. Like Thoreau’s *Walden*, this book focuses on a specific place and describes the changing of seasons. It is beautifully written and easier to read and relate to than *Walden* in my opinion. This is a book that could easily be connected to other subjects.


Just like Hinchman’s book, this one also discusses nature journals. But what sets it apart are the illustrations and the foreward by E. O. Wilson! Yes, the E. O. Wilson. This book is perfect for beginners because it provides information on overcoming the fear of drawing as well as materials, how to make observations, and so much more. It is one of my all-time favorite books and is full every kind of subject matter as well as drawings.

Since all age groups need to learn to appreciate nature, this book is perfect for preschoolers. All crafts use materials found around the house and make connections to nature. Many of these crafts serve a function as well. For instance, one involves making a bird feeder and another makes a guitar and several double as a science lesson.


Though it is an older book, this one is full of ideas and inspiration for making nature activities fit into any subject. It also discusses what level of activity and material is appropriate for each grade level as well as what length of time can be handled by children at various ages. Most of these subjects and activities are still relevant with the new K-12 Learning Standards. Despite its age, this book is still relevant and full of detailed information that can be adapted to EFCA and beyond.


Scotty Reifsnyder’s whimsical vintage-inspired illustrations are reminiscent of Charley Harper’s and play a key role in making this book an enjoyable read. Its compact size makes it easy to carry along on an adventure anywhere. For those who are new campers, there is a ton of information on getting started and planning trips as well as smart tips, gear recommendations, checklists, recipes, and how to build a campsite. There are also many ideas for recreational activities that promote inquiry and appreciation of nature and combat boredom. Some activity examples include a scavenger hunt that looks for different leaf types as well as bird nests and animal tracks. Another is an arts and crafts activity inspired by environmental artist Andy Goldsworthy that requires finding natural materials to make a sculpture that is left behind to the elements. A few more activities include creating fairy houses, berry paint, pressed flowers, and making a nature journal inspired by Meriwether Lewis and William Clark. Besides all this, there is information about hygiene, first aid, and safety as well as packing checklists and resources in the index. Its compact size and fun, unassuming tone make it a great guide for novice and experienced campers and is sure to get a lot of use. This is a book worth purchasing and keeping nearby for adventures.


All kids should be introduced to Beatrix Potter’s delightful stories of animals that are often full of lessons on life. They are all beautifully illustrated and perfect for bedtime reading or even during a class depending on age level.


If you are looking for ways to educate children on practically everything related to nature, check out this book! It contains activities for air, water, soil, exercise, birds, and more. This is
my favorite activity book and it provides wonderful activities for a science teacher as well as a parent. All materials are found around the house.

For children who do not live in rural areas or suburbs, this book is wonderful for parents and educators in urban areas. It contains 52 inspiring activities for all seasons as well as a few indoor activities, all of which promote inquiry and a sense of wonder. Each activity lists skills that are gained while working through them and Susie Ghahremani’s simple and whimsical illustrations are sure to put a smile on any face.

Richard Wiese has a show called “Born to Explore” on Saturday mornings that is full of inspiration and wonderful information about the natural world. When I learned about this book, I knew that it needed to be part of this list. Wiese, like Louv, was inspired to encourage children who are glued to their gaming consoles to get outside and show them how amazing it is and that we need nature as much as it needs us. So this book contains lots of homemade tools and advice for all sorts of explorations. It provides ideas for parents and is easy to read.

**Resources for Sustainable Landscaping and Materials**

Along with resources for educators, I came across many wonderful resources for schools and homeowners for creating sustainable landscaping. EFCA is a great place to find inspiration and ask questions about what is beautiful and what is not as well as what your needs may be and how they fit into your version of a sustainable lawn. There are many options, several of which may sound surprising and some that may not very sustainable (such as using AstroTurf) so use your own discretion and do lots of research. These resources are a great place to start as well as several of the sources used previously in this report that can be found in References.

Schools that are looking for ways to make them more grounded in ecology will find this a useful book. It contains beautiful pictures as well as guidelines and lots of examples from schools that transformed themselves. This book is full of information and practical ideas on everything from green roofs to composting, geology to art and so much more, all of which encourage less asphalt and a greater connection to nature.

This book is a great guide for anyone who is new to sustainable landscaping or simply wants an easy-to-use guide for inspiration and how-tos. It contains a cheat sheet and discusses what resources are out there and lots of common sense information on the reasons for sustainable landscapes as well as how to create one that is appropriate for your needs and climate requirements as well as how to conserve water and create water irrigation systems and more.
There are also several design plans as well as information on just about everything you could think of related to lawn care.


