RUDERAL PICTURESQUE:

ENGAGING THE PROCESS OF PLANT SUCCESSION ON THE GEORGIA PIEDMONT

by

Kenneth Thomas Baker

(Under the Direction of Brian Cook)

ABSTRACT

This thesis explores the potential for "ruderal" vegetation to be used in a new approach to landscape design. The process of early-secondary plant succession is explored as an opportunity in the practice of naturalistic planting design within the context of Georgia Piedmont disturbed landscapes. A contemporary interpretation of picturesque aesthetic principles is synthesized to facilitate an argument for the representation and utilization of ruderal species. Ecological classifications of ruderal plant associations were established from an unpublished subset of the *Natureserve* (2015) database, and three corresponding landscape design typologies were developed: (1) meadow/grassland, (2) woodland, and (3) forest. Direct observation was used to identify typologies within the established aesthetic framework termed "contemporary picturesque" and photographs and drawings are presented to illustrate this empirical process. Projective design was used to test and conceptualize ruderal planting design – or successional planting. Implementation and management strategies are proposed for the broomsedge (*Andropogon virginicus*) ruderal grassland typology.

INDEX WORDS: spontaneous vegetation, plant ecology, ruderal, succession, landscape architecture, empirical research, Georgia Piedmont, picturesque, successional management

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BS Clemson University, 2010

A Thesis Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment

of the Requirements for the Degree

MASTER OF LANDSCAPE ARCHITECTURE

ATHENS, GEORGIA

2015

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DEDICATION

I dedicate this thesis to my parents, four sisters, and fourteen nieces and nephews. Thank you for all your love, support, and encouragement throughout the rigorous process of graduate school. You are my favorite people.

ACKNOWLEDGEMENTS

First, I would like to thank my committee members and the faculty of the College of Environment and Design who guided me through the research process. Special thanks to Brain Cook, for your patience in our many conversations and willingness to always talk-it-out over bagels and coffee, Marianne Cramer, for helping me condense my research question, and Brad Davis, for our many conversations about planting design and landscape painting. Elgene Box, thank you for your helping me better understand the plant biomes of the world. Patrick McMillan, thank you for answering my questions and for your teaching at Clemson University that instilled a life-long curiosity of the natural world. Michiel Schepers, thank you for teaching me how to see the landscape and discussing your philosophy of nature during many outdoor sketching sessions in the Netherlands.

Many people have helped shape and articulate the ideas presented in this thesis, too many to thank individually. I would like to acknowledge the friends I've made during my time at the University of Georgia. Thank you to the MLA class of 2015. Special thanks to the Dubose house guys: Sig Sandzen, Nate Metzger, and Kiley Aguar for encouraging many thesis diversions. Also special thanks to summer travel companions: Lucie Siggins, Nate Dittman, and Andrew Bailey for the many thought provoking conversations and sharing of ideas while on the road. Finally, I would like to acknowledge the Peachtree Garden Club of Atlanta for their faith in me as a student and support over two summers of research. Thank you for giving me the freedom to explore, travel, sketch, and observe, which was vital to the development of this thesis.

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EMBRACING RUDERAL

Introduction

Design research, being subjective in nature, depends heavily on the experiences and processes of the individual; thus I feel it necessary to introduce this thesis with anecdote, in order to help the reader understand how the subject emerged.

The idea of embracing ruderal plants in landscape design began to develop during the summer of 2013, when I traveled extensively through six European countries to study historic and contemporary works of landscape architecture. My findings were captured primarily in the form of sketches, field notes, and on-site watercolor paintings.

The genesis of my research question was the result of a passing stranger's comment. I was visiting the Thijsse's Hof[1] – a park dedicated to educating primary-school children about native plant communities – in Bloemendaal, Netherlands. While visiting the park I decided to sketch a view of the "pannenkoekenhuisje" – or pancake house – a farmhouse in the typical vernacular style of 19th century Holland. As I began to watercolor, a woman approached and asked if she could take a peek at my work. When she realized that the subject of my drawing was a building, she said, "*Ah, I thought perhaps you were drawing the nature*." The 'nature' she was speaking of was the section of garden in which we were standing, the "onkruid akker" which translates to "weed field". Upon reflection, I began to think about *how* the woman used the word

[1] The Thijsse's Hof garden is named for Jac P. Thijsee, a science teacher, botanist, and nationally renowned conservation leader in the Netherlands. Dutch landscape architects regard Thijsee's "heempark" design in Amstelveen, near Amsterdam, as the catalysis for the Dutch ecological landscape design movement of the early 20th century.

nature with regard to a field of weeds. From my perspective, it had not occurred to me that a weed field – mere ruderal plants – could in fact be 'nature'. My drawing was the naïve reflection of an American student; its composition was a reflection of my perspective of nature and personal notion of picturesque aesthetics at the time. I found beauty in the old-world architecture that is scarcely found in my home landscape. The Dutch farmhouse, with its typical terracotta tile roof, was more worthy of capturing than the very garden I was visiting. This strange encounter happened on the first day of a seven-week tour of gardens, and my subsequent drawings and observations would reflect the lesson I learned that day in the Thijsse's Hof. My perspective of nature, and idea of picturesque, was shifted by a chance comment of a passing stranger. The idea for this thesis – mainly the question of the designer's role in designing with *ruderal* plants – transpired during the rest of my trip.

Figure 1 "Pannenkoekenhuisje" – Thijsse's Hof onkruid akker - June 2013
(watercolor by the author)

Another experience influencing this thesis came during a ten-month work experience in the Netherlands in 2011. I studied drawing and painting in the studio of Michiel Schepers and

gained an empirical understanding of how the word landscape is derived from the Dutch, "landschap" - a term coined by early Dutch landscape painters. I learned the painterly ways of reading the landscape and, through my studies in landscape architecture became increasingly aware how landscape painting has influenced the picturesque aesthetics in landscape design. This experience in landscape painting was part of my discovery that painterly principles could be used as a way to represent 'ruderal' plants in design (see chapter 2).

In sum, the discovery for this thesis took place in the Netherlands. The Dutch perception of nature is unique in the sense that there is national pride in their progressive dike system and engineered conquest of the delta landscape, but on the other hand there is a romanticized view of wilderness lost to urbanization. It is certainly ironic that Holland – etymologically meaning wooded land – is now a land of gardens and artificial nature. The culmination of the country's high population density, liberal thinking and overall global worldview led me to experience a new way of thinking about the dichotomy of man and nature in designed landscapes.

Role of Ruderal

This thesis explores the potential for "ruderal" vegetation to be used in a new approach to planting design. These species are normally considered unintentional and are rarely considered in an approach to planting design. The use of spontaneous plants can be cost effective, low-maintenance, ecologically diverse, and can require less water than conventional ornamental plantings. Ruderal species have co-evolved with humans and thrive in disturbed landscapes. Ruderal plant species, and their associative classifications[2] in the landscape, offer a model for

[2] In this thesis, ruderal plants will be presented not in terms of plant communities but in terms of plant assemblages or ecological associations that fit into three landscape typologies, e.g., meadow, woodland, and forest (chapter 4).

engaging planting design as a process, and can be used to guide the landscape towards a habitat restoration using designed disturbance[3].

Problematic

'Naturalistic' has become a fashionable word in landscape architecture, but in practice 'natural' is often misconstrued through an aestheticized, pictorialized, and static stylization of designed nature. There is an inherent problem with the conventional approach to designed plantings because our profession views plants as 'materials', objects in space that merely have an aesthetic role (Byrd and Morrison 1999). Erasure is often the first step in a landscape design intervention. The ground plane is scraped clean and a new ecology of plants is 'designed' to replace the existing. This approach treats the site as if it were a blank canvas, or a gallery floor, giving the designer full license to decide what ought to be planted. There is an inadequacy in the professional approach to 'naturalistic' planting design and lack of engagement in the process of plant succession.

Figure 2 The thesis problematic as illustrated by the High Line in New York City, NY.

[3] Designed disturbance is a management tool by which the successional pathway of a plant community is interrupted in order to achieve a desired aesthetic or subclimax stage of succession (see chapter 5).

Research Question

How can landscape architects utilize plant succession as a design tool for three *ruderal* plant community typologies on the Georgia Piedmont?

Secondary Questions

The research question was broken down into a series of secondary questions. Each sub-question can be placed within three categories of research: 1) aesthetics, 2) ecology, and 3) design.

Aesthetics

- What do ruderal landscapes look like on the Georgia Piedmont?
- What is the designer's role in promoting ruderal species?
- What aesthetic principles are appropriate for utilizing ruderal species?

Ecology

- What is the successional pathway for the Georgia Piedmont?
- What are the vegetation classifications for ruderal plants?
- How can disturbance be used as a resource for diversity?

Design

- What is the designer's response to existing ruderal species?
- How can ruderal landscapes inform the design process?
- How can plant succession be used in a new approach to landscape design and management?

Argument

Almost every landscape design project begins with disturbance, starting a process of plant succession. Disturbance can be used as a design tool to foster more diverse plantings in

successional management strategies. Ruderal plant associations are the result of disturbance in the landscapes. These species form cooperative assemblages naturally, and should be considered an advantage in naturalistic planting design. If landscape architects design plant communities by accepting the early seral stages, habitat restoration will be much easier. Furthermore, it is the author's premise that this approach would promote a planting aesthetic of more localized expression with more diverse plant communities[4].

Context

The environmental context for this thesis is the eco-region of the Upper Piedmont of the Southeastern United States. The landscape architectural context for the application of successional ecologies will focus on utilizing ruderal plant vegetation in the successional development of three typologies (meadow/grassland, woodland, and forest) on upland soils of the Piedmont of Georgia. The study will focus primarily on establishment techniques for the ruderal grassland/meadow – the initial seral stage of succession – for landscape design on disturbed landscapes.

Significance

This research is significant because it offers a new perspective on the application of plant succession within the practice of landscape architecture planting design. The research is geographically significant as much of the contemporary literature focuses on applications in landscape architectural practice outside the Southeastern piedmont eco-region.

This research attempts to build the theory necessary to perpetuate the shifting aesthetic in contemporary ecological planting design within the context landscape architecture on the Georgia Piedmont. The proposed approach to designing with ruderal associations aims to foster

[4] Moderate amounts of disturbance are required to maintain plant community diversity. See chapter 4 for further explanation of plant strategy models such as Grime's (2001) CSR Triangle Theory.

a paradigm shift from horticulturally informed to ecologically informed. There is potential for the ruderal plant community to foster more diverse and resilient plantings, thus it is necessary for practitioners to understand pragmatic ways of implementing and managing the inaugural stages in plant succession. Furthermore, the successional planting concepts generated from this research may be applied in landscape design practice in other regions of Eastern North America.

Purpose

The purpose of this thesis is to conceptualize and represent the designer's role in guiding plant succession across three landscape typologies, utilizing ruderal species that are specific to the Georgia Piedmont. The research aims to introduce the diverse and dynamic nature of ruderal vegetation for the purpose of proposing a reinterpretation of the meaning of nature in landscape planting on the Georgia Piedmont. The main purpose of this thesis is to establish the palette and processes to appease a shifting aesthetic in landscape architectural planting design.

Research Methods

A series of methods described by Deming and Swaffield (2011) in *Landscape Architecture Research: Inquiry, Strategy, Design* were used. An argument for the use of 'contemporary' picturesque aesthetic principles was constructed through literature review of art criticism and discourse analysis in the field of environmental aesthetics. Precedents for naturalistic planting 'movements' in landscape design were also established through the review of secondary descriptive research. Descriptive research explored the ecological functions of ruderal plant communities in order to understand the underlying processes of plant community equilibrium and general concepts relating to plant life strategies and competition.

The author developed a taxonomy of three typologies: meadow/grassland, woodland, and forest from secondary descriptions of Piedmont-specific early-successional ecological studies

and descriptions of natural communities by Wharton (1978) and Schafale & Weakley (1990). The scientific classifications for ruderal plants used for this thesis were developed through analysis of data provided by *NatureServe* (2015). The author requested a custom report from the *NatureServe* central office in Arlington Virginia. On February 23 they provided a subset of the International Ecological Classification Standard, which covers ruderal associations and cultural vegetation types of the Piedmont (NatureServe 2015).

The author also used empirical knowledge from direct observation of the landscape. Observations were recorded in the form of photography, sketches, and graphic illustrations to show the author's process of phenological analysis and plant species identification. Direct observation took place during the summers of 2013 and 2014 when the author traveled and sketched landscapes in Europe and North America. Furthermore, during the spring of 2015, intensive observation took place on the Georgia Piedmont. The exercise of representing ruderal landscapes through photography and drawing/painting helped the author re-enforce the aesthetic notion of the 'contemporary picturesque'. See the Appendix for more representations from this portion of the research process.

Design is subjective in nature and thus requires the author to become integrated with the process (Deming and Swaffield 2011). Projective design is used to test the author's research within the context of design in the urban landscape. The design conceptualizes ruderal plants in the context of meadow/grassland typology established by the author. The intent of the design is to generate visualizations – plans, diagrams, and perspectives – that communicate the design process of utilizing early-secondary successional vegetation in a landscape architectural project. The final design conceptualizes three typological models in order to communicate how plant succession can be engaged in landscape design. Management and landscape restoration

techniques were established from Luken (1990) and Harker et al. (1999). The author conducted a landscape analysis of the site's historic land use and environmental context using secondary resources such as GIS mapping, aerial imagery, historic photos, and direct observation. The contemporary picturesque aesthetic principles established in Chapter 2 were used to generate perspective graphics that represent the conceptual implementation of ruderal species. The application of "ruderal picturesque" was tested in the design portion of the thesis (chapter 6).

Projected outcomes:

- An argument for the landscape designer's role in the utilization of the seral stages of ruderal plant community succession in landscape design on the Georgia Piedmont. This discussion is presented in two parts: (1) the rational or ecological response and (2) the emotional or aesthetic response.
- A classification of three typologies for ruderal plant 'associations' within the Georgia Piedmont landscape.
- A conceptual design and management plan for the landscape architectural application of successional planting for an urban Piedmont site.

Limitations and Delimitations

Multiple delimitations exist, primarily due to the predisposition of the author. In order to complete the design, the author must take a stance on the subject of nature itself and what constitutes the use of native, non-native, and/or naturalized species in the design. The author accepts that humans, and their landscape alterations made by activities of modern society, to be part of ecology and recognizes the consequences of human-assisted migration of plant species (Marris 2011). The conceptual design response will therefore utilize both native and non-native

species. This is a delimitating factor because the perspective is a product of the author's background experience in horticulture and interests in landscape architecture, art, and ecology.

Although this thesis uses the classification – 'biotope planting'– of naturalistic vegetation design provided by Kingsbury (2004), the author recognizes that this framework is merely one of many. The research did not take into consideration the aesthetics of cultures outside of Europe and North America. Although a survey of various types of naturalistic vegetation was conducted, the subject is too vast to completely consider and include in this discussion.

Furthermore, the author realizes that the theory of contemporary picturesque may be construed as a subjective way of seeing the landscape. While this concept draws upon the author's experience in travel sketching it was also the product of the author's literature review, which focused on the philosophy of nature, landscape aesthetics, and the principles of picturesque art.

This thesis research transpired during the spring of 2014 and presented several limitations. A vast amount of literature on the subject of ruderal spontaneous vegetation has been written in German, and due to that language barrier the author was limited to the availability of English translations. A further limitation was lack of resources, both in time and money, for the application of design experimentation. Due to the 3-5 year timeframe needed to properly study early- successional vegetation in a simulated design project, the projective design will be entirely conceptual and based on the author's empirical and descriptive study of ruderal plants.

Most descriptive research in the area of plant succession is limited to observation and description of a few types of communities – i.e. old fields, sand dunes, or glacial moraines. The literature review for this thesis will be limited to oldfield secondary succession studies of the Southern Piedmont region of the eastern United States.

The author acknowledges that the study of ruderal vegetation examines only a brief moment in the natural history of a site. The author used photography and drawings to analyze and experience ruderal vegetation in the landscape of the Georgia Piedmont. The static nature of measuring landscape with photographs will only offer a rhetorical and speculative image to provoke thought about making landscapes using successional vegetation (Corner and MacLean 1996). Photography of contemporary projects and ruderal landscapes visited during the thesis process will only represent the aesthetic and seasonality of the planting design at that moment, thus plant phenology cannot be accurately considered through direct observation methods. Furthermore the author may have formed a subjective bias based on external factors during the site visits such as experience, mood, weather, etc. The photography will provide only an image of the site-specific response of the successional vegetation at that moment. This proves limiting, but through examining secondary studies and analyzing a series of sites, the author aims to project a pattern of ruderal species within the Piedmont.

The urban site chosen for the projective design in Chapter 5 was selected for its proximity to the author's research, i.e. the University of Georgia and downtown Athens. The author realizes that Athens, by some definitions (Del Tredici 2010), is not technically considered urban in population density. An "urban area" must have 1,000 people per square mile, and the Athens 2010 census reports 850 people per square mile (U.S. Census Bureau 2010). Despite this limitation, the author chose the project site because for the convenient ability to observe ruderal vegetation over a one-year period. While the site is not technically urban, the author feels that the site's history of disturbance and the existing ruderal vegetation provided the best opportunity for projective design within the immediate geographic location of the research. The author was able to sketch and analyze the site in both ecological and cultural contexts.

Lastly, the author realizes that this approach to planting design currently has a limited place within the profession of landscape architecture and is not suggesting that it be adopted as an approach to all naturalistic planting design. The observations provided are strictly phenomenological interpretations of early-secondary succession, and due to time constraints, and the many stochastic factors (seed dispersal or random chance), full floristic descriptions cannot be accurately integrated into the typological designs. The author aims not to be the final authority on this subject but rather to introduce an idea about the approach to planting design within the region.

Key Terms

Ruderal **-** is the ecological term for a plant that occurs naturally during the early stages of succession. The word ruderal can be defined as a weedy or commonly introduced plant growing where vegetative cover has been interrupted. Etymologically, the word "ruderal" gives an indication of the types of disturbed environments that these plants colonize; it is derived from latin, *ruderalis,* which translates to rubble. Ruderal plants are pioneer species that thrive in response to extreme levels of disturbance (Grime 2001); they are opportunistic and have rapid growth and reproductive cycles (Kingsbury 2004). Ruderal species are typically high in seed production, which allows for quick colonization of bare soil (Odum 1971), and are a direct response to disturbance – both natural and unnatural – as they assemble in observable plant groupings, composed of both native and exotic species (Del Tredici 2010).

Succession – Ecological plant succession is one of the most fundamental principles of plant ecology and is a phenomenon that occurs in most of vegetation types throughout the world (Weaver and Clements 1929). Succession was first described by Frederick Clements (1916) as the developmental process by which a final stage, or climax community, is reached through a

progression of vegetative phases. Essentially the process of succession shows a predictable sequence and pattern by which species appear in an ecosystem and respond to competition and disturbance over time.

Seral – Seral communities are intermediate stages during an ecosystem's advancement towards the climax stage (Beck 2013). The seral-stage of *Andropogon virginicus* ruderal grassland is the focus of the author's projective design.

Nature – Nature is a human construct, an idea or label that describes the human perspective of living organisms, their processes, and the cosmos (Olin 1997). The etymology of the word suggests dynamic processes of time as it is derived from the Latin *natura*, which comes from *nascor,* a verb meaning to be born, to grow, to spring forth (Crandell 1993). For the purpose of this thesis the word nature equates to the allowance of time and process. A natural or naturalized system is a process of unification into associative state or community (Darke and Tallamy 2014).

Disturbance – as defined by Pickett et. al. (1987), disturbance is "*any relatively discrete event in time that disrupts ecosystem, community, or population structure*." Disturbance interrupts the pathway of ecological succession and 'resets' the trajectory for a given community.

Landscape – the word *landscape* is derived from the Dutch *landschap*, which was a term coined by early Dutch landscape painters. Early usage of landscape was always tied to painting, pictures, or a static representation of nature. Nash (2001:126) suggests that landscape is a by-product of humans creating the built environment; "*No group sets out to create a landscape, of course. What it sets out to do is to create a community, and the landscape as its visible manifestation is simply the by-product of people working and living, sometimes coming together, sometimes staying apart, but always recognizing their interdependence."* Cultural geographer J.

B. Jackson (1984:26), defined landscape as *"a space deliberately created to speed up or slow down the process of nature."* These two definitions will be used for this thesis as they acknowledge that landscapes are a human creation, and the visible by-product of man's control over nature.

Landscape architecture – The practice of landscape architecture is a comprehensive art form that involves the physical design of space – gardens, parks, and communities – using the primary mediums of earthwork (topography), vegetation, stone, and water (Olin 1997). Landscape architecture is concerned with connecting humans to the experience of nature by designing for the health, safety, and the well being of both humans and ecological processes.

Typologies – Typologies are abstractions that help articulate a pattern among certain phenomenon (Faludi 1973). The word "typology" is commonly used in architectural design to help classify spatial 'types' and understand the function or "symbolic dimensions" of practice in relation to society and the natural world (Crewe and Forsyth 2003). Condon (1994:80) classifies built landscapes into the following spatial types: clearing, allee, orchard, terrace, street, square, yard, and cloister. Jackson (1980) has categorized four landscape archetypes: garden, home (dwelling), road, and shrine.

Classification – is a subset of ecological vegetation types. This thesis uses the word classification to distinguish the scientific descriptions of ruderal plant associations from the design typologies abstracted by the author.

Sustainable – used here is the definition provided by Lester Brown (2003) in his book *Plan B.* A sustainable solution is one that provides for current demands of society without harming resources for future generations.

Spontaneous vegetation **–** is the unplanned vegetation that occurs naturally the environment. Spontaneous vegetation in the urban landscape is a cosmopolitan matrix of both native and non-native species (Del Tredici 2010, Robinson and Lundholm 2012).

Natural vegetation - vegetation formed by ecological processes and natural forms of disturbance (van der Maarel 2005).

Naturalized plants are non-native species that have become thoroughly established through introduction and are able to reproduce naturally in their new ecosystem (Porcher and Rayner 2001).

Urban Landscape **–** Del Tredici (2010) has categorized urban landscapes into three taxa: (1) remnant native landscapes, (2) managed horticultural landscapes, and (3) abandoned ruderal landscapes. The projective design portion of this thesis is concerned with design and management of the third taxon.

Southern Piedmont **–** The Southern piedmont is region of rolling hills primarily located in the South-Atlantic states of Virginia, North Carolina, South Carolina, and Georgia. It is a well-defined landscape bordered by the Appalachian Mountains and seaward by the Atlantic Coastal Plain.

