Emerging from the Dark Ages:

A Modern History of the Donald J. Cowling Arboretum

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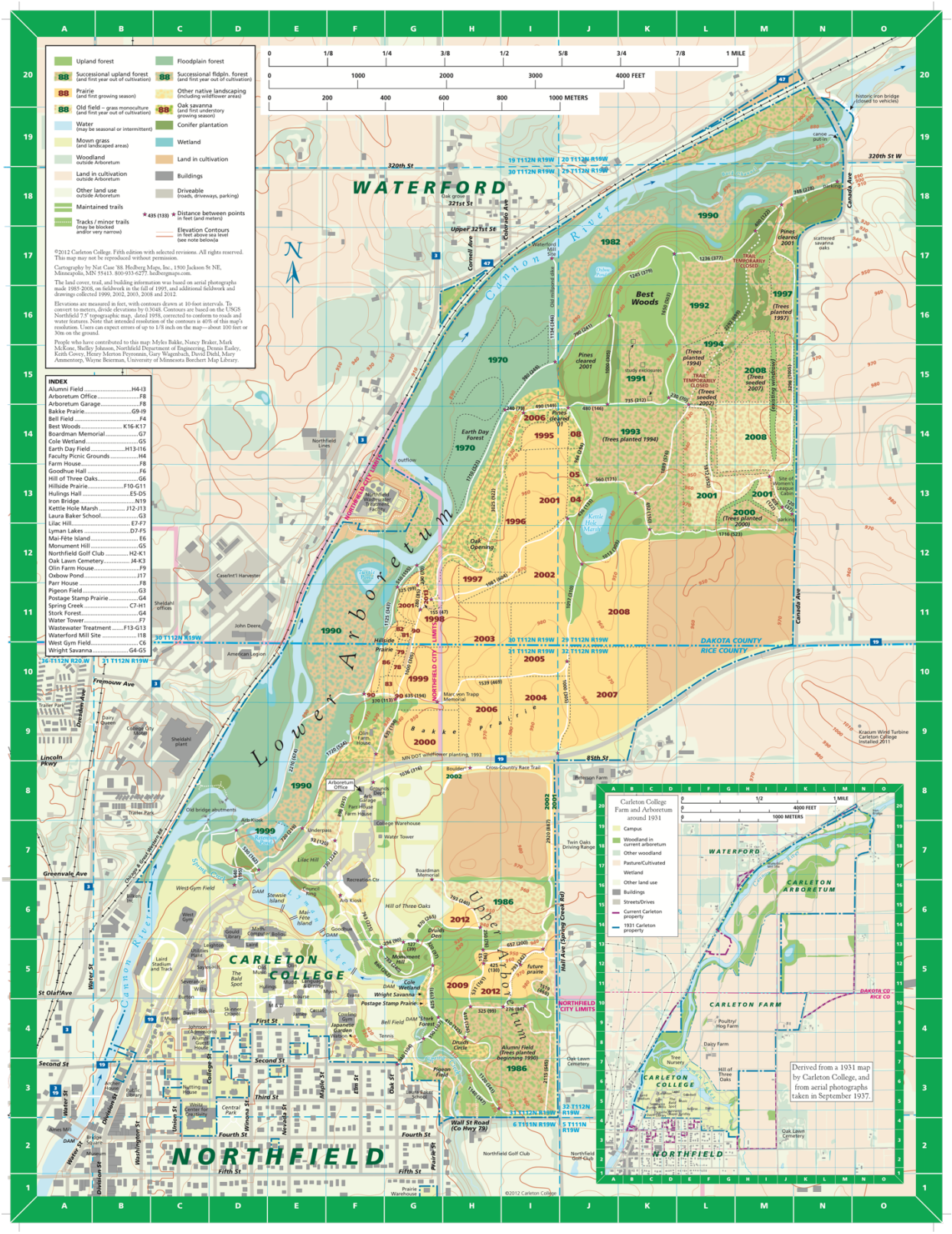

Figure 1 Map of the Cowling Arboretum (Cowling Arboretum, 2012).

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Abstract

This research explores the history of the Donald J. Cowling Arboretum at Carleton College after the "Dark Ages" when the Arb fell into a state of benign neglect. During this time, the first large-scale projects and efforts for ecological restoration began yet, little known about why these efforts were started and how they led to the Arb as we know it today. We draw primarily upon primary sources including letters, reports and meeting minutes as well as informal interviews with key stakeholders in the restoration project to build our narrative. Most prior research on arboreta focuses on key figures, specific events and the larger social discourses that affected the development of these sites. While following same, our work also aims to explicitly account for the importance of eco-centrism and ecological principles in the decision-making process for the Cowling arboretum's managers. Doing so will help us to better understand why certain decisions were made in the Arb and why some goals were pursued and others not.

INTRODUCTION

Arboreta, which first emerged in the United States during the late 19th century, have played a significant role in educational institutions as sites of academic exploration and community development (Court 2012). The push for environmental conservation and the rise of eco-centrism in the United States in the early to mid 20th century was in large part centered around the creation and preservation of spaces like institutional arboreta (Wyman 1947, Jordan and Lubick 2011). As such, they have become well-established parts of these entities and serve as reservoirs of historical and institutional heritage (Elliott, Watkins and Daniels 2016). Knowledge of this environmental history has helped to frame larger debates surrounding conservation practice, the protection of ecosystems and the use of natural resources (Jordan and Lubick 2011). Thus, these histories have not only helped us to understand the past, but have helped us to challenge and re-shape how humans will interact with the environment in the future. Though arboreta across the country have tremendous value, not many comprehensive histories of arboreta have been written. This persists even though they are the sites on which conservation initiatives have begun and taken shape.

The Donald J. Cowling Arboretum or "the Arb" is one site that has received little attention from academics though it is historically important. The Arb was officially established and opened in 1926 (though records from the American Association of Botanical Gardens state that it was created in 1922). Then college President Donald J. Cowling, Professor of Botany Harvey Stork and Superintendent of Grounds D. Blake Stewart were primarily responsible for the management and development of this site (Luterra 2007). Arguably, these gentlemen were among the nation's first restorationists and evidence of their work (i.e. plantings and the creation of infrastructure) can still be seen today (Luterra 2007, McKone and Bakke, Draft Plan for the Cowling Arboretum 1995).

Figure 2 Harvey Stork and unidentified student in 1951 (Harvey Stork Collection).

Cowling, Stork and Stewart worked in collaboration with the United States government and other academic institutions to create the arboretum which was "the first of its kind in the upper Midwest" (The Carletonian 1933). These institutions include but are not limited to the Arnold Arboretum at Harvard University, the University of Wisconsin Madison, the U.S. Bureau of Plant Introduction and the University of Toronto (The Carletonian 1933). In its conception, the primary purpose of the Cowling Arboretum was to provide a space for the testing and demonstration of horticultural and botanical gardening practices (Luterra 2007, McKone and Bakke, Draft Plan for the Cowling Arboretum 1995). It was also considered a refuge for wildlife and by 1949 it was officially named a state game refuge (Muir 1962). Administrators hoped that having a space like the arboretum in close proximity to the staff and students of Carleton would prove beneficial in both academic endeavors and recreational activities (Luterra 2007, McKone 1995). The founders of the arboretum also wanted it to be an educational and recreational space for the local Northfield community (Stork 1939). As a result, nature trails and bridges were constructed and community recreational programs as well as botany and zoology classes were frequently taught in the arboretum (Luterra 2007, McKone 1995).

After the retirement of Harvey Stork in 1955 and the subsequent close of the Carleton Farm in 1964, the arboretum changed its name. On April 20, 1965, the Executive Committee of the Board of Trustees "approved President Nason's recommendation that the arboretum be named in honor of Donald J. Cowling" (R. H. Edwards 1981). Some time later, the arboretum fell into disrepair (Luterra 2007, McKone 1995). There was increased vehicular traffic through the Arb and it was frequently used as a fraternizing locale for students and Northfield residents (Luterra 2007). The nature trails and surrounding infrastructure fell into disuse and invasive species emerged in the woodlands (Luterra 2007, McKone and Bakke, Draft Plan for the Cowling Arboretum 1995). This period is often referred to as the *Dark Ages* (Luterra 2007)(see Appendix A).

While this overarching history of the Cowling Arboretum is known to us, very little attention has been given to the period after the Dark Ages when ecological restoration projects began in the arboretum. We refer to this time the *age of ecological restoration*. We want to understand the events leading up to the establishment of this program as well as explore the factors that resulted in the form, shape, and size of the Arboretum as we know it today. We aim to focus our analysis on this period and answer the question:

How did the ecological restoration program in the Donald J. Cowling arboretum emerge?

We are not only writing a history but, a historiography of the arboretum. A brief review of the existing literature on arboreta will help provide a historical context while we attempt to consolidate and add to pre-existing knowledge about the institutional life of the Cowling Arb. A literature review will also show us how to best expand current historical lenses and frameworks in the study of arboreta.

Literature Review

Beginnings of Arboreta: Scientific, Social & Cultural Significance

The word "arboretum" was first used in 1806 by John Claudius Loudon, a botanist who was considered the premier expert in gardening and horticulture in Europe. This term commonly refers "collections of trees" (Elliot, Watkins and Daniels 2007, Hartley 2007). Though there is evidence that arboreta or spaces like them have existed for more than a millennium, concerted efforts in tree cultivation began in late 17th century in the United Kingdom (Elliott, Watkins and Daniels 2016).

Interest in tree cultivation can be attributed to the deforestation crisis that Britain faced during this period. According to Elliot et al., by the end of the 17th century less than 5% of British land was covered with forest or woodland (Elliott, Watkins and Daniels 2016). Furthermore, there was a serious decline in the number of native tree species (Elliott, Watkins and Daniels 2016). Undoubtedly, this had an increasingly devastating impact on both the human and environmental welfare of the nation. By the beginning of the 18th century, there was a significant drive to repopulate Britain's lands with trees (Elliott, Watkins and Daniels 2016). This was tightly coupled with the British Empire's rise in trade, industry, wealth and imperial power and as a result, there was a push to plant more trees for use in defense, industry and agriculture (Elliott, Watkins and Daniels 2016). The government and British military instituted schools of forestry, tree nurseries and plantations to help in these efforts (Elliott, Watkins and Daniels 2016). Interestingly, there was also a significant move to cultivate trees and plants for their aesthetic and cultural appeal (Elliot, Watkins and Daniels 2007, Prest 1981).

The creation of arboreta came shortly after the rise of botanical gardens. Arboreta were heavily influenced by larger landscape gardening trends, horticulture and botanical practices of the Georgian and Victorian eras (Elliot, Watkins and Daniels 2007). The emergence of these two cultural spaces (i.e. botanical gardens and arboreta) can be attributed both to the importance of trees in British mythology as well as the idealization of "eden" in British culture (Prest 1981). Arboreta served as microcosms for the ideal landscape in society (Elliott, Watkins and Daniels 2016).

These spaces also became centers of scientific innovation. Botanists, arboriculturalists and horticulturalists believed that using precise scientific methodologies would not only make the production of trees far more efficient for economic purposes, but would help achieve this "edenic" ideal (Elliott et al. 2016; Hartley 2007). This emphasis on scientific methodology and principles is emphasized in the first extensive piece of written work on arboreta, *Arboretum et Futicetum Britannaicum* by John Loudon (Hartley 2007). In 1827 he stated that: "It [an arboretum] should contain all the trees and shrubs hardy in the climate of Britain, arranged according to the natural system; its layout should allow easy access through the year; the trees should be disposed in a manner conducive to encourage scientific study and practical instruction… sufficient space should be available for each species to attain its full size and character" (Hartley 2007).

Because of their high cultural value, arboreta were considered a display of wealth and grandeur (Elliot, Watkins and Daniels 2007). Many of the first arboreta were owned privately by wealthy aristocrats (Elliot, Watkins and Daniels 2007, Elliott, Watkins and Daniels 2016). However, as

time progressed more arboreta were open to the public and they were considered essential parts of British society and culture (Elliot, Watkins and Daniels 2007)

As arboretum owners sought to make their collections unique, many began purchasing native plants from different parts of Europe for display. This led to an increased variety of trees in arboreta and a need to have trees "[planted according to] botanical taxonomies, labeled and catalogued" (Hartley 2007). As such arboreta became "living museums" and "living encyclopedias" (Elliot, Watkins and Daniels 2007, Elliott, Watkins and Daniels 2016). Soon, numerous arboretum classification systems were developed and were shared in trade catalogues and botanical journals. This regional exchange of plans became global. Arboreta in other parts of the world, particularly in Europe, in Commonwealth countries and in the United States became international partners (Elliot, Watkins and Daniels 2007, Elliot, Watkins and Daniels 2007).

Introduction of Arboreta in America

According to Thomas Schlereth, the first formal "collection of trees" in the United States was established by Humphrey Marshall on his Marshallton, Pennsylvania estate in 1773 (Schlereth 2007). In 1785 Marshall went on to publish the *Armistrum Americanum*, thought to be the first treatise on woody plant species in the United States (Day 2016). Pennsylvania, particularly the Mid Atlantic/Delaware River Valley region is considered the first hub of arboretum development and research (Day 2016, Schlereth 2007). There, Marshall and others including Andrew Jackson Downing, Frederic Olmstead, and William Hamilton were a part of a larger network of individuals, families and institutions that were critical to the establishment of this first site and then, the establishment of arboretum in other parts of the United States (Schlereth 2007).

These families and individuals were directly connected to famous European arboriculturalists who shared their knowledge and expertise (Day 2016, Schlereth 2007). As a result, the collections in the United States were heavily influenced by European culture. For example, Andrew Jackson Downing was mentored by John Loudon, "the father of arboreta" in Britain (Schlereth 2007). Scholars also acknowledge the role of government institutions in the management and establishment of arboreta. The United States government was willing to fund and support the ventures of early arboriculturalists (Schlereth 2007). For example, in 1872 President John Adams issued executive orders for the Treasury Department, the U.S. Navy and the State Department to create seed collection and plant introduction programs to aid botanical gardens and arboreta (Schlereth 2007).There are also indications that the U.S. government attempted to establish public arboreta. They suggested that a Smithsonian arboretum and even a White House arboretum be created. By 1927 these visions were realized and the National U.S. Arboretum was established in 1927 by an act of Congress (Government 2017).

Historical accounts of the early arboreta also point to the involvement of academic institutions in their development. Of note are the Haverford College Arboretum, the Arnold Arboretum established by Harvard University, and the University of Wisconsin Madison Arboretum. Scholars writing early arboretum histories in the U.S., like Schlereth, paid great attention to specific actors, pioneers and scientists. Compared to U.K. historians, however, they did not acknowledge the larger impacts of arboreta on the social and cultural landscape of the United States during this time. This later changed as historians like Ida Hay and F.E. Court turned to research arboreta at educational institutions.

Educational Institutions and Arboreta

Educational institutions played a pivotal role in the creation of arboreta in the United States. Educators believed that arboreta could be valuable parts of educational institutions' architecture and design. College arboreta were an integral component of the "rural, planned, residential type college model" that universities across the world increasingly adopted in the late 19th and early 20th centuries (Court 2012, Hay 1995). Additionally, it was primarily through these schools that cultural exchange between arboreta in foreign countries and those in the United States took place (Court 2012, Hay 1995). Scholar Thomas Schlereth asserts that European botanists and horticulturalists were recruited and employed by colleges to share their expertise (Schlereth 2007). Conversely, many botanists from the United States were sent to Europe to be trained (Schlereth 2007). Case in point, Haverford College employed William Carvill, an English landscape gardener to prepare and design the larger master plan for the institution's campus and the arboretum (Schlereth 2007).

The most well-known institutional arboretum, Arnold Arboretum was established in1872 by Charles Sprague Sargent, one of the country's foremost experts in botany and a professor at Harvard University. He and his staff detailed extensively what had been planted in the arboretum, the different experiments conducted there and in some instances the sources of funding and support for each of the measures implemented (Sargent 1868). His recorded work informed the history written about the Arnold Arboretum by Ida Hay in 1995. In her account, she consolidated documentation about the work at Arnold Arboretum and highlighted the specific individuals who were responsible for its creation and maintenance. She wrote about changes to the landscape over 120 years with painstaking detail and considered the social and political impact of this resource on the city of Cambridge (Hay 1995). The configuration and species composition of the Arnold Arboretum as well as the expertise of its designers influenced city officials' plans for Cambridge (Haag 1981).

By mid-century, there were ninety botanical gardens and arboreta in North America (and historical researchers suggest that there would have been many more had academic and research institutions not faced serious financial challenges during World War II) (Wyman 1947). By the end of the 20th century, arboreta were ubiquitous and commonly referred to in scientific literature and academic discourse. In 2007, there were fifty-two university arboreta, twenty-four college arboreta and twelve arboreta at junior colleges in the United States.

Ecological Restoration and Arboreta

There is not a specific time in history when we can definitively say that arboreta became sites of ecological restoration (Young, Anderson and Clary 2005). There is evidence that horticulturalists and botanists were doing small restoration-like projects with native plants in arboreta since the late 19th century (Young, Anderson and Clary 2005). Regardless, not all arboreta are sites of ecological restoration. For example, the Arnold Arboretum and the Morton Arboretum in Illinois have collections of plant species that are non-native to the habitat and are often described as gardens (Hay 1995, The Morton Arboretum 2017). However, what is evident is that arboreta are where the first large-scale attempts at ecological restoration took place in the United States.