Though I stumbled upon this book several years ago, it is worth adding as it literally changed my life. It opened me up to the world of truly non-toxic and recycled art materials, many of which are made by hand. It is a must-read for anyone interested in sustainability and contains a variety of paint ideas and recipes.


This is the practical guide for changing your lawn into something beautiful and sustainable. It provides information on everything from pavers, what to plant, how to deal with HOAs and skeptical neighbors to what to plant in your area. It is well-designed and easy to find information and contains beautiful pictures as well as ideas for preventing pests such as mice and deer. This is another book that is worth purchasing.

**Websites**


Children & Nature Network’s website contains a plethora of resources about the importance of nature for all children. There are research materials as well as blogs and materials for parents as well as educators. It is truly an incredible resource.


Since this website is from an organization in India, it has global connections already integrated into its fabric. But it is also a great source of lesson plan and eco-club ideas.


The “Discover the Forest” campaign is a partnership between Finding My Forest, the Ad Council, and United States Forest Service. This is a very kid-friendly website full of ideas for exploring the forest as well as educational resources for educators and parents. It is very colorful and fun to navigate and might be a great way to prepare children for their first excursion to the forest!


This website from the EPA contains information about grants as well as Environmental Education training, lesson plans, and so much more.
A little competition is a good thing and this contest from the EPA is certainly a great contest to enter because it promotes sharing your love of nature with others. It is an interesting contest because entries are mixed media and must be done by a team of at least two individuals from two generations.


National Wildlife Federation’s “Be Out There” campaign is nationwide and this website contains a variety of ideas for getting children outside. In addition to this, it contains ideas for connecting community organizations together and contains activities to encourage lifetime learning.


This website contains a variety of information about the importance of frogs as well as eco-interviews and K-3 amphibian art curriculum! Though it seems to still be in development, it contains some useful resources.


This document discusses how to make global and local interdisciplinary connections in the classroom. Though it is a few years old, much of the information is still relevant. For example, there are links to other resources as well as connections by grade level to various benchmarks for creating more rounded, aware students and citizens.


The Smithsonian is full of great resources but this website focuses on Rachel Carson’s article “Help Your Child to Wonder” and contains the article as well as activities that will help children discover their own place in nature.


As the title states, this resource contains a variety of links to curriculum and lesson plans which connect farms to food as well as environmental issues. Please note that it is a few years old and some of the links may have changed.

The Robert A. Hefner Museum of Natural History is located at Miami University and is a great resource but their website is also full of information that should be taken into consideration. For instance, the “Science for Ohio” section contains tons of lesson plans and how they connect to K-12 curriculum. Many of these are perfect for EFCA and the work is already done for you!


Henry David Thoreau’s *Walden* is the inspiration for this website which contains curriculum from a variety of disciplines that connects to the book. But it also helps students make their own connections and promotes inquiry. Lesson plans are provided and easily downloaded.


If you are looking for some free lesson plans and inspiration, you are in luck! This website contains a variety of interdisciplinary lesson plans as well as gorgeous photography this is sure to amaze. In addition to this, there are games and videos for the classroom.
An Example of Making Connections between Disciplines

As mentioned in Chapter I, one of the things that every environmental issue has in common is that it was not intended. They are all externalities, side effects, of the process. In a rush to help the economy and create jobs, we often brush over the warnings. A simple example of this is that of Dr. Seuss’s (1971) Lorax, a character in his book, *The Lorax*, who speaks for the trees. He kept urging the Once-ler to stop chopping down trees and producing thneeds and he just ignored the warnings and cut more truffula trees and produced more and more thneeds. It was only after the entire forest was destroyed and the rivers were poisoned and all the wildlife left, that the Once-ler fully understood the consequences of his actions and realized consumers really do not need as many thneeds as he thought. The same tale is repeated everyday around the world.

Students could read *The Lorax* and discuss what changes they noticed in their local areas over time. For instance, was land recently developed? If so, what was created? Discuss the need for wild areas and ask them how they think these new developments will affect their local wildlife. Ask what they can do to help. Perhaps have a fundraiser to help the school buy native plants to plant at the school and perhaps throughout the community.

Though *The Lorax* seems really simple, it is full of topics. Depending on the grade level, Ohio’s economic and natural history could be discussed as well as capitalism and the push to make more money and have a successful economy. We all want to be successful, but at what price? Ask students what they think and make as many local connections as possible.