Resiliency **–** Resiliency describes a natural system's ability to overcome disturbance, self-organize, and return to essentially the same structure and function as before the disturbance (Holling 1973). The term finds roots in Charles Darwin's idea of 'robustness' and was an important aspect of his theory of evolution presented in *The Origin of Species* (Levin 2014).

Habitat Restoration **–** "*Habitat restoration* – where the aim is to create something as close as possible to a 'wild' habitat, at either a climax or relatively stable sub-climax community. Maintenance is generally extensive" (Kingsbury 2004:60).

Planting Design can be described as the purposeful selection and combination of plant species in order to achieve unity and harmony in the designed landscape. Robinson (1940) gives five guiding principles for artful planting design: *Simplicity, Balance, Scale, Sequence, and Focalization or Climax.* These five principles are expressed through plants with careful consideration of aesthetic qualities such as *Mass, Form, Texture, Silhouette, and Color.* Robinson explains the landscape architect's role in planting design as one of art rather than craft. The main difference between art and craft in planting design is that art is the conception of the idea, whereas craft is the expression. Craft can be readily taught, but art is less easily taught and requires inherent intuition (Robinson 1940).

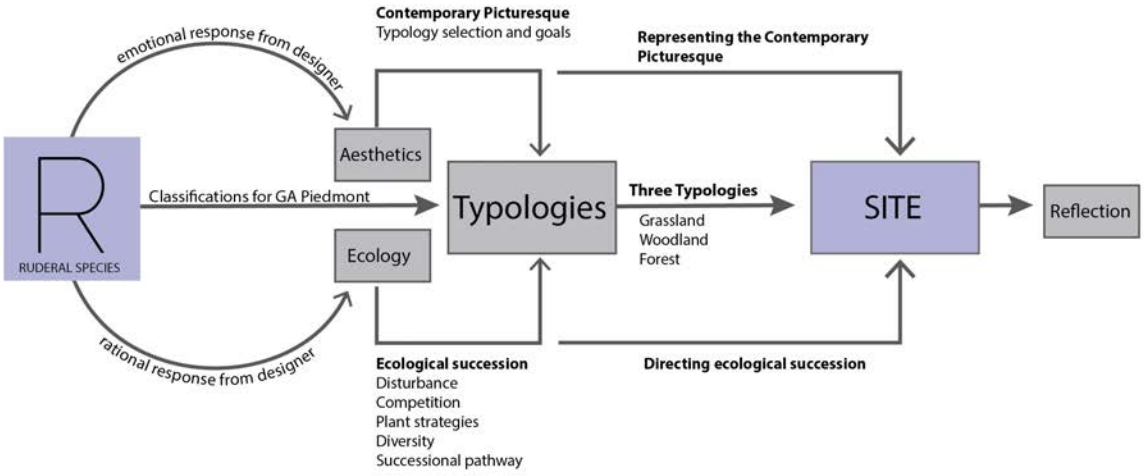


Figure 3 Thesis framework (diagram by the author)

Chapter Summaries

Chapter Two will present the symbolic and aesthetic rationale for utilizing ruderal plants in design. Three devices are presented: (1) concept, (2) philosophy, and (3) ruderal as a painterly way of reading the landscape. Because the concept of landscape finds its roots in imagery and artistic representation, it is necessary to give precedent for the role of artists in helping shift the societal and cultural constructs of nature. The chapter examines key movements in naturalistic landscape painting that are critical to establishing the contemporary picturesque aesthetic conventions of 'naturalistic' landscape design. The chapter focuses on the relational attributes of naturalistic planting to landscape painting and contemporary photography, and will explore art as the driver for a new picturesque aesthetic in landscape architecture.

Chapter Three focuses on the functional aspects of ruderal plant communities by describing the principles of plant ecology that will guide the author's further design exploration. This chapter will use the descriptions of ecologists to frame an understanding of plant community dynamics, plant succession, competition, and disturbance. The chapter also presents a description of the Georgia Piedmont eco-region and the environmental value of old fields.

Chapter Four presents vegetation classifications for ruderal plant assemblages specific to Georgia Piedmont and interprets them into three landscape design typologies for ruderal species. Direct observations of each ruderal typology are also presented through photographs by the author.

Chapter Five establishes management as a key component of projective design. The chapter synthesizes concepts from Chapters 3 and 4 to introduce the concept of designed disturbance in successional landscape management. Strategies for designed disturbance of two typologies are presented within the context of the Georgia Piedmont successional pathway.

Chapter Six is the site application of projective design. It focuses on starting the successional process in landscape design. The author conceptualizes the process of utilizing the ruderal typologies established in chapter 4. The site chosen for projective design, formally known as 'Armstrong and Dobbs', is located at 319 Oconee Street in downtown Athens, Georgia. The site has recently been cleared ('disturbed') for a mixed-use student housing development called 'The Mark'. The projective design is a culmination of the concepts of Chapters 2, 3, and 4, and shows how they can be incorporated in the analysis, concept development, and representation phases of the landscape design process.

Chapter Seven discusses future implications of designing with succession and expanding the role of ruderal in contemporary landscape architecture. The chapter concludes with a discussion of future research topics and a final argument for the use of the picturesque to cultivate a paradigm shift in or cultural perception of nature and design aesthetics.

CHAPTER 2

CONTEMPORARY PICTURESQUE: THE AESTHETICS OF RUDERAL

"Revolution in the aesthetics of nature often takes place when people start appreciating the parts of nature formerly regarded as aesthetically negative." Yuriko Saito (1998:101)

This chapter presents the symbolic rationale for ruderal species as a three-part device: (1) design concept, (2) design philosophy, and (3) design as a painterly device. Furthermore, this chapter examines the aesthetic argument for utilizing ruderal plants in ecological design, dealing with the questions *why ruderal*, and *what is the designer's role in ruderal design?*

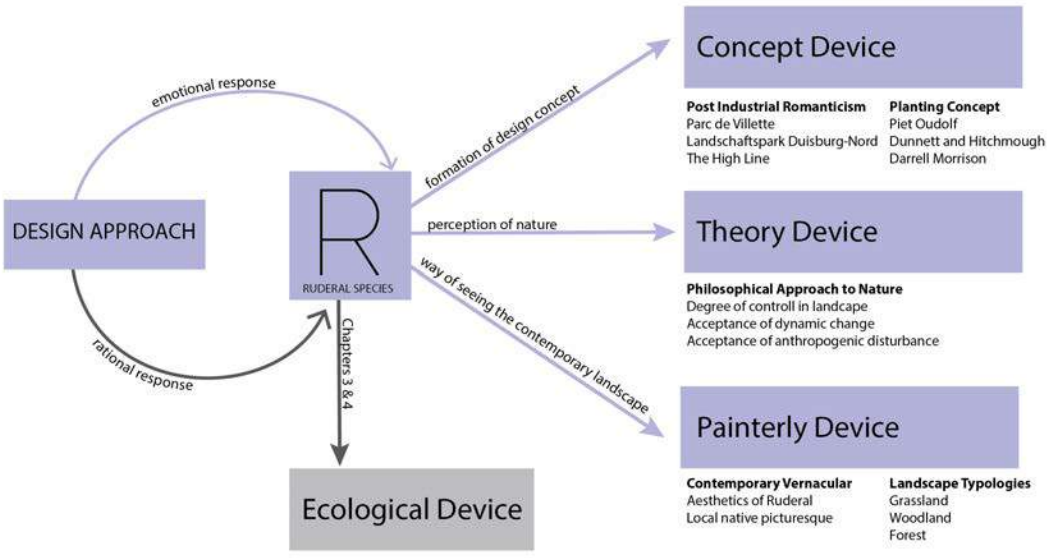


Figure 4 The designer's emotional rationale for utilizing ruderal species

Ruderal as Concept

There are many precedent projects in landscape architecture that use ruderal plants as the basis for developing design concept. Precedent for projects that use ruderal plants as their design concept usually focus on spontaneous vegetation of neglected landscapes. Neglected industrial landscapes (and structures) have been the impetus for many landscape designs in post-industrial countries, from the *Parc de Villette* in France to the *Landschaftspark Duisburg-Nord* in Germany. This theme is also evident in North America including *Gasworks Park* in Seattle, *Fresh Kills Park* in New York, and *Downsview Park* in Toronto. These projects all illustrate how post-industrial landscapes are of cultural value and how ruderal plants can be used in a romanticized way.

Figure 5 Joel Sternfeld's "Walking the High Line" photo series for the Friends of the High Line. (2000). Ruderal plants in this photo include *Conyza canadensis, Oenothera biennis*, and *Potentilla recta.*

Beyond industrial structures, ruderal plant species have influenced many projects in recent history. The early-successional vegetation at an abandoned postwar airstrip in Frankfurt, Germany, formed the design concept for *Alter Flugplatz*, along the *Frankfurter Grüngürtel*. The *High Line* in New York would arguably not have come to fruition without the ruderal plants that inspired the design. Images by Joel Sternfeld (Figure 5) showed the general public the beauty in the dynamic seasonality of ruderal plants when juxtaposed against the Manhattan skyline. On a garden scale, projects like the *Crack Garden* in San Francisco have shown how ruderal plants can be used as a concept in small urban spaces. Dutch designers Bennie Meek and Vincent Wittenberg have incorporated ruderal plants in a modular 'living pavement' concept, as a way to provide habitat for spontaneous natural plants along low-traffic urban streets (Figure 6).

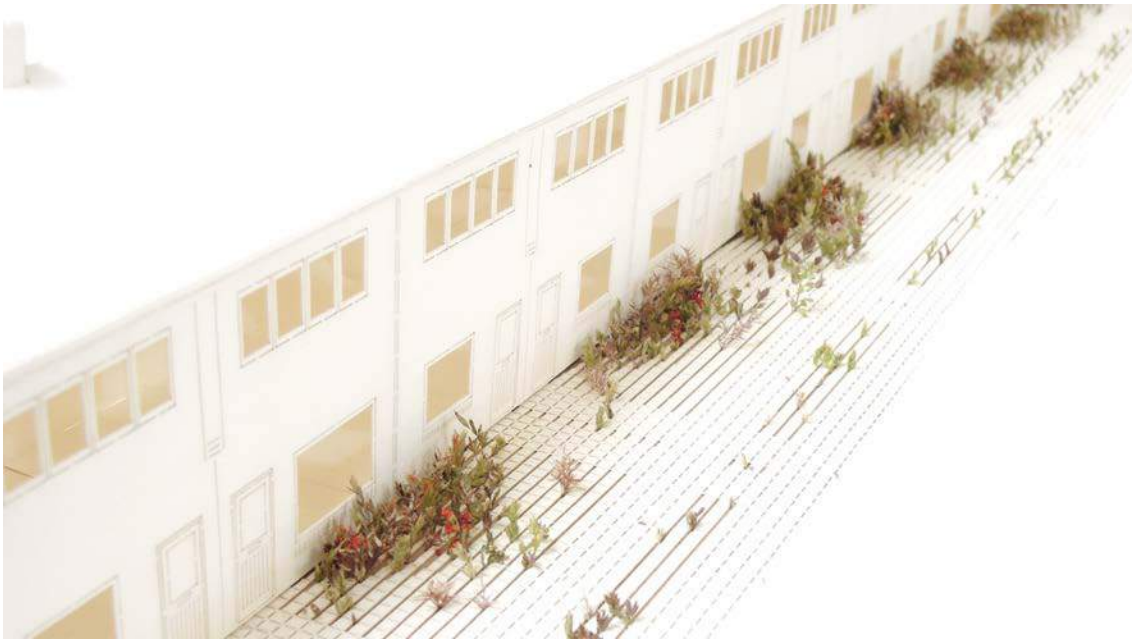


Figure 6 "Living Pavement" concept by Bennie Meek, Eindhoven Netherlands 2012.

Ruderal plants have also been used in the concept of herbaceous planting design. Pete Oudolf, renowned Dutch planting designer, has recently experimented with a matrix of spontaneous meadow grasses in his private garden in Hummelo (Figure 7). The garden displays

how early-successional species can be used in a stylized grassland design. Hitchmough and Dunnett (2004) have researched what they term 'biotope meadows' – a mix of native grass species with exotic forbs – and their work was showcased during the 2012 London Olympic Games at *Queen Elizabeth Olympic Park*. In the Southeastern Piedmont in the late 1990s, Darrell Morrison (2004) used ruderal species as the concept behind the roadside meadow planting at the Atlanta History Center.

Figure 7 Piet Oudolf's spontaneous meadow garden in Hummelo, Netherlands. The garden was twice visited by the author – shortly after installation in spring 2011 and in June 2013. The understory 'matrix' is a mix of early-successional Dutch meadow species. (photo by the author)

Piet Oudolf's use spontaneous 'ruderal' native meadow grasses is the best example of the unconventional approach to successional planting that will be further explored in Chapters 5 and 6 (Figure 7). The design was a solution for the heavily disturbed site (6,000 sq. ft.) formerly used as a nursery pad. The poor sandy-loam soil was considered an opportunity to experiment with

ruderal plants. "*It was about creating a solution*," said Piet, "*less maintenance for the future, and an experiment to see how robust perennials would grow with native grasses and wildflowers"* (Kingsbury 2012:68). Oudolf first designed the arrangement of robust perennial grasses to provide structure for the 'wild' spontaneous Dutch meadow grasses, directly planting grasses such as *Calamagrostis x acutiflora '*Karl Foerster*', Panicum virgatum,* and *Festuca mairei*, with other late-flowering forb perennials such as *Eupatorium* (Joe Pye weed), *Helenium* (sneezeweed), *Vernonia* (ironweed), and *Monarda* (bee balm). He then sowed a mix of Dutch native grasses and wildflower perennials, such as *Dianthus carthusianorum* and *Valeriana officinalis* (Kingsbury 2012).

Ruderal as Philosophical Device

Ruderal plants thrive in disturbed landscapes, usually in places dominated by human processes, and are a natural response to anthropogenic forces. The perception of ruderal plants in the landscape depends on the designer's philosophy of nature.

> "*…it is our shaping perception that makes the difference between raw matter and landscape.*" (Schama 1995:10)

Nature is a human construct, an idea of the cosmos or label that describes the human perspective of living organisms and their processes (Olin 1997). Etymologically the word suggests the dynamic processes of time, derived from the Latin *natura*, which comes from the root *nascor*, a verb meaning to be born, to grow, to spring forth (Crandell 1993).

When discussing nature in landscape design the distinction between gardens (typically domestic) and parks (typically public) must be qualified. Gardens and parks both deal with man's pursuit of harmony with nature (Riley 1988). Nature itself is too vast a subject for this discussion but it is clear that both gardens and parks are about nature. Essentially, gardens are an

expression of formed nature and attempt to derive their meaning through metaphors, rhetoric, and symbolism (Olin 1988). The main difference between parks and gardens is not one of scale, users, or context; the difference is the amount of human control over nature (Riley 1988). A garden is precisely about the human display of control of nature. A park, in Western society, does not manifest complete control over nature but represents a conceptualized, pastoral, and even idealized display of nature (Riley 1988).

Time is the most important aspect of a philosophical approach to the nature of ruderal plants. The landscape designer must understand that ruderal plants are short-lived and move around from season-to-season, which requires one to accept a level of uncertainty. When the designer embraces ruderal plants in their planting scheme, they are letting-go of control over nature and eschewing the conventional approaches to landscape management[5]. The designer must understand the system of plant ecology and accept change in the landscape when using ruderal plants.

Ruderal as a painterly device

The concept of landscape has always been tied to image. The relationship of man to nature is perhaps the oldest subject of art, dating back at least to the Paleolithic cave paintings at Lascaux. Throughout human history, artists have helped push the boundaries of cultural and societal ideas of nature by representing beauty found in the mundane – Caravaggio's basket of rotting fruit (*Canestra di frutta),* van Gogh's dead sunflowers, and peasant shoes are fitting analogs. Artists help represent the beauty in the quotidian landscape – the main setting for ruderal plants. Artist help build a concrete dialectic between man and nature (Figure 8).

[5] 'Conventional approach' is used here to mean the traditional intensive ways of maintaining a landscape design in its original form. Stress and competition (explained in chapters 4 and 5) are typically controlled through trimming, fertilizing, irrigating, mulching, regular mowing, and so on.

Figure 8 Road in Etten (1881) by Vincent van Gogh. The pollarded willow trees in the landscape represent the control of nature. This painting is one example of art's role in representing the quotidian landscape and pushing cultural and societal ideas of nature (Vincent van Gogh).

By painterly device the author means the designer's picturesque way of seeing and representing the landscape as a vehicle for the communication of the sentimental effects of nature. The exploration of the designer's emotional response and utilization of ruderal species in the contemporary landscape must first establish an understanding of the picturesque concepts that developed in the 18th century. The prominent picturesque theorists of 18th century England – Richard Payne Knight, Uvedale Price, and William Gilpin – helped formulate our present-day aesthetic appreciation of nature. Gilpin and Knight presented the picturesque as a third aesthetic category alongside the beautiful and the sublime as defined by Edmund Burke. William Gilpin's essays on picturesque beauty set the precedent for an idealized view of nature in landscape design, one that fueled the English landscape style of 'naturalized' landscapes of the 18th century. Gilpin writes:

"We must ever recollect that nature is most defective in composition; and must be a little assisted. Her ideas are too vast for picturesque use, without the restraint of rules." – Gilpin (1792:67)

Gilpin's picturesque is about "improving" or pacifying nature. Picturesque is a slightly more domesticated version of the sublime. Gilpin also goes on to set guidelines for picturesque beauty painting and describes the necessity for 'roughness', in contrast to Burke's (1757) concept that beauty is tied to smoothness (Figure 9). This aesthetic approach to natural landscapes – representing nature as distant scenography – through painting was inspired by the work of Claude Lorrain, Nicolas Poussin, or Salvator Rosa (Jacobs 2012).

Figure 9 Illustration by William Gilpin (1792) showing the difference between smoothness (beauty) and roughness (picturesque) in landscape composition

The painting of Tintern Abbey, by Turner in 1794 (Figure 10), epitomizes the picturesque way of seeing ruderal species (Figure 10). The vegetation overtaking the ruins of a church is a reflection of man and nature coexisting in the landscape. Juxtaposition in composition was the convention of picturesque landscape representation and is also important for the intentional use of ruderal species in landscape design.

Figure 10 The Chancel and Crossing of Tintern Abbey, by J. M. W. Turner 1794

The English designers who were inspired by the picturesque such as William Kent, Lancelot "Capability" Brown, and Humphrey Repton, gradually replaced the geometric forms of the French garden style with a new style of "natural" landscape. The English landscape gardens of the 18th century approached nature indirectly through imagery. This aesthetic shift in landscape painting formed the basis for our landscape aesthetic in 19th century America, which still pervades much of the conventional landscape design planting practices in Georgia. Picturesque landscape painting in America was different from that in England because of the vastness of the American landscape and the influence of wilderness. American landscape painting represented landscapes as pristine, untouched wilderness. Thomas Moran's paintings of Yosemite Valley and the Grand Canyon epitomize the American ideal view of nature. Nature

was something to experience through travel, existing in national parks and far away places. This idea of 'nature pictorialized' or nature existing in the purist sense – outside of humans – has formed the basis for much of American landscape aesthetic (Townsend 1997, Carlson 2009, Paden 2013).

Early landscape design practitioners in the U.S. – Andrew Jackson Downing, Calvert Vaux, and Frederick Law Olmsted – built the foundation of landscape design on picturesque landscape principles they observed in 18th century England. They approached landscape design in a scenographic way, creating picturesque compositions to be created in three-dimensional space (Corner 1992). Central Park, the most celebrated project of early-American landscape architecture, was built on this idea. Olmsted and Vaux used 10 million horse-drawn cartloads of earth to transform a marsh landscape into a picturesque work of earth sculpture (Smithson 1972). The park was a manifestation of control over nature, delivering the rural Jeffersonian ideals of the time to the people of New York City (Smithson 1972). Even during this era of 'naturalistic' design, Olmsted recognized the beauty found in natural forming vegetation. He understood plant succession and the beauty found in spontaneous vegetation, before it became an ecological theory. In the *Spoils of the Park* he includes this excerpt from one of his travel journals:

> *"The landscape-architect André formerly in charge of the suburban plantations of Paris, was walking me through the Buttes-Chaumont Park, of which he was the designer, when I said of a certain passage of it, 'That, to my mind, is the best piece of artificial planting of its age, I have ever seen.' He smiled and said, 'Shall I confess that it is the result of neglect?'"*
>
> Frederick Law Olmsted (1973)

Re-conceptualizing the picturesque

The aesthetic appeal and perception of ruderal plants differs greatly depending on the context. Weedy plants are perceived differently in the city than they are in rural landscapes. The term landscape differs in relation to urban environments; terms like townscape (Cullen 1961) and cityscape were introduced in the mid-20th century to mark the interpretive dichotomy between natural and artificial scenery (Jacobs 2012). Since the industrial revolution and resulting urbanization, nature in urban landscapes has become a focus of landscape representation.

Increasingly the modern built environment does not have clear definition between urban and rural (Zardini 2000). The urban landscape in America has become more fragmented, starting with post-war suburbanization in the 1950s and massive public works projects that stimulated the 'white flight' of the 1960s. Stephen Jacobs' essay *Blurring the Boundaries between City and Countryside in Photography* (2012) presents evidence of photographers' role in helping architects and landscape architects understand this new hybrid landscape. The imagery of photographers like Robert Smithson, Joel Sternfeld, Andreas Gursky, Jeff Wall, and John Pfahl has portrayed the chaotic post-industrial landscape in a comprehensive and humanistic way. The 20th century version of the picturesque photography has been essential in representing the whimsical beauty of a blurred edge between natural and artificial elements in the city – which are the realm of ruderal plants (Jacobs 2012). Jacobs concludes that these photographers:

> *"…critically investigate how we can experience and value today's urbanized landscape. The pictures by Smithson, Sternfeld, Pfahl, Wall, and Gursky can be seen as contemporary equivalents of the eighteenth-century Claude Glass, the optical device that enabled the traveler to observe the English landscape as a picture that could be described, copied, and contained. Without harking*

back to the idea of a virgin nature and without glorifying the post-urban environment, these artists attempt to chart the whimsical, contemporary urbanized landscape with the help of the artistic models and practices of the tradition of the picturesque."