The University of Wisconsin Madison began their ecological restoration program in the early 1930s. On June 17th, 1934, renowned environmentalist and scholar at the institution, Aldo Leopold, declared that this arboretum would re-establish the "original Wisconsin" landscape (Court 2012). From this point forward, Leopold and professors at the university restored tallgrass

prairie, savannas, wetlands and variety of forest types (Court 2012). They were practicing ecological restoration albeit this vocabulary was not yet invented (Court 2012). In the decades following this practice would continue and grow into an academic discipline (Court 2012).

But, why did this approach emerge? Changes in the landscape in North America at the end of the 19th century were particularly stark, as prairies vanished in a single generation (Court 2012). Furthermore, thousands of acres of natural landscapes had been converted to industrial and agricultural use, resulting in a significant decline of native species (Court 2012). According to Jordan et. al, this rapid rate of degradation shocked many Americans, prompting them to realize the massive scale at which destruction was occurring. At the same time, the popular writings of John Muir, Hamlin Garland, and Willa Cather describing picturesque nature turned wasteland stirred the nation's consciousness because ideas of wilderness and "virgin" land were central to American culture (W. Jordan 2011). Gradually, both people and institutions began to shift their outlooks on what nature "should" look like and thought that the preservation of native ecosystems was a worthwhile endeavor (W. Jordan 2011). This pattern soon proliferated into efforts to restore ecosystems in the early 20th century, although this task was only taken on by a minority.

Trends in the Literature

There are two sets of trends that we would like to highlight. First, how arboreta were designed and organized changed drastically over time. In most of the cases we have studied, arboreta were created originally to correct some moral and social mismanagement of the land. Gradually, the emphasis shifted to a focus on scientific study and development. This is not to say that the moral arguments became irrelevant. Instead, science was increasingly used to protect, restore or aesthetically improve the landscape. We also observed that the sharing of knowledge, expertise and resources among arboreta managers was critical to their survival and development.

Second, arboreta historians themselves have also evolved in their discipline. Initially, arboretum histories focused on single events or key persons responsible for the creation and management of the arboreta. Later works by Hay, Hartley, Elliott, Watkins, Daniels and others expanded these traditional analyses to consider how arboreta and their emergence coincided with larger societal and political shifts. They explored how arboreta were the sites on which larger social issues and decisions played out. By expanding their analysis, these authors uncovered multiple layers of influence of institutions and individuals that were involved in conservation efforts in a way that other studies have not been able to. One common method used by these researchers in addition to the use of primary sources is prosopography (i.e. the construction of a visual network of actors). This method allowed researchers to see connections that would be difficult to glean from purely textual information and allows them to expand the scope of their research without sacrificing the depth or complexity of their analyses.

In our project, we want to consolidate both major theoretical approaches to arboretum history that have been taken by scholars in existing literature. We will look at the development of Cowling Arboretum at Carleton College, while also considering the larger social networks and other institutions that were involved.

Theoretical Frame

Historians have failed to link the practice of ecological restoration and its moral motivations rooted in eco-centrism, to the science of ecology. Ecologists have questioned whether the increased practice of ecological restoration has been accompanied by an application of ecological principles (Young, Anderson and Clary 2005). They claim that past restoration projects have been "more an acid test of horticultural and agronomic skills than of ecological understanding" (Young, Anderson and Clary 2005). Explicitly accounting for the role of eco-centrism and ecological principles in arboretum development will help us to understand why certain decisions were made in the management of arboretum restoration.

Eco-centrism

When Aldo Leopold declared that humans should think of themselves not as "conquerors of the land community" but "plain members and citizens of it," this marked a monumental shift in moral perspectives regarding the natural world (Leopold 1970). Instead of seeing the natural world as a means for satisfying human interests, humans are asked to consider it as something to which we have moral responsibilities (Callicott 1984). Ecosystems are due direct moral consideration, in that the welfare of these systems are independent of their instrumental values (Taylor 2011). This lies in stark contrast with anthropocentrism, which claims that only human interests are of moral importance. In fact, the assertion that other forms of life are only there to serve us bares a certain "human chauvinism" or "speciesism" that eco-centrists denounce (Routley and Routley 1979, Singer 1975). At the core of eco-centrism is placing the ecological community at the center of our moral concern. In connection to this is the idea that nature holds intrinsic value (Taylor 2011). That is, nature has inherent worth regardless of whether there is a valuer (Taylor 2011). We can imagine something like a painting. While we value it because of some natural property embodied in the artwork itself, the painting will nevertheless lose value if we did not value art at all. Nature on the other hand, will never lose its value even if its worth is not recognized. As a result, the eco-centric approach redefined the governance relations between humans and the land by establishing preeminent moral rules and ethically framing their relationship in terms of mutual obligation and mutual respect.

One of the main contributions of eco-centrism is the notion of legal rights for nature. Christopher Stone famously argued for the rights of trees in *Should Trees Have Standing? Toward Legal Rights for Natural Objects* (Stone 1972). In this piece, Stone states that while moral concern is a substantial basis for environmental protection, only a rights-based approach would be the appropriate mechanism for creating a coherent body of law to hold those guilty of committing environmental crimes accountable (Stone 1972). Stone argues that it would be seemingly ridiculous to state that natural objects should have no legal rights merely because they are unable to speak. Corporations, for one, have lawyers that act on their behalf despite being constructed institutions and instruments of development (Stone 1972). Thus, it would only make sense for someone to be placed in the guardianship role for nature as well, and to defend nature against damaging parties (Stone 1972). This places nature on the same legal standing as humans, a move that aligns well with eco-centrism's emphasis on equal moral concern and moral responsibility.

The ideas of eco-centrism have also had considerable influence in the public policy arena, where nature's intrinsic value has been recognized in various international charters and declarations. These include the *1979 Bern Convention on the Conservation of European Wildlife and Natural Habitats*, the *1982 World Charter for Nature*, and the *1992 Convention on Biological Diversity*

(University of Limerick 2016). While worded differently, each document espouses a new kind of valuing that considers every form of life unique, regardless of its worth to man.

Most importantly, eco-centrism is a radical departure from traditional ethical theory by asking us to reevaluate our attitudes, principles, actions, and institutions with a focus on the well-being of ecosystems. Practically speaking, this perspective forces us to examine our policies and politics with a new set of lenses. It changes our sense of what constitutes the moral community (Rolston 1988). Previously, we might have included only members who can reason, those who share a similar kind of background, or even similar species (homo sapiens), but an eco-centric ethic requires ways of expanding this by taking seriously our own membership in the natural world (Rolston 1988).

In the Law of the Rights of Mother Earth passed in Bolivia in 2010:

> *Mother Earth is the living dynamic system made up of the indivisible community of all livings systems and living beings, interrelated, interdependent and complementary, which share a common destiny. Mother Earth is considered sacred; it feeds and is a home that contains, sustains and reproduces all living things, ecosystems, biodiversity, societies and the individuals that compose them* (Buxton 2011).

As it is described above, people are as much a part of the ecological community as trees or flowers. Mother Earth in this case not only has moral status, but also requires us to prioritize it above all other things. In fact, this law is the first in the world to grant nature legal rights equal to that of humans (Buxton 2011). Specifically, this includes the right to life, regeneration, biodiversity, water, clean air, balance and restoration (Buxton 2011). In a time when the environment is prone to the exploitations of market forces, corporate powers and government interests, eco-centrism is an increasingly relevant concept for anyone who is beginning to recognize the gravity of the problem at hand. Thus, by thinking of ourselves as part of nature and asking what good ecological citizenship consists of, eco-centrism offers an alternative moral framework through which we can see the inadequacies of instrumentalist or anthropocentric approaches that we have been long accustomed to.

Principles of Restoration Ecology

There are twelve ecological principles that have historically informed ecological restoration and in the words of ecology historian T.P. Young, "they are deeply embedded in the knowledge base of restorationists" (Young, Anderson and Clary 2005). However, they are not highlighted by historians as being key and influential to the decisions that were made in arboretum restoration projects (Young, Anderson and Clary 2005). For the purposes of our project we will highlight six of these principles: (i) herbivory and predation, (ii) succession and recruitment limitation, (iii) disturbance, (iv) ecosystem stability, energy and nutrient fluxes, (v) ecotypes and niches as well as (vi) genetic diversity (Young, Anderson and Clary 2005).

First, herbivores and seed predators often limit the regeneration of plant communities (Young, Anderson and Clary 2005). Second, through trial and error ecologists have discovered that after disturbances, ecosystems tend to recover naturally. This is referred to as succession (Young, Anderson and Clary 2005). Also, a plant community is most vulnerable or "limited" in its development and this is referred to as recruitment limitation (Young, Anderson and Clary 2005). In both cases, ecologists employ strategies to catalyze plant development and give assistance

through means such as irrigation (Young, Anderson and Clary 2005). These strategies "greatly increase the success of planted individuals" (Young, Anderson and Clary 2005). Third, the disturbance of ecosystems is a natural occurrence and at times is needed to maintain species communities (Young, Anderson and Clary 2005). Fourth, the flux of energy and nutrients for plants plays a critical role in stabilizing ecosystems and ensuring that they are completing their functions (Young, Anderson and Clary 2005). Fifth, ecological research has shown that species that are adapted to local conditions thrive more successfully in an ecosystem (Young, Anderson and Clary 2005). This is because species have niches or physiological limitations that dictate where they can thrive (Young, Anderson and Clary 2005). Sixth and finally, ecosystems with genetically diverse populations are more likely to remain stable and persist over the long-term and "have greater evolutionary potential" (Young, Anderson and Clary 2005).

METHODOLOGY

ARCHIVAL RESEARCH

The data used for this project was mostly taken from the Carleton Archives in the Laurence McKinley Gould Library. The Carleton Archives has extensive collections of photos and documents (e.g. letters, reports, meeting minutes, newspaper clippings, contracts and certificates). Other sources of data included the digital archives of the Northfield Historical Society. We also conducted a series interviews with six individuals to account for Carleton administrative, faculty and student perspectives.

The methods of archival research that we used came from the work of Philip V. Scarpino, who has extensively studied the history of the Upper Mississippi between late 1800s to mid 1900s (Scarpino 1985). Like Scarpino, our main concern in the archival section of the research process was to gain a general understanding of who was involved and the degree to which they were involved by performing an initial read through of documents that we are interested in. Documents of importance was bookmarked and paraphrased in our own notes (these notes was crucial for our next step, interviews). We did not want to impose a time constraint as we believed that time is not necessarily linear (Scarpino 1985). Every occurrence or decision made in time X is the result of a heterogeneous collection of elements from some time before it. Therefore, while we focused on the 1990s as a starting point, it was by no means our only time of interest. At the same time, the depth at which we went regarding different resources also depended on how the interviewees respond. This was done as a conscious effort to let the actors lead us in our research and not the reverse, believing that the actors know best of "what, when and how."

INTERVIEWS

After our preliminary research was completed, we used what we learned to interview key stakeholders in the ecological restoration initiative. Mark McKone (professor of biology and former manager of the Arb), Nancy Braker (current director of the Arb), Caryl Edward Buchwald (former arboretum naturalist and professor emeritus of geology), Beverlee DeCoux (former treasurer of Carleton College), Fred Rogers (current treasurer of Carleton College and alumnus), and Valerie Weiss (Carleton alumna who worked with Mark McKone in the Arb) were our interviewees.

By conducting our interviews after surveying the documents available in the archives, it allowed the interviews to be more question specific and less broadly informative. To avoid interviewees only telling us the "basics" (i.e. information that we could have accessed beforehand through the archives), we brought documents of interest to point out specific dates or events and asked them to recount the circumstances and their thought process at that point in time. This was much more valuable to our research as well as for our interviewees for two main reasons. First, we were able to identify the motivations behind certain projects rather than what was stated on paper, which is often only part of the story. Second, the interviewees were certain about what kind of information they should provide. If the questions had been specific enough, it is quite likely that interviewees would have simply recounted everything that came to their mind. We wanted to be able to mentally re-situate them in the incident in question and gain close insight into how and why they approached the issues in the way that they did.

To more clearly identify the relationships between actors, especially in cases where links are not necessarily unidirectional or immediately obvious, a consistent method for mapping out these relationships is crucial. Thus, to effectively organize our research we adopted the prosopographical technique employed by Elliott Watkins and Daniels in their piece, *Combining Science with Recreation and Pleasure: Geographies of the Arboretum*. Beryl Hartley also uses prosopography in her work on Early American Arboreta.

It is ideal for projects that require the synthesis of large amounts of historical data and helps researchers create a visual network of social and institutional connections through a prescribed mechanism for identifying keywords as well as systematic document labeling system (Elliot 2007). The Real Time Board online platform was used to construct the visual network of our findings and a space to organize archival material. When we mapped the network of all elements within our horizontal time frame, both human as well as non-human were included (Elliot 2007). Through this network, we were not only able to illustrate connections but clearly trace the flows of institutional and social information (i.e. what is being exchanged by our subjects of interest, how much is being exchanged and the direction of exchange).

NARRATIVE

THE GENESIS

"Without the benefit of a comprehensive Arb management plan adopted by the administration, the Arb has been subjected to discontinuous and uncoordinated management. It seems that the concerns of the Arb have not received a high priority since the concentrated efforts of Professor Stork in the 1940s and 1950s…the administration has renewed an interest in coordinated Arb management…Land-use management of the Arboretum requires many decisions to be made involving the input of numerous interested parties. The responsibilities these decisions entail lie heavily on one person. We therefore propose establishing an Arb-planning task force…" (The Environmental Studies Committee 1990).

This statement written on January 18th, 1990 by the now defunct Environmental Studies Committee (ESC) marks the turning point at which the Cowling Arboretum formally embarked on its ecological restoration initiative (The Environmental Studies Committee 1990). The arboretum had been in a state of neglect for the previous forty years and though over time various individual faculty and students had attempted to start conservation projects there, none had been sustained and adequately supported (McKone 2017, Braker 2017, Luterra 2007, C. E. Buchwald, Interview with Caryl Edward Buchwald 2017). That is, until several key and unprecedented institutional changes occurred simultaneously and seemingly spontaneously. There were significant changes made to the structure of Carleton's administration, including the expansion of the Dean of the College Office, an influx of funding for the arboretum as well as major efforts to revitalize the image and academic mission of the college. Additionally, an arboretum task force was created by the Office of the Dean of Budget and Planning. Commissioned by then President of the College, Stephen Lewis, both the ESC and the Dean's office set about to create a committee of individuals that could create a management plan for the arboretum to incorporate into the long-term planning of the college (Shearer 1990). More than a year later, the task force was officially formed (Wagenbach 1991). It was comprised of students, faculty and staff from the Biology, History, Geology, Facilities and Physical Education departments. Professors Caryl Ed Buchwald, Cliff Clark, Dennis Easley, Mark McKone, Mylla Urban and Gary Wagenbach were named as its members (Wagenbach 1991). Student naturalist Valerie Weiss also served on the committee (Wagenbach 1991). While the committee no longer exists, its formation serves as a marker of when the arboretum began to change from a mere amenity into a permanent and influential department within Carleton. A critical look at the arboretum's development up until this point will give us insight into why this was the case.

While we would consider 1990 the hallmark year of our study, important work for ecological restoration began both before and during the establishment of this task force. Though some might argue that this work began even prior to the establishment of the arboretum in 1926, our archival research and information derived from our interviewees do not cite any event prior to 1970 as being important to this cause with two exceptions:

(i) In 1968 Professor Paul Jensen, a member of the Biology Department decided to teach students about natural prairie systems and wanted to acquire a piece of land for this purpose (Reynolds 2014). He identified a seven-mile-long plot of land east of the

college and requested funding for its purchase from the Sumner T. McKnight Foundation[1] (Reynolds 2014). There he established the McKnight Prairie. Most of the land had been used for agricultural production and had been heavily grazed. The land also contained a grove of cherry trees which remain today (Reynolds 2014). The potential of this property was not recognized by the college and it was often referred to as "Jensen's weed patch" (Reynolds 2014). However, McKnight Prairie had swathes of native prairie and as a result was a prime place for the college's first restoration project (Reynolds 2014, Braker 2017). A large part of the seed used for future prairie restoration would come from this plot (Reynolds 2014, Braker 2017). This is important to note because these events predate the modern environmental move towards ecological restoration (Reynolds 2014).

(ii) Sometime between 1967 and 1970, former college President John William Nason[2] commissioned an informal group of professors[3] to handle matters concerning the arboretum (C. E. Buchwald, Report on Arb Usage 1962-1970). This committee suggested that a permanent tree planting committee be created to manage the arboretum and take 30 acres of farmland out of production to be conserved (C. E. Buchwald, Report on Arb Usage 1962-1970). Though this was not accomplished, it demonstrates that members of Carleton's community were thinking about issues of conservation decades before 1990.

These events demonstrate that conservation efforts had begun at Carleton before 1970. However, it was events that occurred during the Spring of 1970 that catalyzed Carleton's shift towards ecological restoration.