This lesson could easily be connected to a variety of subjects. For instance, the discussion of history could be part of a lesson about local history. The discussion about natural history could be linked to a lesson on soil, geology, and wildlife. If the economy and capitalism are discussed, this could be part of a sociology and perhaps psychology discussion as well as part of a math class. Perhaps students could calculate the cost – in dollars – of the loss of wild areas. English is also easily connected as there are many great books that can be connected depending on age level. Another great one is *The Giver* by Lois Lowry (which I read in 7th grade English) since it discusses the effects of a civilization that completely removed itself from the wilderness and pain. The arts could also be connected. Children could draw maps of their local areas and how things have changed. Students in dance and music could study the traditions of other cultures experiencing a lack of biodiversity and the need for preserving other cultures could be discussed.
Appendix G: How-To Guide for Facebook Page and Blog

This Appendix includes information about how to edit the Facebook page and blog as well as some guidelines for maintaining them and ideas about what to post as well as frequency of posts.

This is what it looks like when you open the page. It should say that you are posting as the page, with the option to change to yourself. This means that you would not be able to post as the page, and any posts would be comments to the side.
To make a post, be it words, a picture, or video, scroll down and write something in the box.

When finished, click on the “post” button.
You can also add events, contests and more.

Or going to the top and hitting “edit page” or “build audience”

Say we want to check out admin roles, we would select it from the “edit page” button.
Everyone here is a Manager, which means they can make changes to the page and create content. We can all add others or delete ourselves. We can add others who just create content and have no control over the page itself as well. You can do this by clicking and typing in a name.

Since I thought it may be causing issues, Leno was changed to a content creator. This can always be changed.

To add new admin, just type a name of a friend and select a role and then hit “save.”
By clicking on the "settings" tab, you can control privacy settings as well as who sees what, and much more.

Clicking on the “page info” tab produces this page

Here, you can change the page address, topics, the description about the page and more.
So if you wanted to change the description, you would click in the box, update, and hit save.

By clicking the “build audience” button, you can invite friends and share the page with others. I suggest telling everyone who writes on the page and visits to share the page with their friends to help build an audience. You can also increase likes by creating an ad, which does cost money.
By clicking “increase page likes” this screen appears

Each post has information within it. Scroll down and look at how many people viewed and liked posts.

After you post for a while, you’ll start to see who likes what and get a better idea of what posts produce more activity on your page.

Scrolling down, it looks like a video and wildlife pictures were the most popular:
The video had 99 views and the turtle picture had 102 views!

It seems like most of the posts only get a couple of likes but activity is activity and since this page was created, it has 62 followers and keeps growing. Just keep sharing it and see if anyone
wants to post content. You can always add people as content creators and other roles that do not allow them to make changes to the page itself or access private content.

Some ideas for posts include: have students doing work here post about it and share updates, inform others when you buy more land or find new plants or wildlife, share lots of pictures, talk about local events in Oxford, ask questions about pictures and start discussions, etc.

The Blog is located at: http://edgeofthefarmconservationarea.blogspot.com/

As you can see, I haven’t posted since March. But it is a valuable tool for promoting your site and giving more information.
Which takes you here

And then takes you here. Your view will be different than mine.

We’re just concerned with EFCA’s blog. Blogger also includes insights like Facebook, such as page views and posts.
Clicking on EFCA takes you here:

By clicking on settings, you go to this page:
In order to keep this going, we will need to add authors. You can do so under “blog authors”

For illustrative purposes, I added who is currently on the Facebook page:

And now there are 3 open invitations

You can look around and make changes as needed but it is already connected to the Facebook page and if you add a twitter page or anything else, you can also link that (just search for linking X with blogger).
By clicking on new post, this page appears:

It looks very similar to a word document and works the same way. You can change colors, fonts, add pictures, and more. When ready to share it, hit “publish.” If you are not ready, hit “save” or “preview”. You can save drafts for as long as you wish.

You can change how the page appears by clicking on layout

By clicking “add a gadget,” you can select from a list.
Just scroll through and see if there is anything of interest.

Since Facebook is sort of like fast food, the blog is more like a nice meal at a sit-down restaurant. It is a place for followers and those interested in EFCA to stop and read more about it. Due to this, I would suggest posting more pictures here (you can change the template to be one that focuses more on pictures if you wish) and writing about more in-depth activities. For instance, you could write on Facebook that a Boy Scouts troop visited today and share a picture and then write more about what you do and how and why on the blog. Or you could focus more on research. Students doing projects at EFCA could share updates on the blog and write about their findings. Since this is not a focus right now, I would really focus more on content. Maybe you could just post every other week or at least once a month kind of like a newsletter. People that follow by e-mail will get notifications about new posts and it will be like a surprise in their inbox!