Stephen Jacobs (2012:8)

Figure 11 "Storyteller" by Jeff Wall (1986) is a good example of how photography has helped society understand the contemporary picturesque. The image includes signals or signs of the contemporary times we live in and function is represented in this image by showing a freeway overpass and power lines. Generally the underside of an overpass is not considered a safe environment but Wall portrays the setting in a positive way by capturing normal human interaction. Additionally, many photographers and painters actively try to remove power lines from their picture frame. Contemporary picturesque celebrates and embraces human processes in the landscape.

Contemporary picturesque

Intertwined with the aesthetics of the picturesque – and the English landscape – are the scenic elements of ruin, the patina of passing time, or traces of use/neglect (Jacobs 2012). Robert Smithson, perhaps the father of contemporary picturesque in landscape design, helped re-conceptualize the notion of the picturesque by representing new scenic elements of contemporary

urban decay and dilapidation, including drugs, graffiti, and spontaneous vegetation (Figure 12). Smithson relates the dull monotonous urban world to the themes and ideas of picturesque in his famous essay "*A Tour of the Monuments of Passaic, New Jersey*" (Smithson 1967). Furthermore, the work of Robert Smithson, most notably the Spiral Jetty (1970), and of other land artists of the 1970s was vital to shifting societal views of environmentalism in American landscape architecture (Meyer 2000).

Figure 12 Robert Smithson attentively represented taboo subjects of graffiti and urban decay and introduced a new contemporary concept of picturesque. Hotel Palenque installation, Mexico 1969.

The sensibility of the picturesque allows one to observe ruderal plants with new eyes and to understand and appreciate them as nature. Italian urban planner Mirko Zardini (2000) argues for a revaluation of the notion of the picturesque as a tool for interpreting the contemporary fragmented landscape:

> *"This sensibility leads us to observe the edges, the borders, the lines of contrasts or superimposition of different worlds, more than the homogeneity that is to be found within each of the elements, small or large. Dissymmetry and variety, irregularity, the unexpected, the intertwined, raw materials, tactile values, all that becomes part of the picturesque. The picturesque is inclusive, which is to say that it incorporates the surrounding landscape into the gaze, it accepts individual expression, it blurs the traditional distinction between natural and artificial. What heretofore have been considered negative elements in the contemporary city heterogeneity, excessive variety, disorder, disharmony, the incongruous coexistence of different pieces now constitute a resource, a quality with which to define a new landscape."*
>
> - Zardini (2000:436)

It is with this sensibility, and notion of the contemporary picturesque, that the author will observe the landscape of the Georgia Piedmont in order to establish a taxonomy of vegetation types – or patterns of ruderal landscapes. Because there is a close connection between the representation of landscape and environmental experience, the author will sketch and photograph examples of the "local" contemporary picturesque, and its vegetation, in the Georgia Piedmont (Appendix A).

Opportunities for the contemporary picturesque on the Georgia Piedmont

Zardini's notion of a new landscape picturesque – mainly seeing a resource in what has previously been seen as blight in the contemporary city – is a fitting analog for the author's argument for ruderal plants in design. Ruderal landscapes are commonplace throughout the Georgia piedmont. They are commonly found along disturbed areas such as roadsides, rail

corridors, abandoned industrial sites, and agriculture fields. They are largely perceived as blight in the urban setting and are often associated with physical or financial neglect of the landscape (Del Tredici 2010). These plant associations are often overlooked in landscape design, yet they are a visible ecological process happening in the region's most common landscape. These species are rarely celebrated for their beauty or considered useful for their environmental benefits.

Figure 13 Ruderal plants along a rail corridor in Athens, Georgia (photo by the author, March 2014).

Figure 14 Photograph showing ruderal plants in the urban environment in Athens Georgia (photo by the author Feb 2015).

Figure 15 Secondary succession taking place along the edge of an abandoned parking lot in Winterville Georgia. This photograph illustrates the contemporary picturesque beauty of the neglected Piedmont landscape (photo by the author, Feb. 2015).

Defining naturalistic planting design

Throughout this thesis, the word 'naturalistic' is used to describe a planting design style that is inspired by the principles of ecology. Vegetation ecologists define natural vegetation as forming spontaneously and dominated by ecological processes (van der Maarel 2005). The use of the term in this thesis means to describe a designers approach to selecting plant material based on the goal that they work together in a harmonious ecology (Kingsbury 2004).

Because ruderal vegetation in a designed landscape can appear unintentional or messy, there is need to investigate cultural and aesthetic perception. Dunnet and Hitchmough (2004) and Jorgensen (2011) have thoroughly catalogued aesthetic values and visual perception of designed ecological plantings (Kingsbury 2004). Nassauer's seminal paper *Messy Ecosystems Orderly Frames* showed that the perception of naturalistic vegetation could be made more culturally

acceptable through the use of ‘cues to care’. This strategy uses accepted design practices to ‘frame’ messy plantings and change perception through signs of human intent (Nassauer 1995). James Hitchmough has written extensively on supplementing horticultural ornamental plants to make naturalistic communities more aesthetically appealing (Hitchmough, Dunnett et al. 2004, Hitchmough 2011, Hitchmough 2011). Most of the research experiments by Hitchmough and Dunnett deal with seed mixes comprised of North American prairie forb species and meadow grasses native to the United Kingdom (Hitchmough and Woudstra 1999).

In sum, cultural acceptance of early-succession or ‘weedy’ plants is critical for ecologically informed planting (Kingsbury 2004). A shift in planting aesthetic from the traditional horticultural ‘neat and orderly’ landscape to a more ecologically functional and ‘messy’ is paramount (Nassauer 1995). Biotope planting will now be explored as a strategy for establishing cultural acceptance or displaying design intention in ruderal plant communities.

Types of Designed Naturalistic Vegetation

Naturalistic planting design draws influence from both horticulture and ecology. The examples of naturalistic planting design presented in Figure 16 were developed from the author’s literature review of the movements in contemporary naturalistic planting design. They are presented here to illustrate a gradient of ecological design approaches and their corresponding use of native plants. The design portion of this thesis (Chapter 6) will focus on the use of ruderal plants in the context of biotope planting.

> ***“Biotope planting*** – a plant community with all the dynamism of wild habitat and clearly resembling natural habitats in terms of its structure, but whose species mix is chosen for an aesthetic effect, as well as their ecological suitability for the conditions at the site. Maintenance is generally extensive (i.e. with minimal input)” (Kingsbury 2004 p. 60).

"Habitat restoration – where the aim is to create something as close as possible to a 'wild' habitat, at either a climax or relatively stable sub-climax community. Maintenance is generally extensive" (Kingsbury 2004 p. 60).

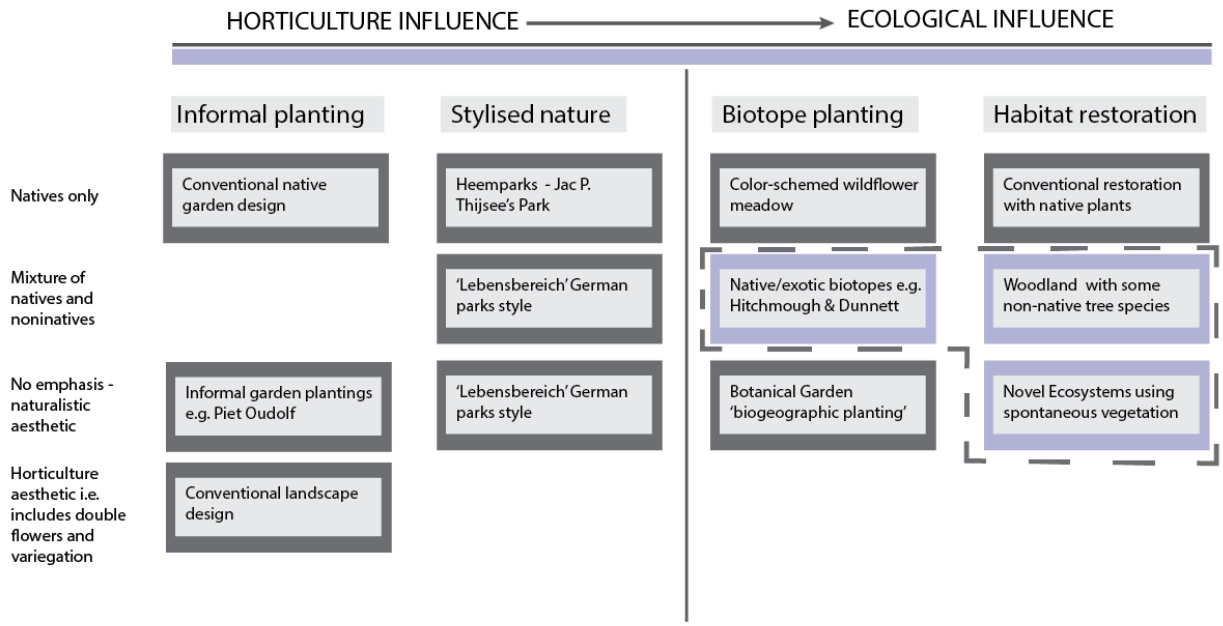


Figure 16 Relationship between horticulture and ecological influences in naturalistic landscape planting design, adapted from Dunnett (2004, 60). The dashed line represents the framework for the typologies of ruderal presented in Chapter 4.

The addition of biotope species is further examined in Chapters 5 and 6. Figures 46 and 47 show how adding species can be instrumental in creating internal versions of Nassauer's (1995) 'cues to care' that were discussed earlier. Furthermore, the biotope planting is a way for the designer to structure and provide order and rhythm to successional ruderal planting design, similar to Piet Oudolf's grassland garden approach shown in Figure 7. More detailed graphics of Biotope planting are presented in Chapter 6.

Contemporary picturesque and naturalistic planting design

Contemporary criticism of the picturesque claims that movement led to our modern-day dissociation from the actual consequences of nature (Townsend 1997). America's disinterested environmental aesthetic and perception of nature based on the picturesque idea of a natural scenic prospect of nature (Carlson 2009). Townsend points out:

> *"the picturesque, in effect, assimilated the reality of nature to an aesthetic vision by distancing actual nature from the point of view of the aesthetic observer. The picturesque drives a wedge between the artist and the reality of nature, a wedge that is justified only by appeals to the aesthetic value of picturesque experience itself* (1997:371)*."* But *"without the transformation of nature by the picturesque theory of sensory appropriation of one's environment, the link between aesthetic experience and sensory qualities would be impossible. (1997:375)"*

The picturesque legacy is paradoxical, while facilitating a cultural shift in the general public's appreciation of natural landscapes it also emphasizes artistic vision as the vehicle for appreciating the natural environment (Saito 1998). This has led designers and landscape users to regard nature as a series of two-dimensional views. The landscape painters of the era focused their work on scenic and sublime features, such as mountains and waterfalls while subtracting the elements of nature that did not make for a pleasing picture. The aesthetic values were translated through the design of the picture frame. The layperson experiencing the landscape today still perceives beauty through the lens of these picturesque conventions.

Nassauer's approach to creating orderly frames attempts to pacify the human perception of natural – and ecologically functioning – plants in landscape design. These orderly frames provide the spectator a comfortable distance from nature, and to view ecological plantings through the window of a 'neat and orderly frame.' This strategy is echoed by multiple environmental aestheticians and is known as distancing (Saito 1998, Conron 2000, Carlson 2009). Distancing helps the viewer overcome the negative reaction – feeling unsafe or disgust – to the unaesthetic or messy character of naturalistic plants in the designed landscape. Nassauer's frames provide a physical barrier to help overcome the negative perception of messy plantings. This strategy of distancing reflects our culture's disinterested attitude, or lack of understanding, towards nature in common, or 'unscenic', landscapes (Saito 1998) and reflects our desire to pictorialize nature in the tradition of the picturesque landscape gardening (Conron 2000).

The designer's role in leading a ruderal revolution

Because picturesque conventions are deeply ingrained in the cultural perception of nature and are often mistaken for ecological quality (Cradell 1993), natural vegetation is often perceived as being messy or chaotic in the designed landscape (Nassauer 1995). But it is the argument of the author that this chaotic spontaneous nature should be considered an advantage in landscape planting design if understood and orchestrated properly: with more latitude and grace for the medium's unique 'independence.' Landscape architectural planting designs that are ecologically informed can be achieved in an artful way only if the designer can fully understand the medium and create the right conditions for dynamic nature to take over. As Laurie Olin (1988) stated: "nature is the central source of culture-changing power that landscape architecture should draw upon". The author views the successional nature of ruderal plants as the kind of

culture-changing power we should be exploring in our approach to planting design, for both artistic expression and ecologic function.

Furthermore, the idea of contemporary picturesque presented in this chapter offers the landscape designer a new tool for representing the aesthetic beauty of ruderal plants in the landscape. The 18th century construct of picturesque was influential to the general public's perception and appreciation of natural landscapes (Townsend 1997) but it also left a negative legacy on our cultural expectations (Carlson 2009). Traditional picturesque representations aim to aestheticize nature and offer nature as a distant scene, to be observed from afar or on postcard and calendar imagery. It has distorted our view of the natural landscape (Rees 1975, Conron 2000, Budd 2002, Carlson 2009). In developing our taste for picturesque landscapes we have also developed distaste for the unscentic nature of the everyday, common, ruderal landscape.

The designer application of picturesque principles relies on the creation of visual compositions of natural scenery, often with emphasis on the passage of time (usually the past) and the exploitation of ruins (Townsend 1997). A contemporary application of picturesque principles should not focus on neoclassical imitations of nature, or the creation of ruins offered by the early landscape practitioners influenced by Gilpin and Price. Nor should a contemporary approach aim to evoke sentimental or romantic representations of a false experience of nature. These approaches distance landscape users from the reality of nature and do not strengthen the case for ecological design in contemporary landscape architecture.

Another role of the landscape designer is in advocating for a sustainable approach to planting design by promoting what Saito calls a "*green agenda*" through "*aesthetic engineering*" (2007:77). The shifting cultural aesthetic of nature that was a byproduct of the 18th and 19th century picturesque helps establish precedent and illustrates the potential for a contemporary

version of the picturesque to help designers shift our modern cultural perception of nature. This idea was described by Marcia Eaton as "*aesthetic ought*" and she states that: "*creating sustainable environments necessitates asking not just what people do find beautiful but what they should find beautiful"* (Eaton 1989: 176).

In short, rather than literally 'framing' to bind and delimit nature in the manner of Nassauer and the traditional picturesque, this thesis is suggesting the use of contemporary picturesque aesthetics to frame nature conceptually and philosophically – and to allow the full embodiment and appreciation of ruderal systems to be possible.

CHAPTER 3

THE NATURE OF RUDERAL: DISTURBANCE AND ECOLOGICAL SUCCESSION

"It is in changing that things find repose" - Heraclitus

Introduction

Ruderal plants are the first part of the ecological process of plant succession and are the landscape's natural response to disturbance. Chapter 2 showed that natural forming, or spontaneous plant species offer a new aesthetic in naturalistic planting design on the Georgia Piedmont – the contemporary picturesque. It is the author's contention that the future of planting design should embrace ruderal plants as the foundation for both social (aesthetic) and ecological (function) landscape resiliency. Rather than viewing ruderal vegetation as a sign of neglect, landscape architects should consider them for their power to provide a more dynamic connection to nature in the human-dominated urban environment. Ruderal plants are a direct response to human perturbation and are a key aspect of resilient planting design. The question for a climate change future, in the context of planting design, is not what once grew here, but what will sustainably grow here now? (Del Tredici 2006).

The terminology of conventional planting design reveals the aesthetic goals of the designer to arrange plants and occupy space in harmonious color and texture. Plants are grouped in *masses* into a collection of plants called the *plant palette.* These terms and principles differ in an ecological approach to planting design, which focuses on arranging *populations* for the

purpose of creating a *community* of plants that co-inhabit a similar environment (Beck 2013). This chapter will introduce the concepts, mechanisms, and terminology of plant ecology, which must be clearly understood for the management (Chapter 5) and design (Chapter 6) of ruderal ecologies.

Plant Community Dynamics

Modern ecological theory is based on the foundation that nature is always in a state of flux, consisting of a shifting mosaic of patches in different stages of recovery from a variety of disturbances (Schafale and Weakley 1990). For the purpose of landscape architectural planting design, it is important to note that an ecologically informed approach must learn how to embrace these changes. To understand community dynamics it is necessary to understand the process of plant succession (Dunnett 2004).

Plant Succession

Ecologists have a long history of theorizing and describing the patterns by which plant communities change through time (Luken 1990). Plant succession is one of the most basic principles of plant ecology (Weaver and Clements 1929). Plant succession was first described by Frederick Edward Clements (1916) as the developmental process by which a final stage, or climax community, is reached through a progression of vegetative phases. This set of vegetative phases is called the successional pathway. Clements' succession/climax model introduced the idea but was never fully adopted by his European contemporaries, who criticized it as a purist approach that lacked consideration for the realities of environmental influences such as disturbance and stress – some even called it a 'fairy-tale approach' (Valk 2014). Clements essentially viewed plant communities as complex organisms, looking purely at ontogeny and phylogeny in a 'monoclimax' model (Valk 2014). One of Clements' biggest critics was the

British ecologist Tansley, who was an early supporter of an ecosystem-centric concept, viewed succession in a more plastic model which took into consideration site-specific environmental inputs (Connell and Slayer 1977, Valk 2014). The history and development of succession theories is well documented by McIntosh (1980), and his paper begins with a profound statement that shows that the concept is far from being fully understood:

> *"Succession is one of the oldest, most basic, yet still in some ways, most confounded of ecological concepts. Since its formalization as the premier ecological theory by H. C. Cowles and F. E. Clements in the early 1900s, thousands of descriptions of, commentaries about and interpretations of succession have been published and extended inconclusive controversy has been generated"* (McIntosh 1980).

In sum, the historical development of the theories of plant succession is far too vast to review for the purpose of this thesis. Despite the efforts from ecologists to describe and interpret the phenomenon of plant succession, there has been little effort to apply this knowledge towards landscape architecture (Luken 1990).

Secondary Succession on the Georgia Piedmont

For the purpose of this discussion, the author will adopt Eugene Odum's description of the most common successional pathway on the Georgia Piedmont. There are two major types of plant succession: primary and secondary. Primary succession occurs in the development of new ecosystems and is associated with new soil formation, while secondary succession occurs on soils that have previously been vegetated. Secondary succession is associated with the resiliency of existing ecosystems and is a direct response to disturbance. Secondary succession is a much

faster process than primary succession (Archibold 1995), and on the Piedmont secondary succession is a rapid process (Oosting 1942).

Odum's successional pathway diagram (Figure 17) shows secondary succession on the Georgia Piedmont (Odum 1971). For the purpose of this investigation, the author is concerned with the seral communities of early-secondary succession – from bare field to grassland-shrub – in order to utilize these species in landscape design. This seral stage of successional vegetation is the focus of this thesis because it the most readily available aspect of secondary succession, both for ecological study and for human accessibility. Meadows are useful in design because they represent human activity and domestication of the landscape. Additionally, the human perception of open plant communities such as meadows and woodlands are part perceived as psychologically safe in landscape design (Stokols and Altman 1987) and represent a socially acceptable way to utilize ruderal plant communities.

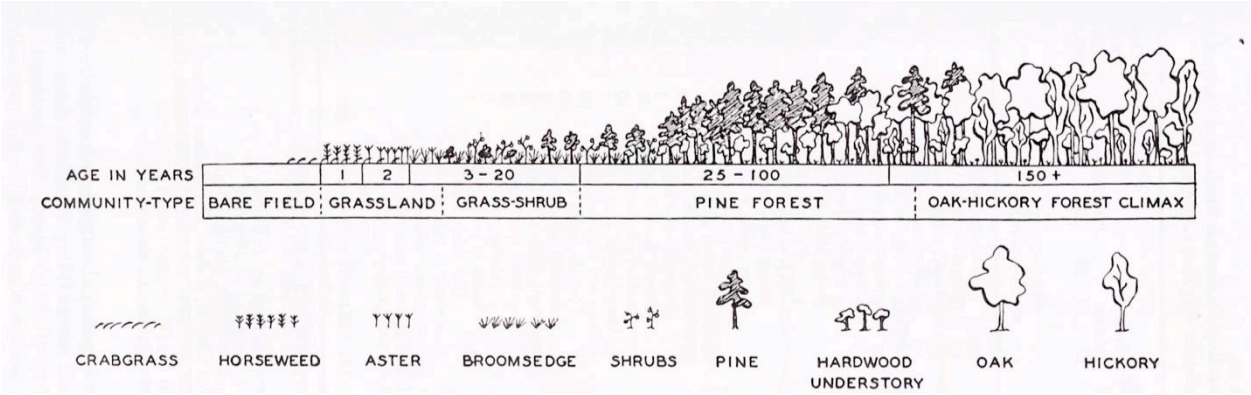


Figure 17 Secondary succession on the Piedmont from Egene Odum's *Fundamentals of Ecology* (1971).

Most of the Georgia Piedmont has undergone secondary succession and is currently in some stage of Odum's model (Wharton 1978). The old-field seral community is an intermediate stage during early secondary succession and has been well documented for the Georgia Piedmont (Schafale and Christensen 1986). These studies provide detailed descriptions of species

composition in the seral stages of succession. Pickett (1982) performed a valuable twenty-year study that observed population patterns and recorded the dominant plant species across three main phases of early succession at the Hutcheson Memorial Forest in New Jersey. The observation shows forb dominance by ten species over three years after plowing. *Ambrosia artemisifolia, Mollugo verticillata,* and *Digitaria sanguinalis* were dominant covers in year one, while *Conyza canadensis, Plantago lanceolata, Plantago rugellii*, and *Oxalis stricta* were noticeably more dominant in years 2 and 3 (Pickett 1982). Johnston and Odum (1956) researched one-year succession on abandoned cotton and corn fields, and recorded *Digitaria sanguinalis* (crabgrass) and *Conyza canadensis* (horseweed) to be the dominant ground covers. Oosting (1942) observed abandoned fields in the piedmont of North Carolina and showed three distinct communities in the first three years after abandonment. Much like Pickett's observations, Oosting (Figure 18) described the first-year cover to be primarily crabgrass (*Digitaria sanguinalis*) and horseweed (*Conyza canadensis*). He explained that, regardless of condition or soil type, the first year is characterized by dominance of these two species. In year two, dominance shifts as *Ambrosia artemisiifolia* and *Aster ericoides* overtop the community and it becomes shrubbier in appearance, averaging 2-4 feet in height. In year two, Oosting reported a number of *Andropogon* and *Solidago* species in seedling stages but noted that their dominance occurs in year three (Oosting 1942). The process of early-secondary succession is vital to improving eroded soil conditions – repairing the red-clay subsoil back to the more organic-rich topsoil that was once abundant before cotton farming (Wharton 1978). Research by Kuo (1965) documented improvement of soil organic content and content of micro-organisms, especially fungi and bacteria.