Growing Pains and Attempts at Starting Ecological Restoration: Caryl Edward Buchwald & Gary Wagenbach

The first Earth Day celebrations at Carleton were held on April 22, 1970. They were organized by Professors Edward Buchwald and Gary Wagenbach, future members of the Arboretum Task Force (C. E. Buchwald, Interview with Caryl Edward Buchwald 2017, Rogers 2017). With support from the college, both gentlemen took students, faculty and staff to clear and replant a parcel of farmland indexed as "H13-I16" on maps of the Arb (see Appendix A) and often referred to as the "Earth Day Field" (Luterra 2007). In conjunction with students and teachers from Northfield Public Schools, twenty thousand trees were planted that day, with the hope that the parcel of land would be restored to successional forest (Carletonian, May 15 1981). This

[1] The McKnight Foundation, formerly the Sumner T. McKnight Foundation is a Minnesota based family group that contributes to a number of philanthropic ventures globally and in Minnesota. Founded in 1953, it was independently endowed by William and Maude McKnight (The McKnight Foundation 2016).

[2] President Nason was a graduate of Carleton College and served as President of the college from 1962 to 1970.

[3] The committee was comprised of professor from the biology and geology departments including: Ed Buchwald, Bill Huyck, Paul Jensen, Patricia Lamb, W.M Ramaley, and Charles Rayment.

event had a transformational impact on the Carleton community as, in the words of Diana Anderson former editor of the Carleton Voice, “the Arb’s salvation became a part of a global cause” (Jarchow 1992).

This global cause that had found its way to Carleton and had proliferated into the modern environmental movement, did not emerge from singularly focused organizations and individuals (Rome 2013). Instead, several fragmented events occurred that culminated in the spring of 1970 (Rome 2013). After the World War and the “baby boom”, urbanization and suburban sprawl increased at unprecedented rates prompting concerns over the loss of natural habitat and green space (Rome 2013). Technological advancements and rapid industrialization resulted in high levels of air and water pollution (Rome 2013). Critically-acclaimed authors Rachel Carson and John Kenneth Galbraith in their respective novels, *The Silent Spring* and *The Affluent Society* also addressed the environmental challenges of the time (Rome 2013). Legal cases such as the Audubon Case where the supreme court prevented the City of Los Angeles Department of Water and Power from using water in a way that harmed the public’s interests (Rome 2013). These events sparked a grassroots movement towards restoring and preserving the natural environment (Rome 2013).

In light of this, organizations such as the Sierra Club redefined their mission to include environmental justice and ideas of restoration (Rome 2013). Also, groups such as the Environmental Defense Fund was also created (Rome 2013). There were increased discussions on campuses across the country which led to sit-in protests at colleges such as the University of California Los Angeles and soon, college campuses became the nucleus of activities (Rome 2013). It was no surprise then that in Senator Gaylord Nelson of Wisconsin would choose to hold a teach in on the environment not in Washington D.C. but at the University of Michigan Ann Arbor (Rome 2013). To gain more attention, the organizers of the teach-in decided to change the event’s name to “Earth Day” (Rome 2013). Soon word spread and environmental activists across the nation began to simultaneously organize their own Earth Day events, and Carleton was one of these institutions (Rome 2013, C. E. Buchwald, Interview with Caryl Edward Buchwald 2017). Carleton students and faculty had been observing these events and had been influenced by other organizations. Professor Edward Buchwald notes that his involvement with the Sierra Club during this time no doubt influenced him to champion environmentalism at Carleton. Therefore, the first Earth Day not only marked the birth of the modern environmental movement. For Carleton, it marked the beginning of a shift in focus from wanting to have a variety of exotic plant species for aesthetic and educational purposes to environmental restoration and protection (Rogers 2017).This shift however, was not without its setbacks and challenges.

As if forewarning the difficulties that lay ahead, most of the saplings planted on April 22nd died after a short while. In part, this was because wild animals, mostly deer, pocket gophers and meadow voles consumed the plants (Minnesota Department of Natural Resources 1985). The high mortality of the seedlings can also be attributed to fact that the Earth Day field was not prime for the development of the plants relative to other fields in the arboretum (Walker 2012). The soil composition had deteriorated over time and had lower levels of nitrogen, carbon and organic matter which are essential for healthy plant growth (Walker 2012).

The depletion of these elements was caused by previous anthropogenic activities in the field, including soybean farming (Walker 2012). This experience demonstrated how difficult ecological restoration was. It also highlights that the organizers of Earth Day did not yet have the

expertise to fully assess the needs of the ecosystem. Furthermore, they would need more tools and resources than initially anticipated to solve these challenges (C. E. Buchwald 2017).

Figure 3: President Howard Swearer and Grounds Superintendent Blake Stewart at a tree planting in 1970.

This pattern of slow and sporadic growth would characterize the restoration initiative for the next two decades as there were inadequate resources and personnel for this mammoth task. However, in the words of Gary Wagenbach, there were a few students and faculty "fretting, stewing and caring on a long-term basis" to ensure that some level of interest in the arboretum remained (Haag 1981). Of note are attempts to establish a committee on college lands and the seminar classes led by Ed Buchwald and Gary Wagenbach in 1972 and 1976, respectively. Additionally, the President's Office formed the Environmental Studies Committee in 1976.

First Articulation of Ecological Restoration Goals

In 1971 Buchwald proposed that a "permanent committee on college lands" be formed (C. E. Buchwald 1971). He lamented the state of the arboretum and its infrastructure. Even after the progress made with Earth Day, he referred to it as a "badly neglected woodland" which was disturbed by pollution from the G. T. Schjeldahl Company[4], student-generated refuse and constant vehicular traffic (C. E. Buchwald 1971). Additionally, increased illegal hunting and plans to build a portion of Highway 19 through the Arb made such a committee more necessary in Buchwald's mind. What is most striking about Buchwald's letter is not his descriptions of the defunct space, but his rhetoric which was heavily eco-centric. He claimed that nature needed "the help of ethical men," that Carleton had "a duty to take a role of leadership in ethical matters" and that the administration sought to "help its students develop their ability ….to act responsibly within any society." This was given as the primary reason that Carleton needed to take a more proactive role in matters concerning the arboretum. Citing well-known environmentalist Aldo Leopold, Buchwald made the case that it was the duty of the college to protect this natural resource in an increasingly urbanized city especially when the economic interests of the College and other institutions in the Northfield community made it more likely that the site would be commercially developed in the future.

While the plug for eco-centrism was made, it seems that Professor Buchwald was aware that his priorities and those of the College were misaligned. To make his proposal more palatable for the

[4] G. T. Schjeldahl Company now known as the Sheldahl Inc. was leading manufacturer of laminates and circuitry in Northfield. (NYT, March 16, 2002). It polluted the Cannon River with chemical discharge (Haase paper, pg. 15)

administration, Buchwald attempted to make the case that the Arb could generate income through the planting of walnut trees and the selling of their produce. But, to no avail. His proposed committee was not created and administrative support for Buchwald ideas appeared minimal.

More specifically, as Carleton College entered the seventies its administration was grappling with much institutional change and financial instability. Inadvertently, this affected all departments, organizations and groups connected to the institution. In an evaluative report prepared for the North Central Association of Colleges and Schools[5], the College's former President John Nason stated that the "unevenness of departmental strength, the lack of systematic and continuous institutional research" as well as dire infrastructural needs would be the College's focus throughout the next decade (Jarchow 1992). When asked to list the priorities and needs for this period, the following were presented: $1,000,000 in gifts and grants for operating costs, raising salaries of faculty members, providing an endowment to enhance Asian Studies, $1,000,000 to assist with student services, developing the library, replacing old building and utilities, remodeling Leighton Hall, creating summer programs for adults and opening an institute to train workers of the American Telegraph and Telephone Company (Jarchow 1992).The Arb is not explicitly mentioned as a site in need of developmental support (Jarchow 1992). Even so, there is mention of the desire for $250,000 to "finance curricular innovations" and arguably arboretum operation and expansion could be supported from these funds (Jarchow 1992). However, the arboretum was not officially established as a distinct office and no doubt, there were numerous other departments vying for the use of these funds.

Nevertheless, Buchwald did not give up. In 1973, he modified his idea for the "Permanent Committee of College Lands" and created the *Land Use Planning Seminar* to survey the Arb's resources and to investigate and document its flora and map its vegetation (Land Use Planning Seminar 1973). In doing so, it seems that he was attempting to reframe his case for the need for long-term planning for the arboretum. He was attempting to show how beneficial this endeavor would be for the education of Carleton students. Thus, the original mission of eco-centrism was expanded to include education. He also thought that his students could contribute much to the dialogue about the Arb. In their final report, the students of this seminar stated that the main aim of their endeavor was to "preserve and enhance ...academic excellence so that Carleton remains one of the very best liberal arts colleges" (Land Use Planning Seminar 1973). Their language suggests that developing the Arb was the moral responsibility of the College and that there were consequences for the mismanagement of these lands. Their statement also stressed the importance of taking "responsibility for and living with— [their] choices and alluded to ideas of eco-centrism (Land Use Planning Seminar 1973).

By 1974, the committee first proposed by Ed Buchwald, the Permanent Committee on College Lands was commissioned by the College's Board of Trustees. Both the committee and the seminar presented final reports to the board. In their response, "the value of the Arb as an educational and recreational resource [to the trustees] was affirmed," demonstrating that at least

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[5] The North Central Association of Colleges and Schools was a membership organization of tertiary institutions in nineteen states including Minnesota. It was created to foster "cooperative relationships among colleges and schools" as well as "encourage academic excellence and improve teaching and learning" (North Central Association 2016).

theoretically the College's administration was at least onboard with the beginning ecological restoration and supporting this cause both financially and with institutional support. In a speech given on April 17th, 1972, an Alumnus and Trustee of the College Lloyd M. McBride spoke about the value of the arboretum to the College and stated that the College had the outdoor facilities "to make it one of the most meaningful and dedicated ecological centers among higher educational institutions in the United States (McBride, Speech on the Arboretum 1972). In his closing remarks, he states that "the Carleton faculty, supported by student's efforts, [was] now embarking on a program whereby governmental agencies, members of industry and recognized organizations may invoke the available expertise and facilities at Carleton with respect to ecological problems" (McBride, Speech on the Arboretum 1972). However, from all accounts this "permanent" committee was disbanded signaling that institutional support had waned. The fact that funding for the arboretum had decreased from $82,142.24 in 1973 to $61,408.60 in 1974 (and did not return to that level until 1978 when Professor Buchwald was named Arb naturalist) provides supporting evidence.

Two years later in the winter of 1976, Gary Wagenbach devised a course similar that of Buchwald to regenerate interest in the Arb and created the *Arb Planning Seminar* to develop a strategic plan for arboretum development. His students observed that though in theory the educational activities in the Arb was not opposed by the College's administration, there was little formal educational engagement there (Arb Planning Seminar 1976). Instead, it was mostly being used for recreational activities. Additionally, the seminar's students wanted to incorporate the value of ecological restoration more explicitly into the mission of the Arb. The Arb's original mission which focused on having a curated collection of plants for research had not been officially revised since 1926. As such, they devised the following statement as a "best guiding principle" for arboretum development and management policies:

> *The Carleton Arb should be developed as a multi-use preservational/educational/recreational area, serving primarily the Carleton community, but also open to the public. To that end it should be managed as a mosaic; protecting fragile plant communities and animal habitats, while allowing recreational use in other areas. The educational potential of the Arb, both for formal courses and individual study must be developed* (Arb Planning Seminar 1976).

In line with this articulation of arboretum policy, students also proposed some measures to ensure the preservation of the landscape. These included (i) the formation of an arboretum committee, (ii) proposal for prairie restoration, (iii) marsh, forest and wildlife management, (iv) the creation of a nature center, (v) the renovation of Lyman Lakes and (vi) the hiring of a naturalist to manage, secure and develop a long-term plan for the arboretum (Arb Planning Seminar 1976). Again, in the job description for the naturalist, the need for proper management, preservation, educational endeavors and recreational activity was reaffirmed (Arb Planning Seminar 1976). The use of the arboretum by Buchwald's and Wagenbach's biology classes represented a convergence of interests between the two entities (i.e. the Biology Department and the Arb) as it bolstered the stability of the arboretum as an institution at Carleton while simultaneously enhancing the research and educational capabilities of the Biology Department. Clearly, this was a promising and symbiotic relationship. Yet, most of the plans generated by these courses (which were compiled in books) were not implemented at that time and some still have been realized.

One idea that the College did adopt immediately was the establishment of a committee to oversee the arboretum. In the same year of Wagenbach's planning seminar (1976), the Environmental Studies Committee (ESC) was formed and approved under President Howard Swearer[6]. The duty of this body was to manage the arboretum, to preserve the college-owned agricultural lands as well as expand the environmental studies curriculum. The creation of the ESC provided a stable link between college administrators and stakeholders in arboretum development that had not existed before. The creation of this committee provided a clear space to discuss issues regarding the arboretum and arguably, should have reduced uncertainty and provided oversight for the Arb. However, it appears that over time the committee began to expand its focus to other matters such as the expansion of environmental studies related curriculum and the creation of two environmental studies related concentrations[7], thus, limiting the space for discussing the development of the arboretum due to additional interests. Nevertheless, a few members of staff remained optimistic and continued work in the Arb.

In his report, Buchwald detailed many of the activities that had taken place in the arboretum since that Earth Day in 1970. The college owned 900 acres of land in 1970; 90 acres were used for the main campus, 410 for agriculture and 360 acres were considered arboretum lands. By 1980, 17 hectares or 42 acres of land were being prepared for prairie restoration. Of these 42 acres, approximately 30% had been seeded and on another 0.03%, sod transplants had been completed. A small portion of this restoration took place in Hillside Prairie and in floodplains. In the case the floodplains, most of the land was originally used for agricultural production but, was restored because of extensive issues with flooding. There was also considerable effort to thin and then remove a 51acre plantation of invasive pine species, the construction of twelve bird houses and reconstruction of two bridges over at Lyman Lakes. A new trail was also created in the Kettle Hole Marsh and considerable work was done to improve conditions on the Old Dike Road Trail. Buchwald also states that there was perpetual work--culvert cleaning, trail grading, the installation of runoff diverters and the trimming and cutting of brush and trees--to ensure that the trail ways were maintained. These additions served not only to help the arboretum to be easier to navigate, but gave physical and visual evidence that a new institution was being established.

This physical restoration work in the arboretum was also supplemented by more educational and administrative initiatives associated with the Cowling Arboretum. These activities included photo contests, orienteering classes, the creation of a floral and faunal checklist and inventory and the creation of a phenology record. Extensive studies were also carried out to investigate the arboretum as an owl habitat, for the restoration oak savanna area. Many famous naturalists including Clare Walker Leslie, Sue Hubble (bee-keeper and author) and David Brower (founder of the Sierra Club) were invited for talks and presentations on campus during the spring term (Weiss 2017). The ESC also started a Prairie and Wood Natural History club that allowed the local community to explore the field of ecology (Leigel, Thompson and Hagenbuch 1977). It was run by students Janice Thompson, Konrad Leigel and Katy Hagenbuch (Leigel, Thompson and Hagenbuch 1977). Furthermore, the student naturalist program that remains today, was proposed on April 20th, 1977 by Paul Jensen. Money from the Environmental Studies Fund was initially

[6] A graduate of Princeton and UCLA and a professor of political science, President Howard Swearer served from 1970 to 1977.

[7] The concentrations created were *Natural History* and Science, Technology and Public Policy.

used to support the venture and later resources from the Cole Family Memorial Fund were also used. Additionally, during the summers of 1978 and 1979, over thirty high school science teachers participated in a hydrology and biology summer camp held in the Arb and funded by the National Science Foundation. During this period, there was also significant changes with staffing at Carleton. Dennis Easley was named groundskeeper during this time (1979) to take over from founder of the arboretum D. Blake Stewart who left in 1975.

While activity had increased in the arboretum, there was still much work to be done and records from this suggest that more staff support and funding were required. In 1977, the ESC applied for the Culpeper Foundation[8] to finance projects in the arb. Buchwald suggested to the ESC that an "Arb" sub-committee be formed and he also requested that he be named chair and naturalist of this committee. The provision of grant funding had recreated a space for and reignited conversations about arboretum development. Buchwald was made naturalist in 1977 and Professors Wagenbach and Jensen were made members of the smaller subcommittee. However, this support was still not sufficient. One requirement for receiving funding from the Culpeper Foundation was that an annual report should be submitted to its board. In 1979, despite the report being due in June, it still had not been submitted by December of that same year. The Culpeper Foundation proceeded to withdraw funding for the program, causing much distress. Eventually, this situation was rectified when the report was submitted. Still, correspondence between administrators and professors at time reflected a myriad of miscommunications regarding specific roles and responsibilities (Edwards and Carlin 1979).

Figure 4 Restoration work being completed at Hillside Prairie, undated (Harvey Stork Collection).

Additionally, the constant forming and disbanding of committees related to the arboretum point to disorganization and lack of clarity on the part of the institution. It also suggests that even though some faculty and students had embraced the rhetoric of eco-centrism the College community as a whole had yet to accept this as a part of the mission of the College. According to Nancy Braker, current director of the Arb and a student at that time, there was no well-articulated mission for the arboretum and she had little awareness what the College was doing with these lands (Braker 2017). Nevertheless, Carleton did make significant strides towards ecological

[8] The Charles E. Culpeper Foundation is now a part of the Rockefeller's Brothers Fund. It used to give funding for exploration to individuals or organizations that did science and environment related projects. They now fund arts and cultural programs (Rockefeller Brothers Fund 2016).

restoration in the seventies. Braker recalls using the Arb for recreational purposes and doing volunteer projects there (Braker 2017). She was a part of a small group of enthusiastic students who used began to use the Arb more frequently for activities such as bird watching and planted trees on a volunteer basis. However, the large majority of the student body remained disconnected from the Arb and the administration failed to communicate the purpose of the Arb and its value to students, faculty and staff (Braker 2017).