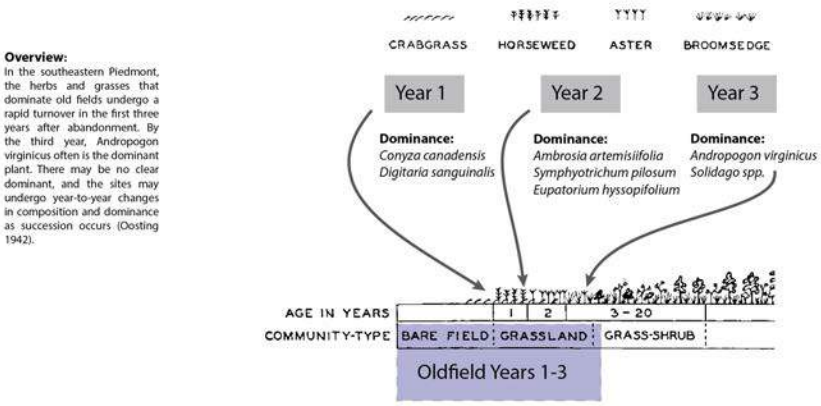


Figure 18 Species that dominate the rapid turnover in the first three years after abandonment of old fields (diagram by the author, adapted from Oosting 1942).

Figure 19 “Oldfield in a Box” – A chain-link fence permits secondary succession in the absence of disturbance by mowing. Clarke County, Georgia (photo by the author).

Wildlife associations with Secondary Succession on the Georgia Piedmont

This chapter deals with plant succession but it is important to note that wildlife associations with the ruderal stages of succession have been well documented. Breeding passerine bird populations of Grasshopper Sparrow and Eastern Meadowlark were documented to have an affinity for abandoned cotton and corn fields by Johnston and Odum (1956). The authors hypothesized that bird diversity will increase over time and recorded the dominant bird species for each stage of succession. Blue Grosbeak was also recorded by Wharton (1978) to prefer secondary successional communities. Wharton (1978) also observed field mice species such as beach mouse (*Peromyscus polionotus)* and the seed-eating harvest mouse (*Reithrodontomys sp.)* to take up residence in the first three years of succession. The cotton rat (*Sigmodon hispidus*), meadow mouse (*Microtus sp.*), pine vole, and deer mouse are the dominant mammals during the grassland stages but migrate when shrubs overtake the community and grasses are thinned out from shading. Wharton also observed that quail, doves, rabbits, and foxes have an affinity for the open habitat provided by old fields.

Plant competition

An ecologically informed approach to planting design must understand competition and co-existence in order to successfully combine species into functioning plant communities. Selecting species based on aesthetics and function alone does not consider plant biological factors that may limit plants in their ability to co-exist in a scheme. For the purpose of this discussion it is important to understand trade-offs in adaptive plant strategies and the constraining factors that limit diverse plant communities.

C-S-R Triangle Theory

> *"The impact of a dominant plant may be exerted upon neighbors at various stages of their life cycles … This phenomenon is well illustrated by trees and shrubs, many of which as seedlings are subject to dominance by established perennial herbs but are themselves capable of dominance (often over the self-same herbs) at a later stage of their life-span."*
>
> Grime (2001, p. 180)

J. P. Grime's *C-S-R Triangle Theory* is a seminal theory in plant ecology and a widely accepted explanation of plant community competition. His model (Figure 20) shows a trade-off relationship between stress and disturbance as the two fundamental threats to community diversity (Grime 1987). His model presents the relationship between three main strategies that can be used to define every habitat on earth (Dunnett 2004). *Stress* is the term used for limitations relating to plant physiological needs such as temperature, light, and nutrients. *Disturbance* is an external environmental force such as grazing, cultivation, trampling or burning. In Figure 20, the relationship between stress and disturbance is shown on a gradient from high to low.

Competitors (C) are species that occur in low-stress and low-disturbance environments. They must be addressed because they often limit diversity in plant communities through aggressive growth strategies. They dominate or crowd out other vegetation with spreading foliar canopies that limit light availability below and with spreading root systems that limit water and/or nutrient availability to other plants. Competitor plants outcompete other species via two strategies: (1) faster rate of growth or by (2) faster uptake of resources nutrient (Beck 2013). Too

many competitor species in a plant community will yield a vegetative stand that is low in diversity and high in density (Dunnett 2004).

Stress Tolerating (S) species occur in high-stress, low-disturbance situations and their strategy is one of thrift. These species are typically found in plant communities that are low-energy systems and tend be unproductive or low in biomass. The vegetation is usually sparse, evergreen, and slow growing.

Ruderal (R) species have a disturbance-tolerating life strategy, and occur in high-disturbance, low-stress environments. The R-strategy is one that enables rapid recovery. Ruderal species are pioneer plants that thrive in response to harsh environmental disturbance. Ruderal communities occur in areas of human disturbance, usually occur along roadsides, rail corridors, and abandoned industrial or farming sites.

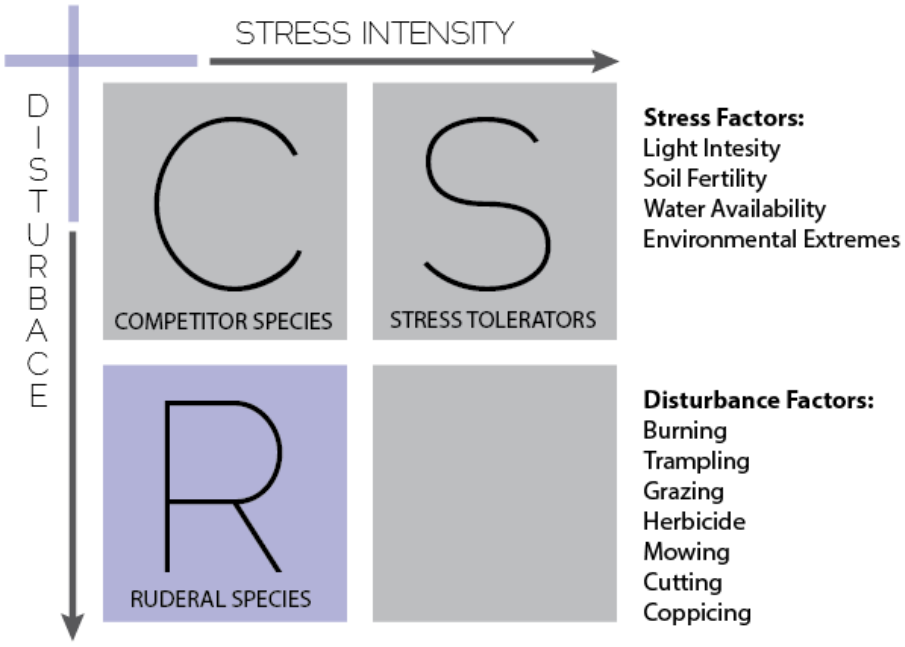


Figure 20 Grime's CSR Theory (Grime 2001)

Diversity and disturbance

In most ecosystems, the successional pathway starts with fast-growing, short-lived herbaceous species – ruderals – that are gradually replaced by slower growing, long-lived woody species – called stress tolerators and competitors (Connell and Slayer 1977). The evolutionary trade-offs in Grime's CSR theory provides insight into ecological design and species composition. A balanced community is composed of species from each of the three life strategies. Coexistence is achieved when all plant species occupy their niche within the community. Grime's theory also emphasizes the role of disturbance in creating diverse communities. Disturbance interrupts the pathway of ecological succession and 'resets' the trajectory for a given community. Grime's CSR theory concludes that high levels of diversity are maintained by intermediate level of disturbance. This theory will be integral to the management of successional communities (Chapter 5) and an important aspect of the projective design in Chapter 6.

Disturbance on the Georgia Piedmont

The Piedmont landscape has been modified significantly by anthropogenic disturbance, even prior to European settlement. The "Pristine Myth" by Denevan (1992) catalogs evidence of disturbances in Eastern North America by aboriginals prior to European activity. Widespread agriculture practices and burning regimes converted much of the land into a mosaic of open successional fields and semi-stable prairie communities (Delcourt and Delcourt 2004). There are accounts by pre-settlement European explorers such as DeSoto, Mark Catesby, and John Lawson that described a savanna-like landscape with extensive fields ranging in size up to 40 km wide (Barden 1997). This evidence suggests that the Piedmont landscape of Georgia appeared more like a savanna or prairie than the mixed hardwood-pine forests that are prevalent today.

Disturbance by man increased after European settlement. Fire historian Pyne (1982) claims that fire was a cultural practice by white settlers until the Federal Government enacted fire suppression laws in the early 1900s. Settlers continued to burn their environment. Fire was used to control snakes, ticks, and the boll weevil, which could cause economic destruction to cotton crops (Pyne 1982). 'Woodsburning' was a cultural way of life for rural people in the Southeast. An interview project by the U.S. Forest Service and psychologist John Shea investigated the persistence of burning. One interviewee stated:

> *"woods burnin's right. We allus done it. Our pappies burned th' woods an' their pappies afore 'em. It war right fer them an' it's right fer us."* (Pyne 1982:143)

Fire was a technology for landscape management, and disturbance was useful for modifying the landscape to man's preference. Fire management continued in the rural South as an extension of old culture until the fire suppression laws of the 1930s. The U.S. Forest Service's successful *Smokey the Bear* campaign in the 1940s was effective in changing perception of fire for generations to come (Pyne 1982).

Hawk (1952) described the Piedmont region during this important shift away from a fire-disturbance regime. His essay captures the transformation of a landscape in an early successional stage during an economic transition from agriculture to what he calls a post-agriculture industrial landscape of the 'New South'.

> *"Red earth and evergreen is the gaudy color contrast seen on every hand in the South Atlantic Piedmont. It appears and reappears in all localities and in all seasons"… "The pine woods of the Piedmont seem unusually bright because many of the forests are made up of new trees only a few years past the seedling stage and the needles have the fresh greenness of vigorous*

growth; also, these are well cared for forests with trees of uniform size and with little underbrush remaining."

"Yet in spite of the prevalence of wooded country a traveler driving through any part of the region is usually more conscious of the agricultural land lying along the road than he is of the forests. The fields are varying sizes and shapes. They often give the impression of having been cut "pioneer-fashion" out of the original forest, although the exact opposite is nearer the truth; it is the trees that are encroaching on the cropland."

(Hawk 1952:27)

Hawk's prose paints a picture of the Piedmont landscape in an early-successional state, roughly 20 years after cotton farming and fire management practices had largely ceased. This account describes the ruderal meadow/grassland landscape as the dominant feature of the Piedmont landscape experience in the 1950s.

Contemporary Concepts of Succession

In recent decades, ecologists have presented new theories of plant succession based on complex systems (Lister 2006). The linear model of succession, and its notion of a 'climax', or single stable state, has been replaced with a non-linear and dynamic cycle of ecosystem development. Instead of the Clementsian 'climax stage', Holling presents a more dynamic model, using the nomenclature "shifting steady states." His theory takes into consideration the concept of ecosystem resiliency and disturbance (Holling 1986, Gunderson and Holling 2002, Lister 2006). In Holling's (1986) figure-eight panarchy model, ecosystem biodiversity and connectedness are represented by four factors: (1) exploitation or birth, (2) conservation or

growth, (3) release or disturbance, and (4) renewal or reorganization (Lister 2006). In Figure 21 the author has modified Holling's figure-eight model to illustrate how the cycle of utilizing ruderal species and succession for the landscape design can be used in the three typologies that are presented in Chapter 4.

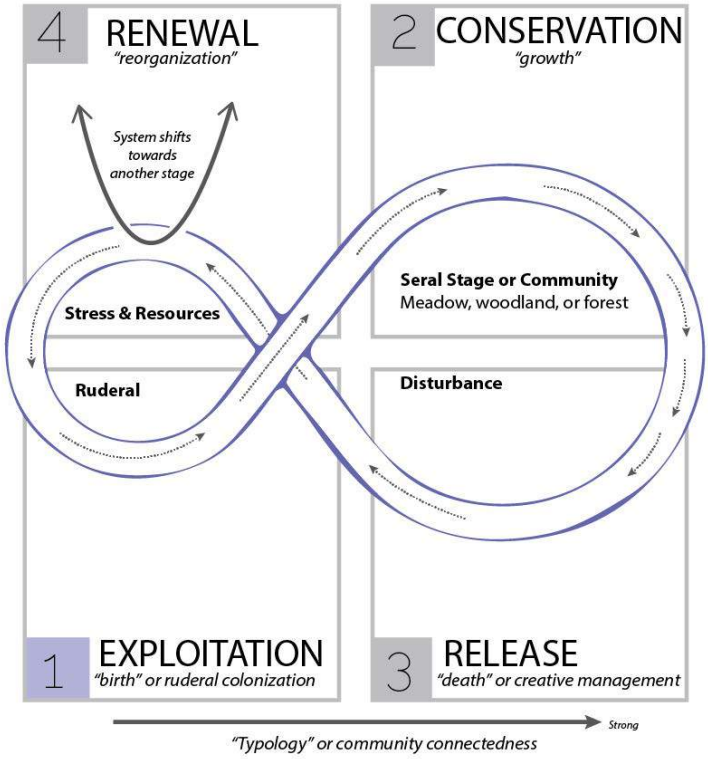


Figure 21 Plant community dynamics: modified version of Holling's figure eight (Holling 1986, Gunderson and Holling 2002, Lister 2006).

Conclusion

There are multiple environmental and physiological factors contributing to plant community dynamics. Landscape architects should understand plants that thrive in disturbance and consider design strategies that fully understand disturbance ecology.

The successional pathway in the Georgia Piedmont has been made clear by ecological research of old-field vegetation. This research shows how species in the successional pathway respond to different stress or disturbance factors. Each stage of succession shows faster growing, short-lived species being replaced by longer-lived, slower growing species (Connell and Slayer 1997). Grime's C-S-R theory gives a model for designing successional plant communities, as turnover is based on factors of stress and disturbance and contrasting life strategies of plant species (Luken 1990).

Plant ecologists have established that disturbance is critical to plant community structure and diversity in natural ecosystems. The same holds true in designed communities. Each typology (explored in chapter 4) shows how different disturbance regimes and intervals translate into different vegetative structures along the successional pathway. Disturbance is an intelligent and effective way to enhance the diversity of landscape plantings, and a management tool for using succession in an intentional way (Beck 2013).

CHAPTER 4

APPROACHING DESIGNED RUDERAL: THREE TYPOLOGIES

> *"The further away we step from natural models the more likely we are to run afoul…and create communities that require us to work to maintain them rather than their being able to function by themselves."*
>
> Travis Beck (2013:52)

Vegetation Classification

The worldwide distribution of a species is determined by its own unique tolerance to ecological conditions, physically and in a given ecosystem. Species with similar tolerances develop into identifiable plant formations that have similar floristic and structural characteristics. There is a hierarchy to vegetation classification. At the broadest scale, biogeographic regions are broken down into major world biomes such as tropical forests, temperate grasslands, coniferous forest, temperate forest, and polar tundra. Climate is influenced primarily by the amount of solar energy intercepted by the earth's surface and atmosphere, and secondarily by seasonal precipitation, effects of mountainous barriers, and continental location in relation to thermal and oceanic currents. The Köppen–Geiger climate classification for the Georgia Piedmont is Warm Temperate, meaning that the average for the warmest month is >18˚C and the coldest month is > -3˚C (Archibold 1995).

Classifications of ecological systems are the basis for understanding community composition, structure, and function. Vegetation descriptions are important to any ecological

classification system because plants are the most dominant and accessible component of a terrestrial community. Furthermore, classification systems are important to conservation because they help simplify ecological community patterns through a set of taxonomic criteria. Essentially, these can bring clarity and order to the complex subject of ecology (Anderson, P. Bourgeron et al. 1998).

Classifications are usually based on multiple factors that influence ecological processes, such as vegetation, soils, and hydrology. Vegetative classification can be based on either floristic or physiognomic characteristics. Physiognomic classifications are based on the structure (height and spacing), growth form, and to leaf characters (seasonality, shape, phenology, duration, size, and texture) of the dominant or component species. Floristic classifications define vegetation types based on species composition or species groups (Anderson, P. Bourgeron et al. 1998).

Ruderal vegetation classification

Ruderal plant formations are difficult to classify because of stochastic factors on different scales. NatureServe (2015) groups ruderal plants in terms of associations rather than plant communities. A community can be defined as an aggregation of species that co-exist in both time and space with the potential to interact with one another (Whittaker 1962, McPeek and Miller 1996). Community ecology focuses on the principle of distribution and dynamics – how species are distributed across landscapes and how the communities are influenced by interactions between species and the environment (Anderson, P. Bourgeron et al. 1998).

The ruderal plant associations used for this thesis are based on the vegetation structure of natural communities, i.e., forest, woodland, and meadow/grassland. They are described as ‘ruderal associations’ rather than communities. There are still many unanswered questions about the interactions in novel ecosystems (NatureServe 2015).

There is a different approach to classification of anthropogenic communities between ecologists in North America and Europe. Vegetation classification in the United States does not include landscapes that have been influenced by cultural processes, or vegetation types that are dominated by human processes. The European (EUNIS) classification system places ruderal plants into the grassland vegetation type. The specific nomenclature used is "E5.1 – Anthropogenic herb stands" and describes the habitat as areas of land disuse, including woodland fringes, clearings, tall forb stands, abandoned urban or agriculture land, transport networks, or land used for waste disposal (Davies, Moss et al. 2004). In North America, the Nature Conservancy's International Classification of Ecological Communities: Terrestrial Vegetation of the United States (1998) is mostly concerned with 'natural vegetation' for the purpose of conservation. Furthermore, the organization does not yet list data for ruderal communities on their public web database, but does provide a description of anthropogenic communities in the appendix of their report:

> *"**Semi-natural/altered vegetation** may be defined as plant communities where the species composition and/or the structure of the vegetation has been altered through anthropogenic disturbance such that no clear natural analogue is known…"*
>
> *"**Ruderal communities** are vegetation resulting from succession following anthropogenic disturbance of an area. They are generally characterized by unnatural combinations of species (primarily native species, though they often contain slight to substantial numbers and amounts of species alien to the region as well) …These communities are generally not priorities for conservation for their own sake, though they may support rare species or function as important*

> *landscape connectors or matrices in reserves. In many landscapes, ruderal communities occupy large areas—sometimes more than any other category of communities. They can provide important biodiversity functions"*(Anderson et al. 1998:137).

In recent years, ecologists in North America have begun to accept anthropogenic disturbance as an inevitable by-product of modern civilization, and have started to modify classification systems to incorporate novel or anthropogenic associations that exist in semi-natural or altered landscapes (Faber-Langendoen, Keeler-Wolf et al. 2014).

The classifications for ruderal plants used for this thesis were provided by the *NatureServe* database (2015). *NatureServe* is an international organization including U.S. State Natural Heritage Programs and Conservation Data Centres (CDC) in Canada and Latin America and the Caribbean. Ecologists from various organizations have contributed the development of the classification of ecological systems published on the website: *NatureServe Explorer.* The author requested a custom report from the *NatureServe* central office in Arlington Virginia. On February 23, 2015 they provided a subset of the International Ecological Classification Standard, which covers ruderal associations and cultural vegetation types of the Piedmont (NatureServe 2015).

Observing patterns of ruderal plants on the Southeastern Piedmont

The author gathered empirical evidence of ruderal plant associations on the Piedmont of Georgia. Figures 23-27 are graphic illustrations of the kind of phenological analysis and species identification that took place during the process. This analysis helped formulate the three landscape typologies to be used herein. See Appendix B for more pictures of this stage of the author's analysis.

Figure 22 Roadside ruderal grassland, Clarke County, Georgia (photo by the author)

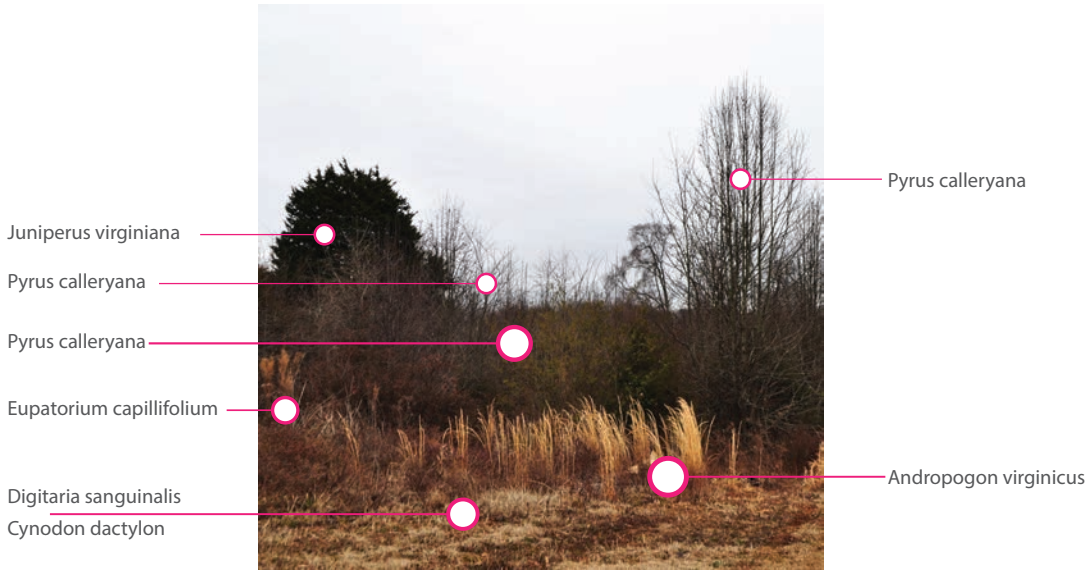


Figure 23 Ruderal shrubland with grassland edge, Anderson County, South Carolina

Figure 24 Roadside ruderal meadow/grassland with woody species encroaching. Photo illustrates three types of disturbance intervals. Clarke County, Georgia.

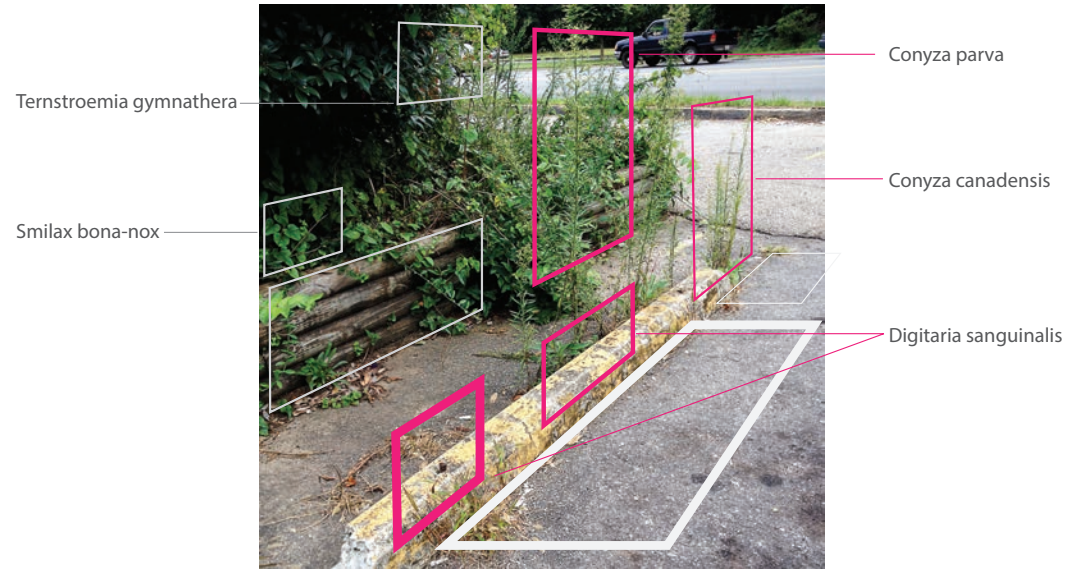


Figure 25 Ruderal parking-lot showing early-successional species. Clarke County, Georgia.

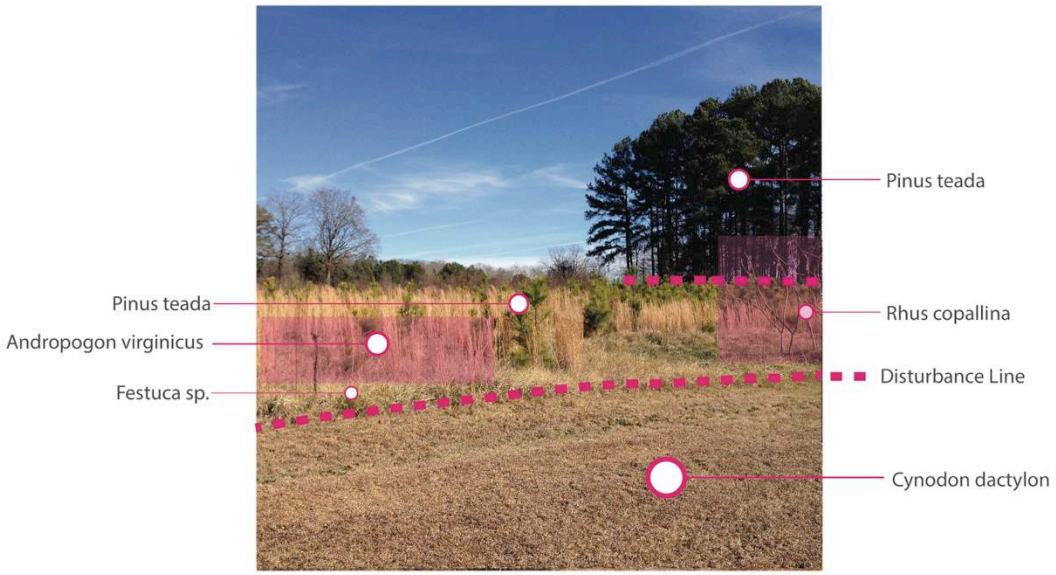


Figure 26 Ruderal grassland (foreground) with Pine woodland (background). This grassland is shifting to the shrubland phase as *Pinus taeda* and *Rhus copallina* are starting to encroach on *Andropogon virginicus*. Anderson County, South Carolina.

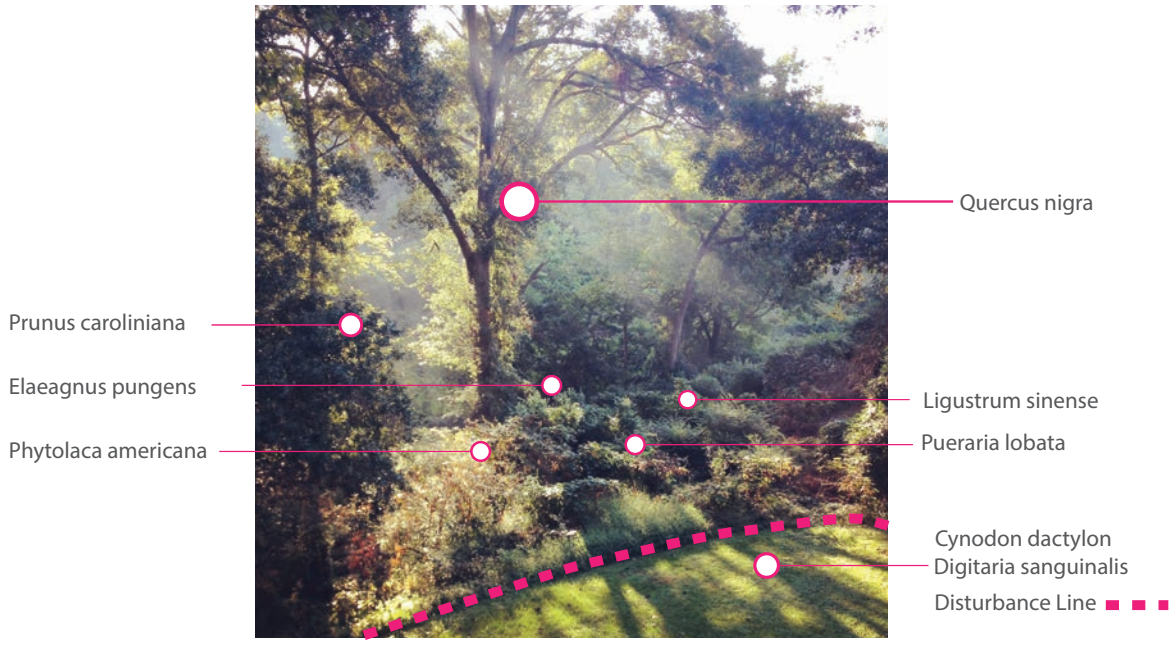


Figure 27 Ruderal forest edge containing more shrub and vine species. Clarke County, Georgia.

Three Typologies: meadow/grassland, woodland, forest

The author's taxonomy of three typologies: meadow/grassland, woodland, and forest, will guide the projective design in chapter 6. Descriptions of Piedmont natural communities by Wharton (1978) and Schafale & Weakley (1990) helped guide the author's construction of three design typologies for utilizing ruderal plants. The diagram (Figure 28) shows the relationship between natural communities and ruderal plant associations.

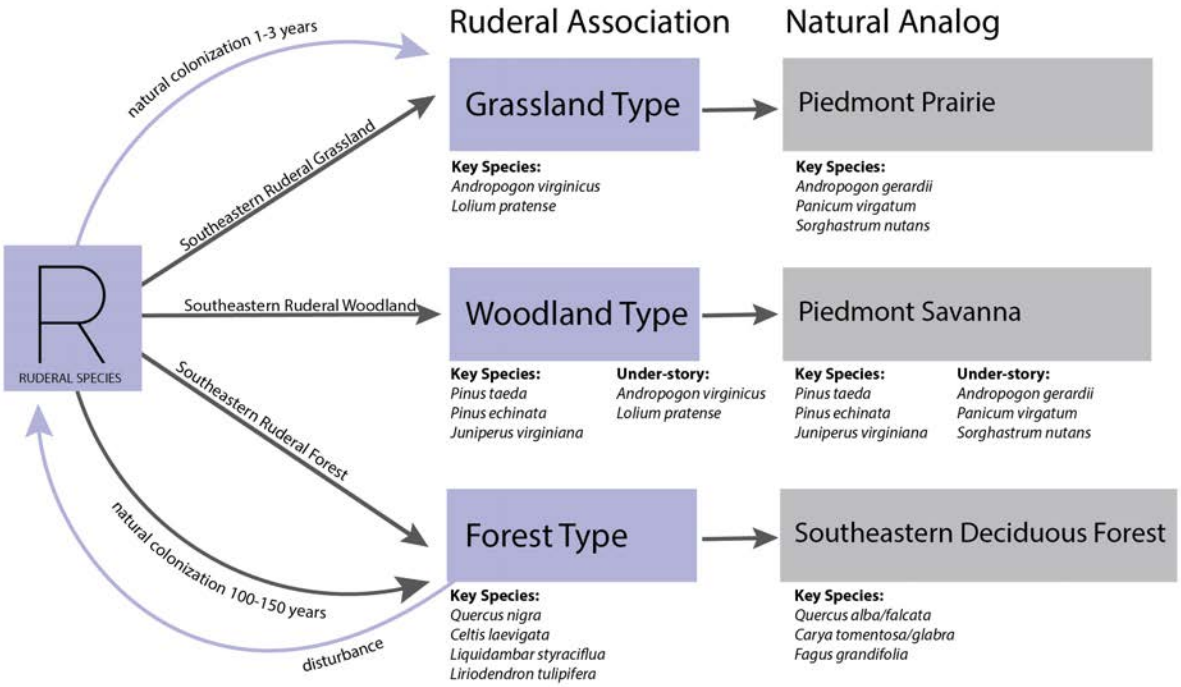


Figure 28 Diagram showing the relationship between ruderal design typologies and analogous natural plant communities. Species list adapted from Wharton (1978), Schafale & Weakley (1990), and NatureServe (2015).

Ruderal Grassland/Meadow: typology and classification

Meadows or grasslands exist naturally throughout the world in climates of low precipitation. Because the Georgia Piedmont climate has relatively high annual precipitation, meadows exist only in the presence of natural or human disturbance. On the Piedmont, meadows represent human intent. They are a direct response to man's domestication of nature; they are a

representation of our agrarian past and can be traced to the practice of crop rotation and the subsequent fallow-fields involved in the process (Jackson 1980). A further domesticated version of the meadow is the front lawn. J. B. Jackson (1951) has written on the evolution of the American lawn in his essay *Ghosts at the Door*. He writes that the importance and meaning of American lawns in landscape design is not only to satisfy a love of beauty but also to satisfy a deeper familiar kind of beauty tied to national pastimes and cultural roots. The lawn has become a national institution because it serves social purpose through the display of good citizenship, neatness, and luxuriant taste.

Figure 29 Ruderal Grassland near a gas station in Carnesville, Georgia (photo by the author).

The American lawn finds its roots in our colonial past, and cultural connection to Great Britain and the lowlands of the Netherlands (Jackson 1980). The colonists of North America transferred their home country's cultural way of life, which was also translated into the landscape pattern. America's expression of nature in the built environment can be linked directly

to primitive man in Northern Europe. Our inherited philosophy towards nature, as something to be harnessed, tamed, and domesticated to establish order, is expressed in the American landscape through the lawn and meadow (Jackson 1951).

Figure 30 Ruderal Broomsedge meadow/grassland, Clarke County Georgia; photo by the author.

The Southeastern ruderal grassland/meadow occurs on sites with recently disturbed soils or disturbed vegetation. This classification can be found on cleared sites with disturbed soils such as old fields, abandoned quarries, old homesteads, etc. It is also found on sites with heavily disturbed vegetation such as roadsides, rail corridors, and over-grazed pastures. The ruderal grassland has a distinct composition and structure, different from natural sub-climax Piedmont prairie (Juras 1997). These stands are composed of weedy generalist species, usually a combination of native and exotic species (NatureServe 2015).

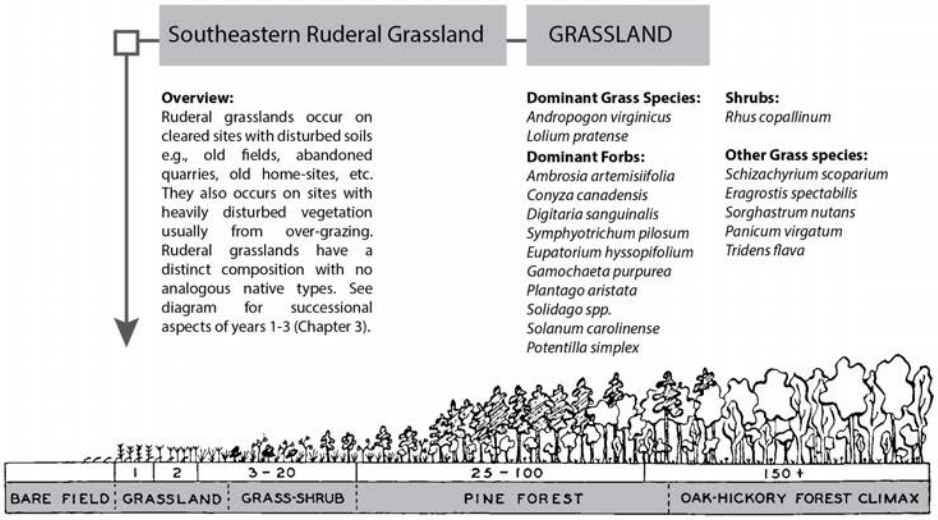


Figure 31 Southeastern Ruderal Grassland – species classification from NatureServe (2015); diagram by author

Ruderal Woodland: typology and classification

It is often difficult to disambiguate between the terms forest and woodland, but for this thesis, tree density and canopy cover will be the main differences. Woodlands have a lower density of trees and typically have less that 30-50% canopy cover. The open woodland canopy allows for sunlight to reach the ground layer, and supports a diverse ground layer of herbaceous grasses and forbs. On the Georgia piedmont, woodlands are pine-based communities with Loblolly (*Pinus taeda),* Shortleaf (*Pinus echinata),* and Slash (*Pinus elliotii)* Pines comprising the main tree cover. In Georgia, the woodland type is better associated with the coastal plain eco-region, most notably the natural communities of longleaf pine (*Pinus paulustris)* and pine flatwoods (*Pinus elliottii),* but historic accounts of anthropogenic fire regimes support evidence that woodlands or savannas were once a main vegetation type on the Georgia Piedmont (Juras

1997). These are now rare due to agriculture and fire suppression of European settlers (Juras 1997).

Figure 32 Woodland Typology, Clarke County, Georgia (photo by the author).

The Southeastern ruderal woodland has an open to scattered canopy of Loblolly Pine (*Pinus taeda)* and sometimes Slash Pine *(Pinus elliottii)* with a herb layer dominated by Broomsedge (*Andropogon spp.)* on dry, eroded soils and Little Bluestem (*Schizachyrium scoparium)* or Switchgrass (*Panicum virgatum)* on wet, nutrient-rich soils. NatureServe (2015) presumes that this is not a naturally occurring community and is only known in fire-maintained landscapes outside of Georgia's natural range of longleaf pine (*Pinus palustris)* (NatureServe 2015).

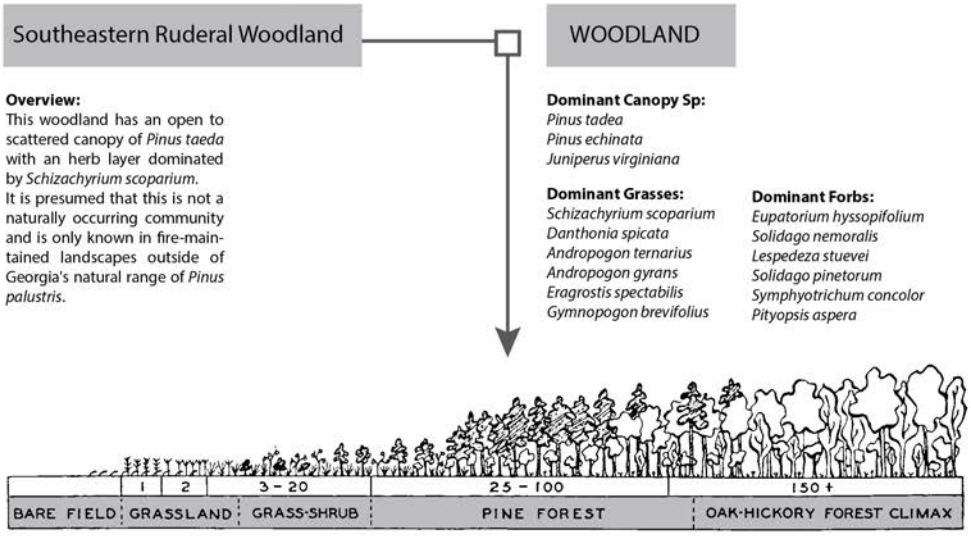


Figure 33 Southeastern Ruderal Woodland – species classification modified from NatureServe (2015).

Figure 34 Ruderal grassland with *Pinus teada* beginning to emerge. Woodland typology in background, Pickens County, South Carolina; photo by the author

Ruderal Forest: typology and classification

The forest typology represents the 'climax' vegetation. The Southeastern Deciduous Oak/Hickory Forest is a prominent feature of the Piedmont landscape. It is a deciduous-based community with generally >60% canopy cover. In the absence of disturbance, the Piedmont will naturally form a forest community comprised of Hickory (*Cary spp.),* Oak *(Quercus spp.),* and Beech (*Fagus grandifolia).*

Ruderal forest stands are found on disturbed soils of the Piedmont uplands, especially on abandoned agriculture or logging lands. The ruderal forest canopy is dominated (>50%) by Sweetgum (*Liquidambar styraciflua),* Water Oak *(Quercus nigra),* and Sugarberry *(Celtis laevigata)* and sometimes with a mix of other generalist hardwood species such as Mockernut Hickory (*Carya tomentosa),* Tulip Poplar *(Liriodendron tulipifera),* White Oak *(Quercus alba),* Southern Red Oak (*Quercus falcata),* Willow Oak (*Quercus phellos),* and Black Oak (*Quercus velutina)* (NatureServe 2015).

Figure 35 Southeastern Ruderal Deciduous Forest typology, Clark County, Georgia; photo by the author.

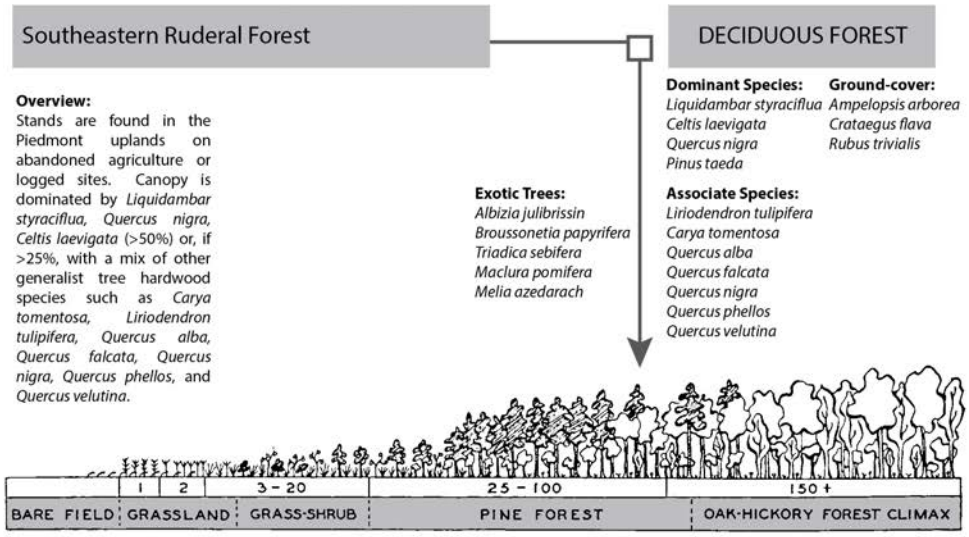


Figure 36 Southeastern Ruderal Forest – species classification adapted from NatureServe (2015).

Figure 37 A typical ruderal forest, Clarke County, Georgia.

Figure 38 A linear ruderal forest between two properties, Clarke County, Georgia; (photo by the author)

Conclusion

Disturbed ruderal landscapes are perhaps the most common landscape on the Georgia Piedmont. This chapter has established three piedmont-specific classifications of ruderal plant associations. This chapter presented photos of direct observation to support the established ruderal vegetation patterns. Chapters 5 and 6 will focus on utilizing the ruderal species from each classification for the design of three landscape typologies that are commonly used in practice: meadow/grassland, woodland, and forest.

CHAPTER 5

SUCCESSIONAL MANAGEMENT: BECOMING PART OF THE PROCESS

> *"In nature plants are grouped according to ecology, or adaptability to their environment. In landscape work, plant groups seem to depend upon fashions and styles. It is often possible to ascertain the decade in which a garden was laid out by the type of plants that were in vogue at the time."*
>
> Marjorie Cautley (1935:200)

The design portion of this thesis presents plant community design using early-successional plants as the driver. Because ruderal species are fast growing and thrive in areas of frequent disturbance, their typologies can be very useful for the early stages of landscape design and can reduce problems from less desirable competitor species (Beck 2013). "*Every newly installed planting area is also a recently disturbed site and can potentially benefit from the inclusion of ruderal species*" (Beck 2013:80). This approach is not an intensive reworking of land into habitats that 'ought to be' but instead is a new way of managing and embracing site-specific natural selection that already occurs in the successional pathway of the Georgia Piedmont (chapter 3).

This chapter presents how succession can be used as a management tool by controlling the rate of succession to meet the landscape aesthetic (chapter 2) and typology (chapter 4) goals established by the designer. The author's management and design strategies will focus primarily on the ruderal grassland/meadow typology (Chapters 5 and 6).