Overall, the Arb was not a priority for the College in the 1970s. As such, internal and external institutional support as well as funding was insufficient. As a result, student and faculty Arb use for recreation and research was low. The Arb lacked organizational structure and most efforts to restore the land were relatively small and organized by a select few. While Buchwald and others were certainly influenced by external groups and organizations, connections with these groups were sparse and inconsistent. Though the ecological ideas of succession were recognized by Buchwald and others (i.e. communities can recover naturally after anthropogenic disturbance), the complementary knowledge of restoration limitation (i.e. plants need support early in succession in order to thrive) was not adequately applied. Thus, progress was slow.

Picking Up the Pace:

The Environmental Studies Committee & increased arb programming

Despite these challenges, by the eighties the Arb was clearly abuzz with activity and many key improvements were made. The effects of the Arb restoration project became more palpable on Carleton's campus as more students, faculty and staff used the site. Additional sections of Hillside Prairie were restored in 1981, 1983 and 1986 and the Alumni Field was prepared for future restoration work. Though not operating on an extensive scale, Buchwald and Wagenbach enlisted students to help with irrigation and building small enclosures to minimize herbivory (C. E. Buchwald 1980). The ski trails were well maintained during this time by Dennis Easley, the grounds manager for the College and there was an increase in the number of skiers in the Arb.

Findings from an Arb use survey taken in 1985, showed that over twenty-five (24.7%) of respondents skied several times a year (Smith 1985). There were Arb walks, an annual Arb Day, prairie restoration and Arb clean-up days (Smith 1985). Students also went to the Arb to help build infrastructure like birdhouses (Smith 1985). Sedentary activities like writing, reading or daydreaming were enjoyed by 57% of the respondents at least once a year (Smith 1985). Over 40% had done some sort of lab work in the Arb, and 24% slept out in the Arb at least once a year (Smith 1985). Even though the condition of trails of the Arb was often poor, 40% of respondents had reported using these trails at least once a year (Smith 1985). Eighty-Five (85%) of all professors reported using the arboretum at least once a year. All these respondents (both faculty and students) reported "feeling grateful" for the Arb and that it provided a good escape from the intense academic pressure (Smith 1985).

This can be attributed to the fact that the ESC spent the larger part of the 1980's reorganizing its structure, clarifying its goals and reorienting their efforts after much disorganization in the

seventies. On April 22nd, 1980, Ed Buchwald wrote the following to Mylla Urban[9] "the ESC lacks dynamism because members are all busy" (C. E. Buchwald, Memo on the ESC 1980). In his words, the committee "seemed moribund" and there was no clear leader assigned to set and achieve specific goals. Thus, while individual faculty and students completed work in the Arb, little was being done by the ESC as a committee. Further proof of this came in a memo from Beverlee DeCoux to John Tallmadge, the new chair of the ESC, where she states that accumulation of unused funds by the committee "[was] an embarrassment to our fundraising efforts" because it would make little sense to ask for more money from donors when little money is being spent on projects at all (DeCoux, Letter regarding funding for the Environmental Studies Committee 1982).

This was unfortunate as Buchwald, Wagenbach and other Arb involved staff faced considerable challenges with their programing and would have benefitted from consistent support. In a report published on February 20th, 1980, Professor Buchwald highlighted the growing challenges with Dutch Elm disease, its increased proliferation and how it threatened to destroy all the progress made with forest succession in the arboretum (C. E. Buchwald 1980). He also notes the fact that significant portions of the arboretum budget were used to remove the affected trees and that because the maintenance staff was short on time and resources, members of the public could come and cut down the diseased trees (C. E. Buchwald 1980). Additionally, there were issues with beavers on Lyman Lakes. These "annoying beavers" sought to use this location to construct dams for habitat (C. E. Buchwald 1980). Also, because it was believed that beavers would increase the likelihood of flooding in Bell Field due to their destruction of the willows. However, in the professional opinion of Buchwald, an ecologist, these beavers could not be supported by the surrounding ecological habitat (C. E. Buchwald 1980). Because attempts to trap the beavers were unsuccessful, as an alternate management strategy, numerous beavers were shot (C. E. Buchwald 1980). Student naturalists aimed to keep track of the damage to trees caused by beavers by counting the number of "cut" trees.

To rectify this issue, the ESC was reorganized: a committee chair was named and this position was rotated among members. Members debated and came to a consensus on the priorities of the ESC. In meeting minutes from 1982, John Tallmadge, the then chair of the committee mentioned that the committee was "preoccupied for months with creating a natural history concentration but that [their] mission was actually broader" (Environmental Studies Committee 1982). As such, the committee began to expand environmental studies related programing at the College. For example, it was this committee that organized and funded an environmental careers conference. They invited environmental activists, academics and practitioners such as Ann Zwinger[10], Dr. Martin Zimmerman[11] and Barry Lopez[12] (Wagenbach and Zimmerman 1982, Environmental Studies Committee 1982). Each spring a naturalist was invited to the campus to speak. At the same time, they also added to the environmental related course offering at Carleton, creating

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[9] Mylla Urban is a professor emeritus of physical education, athletics and recreation.

[10] Ann Zwinger was a renowned historian and the author of "Land Above the Trees (Hazelhurst 2014)."

[11] Martin Zimmerman was a professor of forestry at Harvard University and a well-respected plant physiologist (The Harvard Crimson 1984).

[12] Barry Lopez, an environmental activist, is the author of the critically-acclaimed novel Of Wolves and Men (Evans 1994).

courses in environmental pollution, environmental geology, sustainability, natural history, and population dynamics (Carleton College Registrar's Office 1982). They also led student activities such as environmental film screenings, field trips and sponsored the activities of the Natural History Club. Furthermore, they funded research by students and faculty through grants such as the Matterson Fellowship. In the winter of 1988, following in the steps of those before him Mark McKone created an arboretum planning seminar with the express intent to make details surrounding the restoration initiative. Much time and effort was spent showing the value of an environmental studies to students of a liberal arts college. In one note written on February 1st, 1980, the committee discusses the findings of an informal student survey which showed that "[didn't] know of the environmental studies programming and [didn't] think of it as a part of a liberal arts education" and attempted to create strategies to solve this issue.

The committee also sought to expand its network. Correspondence between professors on the committee and academics at other universities such as Harvard and Hobart and William Smith College were frequent. Some these academics from external institutions, such as Dr. Zimmerman from Harvard University was surprised to hear of Carleton's 900-acre arboretum (Wagenbach and Zimmerman, Letters from Wagenbach Zimmerman 1982). Gary Wagenbach visited a conference on restoration ecology in 1984, and it was from this conference that a Friends of the Arb club was formed. Through this conference, the committee began to clarify what ecological restoration meant for the College, define potential research projects in the Arb, and understand the true benefits of ecological restoration. One benefit of ecological restoration initiatives at universities was its ability to encourage inter-disciplinary collaborations as "efforts of restoration ecology [and ecological restoration] causes people from different disciplines and points of views to talk to each other" (McBride, Correspondence between L.M. McBride and President Robert Edwards 1977). It also would force scholars at Carleton to synthesize their understanding of the natural environment "rather than just reducing nature into its component parts" (Wagenbach 1984).

In April of 1987, it was suggested that the ESC meet with the Rice County Forester Lillian Baker to come up with a long-term management plan for the Arb. To fund the programs necessary for executing the plan, they sought to expand the endowment given by the Cole family (Sullivan 1985). On August 13th, 1985, the state of Minnesota Department of Natural Resources wrote a private forest management plan for Carleton that addressed objectives such as how to improve the value of the property, how to improve wildlife habitat and recreational opportunity, how to prevent erosion and improve water quality, as well as protecting the vegetation from fire, grazing, insects and disease (cite this). They also gave extensive descriptions regarding the conditions of different tree species in the Arb, their age, characteristics and tips for management.

Though the Arb had clearly made its way into the culture at Carleton and had become an increasingly important part of the social and academic scene, the Arb was still not well-integrated into the institution. This is evident in a 1985 letter and petition from Buchwald to President Robert Edwards. In it Buchwald notes that the Arb still was not "a mainstream concern" of the Carleton administration. In response to efforts by Ed Buchwald, President Edwards and Treasurer Wright had a series of meetings with Gary Wagenbach and Buchwald. In the correspondence from these meetings, three major things become clear: (i) the college's administration was uncertain as to what the arboretum was and what it should be, (ii) they wanted an arboretum committee outside of the ESC to report directly to the president as "the

shorter the link to the operational part of the College, the swifter the execution of plans" and (iii) both Edwards and Wright preferred to have the subcommittee give policy and planning advice rather than operate as a managing body for the arboretum presumably because the administration wanted more direct control over what happened with arboretum lands.

In 1986, the arboretum saw a shift in management when Ed Buchwald was pressured by both the College President David Porter and the Dean of the College to step down from his naturalist position (C. E. Buchwald 2016). From both archival records and Buchwald's personal account, it is unclear why this occurred (C. E. Buchwald 2016). Professor Buchwald continued to remain involved with the activities in the arboretum, though to a much lesser extent publicly (C. E. Buchwald 2016).

In sum, this period in the Arb's history was characterized by a marginal increase in funding and support from administrators of the college. The ESC was instrumental in initiating more student-centered activities in the Arb as well as creating programing for members of the Northfield community. Yet, their attention to ecological restoration in the Arb was relatively low due to other commitments (e.g. creating environmental studies curriculum). There was more student and faculty research in the Arb but they were not formal or extensive by any means. During this time, Carleton staff began reaching out to external organizations and began to connect with institutions doing similar work to exchange ideas and expertise. The Arb's managers began using techniques to assist with succession. These include building structures around young plants to prevent herbivory, and began first attempts at animal population control through trapping and hunting. The removal of invasive plant species and the minimal use of herbicides and irrigation as well as experimentation with prescribed burning also helped to progress the restoration project.

Revival & Restoration:

The McKone-Bakke Years

The position of arboretum naturalist remained vacant until 1991 when Mark McKone, Professor of Biology was asked to serve in the new position of part-time director of the arboretum. He worked very closely with Myles Bakke, an ecologist who came to Carleton as a biology lab technician in 1980 (McKone 2017, Braker 2017). Bakke assumed the role of part-time arboretum manager. The appointment of McKone and Bakke was in large part spurred by Dean Clement Shearer (Shearer 1990). Shearer was hired as the College's first Dean of Budget and Planning in 1989 by President Stephen R. Lewis (Shearer 1990). This marked the first time that the arboretum was placed under the portfolio of a high-level administrator. Under Dean Shearer, the Environmental Studies Committee (ESC) was asked to evaluate which next steps were needed to ensure that conditions in the arboretum would permanently improve and that more robust and serious development could begin (Shearer 1990). The ESC recommended the creation of the Arboretum Task Force, finally taking the advice that former students of Wagenbach and Buchwald had given for nearly twenty years (Wagenbach 1991, The Environmental Studies Committee 1990). The Arboretum Task Force had the responsibility of creating a long term strategic plan and future policies for the arboretum (Shearer 1990).

According to Bakke, the increase in institutional support and leadership occurred because Lewis' administration recognized the value of the arboretum (The Global Local Commons 2015). In one report written by an external evaluator approximately 20 years ago, Beverlee DeCoux, former comptroller at Carleton recalled reading that the arboretum would be the single most valuable resource on Carleton's campus in 50 to 100 years as land use change and increase in urbanization and around Northfield (DeCoux 2017). Thus, the college needed to invest in its protection and development.

In 1994, Mark McKone and Myles Bakke completed a plan for the Arb that articulated three main goals: (i) education, (ii) conservation and (iii) recreation. This report was the first time in 40 years that anyone at the college had expressed that the primary aim for the arboretum was to enhance education at Carleton. Participating in ecological restoration and conservation was considered as a part of this larger educational mission. The Arb was considered a huge asset to Carleton as very few colleges "could offer more than textbook learning about restoration ecology."

With these structural changes, the arboretum became an official department and had much clearer organizational goals. Evidence from text and interviews also show that the Arb was no longer under the jurisdiction of the ESC. In many senses, it became independent actor on the campus. Additional institutional support for the arboretum was in part helped and even influenced by an influx of financial support. More specifically, the college received $750,000 in honor of Treasurer Frank Wright and his deceased wife, Louise Coffey Wright for arboretum development from an anonymous donor. The gift was given in 1990, the year when Treasurer Wright retired from his position on the Carleton board. Louise, who died the previous year of cancer, was a volunteer naturalist in Northfield and a frequent user of the facilities. According to records from the Environmental Studies Committee, the arboretum's funding also grew because increased funding through endowments from the Richard Cole Memorial Fund from the Cole family beginning in 1981 and the Anne Sipfle Ski Trails Memorial Fund[13]. The combination of increased administrative and financial assistance resulted in an unprecedented increase in restoration activities[14].

However, this transition was not smooth as other departments at Carleton did not defer to them when matters concerning the Arb arose. Case in point, for years the Grounds Department was responsible for the physical management of the arboretum. They maintained the trails and other infrastructure. When the Arb manager position was created, it was expected that this individual would manage maintenance issues. However, this was not very clear at first. For example, the Grounds Department in conjunction with officials from the Physical Education, Activities and Recreation Department placed signs in the Arb banning the use of certain trails for bikers and walkers in the Arb (Sipfle 1997, Braker 2017). This was not approved by Bakke or Myles.

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[13] Ann Sipfle Littlefield was the daughter of Professor Emeritus (philosophy) David Sipfle. He created the fund after her death (Sipfle 1997).

[14] The Richard Cole Memorial Fund (now the Cole Memorial Fund) was given in honor of Richard F. Richard Cole '40 and Richard Seeger Cole, a biology major from the class of 1969. The latter Cole, was "an avid outdoorsman" and felt the Arb "had contributed to his successful education" at Carleton. The Cole Wetland was planted in 1995 in honor of the family.(Arboretum 2008-2015; Solson 1989).

Eventually, after some negotiations the signs were removed and new places were designated for skiing with the Arb staff's approval (Sipfle 1997, Braker 2017).

Another case occurred in 2000, when Carleton sought to build a new recreational center that would provide modern facilities for its students. The site selected for the building was on land that had long been considered a part of the Arb. More specifically, the recreational center would be built in the middle of what was essentially, a "wildlife corridor", meaning that species and the local natural habitat would become fragmented (Braker 2017, Carleton College 1997). Furthermore, by building the recreational center in the designated location, it would force the chopping down of a large, 150-year-old oak tree beside Goodhue (Braker 2017). Rob Hardy, a staff member of the Classics Department and frequent Arb user and the staff were particularly upset and taken back by this decision. Thus, they took it upon themselves to vouch for the preservation of this tree by protesting the administration's original plan. The altercation lasted for months, but eventually resulted in an optimistic outcome when the College decided to compromise by taking into consideration the interests of the Arb. This incident also highlights that although the Arb staff was more concerned with ecological restoration during this time, some of their motivations to act were tied to eco-centric values.

Though Bakke and McKone wanted to accomplish ecological restoration in the Arb, they were uncertain about how exactly this restoration would occur, but knew that certain steps were absolutely necessary (such as the introduction of locally adapted plants) in order to accomplish these goals (McKone 2017). They referred to the recommendations made by the Arb Planning Seminar that McKone had taught in the winter of 1988 to them better clarify what needed to be changed in the Arb and how exactly these changes might occur (McKone 2017). When asked if the present condition of the Arb aligned with these students' recommendations, Mark remarked that the Arb today is "pretty close" to what they had intended (McKone 2017). The most significant deviation from this original vision was the state and configuration of the upper arboretum (McKone 2017). His statement evidences how critical student input was to the development of the Arb as we know it today[15].

They began their work by restoring large expanses of field and farm land to forest. This occurred every year from 1991 to 1994. The 10,800 Oak and Hickory seedlings planted by Bakke and his student crew in 1994 are particularly notable. Major prairie restorations also commenced in 1995. All the species selected for reintroduction existed in this region before European settlement and there was an invasive species eradication program through which buckthorn, honeysuckle and siberian elm were removed (Luterra 2007). This brings to mind questions and conflicts over how McKone and Bakke determined which invasive species should remain and which ones should be eradicated. The argument could be made that the removal of invasive flora and fauna ensured ecosystem health and stability, though it had little impact on the recreational and aesthetic payoff of nature. Conversely, the ecosystem composition the Arb's ecologists were trying to achieve possibly optimized the research and educational possibilities for faculty and students. This need to balance different interests with regards to native versus non-native species would persist. Bakke and McKone also used a variety of restoration techniques to increase their understanding of succession in a restored landscape occurs and to get a sense of which methods

were most appropriate for the Arb. Therefore, the restoration of the Arb was not only driven by the desire to protect the ecosystem, but also the desire better understand, experiment with and apply ecological principles in practice. McKone and Bakke's work was on the cusp of larger developments in restoration ecology as it was only at the beginning of the nineties that "restoration ecology became a strong field attracting basic research" (Young, Anderson and Clary 2005).