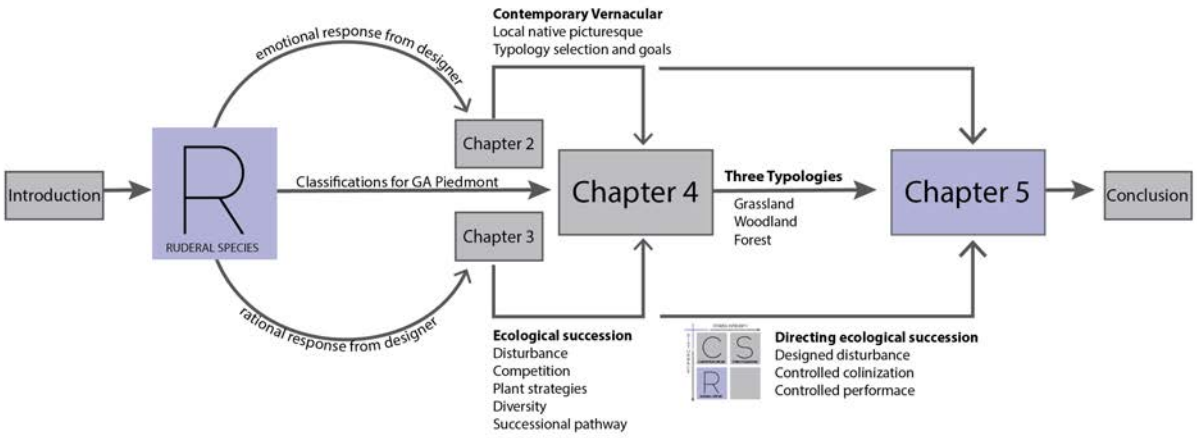


Figure 39 Thesis framework diagram reviewing the chapters leading to Chapter 5 (diagram by the author).

Traditional vs. Ecological Approach

The conventional approach to 'naturalistic' landscape design envisions the landscape as a static entity and aims to implement a mature, or climax, stage rather than considering plant ecology factors such as dynamics and disturbance (see Chapters 1 and 2). All too often, this approach to 'naturalistic' planting design is a failed attempt to instill 'regionally correct' or 'natural' plant communities (Woodward 2004). But the true local identity and sense of place is revealed through the common landscape, and its spontaneous vegetation (Corbin 2003). Gaining an understanding of the common patterns of vegetation will help the designer utilize those species in design, thus working within the local ecology of the site (Woodward 1997). Ecological function is overlooked in this conventional approach, which attempts to sterilize the ground plane and project preconceived ecologies into a climax, and static, state (Beck 2013).

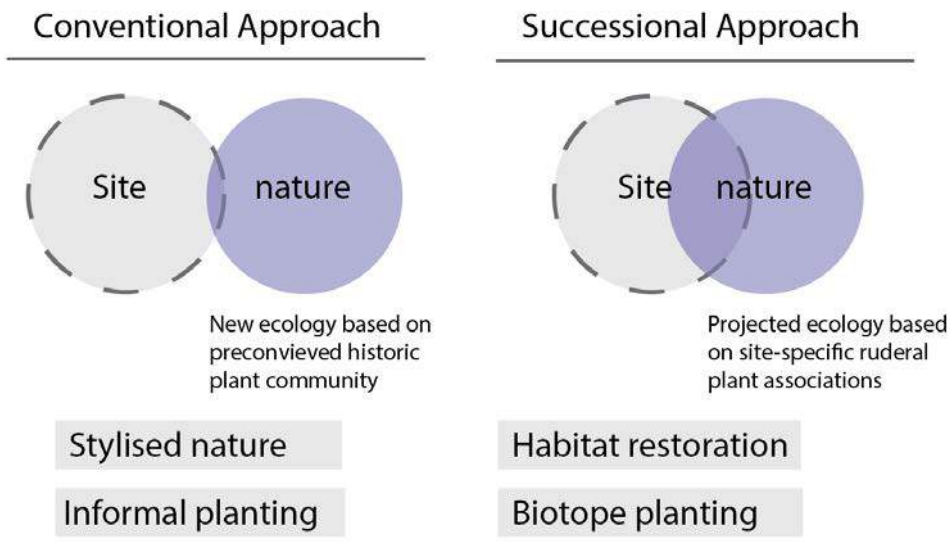


Figure 40 The Conventional versus Successional approach to planting design

Nearly every major landscape project begins with some form of disturbance that sets in motion the process of succession (Beck 2013). If designers instead recognize that plant communities evolve in stages, "*we can arrange plants from different points along the disturbance continuum in a temporal series*" (Beck 2013:198).

Design focus

The author acknowledges that design and landscape management are closely associated with one another, especially when dealing with the stochastic – or randomized – pattern of a naturally colonized plant community. For this reason, the author will narrow the scope for designing with ruderal species and build a concrete model for management in successional planting schemes. With an in-depth understanding of the Georgia piedmont successional pathway (Chapter 3), landscape architects can begin incorporating ruderals and successional management in the decision making process of design.

Because this approach to planting design is process oriented, the design in Chapter 6 will focus on the inaugural steps to engaging the process. The design, representation, and species selection for grassland/meadow typology is the key to initiating successional plantings. This typology is most relevant to the research question, as it deals with the very early stages of secondary succession.

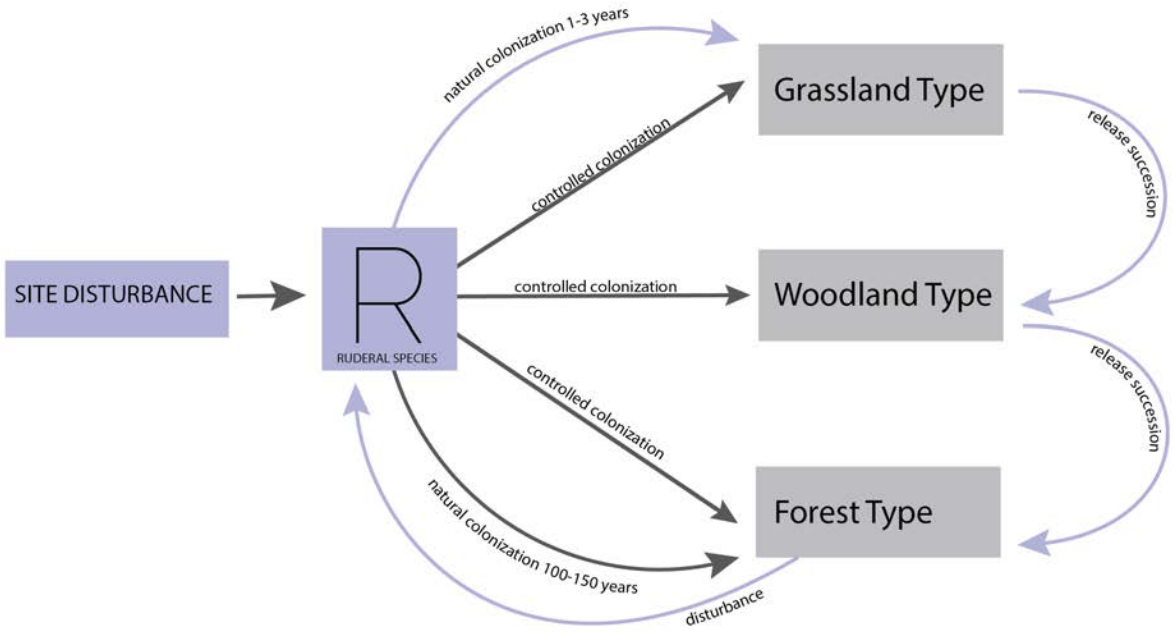


Figure 41 Controlled colonization vs. natural colonization in the successional development of three typologies

Figure 41 shows how site disturbance and ruderal species set in motion the cyclical process of plant succession. The woodland and forest typologies are presented and show an overview of ruderal plant classifications on the Georgia Piedmont. Representing these two typologies in a conceptual design seems arbitrary, as there are too many site-specific environmental variables to consider. The “design” of these typologies is best represented through a management model for designed disturbance and successional management (Figure 42).

Furthermore, the woodland and forest typologies needed to be defined and observed by the author because they can provide a useful tool for site analysis. Being able to recognize ruderal plant assemblages can inform the designer's selection of a disturbance regime. They also inform about the site's species availability from neighboring plant populations and propagules in the soil. The ability to recognize disturbance, and ruderal plant assemblages, when reading the landscape, can help the designer make a case for decisions regarding design strategy and landscape management.

Three-component model for successional management

The manipulation of successional pathways in order to achieve management goals is called succession management. Pickett's (1987) three basic causes of plant succession are (1) site availability, (2) differential species availability, and (3) differential species performance. *Site availability* refers to the contributing process of disturbance and the modifying factors of scale, severity, and time. *Species availability* refers to the site-specific landscape situation, which in turn effects colonization from seed dispersal or existing propagules remaining in the soil, the modifying factors are previous land use history and time since last disturbance. *Species performance* refers to the processes contributing to succession which the author discussed in chapter 4 – plant life history, stress, and competition – and other processes that were too in-depth for this thesis, such as ecophysiological processes (genetic differentiation and rates of germination, assimilation, and growth), allelopathic processes (soil chemistry, microbes, and neighboring species), and herbivory (climate, predators, plant vigor, and community patches) (Luken 1990, Pickett, Collins et al. 1987).

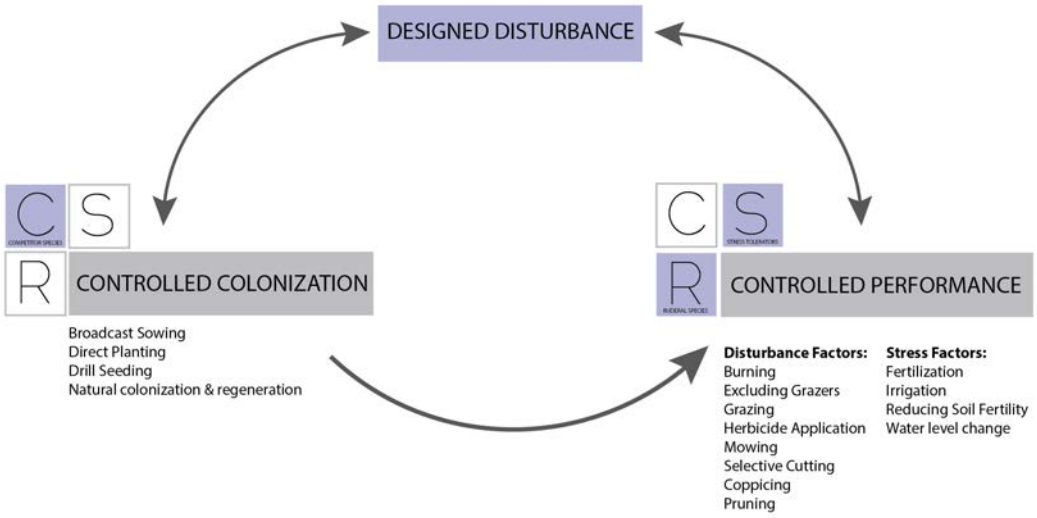


Figure 42 Three components of a succession management model (Picket et al. 1987, Luken 1990, Dunnett 2004)

Picket's three causes of plant succession can be translated into a management model for guiding succession (Figure 42). Picket's three causes of succession become three components in the model, (1) *Designed disturbance* stems from site availability, (2) *Controlled colonization* stems from the differential of species availability, and (3) *Controlled performance* stems from the differential of species performance (Luken 1990). Figure 43 illustrates Luken's three-part model within the context of secondary succession on the Georgia Piedmont, in order to help the reader visualize the successional management model within the context of chapter 3.

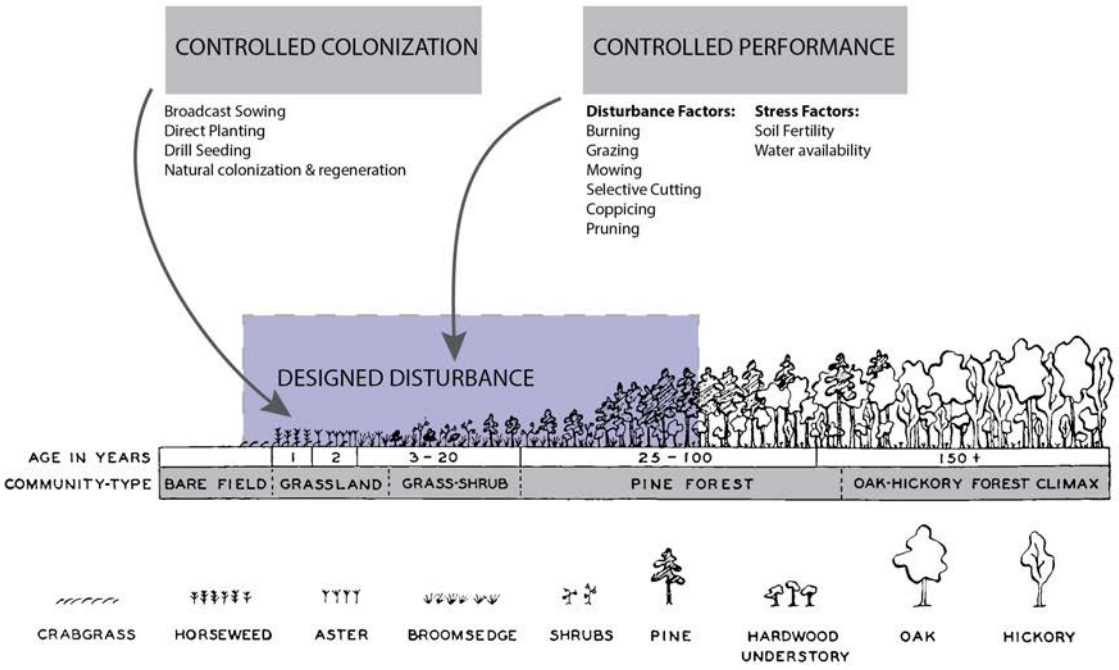


Figure 43 Successional management model for secondary succession on the Georgia Piedmont (Odum 1971, Luken 1990, Dunnett 2004)

Designed Disturbance

Designed disturbance involves intentionally interrupting the successional pathway so that successional management, limiting or enhancing population growth and decline, can take place. In chapter 3, the author showed how disturbance is an essential component in vegetation ecology. Designed disturbance refers to an intelligent approach to landscape management where disturbance is planned to mimic natural disturbances in frequency and intensity. A disturbance interval that is based on the target natural plant community will minimize the impact and spread of exotic competitor species (Luken 1990).

Nature-based disturbance of this kind will contribute to more "natural" plant communities both in structure and diversity (Schafale and Weakley 1990). Human disturbance in the landscape is so pervasive on the Georgia piedmont that it is difficult to find examples of

natural communities outside of man's influence. Sources of natural disturbance on the Georgia Piedmont include fire, wind and ice storms, and wildlife grazing (largely eliminated by human extirpation of bison and elk). Sources of human disturbance in the landscape include direct disturbance from logging, grazing, and clearing, and indirect disturbance from exotic-species introduction, fire suppression, and the modification of waterways and their ability to flood and deposit sediment naturally (Beck 2013).

Designed disturbance takes place in two ways, controlled performance and controlled colonization.

1. Controlled Performance: refers to the manipulation of resource availability by modifying stress factors or disturbance intervals in order to control plant establishment, growth, and competition. Designed disturbance in the form of clipping, burning, and spraying and the subsequent plant or partial plant removal will change the availability of resources (light, water, and nutrients) for the surviving plants in the successional management regime (Luken 1990). For example, the removal of biomass through burning will remove nutrients such as nitrogen from the system.

Stress factors deal with water and nutrient availability and can be managed by either adding or exhausting water or nutrients. Bakelaar and Odum (1978) showed that adding fertilizer to early-successional vegetation could speed up the successional process. They report that adding nutrients significantly increased productivity, by 42%, and shifted dominance from grassland (*Phleum pratense*) to forb/shrub stages, dominated by *Solidago altissima*, that are normally representative of later stages of succession. Adding nutrients will increase productivity, biomass, and dominance, but decrease diversity (Bakelaar and Odum 1978).

2. Controlled Colonization: refers to the designer's approach to managing vegetation regeneration. Controlled colonization can speed up or slow down the natural process of plant succession based on the choices of the designer and the desired typology. In Figure 43 the designer has four choices when dealing with ruderal plants in successional management: (1) arrest succession, (2) intervene by subtracting certain species, (3) intervene by adding new and culturally accepted species, or (4) do nothing and allow succession to run its course (Kühn 2006). This chapter will focus on the controlled colonization of the grassland/meadow ruderal typology in the site application section.

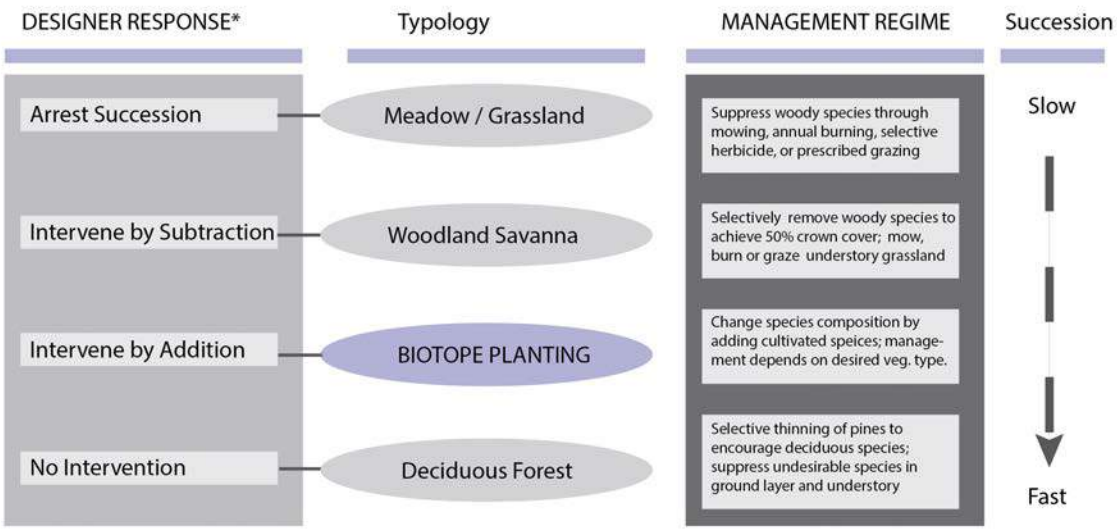


Figure 44 Designer responses – adapted from Kühn (2006) – to ruderal vegetation and subsequent management regime

Grime's (2001) CSR plant life strategy can help the designer understand the role of competitor (C) species, ruderal (R) species, and stress tolerating (S) species in succession management. Controlled colonization is critical in the early stages of succession to manage competitor species. Designed disturbance allows the designer to control performance and

maximize the role of ruderal species (R) and stress tolerating species (S) in meadow/grassland, woodland, and forest design typologies. Figure 45 illustrates how Grime's strategy can be applied to the successional pathway on the Georgia Piedmont.

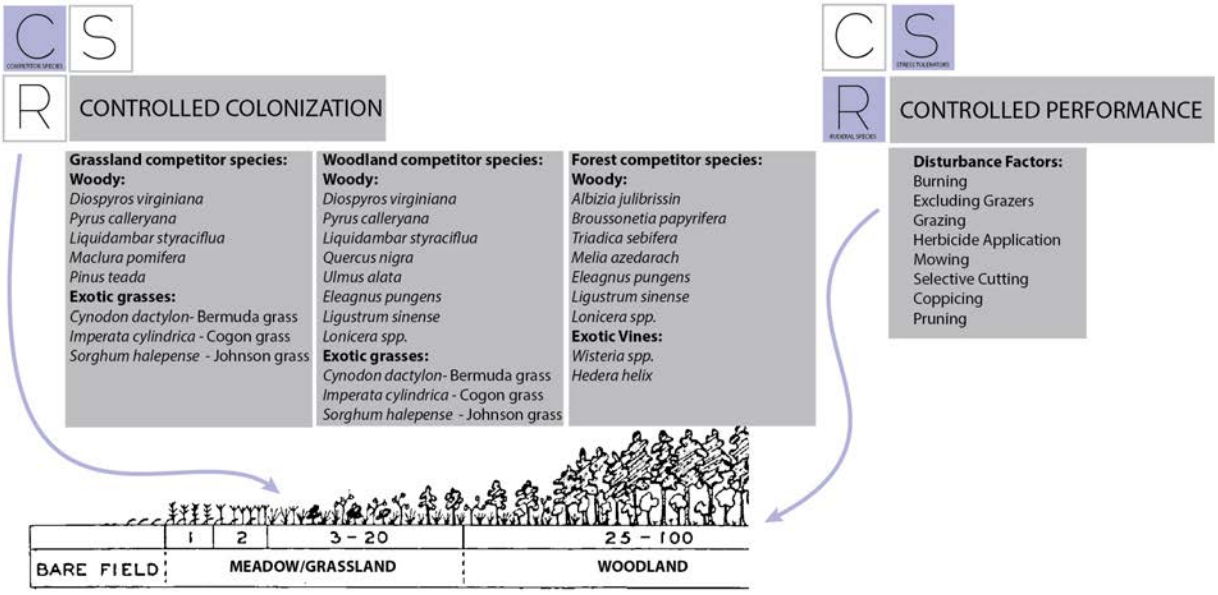


Figure 45 Grime's CSR theory in relation to successional management. Controlled colonization deals with competitor species (C) while controlled performance deals with stress tolerating and ruderal species (S and R).

3. Meadow/grassland management: In an email conversation with Mike Schafale, an expert and author on plant ecology of the Piedmont, the author asked about utilizing ruderal plants in landscape architecture. Schafale writes, "*It is interesting to think about promoting such vegetation. In one sense it is easy – if you abandon a field, it develops. But in urban settings, you tend to get a lot of exotics and escaped ornamentals. And it is true successional vegetation, and you can't easily keep it around. If you try to keep the trees down, you can sustain the broomsedge for awhile, but fescue and other things that respond better to mowing or whatever you use to keep it open will tend to move in*" (Schafale 2015).

In old-field seral stages, such as the Southeastern ruderal grassland, nitrogen is the most limiting nutrient. Only when nitrogen is readily available do other nutrient resources become available (Mellinger and McNaughton 1975). *Andropogon virginicus*, being the dominant species in terms of biomass, is a warm-season perennial (C4) grass that is dormant during the cool months. Adding nitrogen during the cool season will stimulate competition from cool-season grasses (Owensby, Robert et al. 1970), such as *Lolium pratense* and other weedy species (Wayne and Elder 1960). The application of nitrogen during the warm season will help encourage dominance of *Andropogon virginicus* (Rehm, Moline et al. 1972).