Additionally, there was an intensive campaign to collect seedlings for present and future restoration projects. For this endeavor, only local seedlings were used and over time Myles Bakke and Mark McKone were able to collect around eighty to ninety different seed species. Much of this seed was collected from small swathes of prairie in Rice and Dakota county, along railway tracks, along highways and in tiny sections of the arboretum that had managed to remain free of agriculture and other damaging anthropogenic activities (Braker 2017). Most seeds were taken within a 15-mile radius of the college so that all the plants in the prairie and forest were locally adapted. While this was a time and labor intensive process it was considered an important factor in ecological restoration. This demonstrated that ecological principles of genetic diversity and ecotypes were being considered. Having a locally adapted plant species increased the likelihood that the plantings would survive and be resilient in the face of external stresses on the ecosystem.

During these restoration projects, McKone and Bakke received advice, expertise and assistance from the Nature Conservancy, Prairie Restorations (operated by the parent of a Carleton student), Barr Engineering and the University of Wisconsin Madison. More specifically, the Nature Conservancy provided support through persons such as Lisa Mueller, who awarded Carleton a plaque for the restoration of the McKnight Prairie because of the presence rare species such as the prairie bush clover (McKone and Bakke, Draft Plan for the Cowling Arboretum 1995). Barr Engineering helped administer an arboretum use survey, and created a master plan for the Arb. McKone even stated that after the success with the survey, Barr Engineering really pushed for Carleton to create a long term, master plan. Unfortunately, no copies of this master plan can be found. Additionally, in 1994 the College enrolled nearly eighty acres of Arb land in government cost share and conservation programs to help defray the costs of restoration. The eco-centric vision for the arboretum took hold through more legal and formal distinctions i.e. the designations of certain part of the arboretum as protected not only by Carleton but major institutions such as the Nature Conservancy and the United States government.

They Arb staff also enlisted the help of graduate students from the University of Illinois to administer a survey of arboretum users. Over six weeks the pair collected data from 276 arboretum visitors, in 1994 the arboretum staff requested that graduate students, Thora Cartlidge and Sue students, faculty and alumni to glean information about the design and management of the Arb. They also aimed to gather more details on visitor demographics. The most significant finding from the survey was that the Arb's goals and mission was still unclear to Carleton and the Northfield community at large. Furthermore, the surveyors emphasized the need for Carleton's administration of clarify and "clearly distinguish" the Arb's educational role and its conservation and research role. It was only until this was done that meaningful long-term planning for the arboretum could be accomplished.

The involvement of these external organizations also brings into question the extent of the influence that external organizations had on arboretum development. Because of their distance

from the Arb, one would intuitively think that their influence was minimal. But, arguably the geographic and institutional distance from the Arb had some but, not significant bearing on Arb development as interpersonal and natural connections proved to overcome these divides.

This period marked a monumental shift towards recognizing the value of the Arb by the college's administration, spurring increases in funding, hiring of personnel as well as the restructuring of arboretum management. The process through which this happened however, was a bumpy one. For one, other departments and offices did not yet understand the new role of the arboretum and thus, failed to acknowledge it as a legitimate institution of the college. Despite this, the range and number of student activities in the Arb expanded and professors, at least those from departments of the hard sciences, became more inclined to conduct formal research using this outdoor laboratory. Furthermore, we see a greater willingness to directly engage with external organizations and adopt their recommendations relating to Arb planning and design. Arb staff also began experimenting with prescribed burnings and taking a more proactive role in matters concerning animals control and biodiversity.

Moving Ahead:

Continuing Restoration & Expanding Progress with Nancy Braker

In 2004, Myles Bakke informed the college that he would be retiring in five years. Because Bakke was such an essential part of the functioning and maintenance of the Arb, it not only prompted the search to find a new arboretum manager, but the creation of an independent task force to assess the progress that had been made to the arboretum as well as potential next steps. Three individuals made up this team, including Nancy Braker, an alumna who had worked for the Nature Conservancy in a variety of capacities.

The task force spoke to stakeholders in management and development of the arboretum to get a clearer sense of recent developments as well as future plans for the Arb. The task force generated a report and a number of findings emerged. First, there was solid campus wide support for the arboretum's development. There was a consensus across all sectors of the college that the Arb was an important and valuable resource. Second, there was some increased investment on the part of the College in the arboretum primarily through the acquisition of lands that bordered it. Third, there was considerable progress made with restoration given the resources and staff the arboretum had. Of note, were the Best Woods and Harvey Stork forest which were described as "excellent". Moreover, the diversity of species in the arboretum made it an ideal place for faculty and students to complete research. Finally, though small the arboretum had an extremely dedicated and hardworking staff, who given their limited resources, had accomplished much.

However, the task force noted that there was a lack of cogent history of the Arb as well as no concrete, well-expressed, common vision or plan for the arboretum. Moreover, the Cowling Arboretum remained largely undocumented and unpublished relative to its counterparts at schools like the University of Wisconsin Madison and Harvard University and "did not receive the kind of recognition it deserved" (Braker 2017). There were questions about whether the Arboretum was properly situated within the organizational structure of the College. It was a unit in the Budget and Planning Office, but the task force thought that the Dean of the College or Facilities Department could potentially provide "a better fit". Furthermore, much of the

restoration was occurring without long-term ecological planning that accounted for the composition of seed mixes, site analysis (consideration of soil types, existing seed banks, remnant plants), and concern for edge effects. Another major takeaway from the report was that the arboretum needed "to play a bigger role in the educational life in the college." There was poor communication between students and the college regarding the educational value of the arboretum and there was unstructured support for faculty and students in their academic use of the Arb. Professors were uncertain of how they could use the arboretum to enhance their in-class teaching.

The task force considered the following as the next essential steps for arboretum development: (i) hiring a sufficient number of ecologically trained staff and making the Arb staff's organizational structure more robust, (ii) improving the documentation and historical records of the arboretum, (iii) increasing more research and educational capabilities of the arboretum, (ii) the development and implementation of long range restoration management plan, and (iv) improving communication about arboretum programming with individuals both within and outside of the Carleton community.

In 2007 when the college's administration began the search for an arboretum director, Nancy Braker. After more than 20 years at the Nature Conservancy she felt that her extensive experience in restoration management, rare species conservation and land protection could be of value to the institution and began her tenure in October of that same year. She believed her experience working with numerous organizations would provide a wider network to accomplish the necessary work in the arboretum.

After hiring Braker, the college sought to hire a full- time arboretum manager. While they Arboretum Committee wanted to find someone with extensive experience in ecological restoration they also wanted an individual who had extensive experience supervising young people with limited knowledge of restoration. In 2008, Matthew Elbert, who had worked as restoration practitioner in New York city parks was hired. While Nancy's expertise was in entomology and land use planning, Elbert was a trained botanist. Thus, he was adding to the scientific expertise of the staff. Mike Callery, a member of the Grounds Department also became a part of the team. Callery, who is still employed, spends approximately three-fourths of his work time quota in the Arb maintaining trails and Arb infrastructure. The student naturalist program grew in this time. In 1990, only two student naturalists were employed. However, by 2007 the Arb had six student naturalists working and a growing number of trained volunteers. This change was in large part made possible by donations from the Cole family who continues to contribute to the college through an endowed fund.

With the additional manpower for Arb management, it was easier to expand the administrative undertaking of the Arb and improve the documentation of Arb developments. The Arb website was renovated and provided information about Arb activities and events to the general public. The Cowling Arboretum Digital Archive was also created to store and record materials related to the arboretum. It not only provides background information on the Arb but improves but provides resources for academic research and study.

Undoubtedly, research and study in the arboretum grew drastically during this time. Biology and Geology classes had traditionally been held in the Arb but, this new period saw disciplines such as Cinema and Media Studies, Archaeology, English, Educational Studies, Religion and Art taking advantage of this resource. Some of the most unconventional classes to be held in the arboretum include Introduction to Archaeology where students went on digs, and an Advanced Ceramics class. While there are no typical archaeological sites in the arboretum, the instructors were able to engage in the full process of archaeological exploration because of the modern history of the landscape dating back 150 years. In the case of the ceramics course Professors from the Geology and Art department collaborated on a project. In first phase, students from a Geology of Soils class measured for soils with clay properties. These soils were then dug and used by the Advanced Ceramics class for their art work.

Faculty and students have also completed research projects and published their work in major academic journals. This research includes an investigation to understand the patterns of soil carbon and nitrogen accumulation in restored prairies, exploring patterns of herbivory on prairie legume plant species, examining the differences in ecosystem properties between restored prairies and agricultural fields by looking at changes in and interactions between plant communities as well as assessing the edge-effects of adult corn-root worm beetles on sunflowers in tallgrass prairie remnants. These projects have contributed and added much to the understanding of restoration ecology and helped to improve the practice of ecological restoration. Considering only the articles cited above, this research has been cited over 200 times by scholars. The scholarship produced during this time was made possible only because of the decades of prior work to transform the Arb from a collection of plants to an outdoor laboratory. The increase in scholarship from the Arb coincides with the growth in research literature from the field of restoration ecology (Jordan and Lubick 2011).

Efforts to expand this outdoor laboratory continued. In 2007 through 2009 and then in 2012 and 2013, the Arb staff restored lands to native prairie, successional floodplain forest and floodplain forest. Additionally, swathes of native wildflowers were added. There was also an influx of species, many of them rare and endangered into the Arb. Increasing numbers of Wood turtles, Blanding's turtle, Henslow's sparrow, Kittentails, Ovate leaved skullcap and jointed sedge, among others, were observed. The Arb was able to keep track of this influx with more consistent data collection and more refined data collection techniques. 1. management of existing forest to improve its ecological integrity. 2. planting forest or prairie into former agricultural land. These efforts are distinct and should probably be distinguished from one another. Though successful at points successful, this move to expand restoration efforts was not without its challenges. The Arb's managers had to make decisions to keep or remove plant species that were non-native. This includes the pine plantation in the northern part of the Arb. Though frequented by students and other Arb patrons, the tree stand of white, red and jack pine had to be thinned because it proved a fire hazard during the occasional prescribed burns and harbors invasive species such as buckthorn (Arboretum 2008-2015). Nevertheless, the Arb saw considerable growth since the beginning of restoration efforts. Approximately 140 acres of prairie has been restored and tens of thousands of trees and wildflowers planted. Each year students, faculty and the Arboretum staff complete thousands of hours of work all to ensure that the ecological restoration initiative continues.

Figure 5 Unidentified male doing prescribed burning of prairie in the arboretum (Archives 2009).

Starting 2010, the Arb committee began to position itself to write a long term-comprehensive plan for Arboretum management as well as clarify and reiterate the values, mission and goals of the Arb. Such a document had not been written for fifteen years (in 1995) and they felt that another, more comprehensive plan was long overdue. They used a number of documents to guide their planning efforts. These include the final report from the 1988 planning seminar led by Mark McKone, the 1993 Arb use survey, the 1995 draft plan, the 2004 evaluation report written by the external review committee and the 2009 alumni survey. The use of these documents demonstrates the first explicit use of institutional history to determine next steps for the arboretum. It provided a sense of continuity and sustained growth that had not been evident in planning during the decades before.

The committee completed the plan and submitted it for review to the college's administrators in 2011. After articulating what they want the Arb to be in future decades, they explain strategies to achieve this vision. They detailed what the arboretum their plans regarding the expansion of Arb's institutional support and funding, next steps in the ecological restoration project, future programs to improve the Arb's education and outreach efforts as well as plan to improve the Arb's research capabilities.

The committee aimed to increase contact with other institutions and other organizations that manage arboretums, as they would be able to provide valuable expertise. Sometimes that meant simply connecting with personnel at other arboreta and other conservation sites and reading new and relevant research materials from scholars from diverse intellectual backgrounds. At other times, it meant collaborating on or adapting programs from other organizations. The Arb been a site for the National Aubodon Society's annual Christmas Bird Count, has hosted master classes to train naturalist volunteers with curriculum from the University of Minnesota's Extension Service. The institution also participated in the Driven to Discover (D2D) Citizen Science Monarch Butterfly project which was also developed by the University of Minnesota Extension Service. Both are funded by the Minnesota Department of Natural Resources and the National

Science Foundation. Thus, the tradition of seeking external help and expertise for arboretum development continues.

The staff also wanted to expand their volunteer program by training more persons to serve and creating more college-specific events for incoming students to Carleton. Plans to build a new arboretum center for academic use and outreach program as well as Work with municipalities and organizations to preserve neighboring agricultural communities and the conservation areas along the Cannon River. Additionally, the Arb's managers wanted to continue to develop the sites' GIS system and database. The committee aimed to increase funding through support private individuals, foundation as well as grants from philanthropic organizations and the government. This goal was achieved as when compared to the nineties the funding base of the program had broadened. Minnesota Department of Natural Resources Assistance Program, the Dakota County Farmland and Natural Areas Program, and the Natural Resource Conservation Service of the U.S. Department of Agriculture. Conservation easements through the U.S. government was also considered an option. The Arb's managers hoped to cement their status as an institution by joining organizations such as the Natural Areas Association, The Society for Conservation Biology, The Society for Ecological Restoration and other Arboreta and Botanic Gardens. When questions about the future of the Arb are asked, many different values. Some of our interviewees and documents expressed that since leaving the Carleton community they had not thought much about the arboretum or what it had become. They simply wanted it to remain a space that students and members of the Carleton community could continue to enjoy. Mark McKone envisioned a shift in focus to include animal species restoration in the arboretum. Fred Rogers and Nancy Braker, on the other hand, envisioned that the arboretum would become more naturally integrated into the daily life of the Carleton student.
In the words of Braker:

"When a faculty member is thinking of course assignments or class, I want them to think of the arb and figure out how do I integrate that with what I' m doing with my students. I want it to be a natural thing for them to think about just as now like we think of the CMC or library as a space for learning. I want it to become a part of the fabric of our lives and absorbed into the daily life of Carleton."

The last few years of the Arb's history demonstrate that it became a part of Carleton's institutional fabric and heritage. While the Arb and its programs became better served the academic mission of the college, the Carleton community has also embraced the eco-centric principles that first undergirded this move towards ecological restoration. This was very evident when college President Steven Poskanzer in his inauguration speech used the metaphor of prairie restoration to speak of how a Carleton education can transform the lives of each student. The appointment of a full-time Arb director and manager as well as the increase in financial support for the Arb despite financial difficulties of the college during the early 2000's and during the 2008 financial crisis further illustrate this point (see Appendix B and C). The number of patrons visiting the Arb and using its facilities has increased due to the introduction of new educational and community outreach programs. The research capabilities of the Arb, though not yet at an optimal level have also been significantly improved, transforming the Arb into a reputable scientific research site.

Conclusion

Main Findings

The age of ecological restoration in the Cowling arboretum coincided with global rise in modern environmentalism and in some ways paralleled the development of ecology as a field. As such, eco-centrism and moral responsibility were initially used as the main arguments to support desire for arboretum development. As with the managers of the earliest arboreta in Europe and at the University of Wisconsin Madison, Ed Buchwald and Gary Wagenbach were motivated by the desire to restore lands that had been lost to human degradation. In their reasoning, they emphasized cultural and social values of the land and humans' obligations to protect it. However, overtime under the direction of Mark McKone, Myles Bakke and Nancy Braker, the focus shifted towards attempting to understand the science behind landscapes and ecosystems to improve these restoration practices. Even though the Cowling Arb's earliest managers wanted it to be a site of conservation and preservation, it eventually became an outdoor laboratory that advanced the study of ecological restoration at the college. That is not to say, this shift signifies a loss of eco-centric values; the focus has evolved beyond moral impetus. For instance, in the 2011 planning report, the Arb committee considered enrolling sections of the Lower in conservation easements where the rights of the college to change the landscape in anyway would be forfeited. Another example, is that when the college administration wanted to construct the recreation center, the Arb staff fought this decision. One of their main reasons was their desire to preserve a 150-year old tree despite the difficulties that this might have posed for the center's construction.

Furthermore, the Arb was developed through the sharing of expertise, tools and resources between external organizations and Carleton. This exchange of information not only aided the day to day activities and operations of the Arb, but it also helped to legitimize the Arb. This broad network of support helped to make Arb development consistent and stabilized as an institution.

This process was not without its own set of challenges. In the seventies and eighties, support from the Carleton administration was minimal and inconsistent. This was primarily fueled by financial woes of the college and its need to develop other infrastructure and academic programs that were considered more directly linked to the college's educational mission. At first, the college had a limited understanding of how conservation and restoration programs would benefit its students, mainly due the few experienced faculty and staff on campus. After years of neglect and poor management, progress on ecological restoration projects were slow because ecologists needed to take the time to better understand the unique characteristics of the Arb and account for them in their planning. The presence of invasive species and limited availability of tools, data and technology to speed up succession further hindered this work.

After resolving these issues and clarifying the goals and visions of the Arb, it became clear that the arboretum is a great resource and with proper planning its use would enhance and perfectly align with the college's educational agenda. This is evident in the college's hiring of a full-time director of the Arb, creation of a Arb committee that meets consistently to discuss and resolve issues pertaining to the site's management, and increased funding for the arboretum. Also, now more than ever, a large number of patrons visit the Arb for recreational and educational purposes. According to a study by Vought, Ross and Hatch in 2017, 53% of students utilize the

Arb at least once a month. The majority uses it for personal recreation (87.69%), followed by socializing (33.85%), classes or classes or labs (26.15%) job related activities (13.85%), CCCE or CANOE programming (9.23%), and Arboretum Programming (9.23%). Only 3.08% of student participants had not utilized the Arboretum (Vrought, Ross and Hatch 2017).