4. Woodland management: The historic existence of an anthropogenic fire regime indicates that a disturbance is required to maintain woodlands on the Piedmont. Disturbance prevents other mid-succession deciduous trees, such as *Liquidambar styraciflua, Ulmus alata,* and *Liriodendron tulipifera,* from invading and continuing the processes of succession to forest. Other woody species that could invade the woodland include *Robinia pseudoacacia* (Black Locust), *Pyrus calleryana* (Bradford Pear), *Albizia jullibrissin* (Mimosa), *Melia azedarach* (Chinaberry), and *Sapium sebiferum* (Chinese Tallow Tree). Richard Westmacott stated that sweetgum (*Liquidambar styraciflua)* and persimmon (*Diospyros virginiana*) were the most vigorous woody species in grassland/woodland restoration on his farm in Ogelthorpe County, Georgia. Westmacott cuts these species selectively and treats each rootstock with a hand-brushed application of concentrated herbicide (personal communication with the author, March 4th 2015).

Succession Based Design

Figures 46-47 illustrate the design process for implementing the three ruderal typologies. A generic piedmont site is used to show how the approach to establishment is different

depending on weather or not soil disturbance has occurred. Refer to Chapter 6 to see the application of biotope ruderal grassland in the physical design of an actual site.

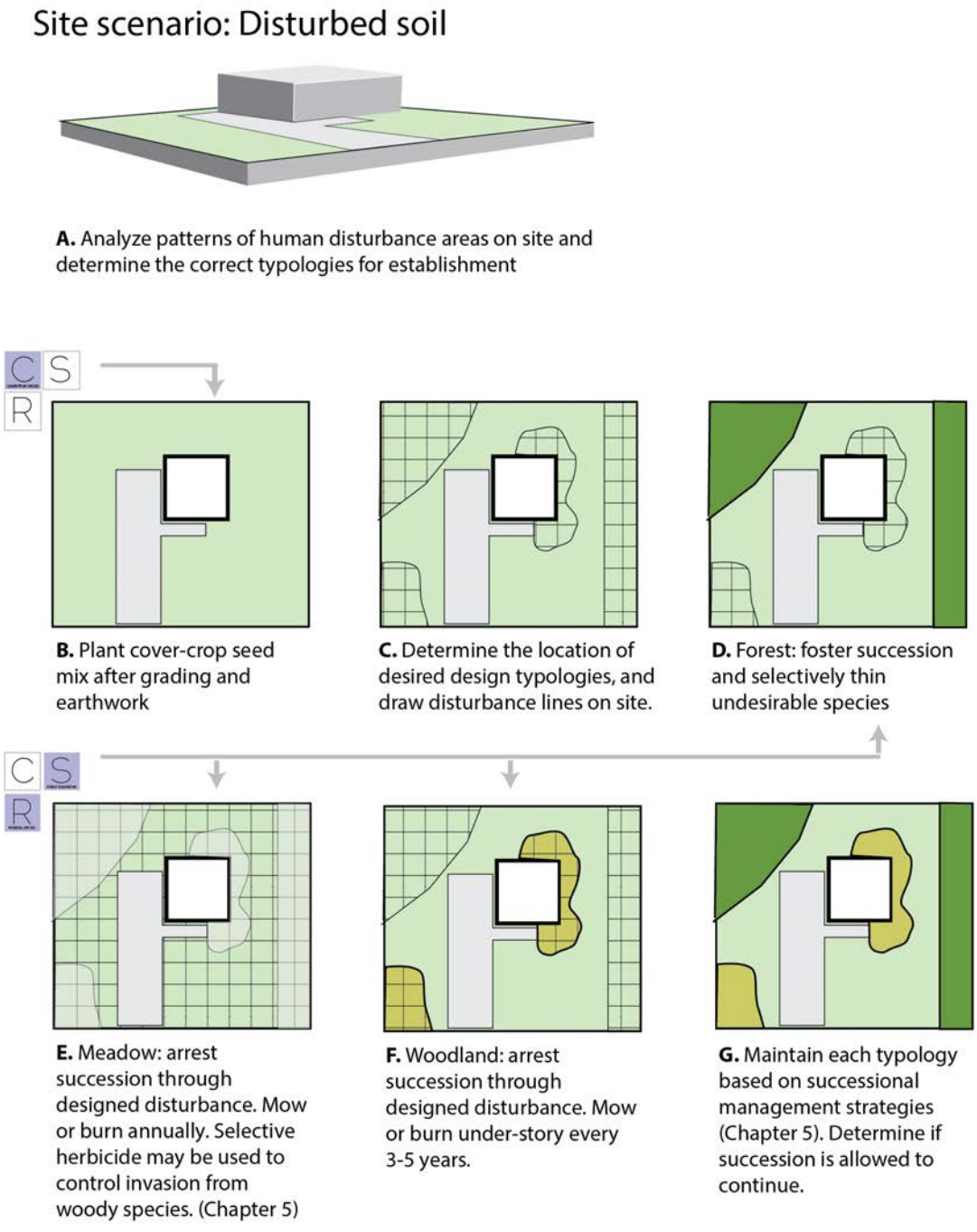


Figure 46 Diagram showing sequential design operation for successional design on a site with disturbed soils.

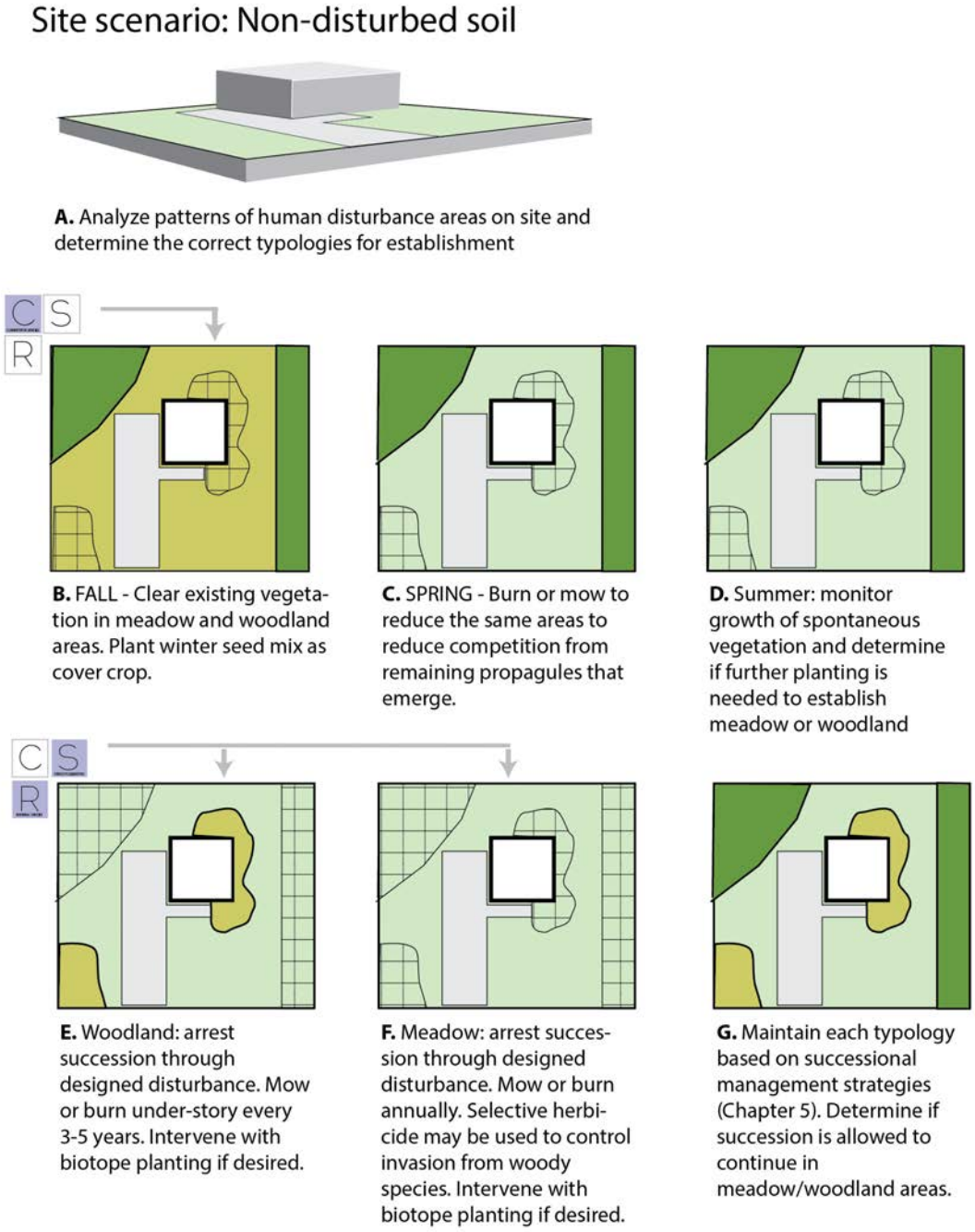


Figure 47 Diagram showing sequential design operation for successional design on a site with non-disturbed soils.

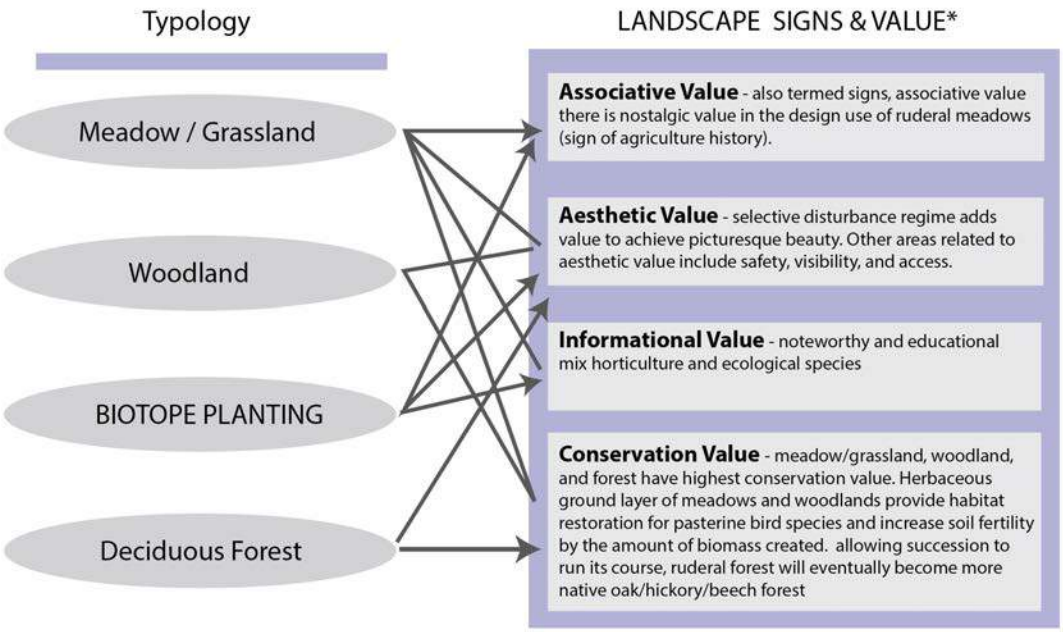


Figure 48 The design values in terms of typology selection; diagram created by the author, adapted from Kühn (2006)

Designer response: identifying criteria to inform management of ruderal vegetation

The landscape values shown in Figure 48 are based on Kühn's (2006) essay, where he describes four design perspectives, or values, in species selection for landscape design. The author has adapted these values within the context of the typologies for this thesis. Figure 45 illustrates the design and management approach to each of the three typologies. The 'biotope planting' category refers to Kühn's (2006) strategy for adding culturally accepted species. These species are added to the ruderal community for the purpose of landscape design and displaying human intent in the scheme. The addition of biotope species (Figure 49) can be instrumental in creating internal versions of Nassauer's (1995) 'cues to care' that were discussed in Chapter 2. Furthermore, the biotope planting is a way for the designer to structure and provide order and rhythm to successional ruderal planting design, similar to Piet Oudolf's grassland garden approach examined in Chapter 2 (see Figure 7).

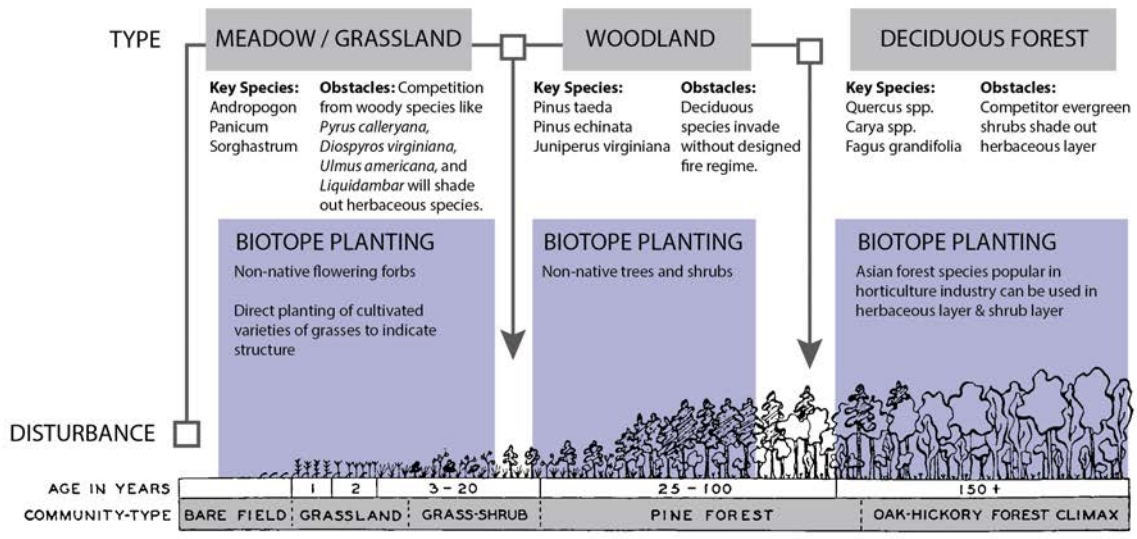


Figure 49 Designing with plant succession and suggested strategies for biotope planting across typologies

Biotope Planting

Biotope planting is similar to Piet Oudolf's matrix planting discussed in Chapter 2. The goal of biotope or matrix planting is to minimize maintenance inputs of traditional informal naturalistic planting design by developing a matrix of species to suppress invasion of competitor weeds species. Biotope planting aims to use natural plants in the development of the matrix in order to minimize management problems from insect pests, soil infertility, and watering requirements.

The Georgia Piedmont ruderal grassland typology will inform the author's projective design of biotope meadow in Chapter 6. The idea is to encourage a matrix of warm-season (C4) grass species (*Andropogon virginicus*) to discourage competition from undesirable species. The author's observations of ruderal communities on the Piedmont show that a matrix of *Andropogon virginicus* will work best in the conditions of poor soils and heavily eroded or disturbed soils.

Furthermore, the establishment of Piedmont meadow species was observed by the author's experience working with the South Carolina Botanical Garden (SCBG) at Clemson University in 2012 to establish a piedmont prairie biotope planting. Dr. Patrick McMillan, director of the SCBG, has established a piedmont prairie community based on natural analogue (see Chapter 4) species such as Indian nutgrass (*Sorghastrum nutans*), Little bluestem (*Schizachyrium scoparium*), and Big bluestem (*Andropogon gerardii*). Broomsedge (*Andropogon virginicus*) was not incorporated into the planting scheme. Dr. McMillan – who has served as outside professional on this thesis committee – commented that utilizing a ruderal species like Broomsedge (*Andropogon virginicus*) would have been a much easier way to establish a biotope meadows at the SCBG. He agreed that it represents a new way of biotope planting in the region.

Conclusion

This chapter presents how succession can be used as a management tool by controlling the rate of succession to meet the landscape aesthetic (chapter 2) and typology goals (chapter 4) established by the designer. Grime's CSR plant life strategy can aid the designer in developing designed disturbance intervals for the successional management of each typology. Controlled colonization is critical in the early stages of succession to manage competitor species, and chapter 6 will explore how to establish the meadow/grassland typology in order to inaugurate the early-seral stage of succession. In successional management strategy laid out in this chapter, the author shows that designed disturbance can maximize the role of ruderal species (R) and stress tolerating species (S), while limiting the role of competitor species (C) in the meadow/grassland, woodland, and forest design typologies.

The successional management strategies discussed in this chapter are a key to designing with ruderal species. Chapter 6 will show a way of implementing successional planting design to

an urban site and illustrates how the process of successional planting design can be practiced in landscape architecture. Biotope planting offers the best opportunity for designer's to improve ruderal plant compositions through the internal structuring and arrangement of horticulturally accepted species. Biotopes allow the designer to show intentionality to the ruderal meadow/grassland and improve seasonality or phenotype of the planting schemes. Details for implementing the biotope meadow will be covered in Chapter 6.

CHAPTER 6

SITE APPLICATION: INSTALLING THE RUDERAL PICTURESQUE

> *"In the end it would be a failure if we did not recognize that the reality of nature and society are greater than our capacity to understand and manipulate them. In advocating design I am proposing wild design, the kind that operates in sympathy with the vitality of life (2003:4)." . . . "Intentionality is critical to the success of restoration, but intentionality courts hubris (2003:285)."*
>
> Eric Higgs

Site Overview

The site chosen for the projective design is located in downtown Athens, Georgia, within close proximity to University of Georgia's North Campus, and Dudley Park. The property, commonly called Armstrong and Dobbs, was chosen because it was recently cleared for construction. The scale of disturbance – approximately 10 acres – and the site's historical relevance as a historic warehouse district guided the author's selection. The site's land-use history (rail yard and light-industrial) provided an appropriate context for the application of ruderal plants in design.

The Armstrong and Dobbs site has been in the local media several times of the past few years, as concerned citizens of Athens have been in conflicting arguments with developers - most notably protesting against the development of the box-store giant, Wal-Mart. It is the view of the author that this site is the last of its size and proximity to downtown, which is precisely why it

has stimulated a debate about its redeveloped (Figure 50). The site's historic land use, existing ruderal associations, and the cultural connection to the citizens of Athens are all reasons for the use of ruderal species as both an ecological and emotional device (chapters 2, 3, and 4).

Figure 50 Context map for the projective design study area.

EXISTING BUILDINGS
319 Oconee St
Athens, GA 30601
[33.957447, -83.369528]

SITE AERIAL
319 Oconee St
Athens, GA 30601
[33.957447, -83.369528]

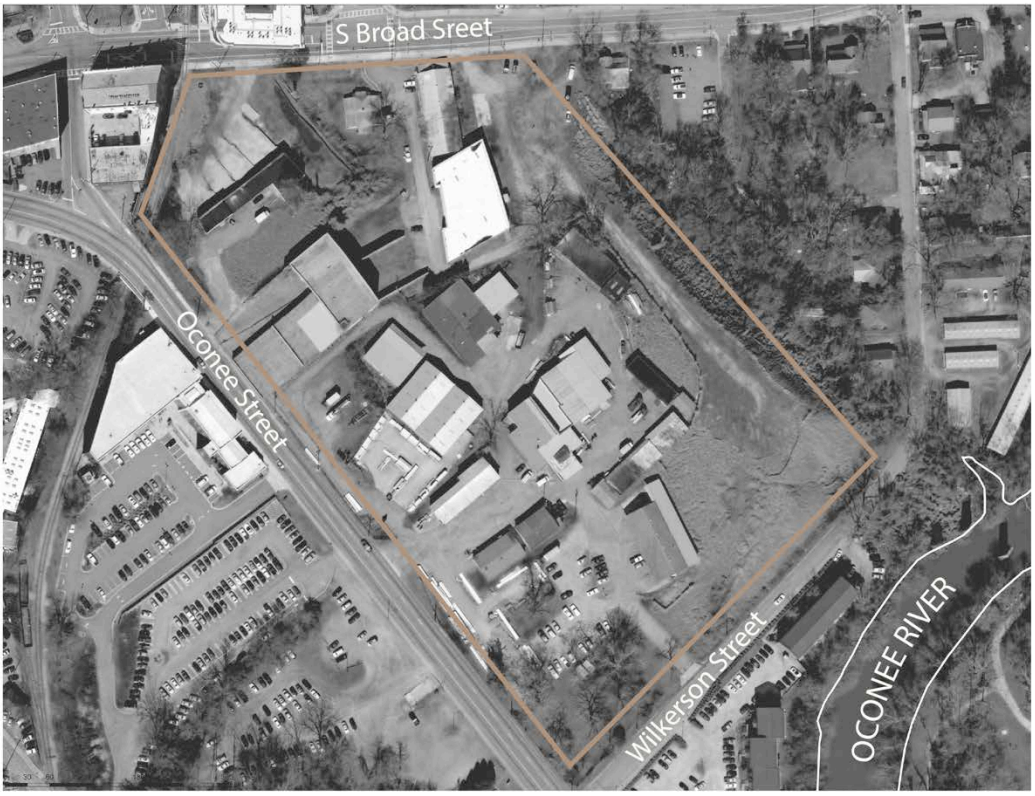


Figure 51 Aerial and diagrammatic views of the site's pre-disturbance conditions (Fall 2014)

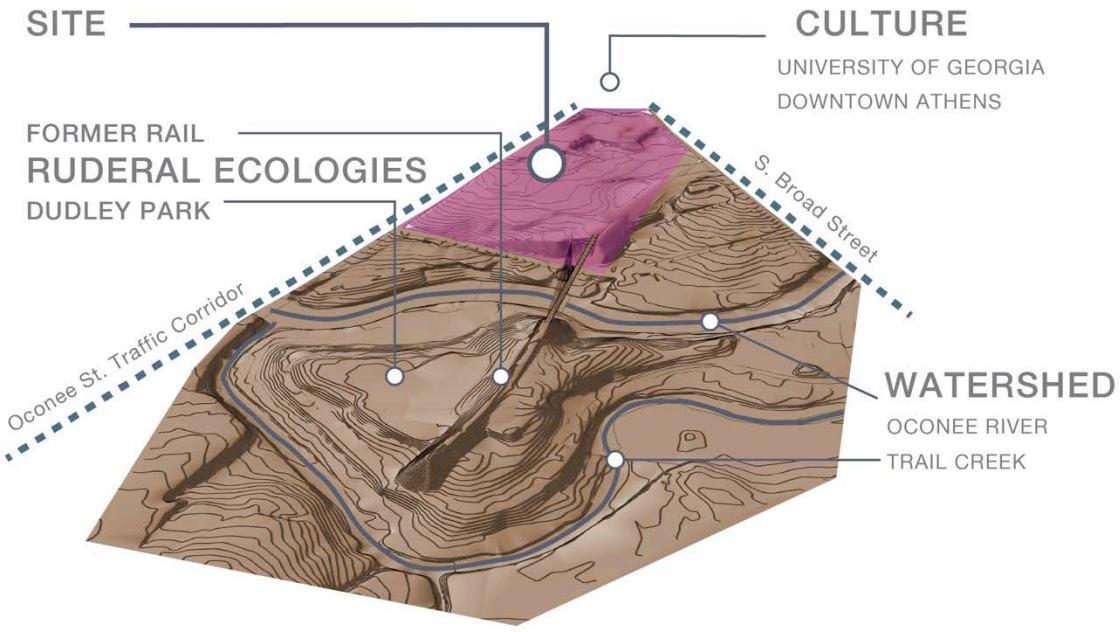


Figure 52 Axonometric representation of site topography, and both ecological and cultural connections.