Challenges

Despite our best efforts to remain organized it was still difficult to keep track of the hundreds of documents that we reviewed and analyzed for this project. The volume of materials also made it difficult to pick and choose what details we would include in our narrative and what we would exclude. Initially, our project included a repeat photography and GIS component. However, because constraints we had to change our approach and prioritize telling the story through textual and oral data. This alone gave us rich and complex information. We were fortunate to discover repeat photography collections done by former and current student naturalists. These photos had never been used in a research project and we believe they complement our narrative well.

Additionally, we faced many challenges with accessing data that was created less than thirty years ago. We requested special access to this information from the Dean of the College Office and the President's Office. While they gave us some documents, we were not allowed to see most of them. This additional information would have no doubt added to our story.

Future Work

We propose that future work should extend to using repeat photography and GIS to go one step further and assess whether the proposed changes for the landscape were indeed actualized. Furthermore, actor-network theory may be applicable here as another theoretical approach for understanding the creation and emergence of the ecological restoration initiative. Previously, this theory has been used in other research studying environmental phenomena and issues by debunking the barrier between society and nature. However, this would be by no means an easy feat, as it would require the researcher to go about and observe miniscule details of each potential actor in an identified network. In addition, we believe that a book should be written about the Arb similar to the one written by F.E. Court for the University of Wisconsin Madison arboretum. Unfortunately, given the time that we had, we could only choose to focus on a certain period without delving deep into the comprehensive history of the Arb. The Carleton Archives has wealth information for this task. There are also individuals such Professors Buchwald and Wagenbach who would be able to provide valuable first-hand accounts of development in the Arb. Our project did not focus enough on the contributions that students made to the Arb and the projects that they did there. Future historians should consider speaking to these former student naturalists and alumni. Lastly, we encourage future researchers to generate a list of student and faculty research projects that have been completed in or about the Arb, as this would future researchers to much more easily identify gaps and carry out projects that builds upon this earlier work.

Today, the Cowling Arboretum remains a prime locale for education, conservation and recreation. Students, faculty, staff of the College as well as members of the Northfield community enjoy this space and participate in the many education, conservation and recreational activities that take place there. Most of the seedlings that were initially planted in the Earth Day field on April 22, 1970 died. Should you visit that same plot of land today one would be

pleasantly surprised. After these initial failed attempts seeds from the surrounding forest, mostly from cottonwood and silver maples filled in the former field and forms a closed canopy.

WORKS CITED

Arb Planning Seminar. 1976. "Arb Planning Seminar Final Report ." Carleton College.

Arboretum, The Donald J. Cowling. 2008-2015. *The Arb Report.* The Cowling Arboretum, Carleton College, Cowling Archives.

Archives, Carleton College. 2009. *Photo of prescibed burning being done in the Arb.* Carleton College.

Braker, Nancy, interview by Carly Yu and Sacha Phillips. 2017. *Interview with Nancy Braker on the Cowling Arboretum* (February 20).

Bratton, S.P., and Peter White. 1980. "After Preservation: Philosophical and Practical Problems of Change." *Biological Conservation* 241-255.

Buchwald, Carly Edward. 1980. "Memo on the ESC." Carleton Archives, April 22.

—. 1962-1970. "Report on Arb Usage." Unpublished material from the Carleton College Cowling Arboretum archives.

Buchwald, Caryl Ed, interview by Claire Kelloway. 2016. *Ed Buchwald Sound Bytes*

Buchwald, Caryl Edward. 1971. "A Proposal for a Permanent Committee on College Lands." Proposal, Carleton College.

Buchwald, Caryl Edward, interview by Carly Yu and Sacha-Rose Phillips. 2017. *Interview with Caryl Edward Buchwald* (March 8).

Buchwald, Caryl Edward. 1980. *Report on the Arboretum* . Carleton College, Northfield: Carleton College.

Buchwald, Caryl Edward. 1980. *Report on the Arboretum 1980.* Geology Department, Carleton College, Carleton Archives.

Buxton, Nick. 2011. "The Law of Mother Earth: Behind Bolivia's Historic Bill." *Yes! Powerful Ideas, Practical Actions.* April 21.

Callicott, Baird. 1984. "Non-anthropocentric Value Theory and Environmental Ethics." *American Philosophical Quarterly* 4: 299-309.

Carleton College . 1997. *Master Plan.* Carleton College.

Carleton College Registrar's Office. 1982. "Carleton College Course Catalog." *Carleton College.* Northfield, Minnesota. 112-113.

Council for Independent Colleges. 2016. *Cowling Arboretum.* Accessed 2016.

Court, F.E. 2012. *Pioneers of Ecological Restoration.* Madison, Wisconsin: The University of Wisconsin Press.

Day, B.A. 2016. *Arboretums.* Accessed November 7, 2016. http://philadelphiaencyclopedia.org/archive/arboretum/.

DeCoux, Beverlee, interview by Carly Yu & Sacha-Rose Phillips. 2017. *Interview with Beverlee DeCoux on the Cowling Arboretum* Northfield, Minnesota, (Janaury 28).

—. 1982. "Letter regarding funding for the Environmental Studies Committee." June 2.

Delvan, Leonard. 1904. *The History of Carleton College, Its History, Its Growth, Environment and Builders.* Chicago, Illinois: F.H. Revell Company.

Edwards, Robert H, and Chuck Carlin. 1979. "Notes between the President's Office and the Dean of the College Office." December 30.

Edwards, Robert H. 1981. "Letter to Henry L. Woodard." *Carleton Archives.* Northfield, Minnesota, February 11.

Elliot, P., C. Watkins, and S. Daniels. 2007. "Combining Science with Recreation and Pleasure: Cultural Geographies of Nineteenth Century Arboretums." *Garden History* 35: 6-27.

Elliott, P.E., Charles Watkins, and S. Daniels. 2016. *The British Arboretum: Trees Science and Culture in the Nineteenth Century.* New York, New York: Routledge.

Environmental Studies Committee. 1982. "Meeting Minutes." Northfield, Minnesota: Carleton Archives, October 20.

Evans, Alice. 1994. "Leading Into the Light: An Interview with Barry Lopez." *Poets & Writers.* March/April.

Government, United States. 2017. *U.S. National Arboretum History and Mission.* March 8. www.usna.usda.gov.

Haag, Becky. 1981. "The Arb: New Intruders Confront Themselves." *The Carletonian*, May 15.

Hartley, B. 2007. "Site of Knowledge and Instruction: Arboretums and the Arboretum et Futicetum Britannicum." *Garden History* 35: 28-52.

Harvey Stork Photo Collection. 1909-1945. "Harvey Stork Photo Collection." Northfield, Minnesota: Unpublished material from the Carleton Archives.

Hay, Ida. 1995. *Science in the Pleasure Ground: A History of the Arnold Arboretum.* Boston, Massechusetts: Northeastern University Press.

Hazelhurst, John. 2014. "Goodbye, Ann Zwinger." *Colorado Springs Independent.* Colorado Springs, September 10.

Hazlett-Norman, Clara. 2015. *Repeat Photography Project in the Cowling Arboretum.* Carleton College, Northfield.

Jarchow, Merrill E. 1992. *Carleton Moves Confidently Into Its Second Century.* Northfield, Minnesota: Carleton College.

Jordan, W.R. 2011. "Some reflections on Curtis Prairie and the Genesis of Ecological Restoration." *Ecological Management and Restoration* (Wiley Online Library).

Jordan, William R., and George M. Lubick. 2011. *Making Nature Whole.* District of Columbia, Washington: Island Press.

Land Use Planning Seminar. 1973. "Land Use Planning Seminar Final Report ." Biology, Carleton College.

Leigel, Konrad, Jancie Thompson, and Katy Hagenbuch. 1977. "Prairie and Woods Natural History Club." June.

Leopold, Aldo. 1970. *A Sand County Almanac: With Other Essays on Conservation from Round River.* Random House Digital Inc,.

—. 1930-1939. "Reports on the University of Wisconsin Madison Arboretum." *Aldo Leopold Archives.* Madison: University of Wisconsin Madison Libraries.

Luterra, Mark. 2007. *Interpretive Guide to the Cowling Arboretum.* Online PDF. Northfield, Minnesota: The Donald J. Cowling Arboretum.

McBride, L.M. 1977. "Correspondence between L.M. McBride and President Robert Edwards." Northfield, Minnesota, September 27.

McBride, L.M. 1972. *Speech on the Arboretum.* Carleton College, Carleton Archives.

McCurtney, Owen. 2012. "Repeat Photography Project in the Cowling Arboretum." Carleton College. *Unpublished material from the Carleton aRCHIVES.* Northfield, Minnesota.

McKone, Mark, interview by Caryl Yu and Sacha-Rose Phillips. 2017. *Interview with Mark McKone* (February).

McKone, Mark, and Myles Bakke. 1995. *Draft Plan for the Cowling Arboretum.* The Donald J. Cowling Arboretum, Carleton College, Northfield: Carleton College.

Minnesota Department of Natural Resources. 1985. "Private Forest Management Plan." Carleton College.

Muir, William. 1962. *A Brief in Support of Continuance of the Carleton Arboretum as a State Game Refuge.* Carleton College, Carleton College Archives.

North Central Association. 2016. *Purpose of the North Central Association.* www.northcentralassociation.org.

Prest, J.M. 1981. *The Garden of Eden: The Botanic Garden and the Recreation of Paradise.* New Haven, Connecticut: Yale University Press.

Reynolds, Maddie. 2014. *McKnight Prairie Conservation History.* Northfield, Minnesota: The Donald J. Cowling Arboretum, June 1.

Rockefeller Brothers Fund. 2016. *Culpeper Arts & Culture Grants.* rbf.org.

Rogers, Fred, interview by Carly Yu and Sacha-Rose Phillips. 2017. *Interview with Fred Rogers about the Cowling Arboretum* Northfield, Minnesota, (January 25).

Rolston, Holmes. 1988. *Environmental Ethics: Duties to and Values in the Natural World.* Temple University Press.

Rome, Adam. 2013. *The Genius of Earth Day: How a 1970 Teach-In Unexpectedly Made the First Green Generation.* New York, New York: Straus and Giroux.

Routley, Richard, and Val Routley. 1979. "Against the Inevitability of Human Chauvinism." *Ethics and Problems of the 21st Century* 59.

Schlereth, Thomas J. 2007. "Early North American Arboreta." (Garden History) 196-216.

Shearer, Clement. 1990. "Memo to TWM members." Northfield, Minnesota, January 26.

Singer, Peter. 1975. *Animal Liberation.* Random House .

Sipfle, David. 1997. "Letters between Erin L. George Stewardship Officer and Professor Sipfle." August 22.

Smith, Sidney. 1985. *A Brief Summary of the Arboretum Survey.* Carleton College, Carleton Archives.

Solson, Christine. 1989. "Memo on Stewardship Policies." November 28.

Stone, Christopher. 1972. "Should Trees Have Standing? Toward Legal Rights for Natural Objects." *S. CAI* (45): 450.

Stork, Harvey. 1939. *The Carleton Arboretum Progress Report.* Botany, Carleton College, Carleton College.

Sullivan, Dan. 1985. "Memo from Dan Sullivan to Ed Buchwald." Carleton Archives.

Taylor, Paul. 2011. *Respect for Nature: A Theory of Environmental Ethics.* Princeton University Press.

The Carletonian. 1933. "Stewart Says Carleton Arboretum Is Unrivalled In United States." *The Carletonian*, April 1st: 1.

The Environmental Studies Committee. 1990. "Proposal for Establishing Arb Planning Task Force." Carleton Archives, January 18.

The Global Local Commons. 2015. "Diagrams generated by students from Global Local Commons Course." Northfield, October.

—. 2015. "Transcript of Interview with Myles Bakke." October.

The Harvard Crimson. 1984. "Harvard Forestry Professor Dies of Cancer at Age 57." *The Harvard Crimson.* Cambridge, March 10.

The McKnight Foundation. 2016. *Mission Statement.* Accessed March 7, 2017. www.mcknight.org/about-us.

The Morton Arboretum. 2017. *Mission and History.* www.mortonarb.org.

University of Limerick. 2016. "Anthropcentrism and Ecocentrism: Finding Balance for Environmental Protection Purposes."

Vrought, Morgan, Molly Ross, and Gina Hatch. 2017. "Senior Integrative Exercise ." Environmental Studies, Carleton College, Northfield.

Wagenbach, Gary. 1984. "Letter from Wagenbach to Buchwald." *Letter.* Carleton Archives, October 19.

—. 1991. "Memo to Arb Task Force Members." April 19.

Wagenbach, Gary, and Martin Zimmerman. 1982. "Letters from Wagenbach Zimmerman." Northfield, Minnesota, May 13.

Walker, Alex. 2012. *Effects of a 1970 Restoration Planting on Soil in the Cowling Lower Arboretum.* Northfield, Minnesota, October 1.

Weiss, Valerie, interview by Carly Yu and Sacha-Rose Phillips. 2017. *Interview with Valerie Weiss*

Wyman, Donald. 1947. *Arboretums and Botanical Gardens of North America* . Waltham, Massechusetts: Chronica Botanica Company.

Young, T.P., D.A. Anderson, and J.J. Clary. 2005. "The Ecology of Restoration: Historical Links, Emerging Issues and Unexplored Realms." *Ecology Letters* (Blackwell Publishing) 662-673.

APPENDICES

APPENDIX A: TIMELINES

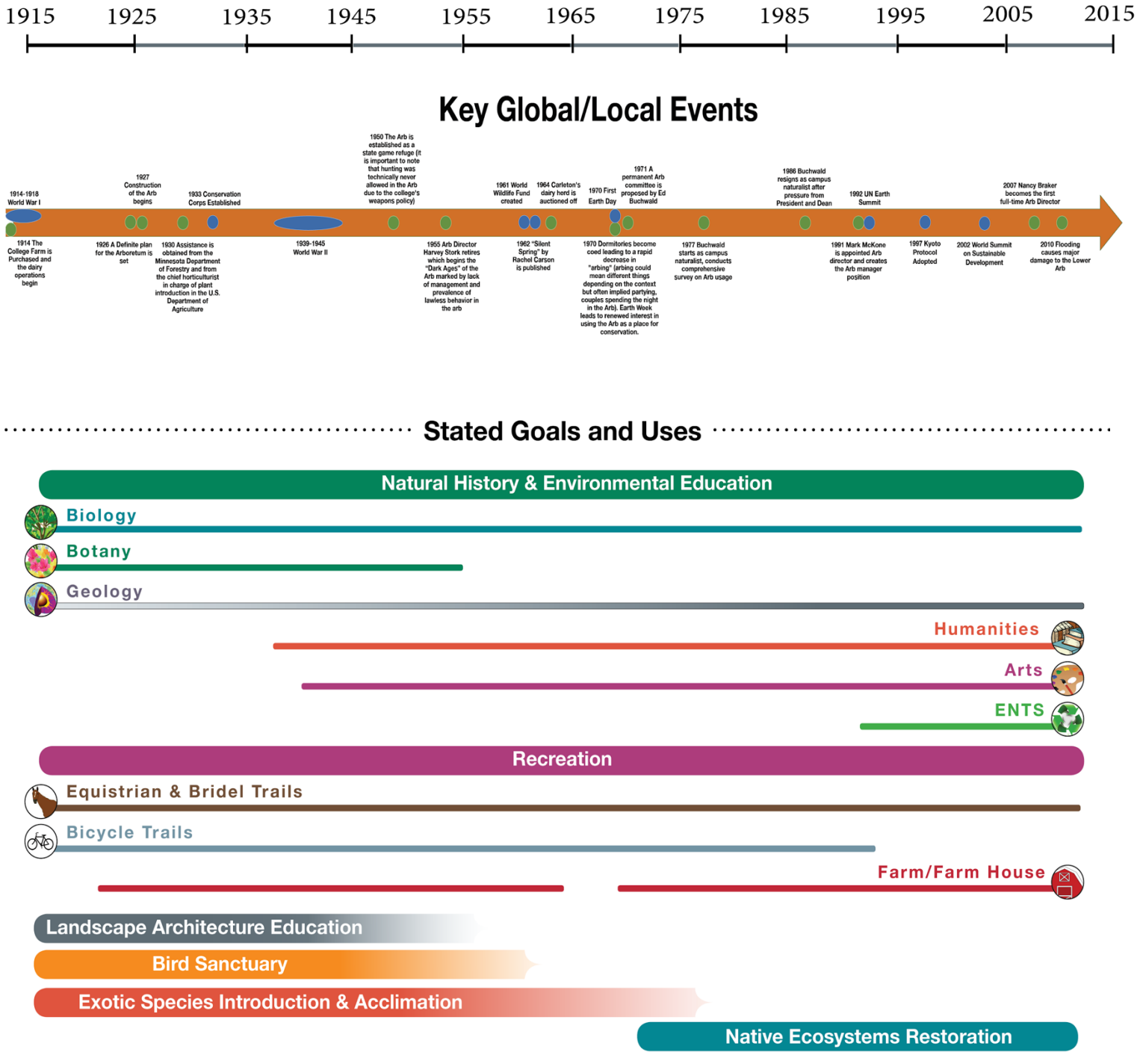


Figure 6 The timeline at the top of the figure shows events specific to the Arb and international events from the early 20th century to 2015. The lower figure shows the range of courses and educational programs and courses taught in the Arb over this same period (The Global Local Commons 2015)

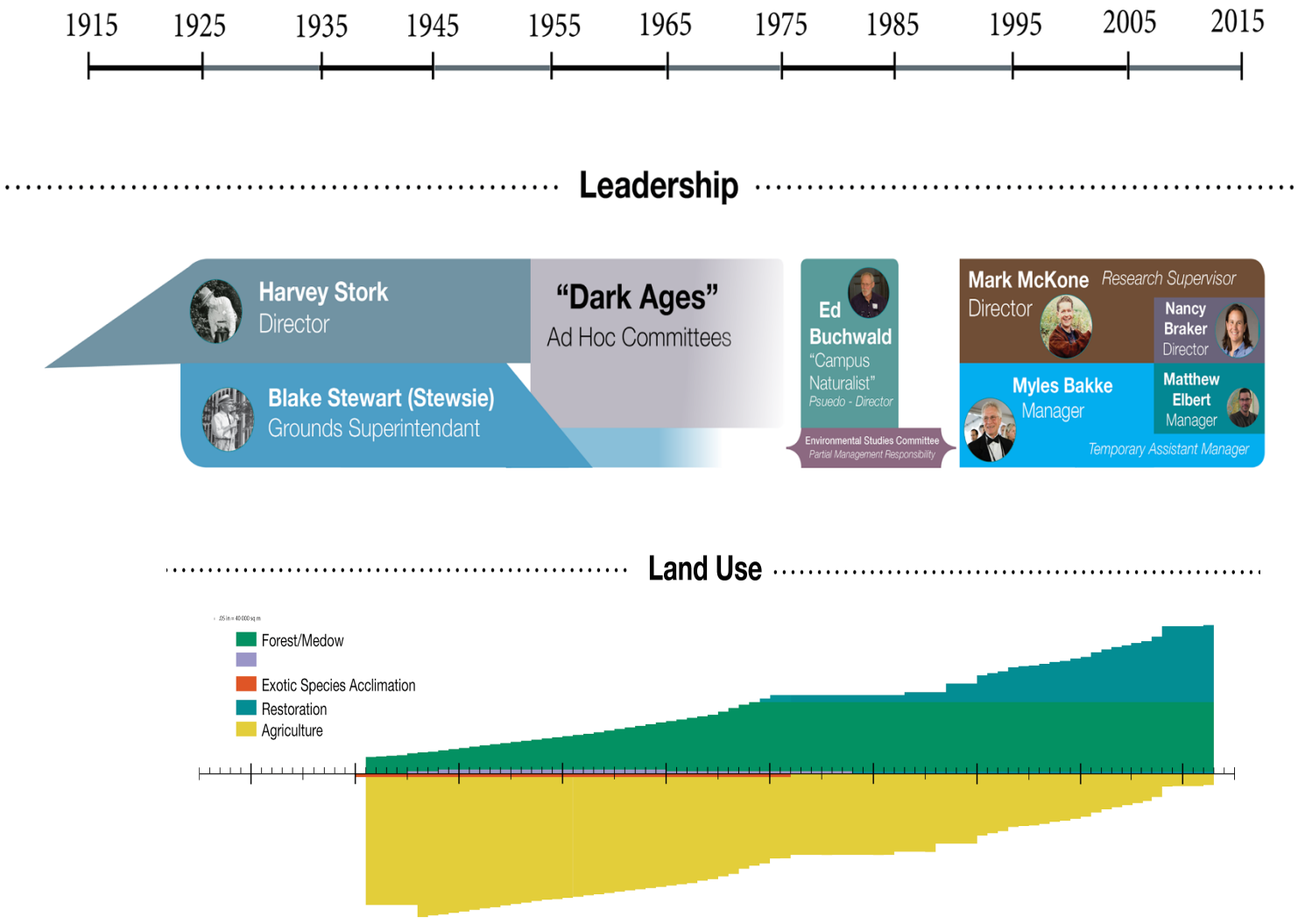


Figure 7 The top half of the figure shows the different directors and/or managers of the arboretum over the course of its history. The bottom half of the figure showing the progress with restoration, agricultural production and exotic species acclimation. The chart also shows the increase in forest and meadow land cover (The Global Local Commons 2015).

APPENDIX B: ORGANIZATIONAL CHARTS

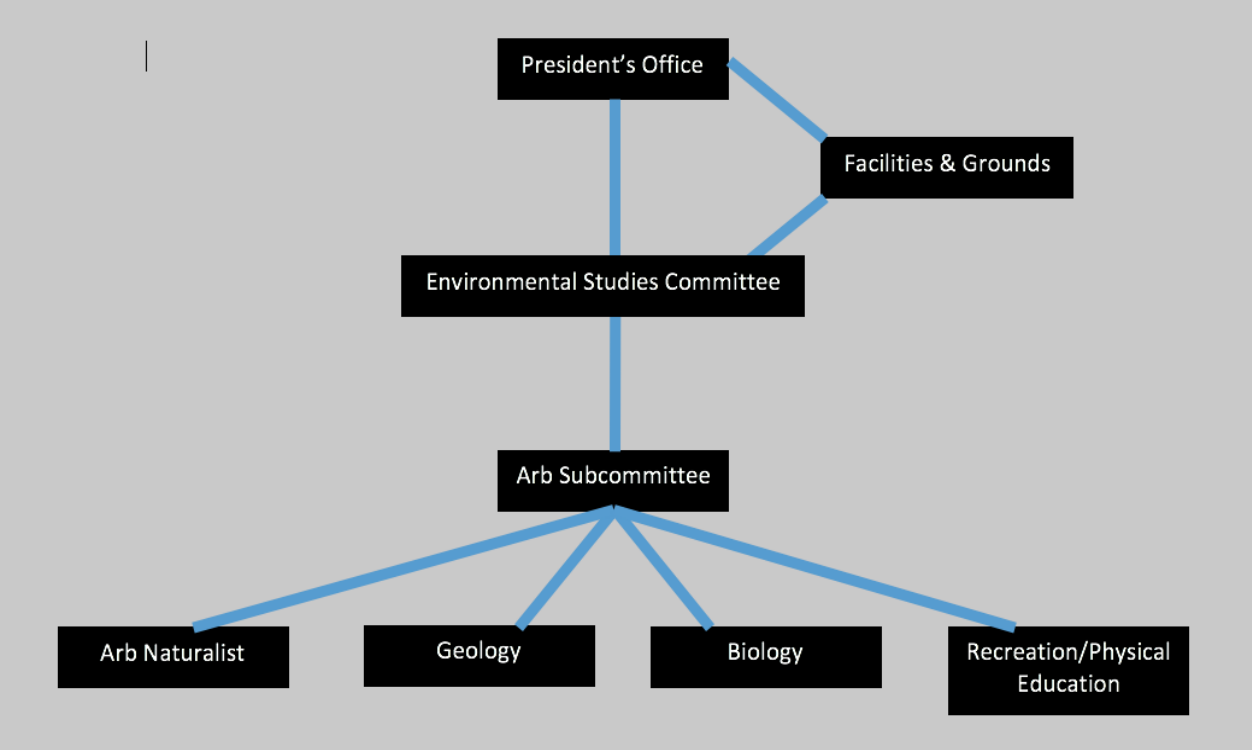


Figure 8 Chart showing organizational structure of the Arb in the 1970s.

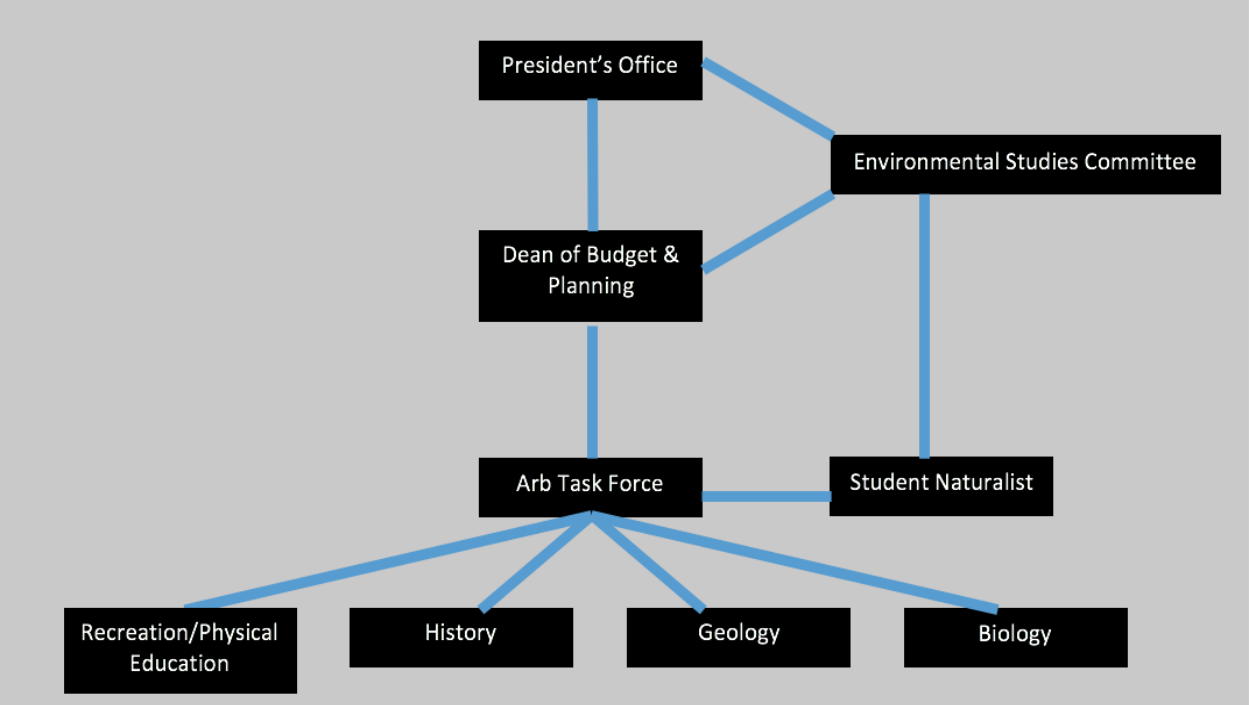


Figure 9 Chart showing organizational structure and network of influence for the Arb at Carleton in the 1980s.

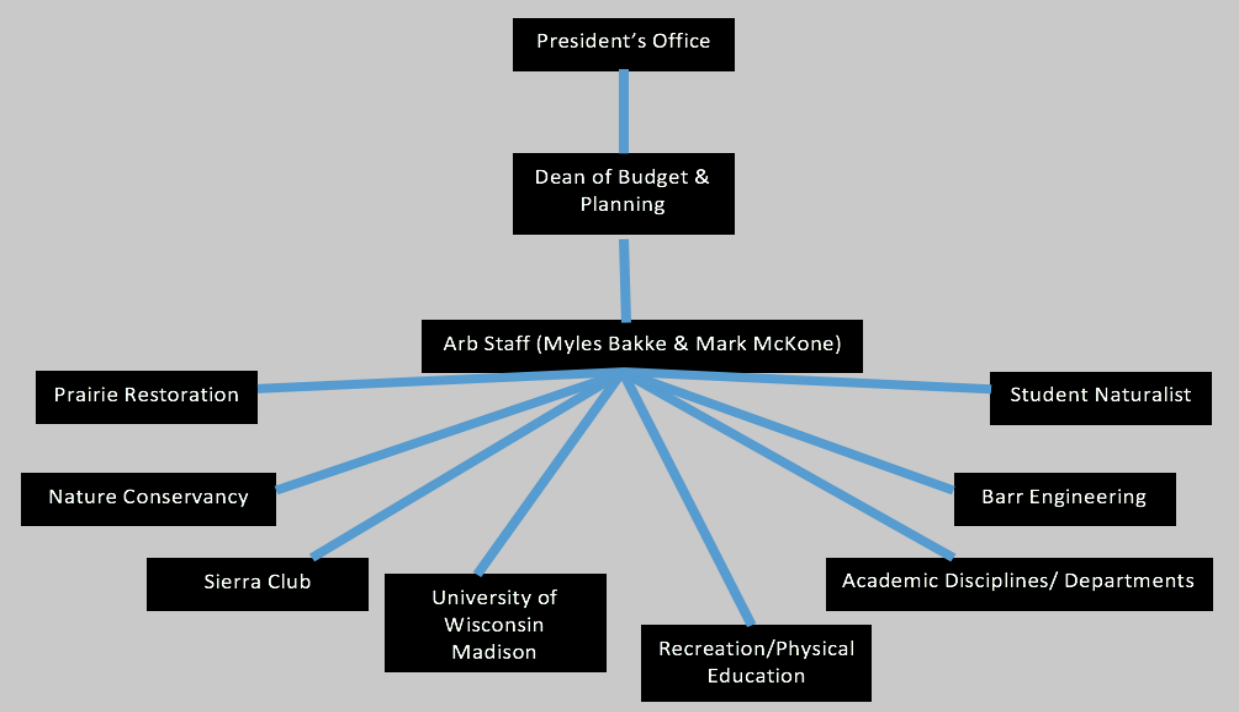


Figure 10 Chart showing organizational structure of the Arb in the 1990s.

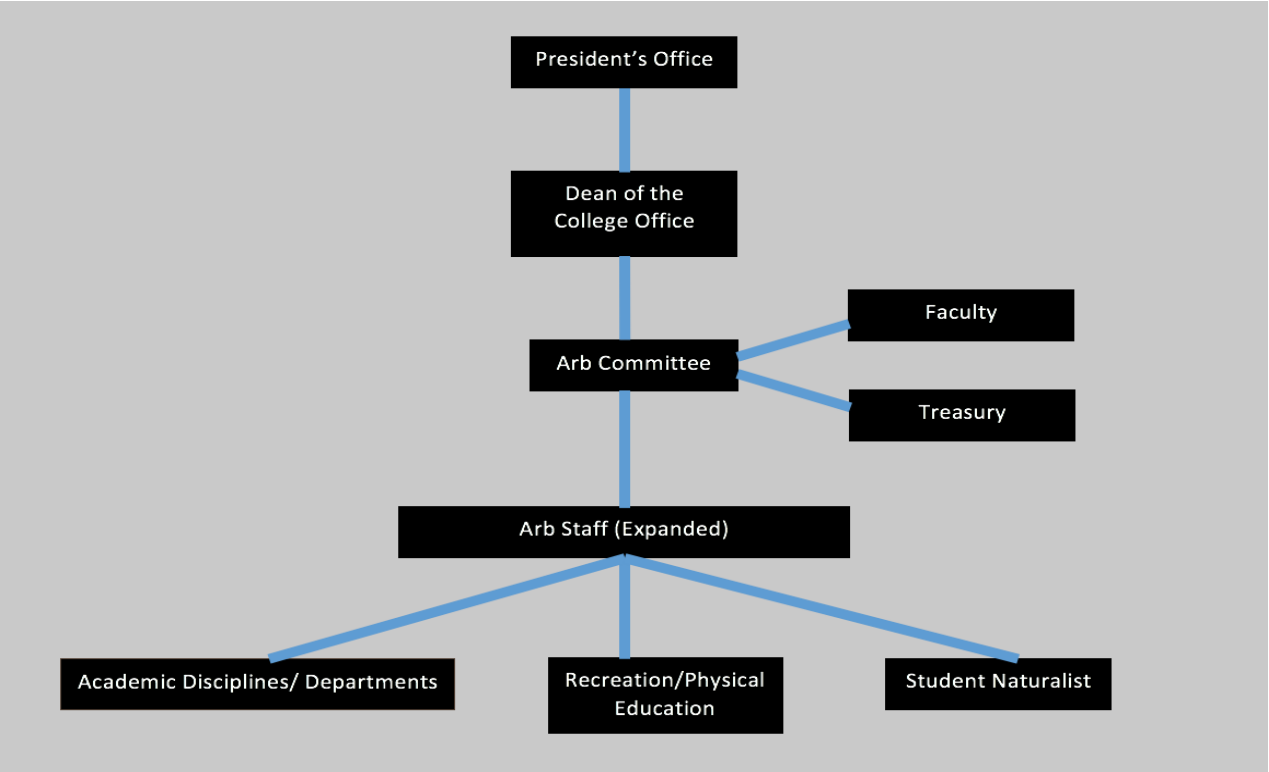
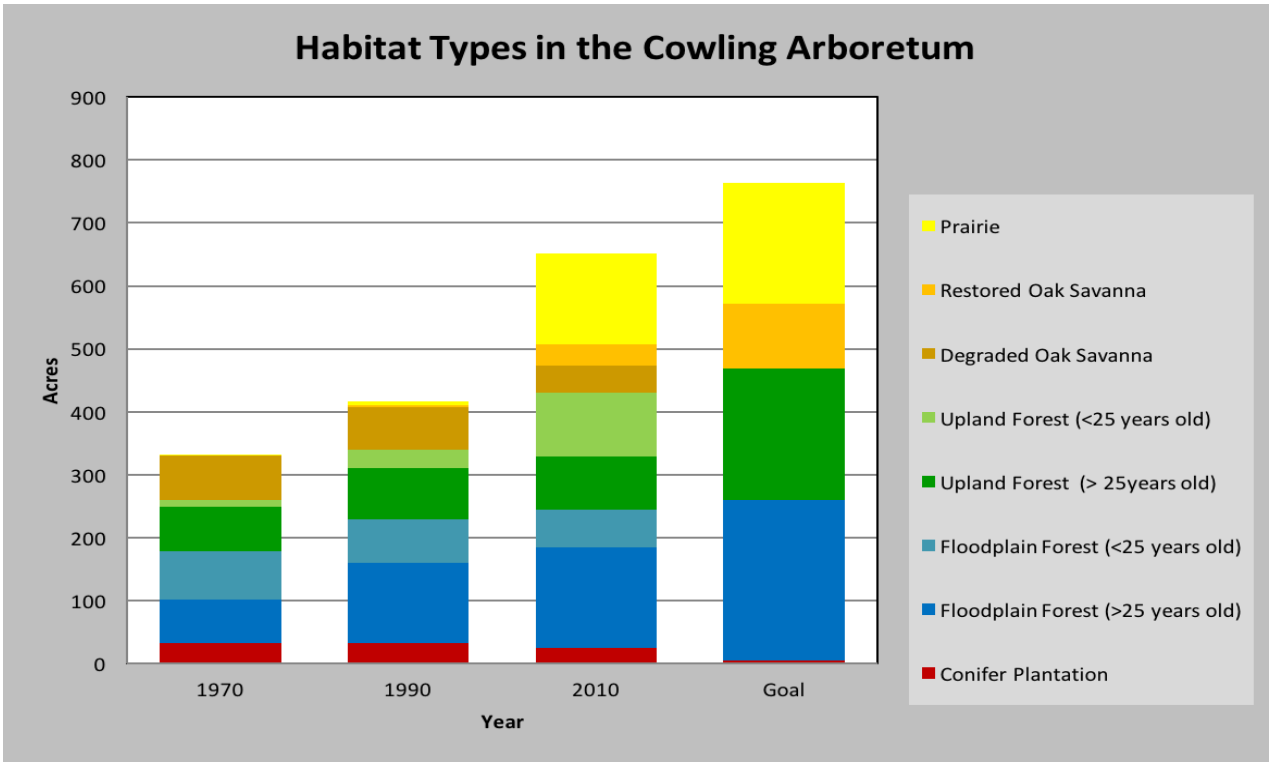
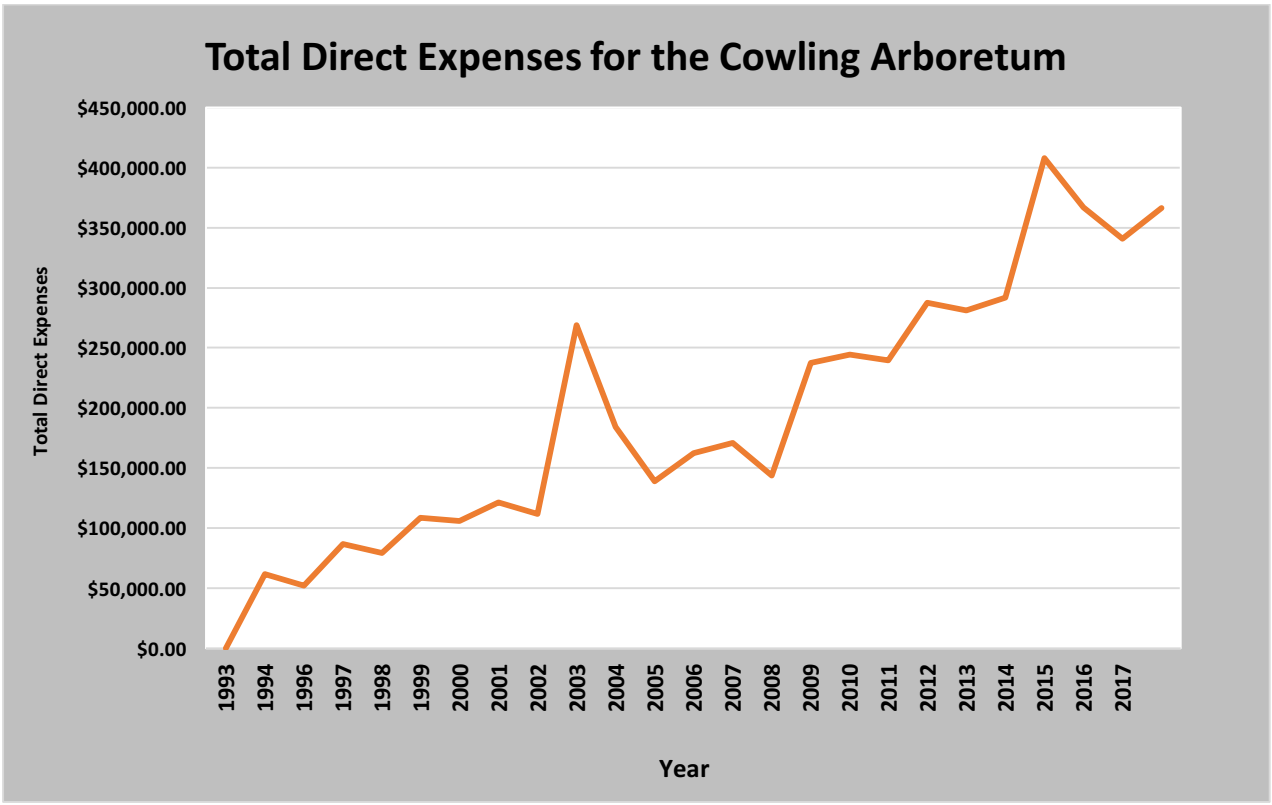


Figure 11 Chart showing organizational of the Arb post 2007. The Arb staff (expanded node) includes the full-time Arb director, Arb manager and research coordinator positions

APPENDIX C: GRAPHS

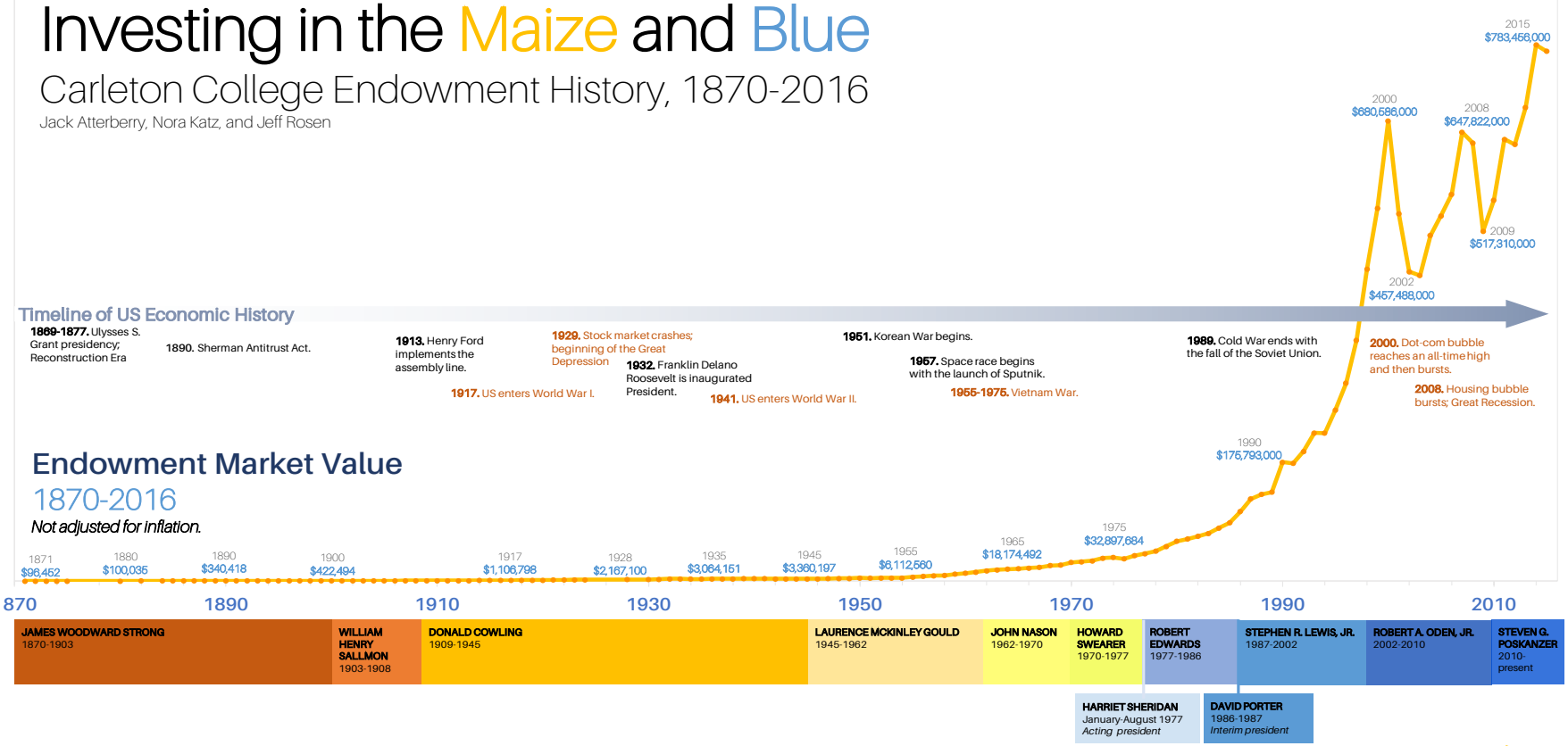




Investing in the Maize and Blue

Carleton College Endowment History, 1870-2016

Jack Atterberry, Nora Katz, and Jeff Rosen



Endowment Market Value
1870-2016

Not adjusted for inflation.

Timeline of US Economic History

1869-1877. Ulysses S. Grant presidency; Reconstruction Era

1890. Sherman Antitrust Act.

1913. Henry Ford implements the assembly line.

1917. US enters World War I.

1929. Stock market crashes; beginning of the Great Depression

1932. Franklin Delano Roosevelt is inaugurated President.

1941. US enters World War II.

1951. Korean War begins.

1957. Space race begins with the launch of Sputnik.

1955-1975. Vietnam War.

1989. Cold War ends with the fall of the Soviet Union.

2000. Dot-com bubble reaches an all-time high and then bursts.

2008. Housing bubble bursts; Great Recession.

JAMES WOODWARD STRONG 1870-1903	**WILLIAM HENRY SALLMON** 1903-1908	**DONALD COWLING** 1909-1945	**LAURENCE MCKINLEY GOULD** 1945-1962	**JOHN NASON** 1962-1970	**HOWARD SWEARER** 1970-1977	**ROBERT EDWARDS** 1977-1986	**STEPHEN R. LEWIS, JR.** 1987-2002	**ROBERT A. ODEN, JR.** 2002-2010	**STEVEN G. POSKANZER** 2010-present

HARRIET SHERIDAN January-August 1977 *Acting president*

DAVID PORTER 1986-1987 *Interim president*

Timeline of Carleton Economic History

1871. William Carleton's historic $50,000 gift.

1876. Joseph Lee Heywood, Carleton Treasurer, is fatally shot during the James-Younger Gang bank raid.

1880. Endowment exceeds $100,000.

1917. Endowment exceeds $1 million.

1919. Enrollment exceeds 500.

1925. Finance committee, led by President Cowling, votes unanimously to transfer endowment funds to Northwestern National Bank in Minneapolis; for the first time, the endowment is managed externally.

1958. Enrollment consistently exceeds 1,000.

1959. Endowment exceeds $10 million.

1971. Enrollment exceeds 1,500.

1986. Endowment exceeds $100 million.

Late 1960s. The Carleton Investment Committee hires the Endowment Management and Research Corporation to manage some of the College's investment portfolio.

1978. Establishment of the Carleton Committee on Investment Responsibility (now CRIC) as a response to student requests that the College withdraw investments from corporations involved in South Africa.

2004. Fred Rogers '72 becomes Vice President and Treasurer.

2016. Divestment efforts continue, with students, faculty, and alumni lobbying the Board of Trustees to divest from fossil fuel companies.

The 40-year period from 1950 to 1990 saw a $170 million-dollar increase in the Carleton endowment. With growing enrollment and an eye to peer institutions, the Carleton Investment Committee turned its attention to professional portfolio management and strived to develop a competitive and consistently profitable endowment.

APPENDIX E: TABLE OF ARB DEVELOPMENT

	Growing Pains & Attempts at Starting Ecological Restoration: Caryl Edward Buchwald & Gary Wagenbach	***Picking Up the Pace: The Environmental Studies Committee & Increased Arb Programing***	***Revival & Restoration: McKone-Bakke Years***	***Moving Ahead: Continuing Restoration & Expanding Progress with Nancy Braker***
Institutional/Administrative Support	Poor, disorganized committees, lack of specific and sustained funding. Support from the College in theory but no follow through. Arb is not a priority.	More spending for the Arb but this increase is marginal. Institution tries to set up a structured committee but focus on the Arb is still minimal.	Part-time director and managerial position created. Dean's Office designated to oversee Arb planning. Took time for the rest of the College to understand new structure. Arb development becomes a priority though not without contest.	Arb becomes a part of the institution's heritage and culture. Lines of communication and organization are much clearer. Full time Arb director and year-round managerial position instituted. Arb Committee meets regularly.
Faculty/Student Support	Only 2-3 faculty members and a small group of students were involved consistently in the Arb or were using the arb for academic purposes. Students help to create new vision for the Arb by participating in Arb-related seminars.	More student-centered activities in the Arb generated by the ESC. In addition, ENTS related concentrations are created. There is also an overall increase in the number of Arb volunteers as well as recreational use of the Arb.	More student activities in the Arb are added. Professors begin using the Arb more for their personal research projects.	A noticeable Increase in the number of student naturalists (from 1 or 2 to about 10). A even wider diversity of activities in the Arb.

	Growing Pains & Attempts at Starting Ecological Restoration: Caryl Edward Buchwald & Gary Wagenbach	***Picking Up the Pace: The Environmental Studies Committee & Increased Arb Programing***	***Revival & Restoration: McKone-Bakke Years***	***Moving Ahead: Continuing Restoration & Expanding Progress with Nancy Braker***
Education and Research Projects	Some small research projects were being done-usually having to do with the evaluation of the landscape. Minimal restoration work and little documentation about these works.	Extension of projects to the community, with an increase in student research in the Arb. Arb begins offering tours on species that are grown there.	The Arb becomes an outdoor laboratory. More consideration of research potential of the Arb. More experimentation. More robust and consistent documentation. More classes begin having a focus on projects in the Arb.	Published research and more long term studies in the Arb. More reach out to the community through workshops and classes.
External Groups	Provide inspiration but did not provide concrete support.	External groups are communicating more with the Arb staff by sharing their expertise and giving their advice on Arb management.	External groups come to campus to do projects in the Arb. They help with prairie restoration, conducting surveys and making recommendations for long term plans.	Significantly more data exchange between external groups and the College. Continues to collaborate on management and restoration initiatives.
Ecological Restoration/Eco-centric Principles	Evidence that there were ideas circulating regarding succession and recruitment limitation. Clear increase in the number of trees planted.	Begin using techniques to aid in succession (e.g. building fences around plants, removing invasive species) and management of existing forest. Minimal use of herbicides and intense irrigation. Begin experimenting with prescribed burnings.	Managers use prescribed burnings. More systematic plantings of prairie and forest to better understand effects of restoration techniques. Management of existing forest intensifies. Concern with animals, wider ecosystem-storm water retention and wetland project. Increasing prairie diversity.	Managers using prescribed burnings with refined technique; systematic plantings of prairie and forest continue. Built more habitat corridors, conducts frog toad survey and bird census. Prairie diversity continues to increase (over 100 species). Concerns regarding edge effects, habitat fragmentation and the introduction of prairie animals result in new approaches.

APPENDIX F: THE ARB THEN AND NOW IN PHOTOS

Figure 12 The road in the figure above is Highway 19 seen in the figure below. (Harvey Stork Photo Collection 1909-1945; Hazlett-Morgan 2015).

Figure 13 Bridge seen in the photo above is a bridge in the Upper Arb and is also in the photo below. (Harvey Stork Photo Collection 1940; Hazlett-Morgan 2015).

Figure 14 Lyman Lakes seen in the photo above and in the photo below
(Harvey Stork Collection 1909-1945; Hazlett-Norman 2015).

Figure 15 View of Lyman Lakes in both photos from hill on the east side of Boliou Hall. (Harvey Stork Photo Collection 1909-1945, Hazlett-Norman 2015)

Figure 16 Suspension bridge in lower Arb as seen above and its remnants in the photo below (Harvey Stork Collection circa 1980; Hazlett-Norman 2015).

Figure 17 Waterford Dam as seen in the photo above when it was still in use and its remnants in the photo below (Harvey Stork Collection 1909-1945; Hazlett-Norman 2015).

Figure 18 Bridge in Upper Arb in the photo above and in the photo below
(Harvey Stork Collection 1909-1945; Hazlett-Norman 2015).

Figure 19 Floodplains in the lower Arb as seen above and in the photo below
(Harvey Stork Photo Collection 1909-1945, McCurtney 2012)

Figure 20 The tree in the right of the photo above is the tree in the right of the photo below. In the photo significant growth of trees and shrubs can be seen (Harvey Stork Collection 1909-1945; Hazlett-Norman 2015).

Figure 21 Farm House in the mid to early twentieth century and a more recent photo of the same house (Harvey Stork Photo Collection 1909-1945; Hazlett-Norman 2015).