Site Analysis

The selection of ruderal typologies is based on site analysis of existing vegetation (Figure 54 and 55) and patterns of disturbance (Figure 53). The meadow/grassland typology, which has a higher proportion of ruderal (R) species, is appropriate for the design of areas with heavily disturbed soils and/or areas with high vehicular or pedestrian traffic. Ruderal meadow/grasslands will thrive in poor soils and should be located accordingly. Wherever there is great potential for perpetual disturbance, ruderal species should be incorporated. The forest and woodland typologies are informed by site context and existing stress-tolerator (S) and competitor (C) species on site. The site's edges and neighboring forest/woodland communities should be considered when planning for the forest or woodland typology.

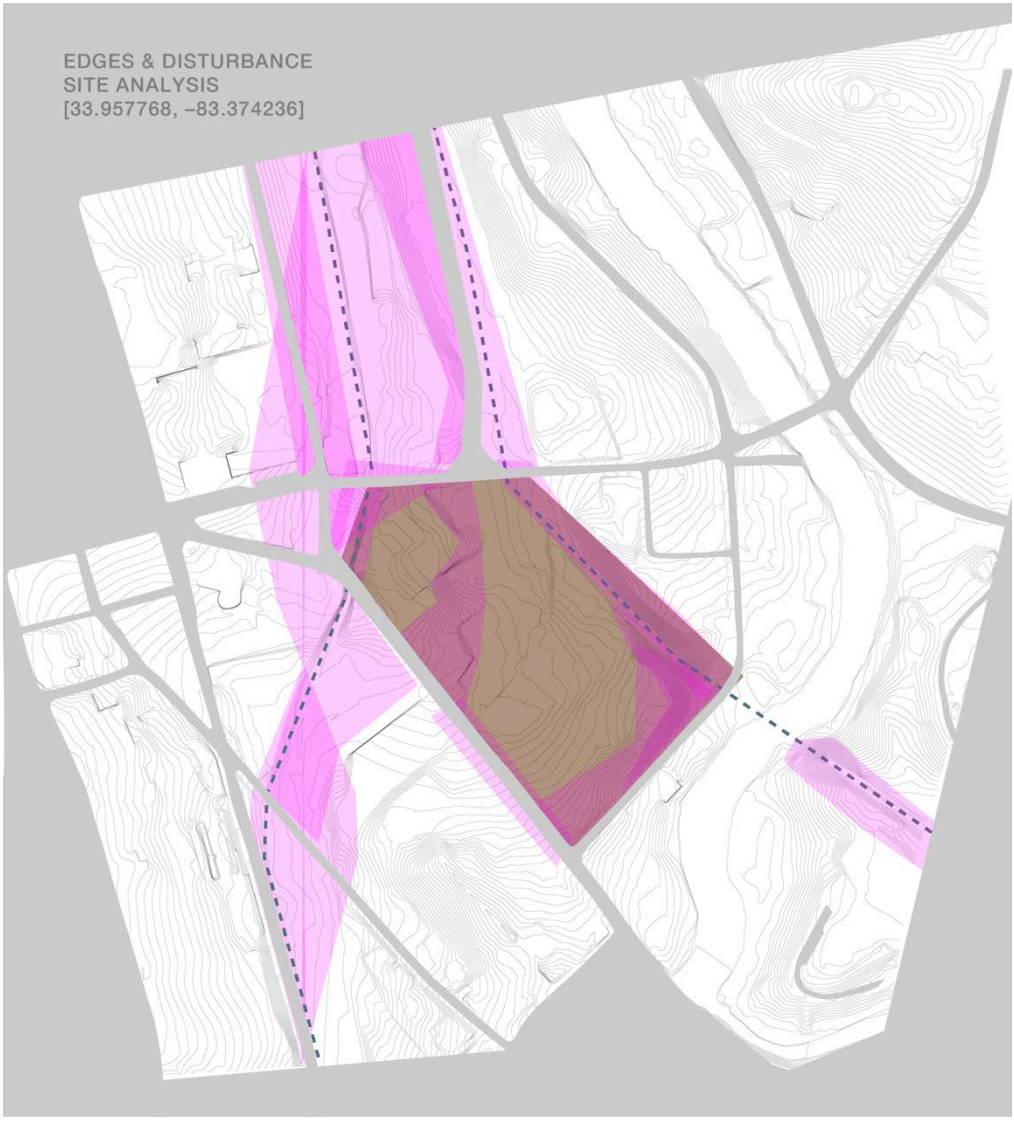


Figure 53 Analysis of the site's pre-disturbance patterns and off-site edge habitats reveal where ruderal associations can be utilized as an ecological device. Disturbance analysis is essential to designing successional vegetation typologies. Areas in darker pink indicate more intense disturbance intervals.

Because the site's boundary is three roads and two former rail corridors (figure 53), the author observed many of the common signs of disturbance that are associated with ruderal species. Analysis (figure 59) revealed a history of light-industrial activity, from cotton storage and processing to most recently, a building material supplier's wholesale yard (Figure 49). Dashed lines in Figure 51 indicate former rail beds. The edge habitat along these former railways provided an opportunity for forest or woodland habitat restoration through successional

implementation of ruderal species (figure 59), especially along the proposed ‘firefly’ greenway trail on the former rail bed indicated in Figure 52.

Figure 54 Site analysis and on-site sketching/photography informed the opportunities for utilizing ruderal species as a concept device in the design

Figure 55 Photo inventories of ruderal plant associations, signs of disturbance, and opportunities for contemporary picturesque views

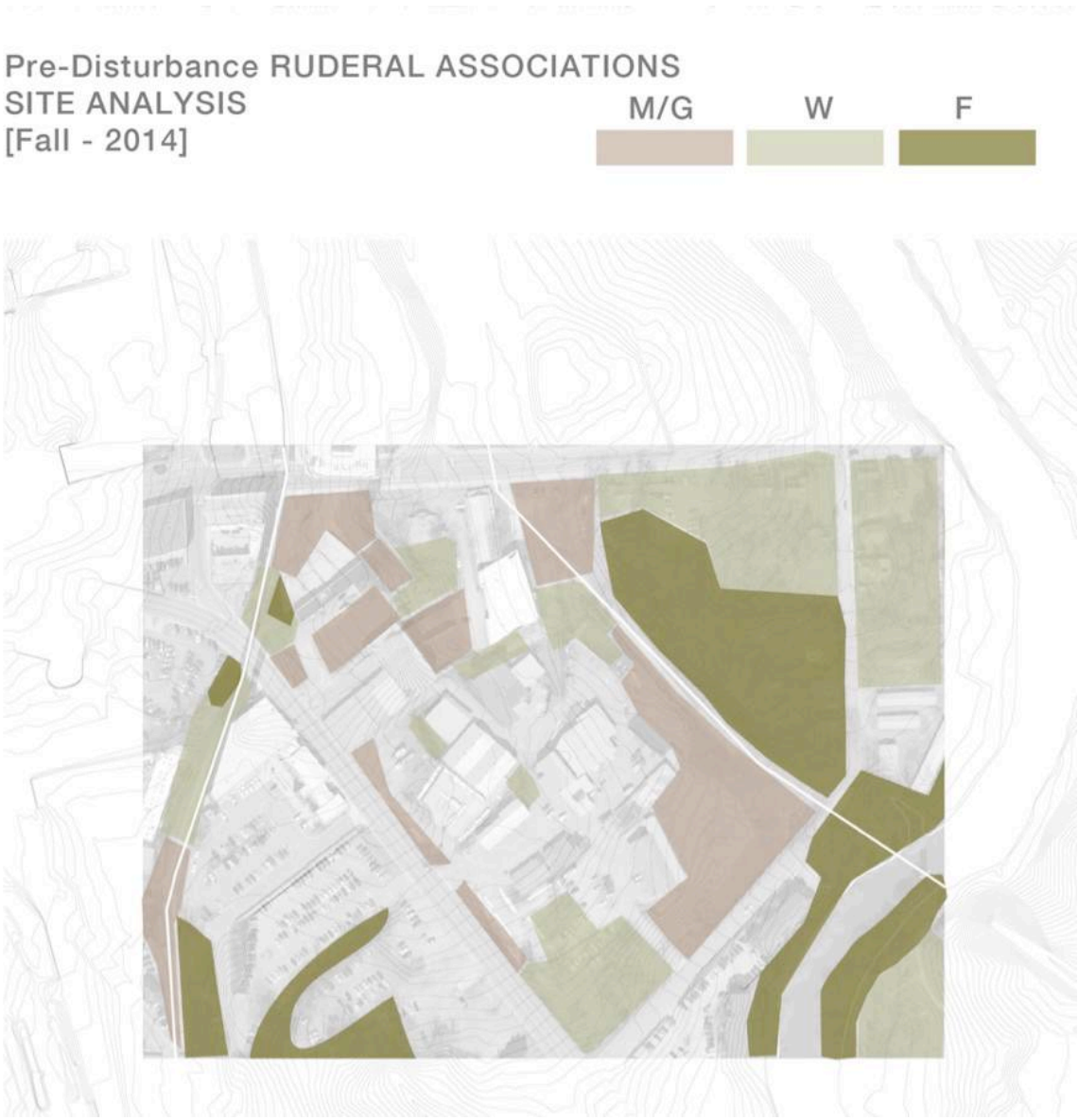


Figure 56 Pre-disturbance ruderal associations, Fall 2014. (M/G stands for meadow/grassland, W indicates woodland, and F is for ruderal forest)

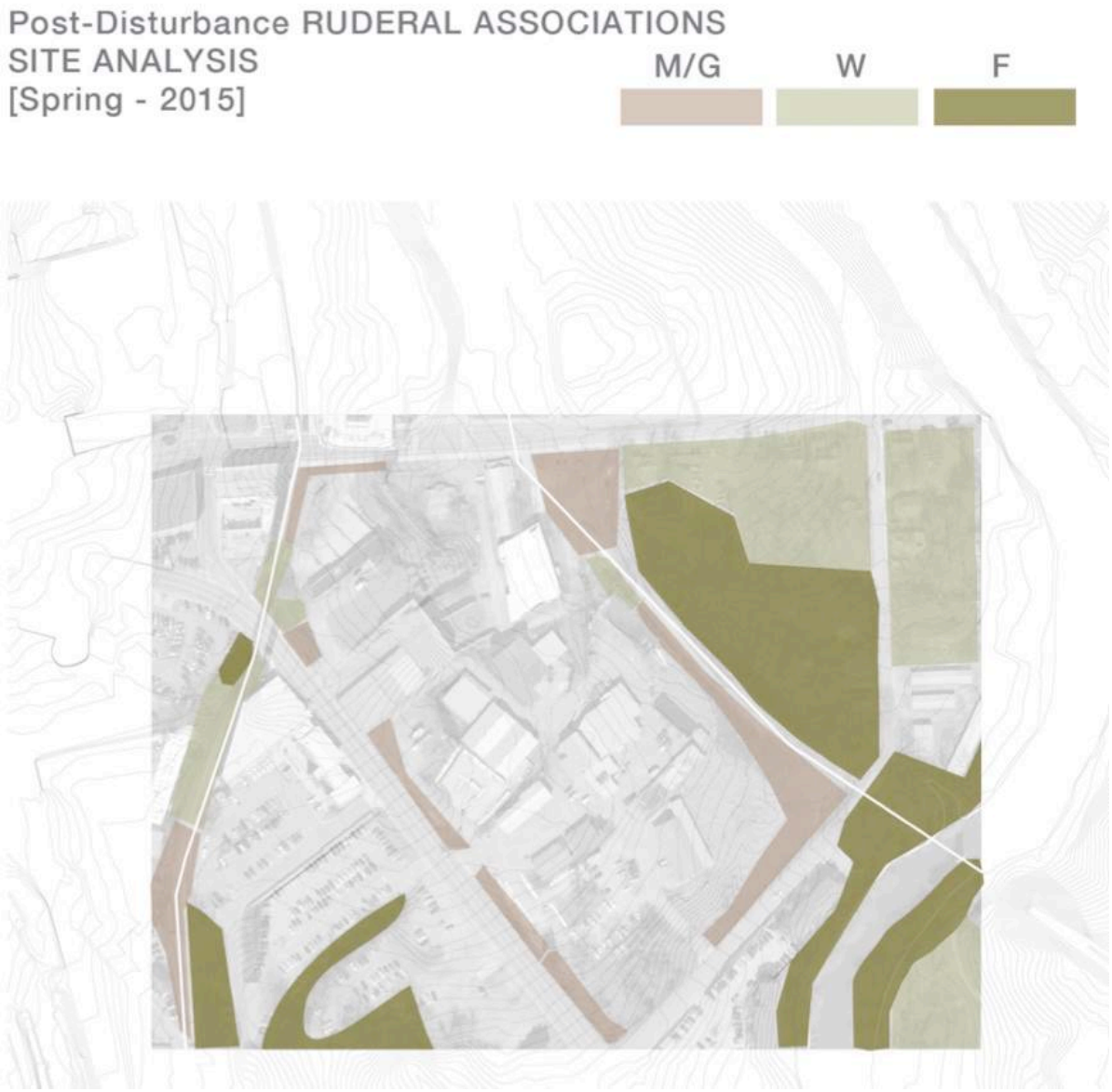
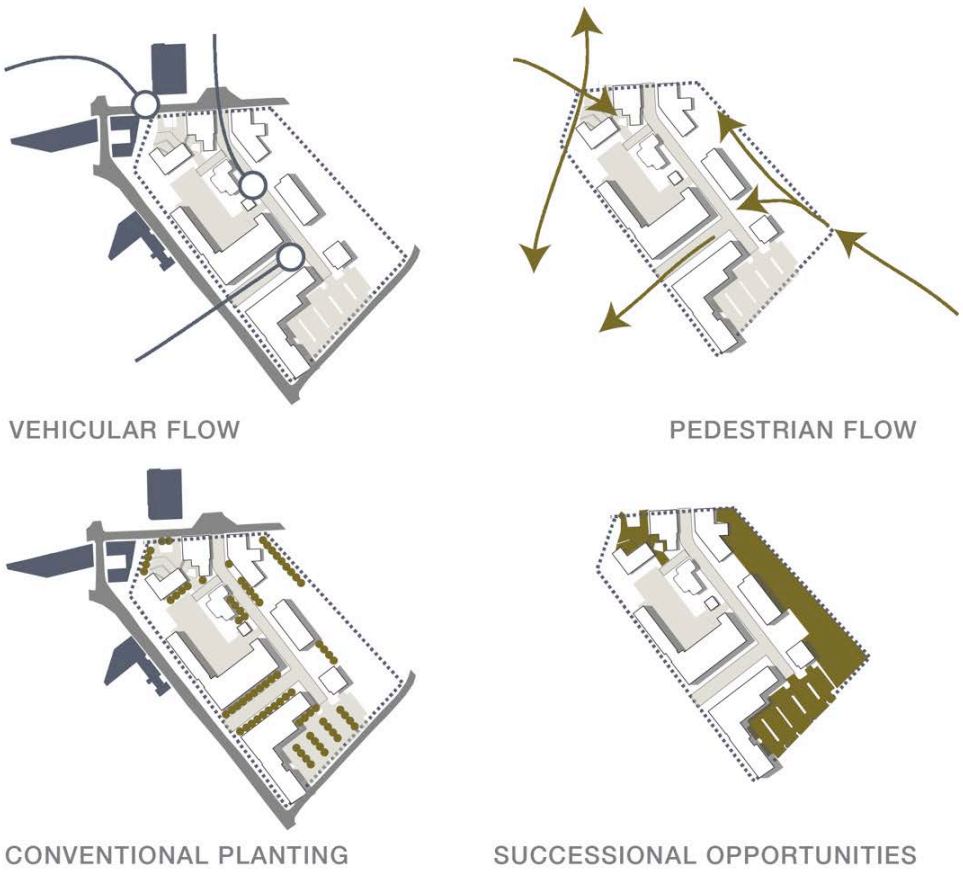


Figure 57 Post-disturbance mapping of ruderal associations, Spring 2015. (M/G stands for meadow/grassland, W indicates woodland, and F is for ruderal forest)



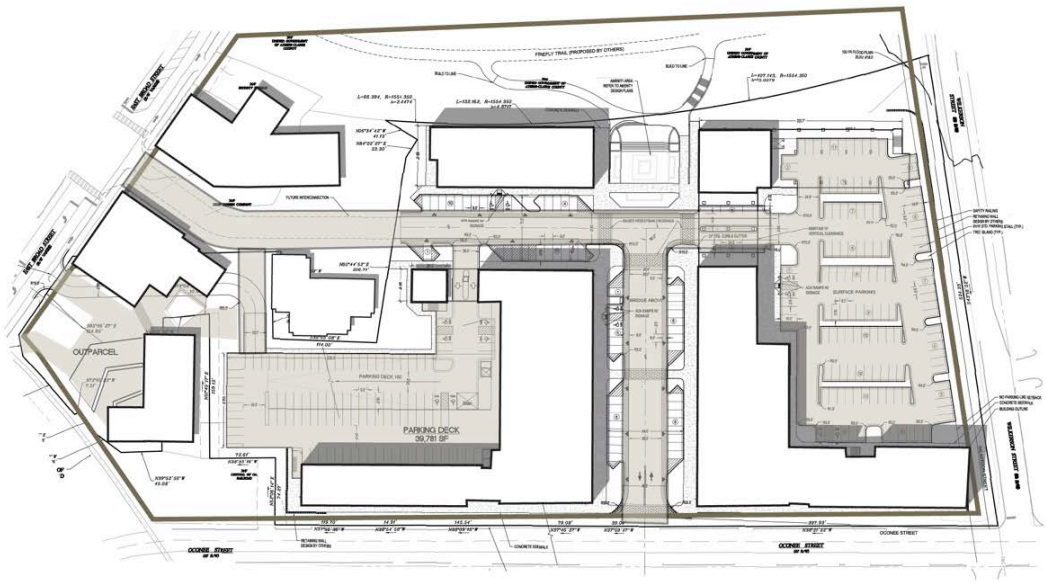


Figure 58 The site design and diagrams showing human access and conventional vs. successional planting strategies

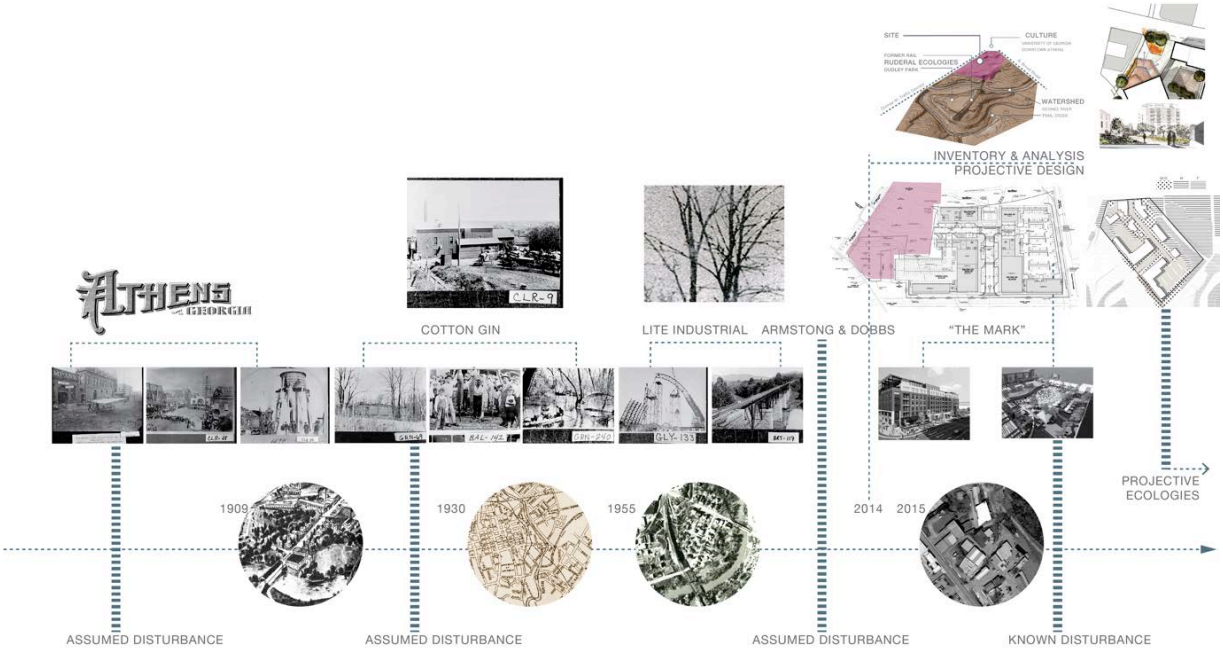


Figure 59 Historic research and analysis helps infer past disturbances on the site.

Site Design

Much of the northern half of the site is registered as Historic Warehouse District. The author used this fact in the development of the design concept for the successional planting schemes and the planning of the site's architectural style. This provided a design opportunity to transition between old and the new mixed-use architecture proposed by "The Mark" student housing development. The building footprints in the projective design are not entirely an accurate representation of the plans for development of "The Mark." The three building footprints on the northern part of the property (top of Figure 61) are a deviation from the proposed development. This change to the design provides historic warehouse style architecture and an opportunity for a gradient of building scale. Furthermore, the aesthetic character of the ruderal grassland typology plays nicely with the contemporary picturesque qualities of Athens's historic warehouse-style architecture and the adjacent rail corridor (Figures 60, 62-64). Thus, ruderal species will be used as a concept device in this strategic area (highlighted in pink in

figure 54). Picturesque aesthetic conventions were used to place evergreen tree species to frame the view and contrast with the broomsedge (*Andropogon virginicus*) meadow in figure 60. The design aims to improve the pedestrian experience from downtown Athens. Site topography was considered when creating these pedestrian nodes, and the warehouse-style buildings provide a framework for two plaza spaces (figure 58). The perspective (figure 58) shows the site's pedestrian connection to downtown Athens.

Figure 60 The author used the aesthetic notion of contemporary picturesque (chapter 2) to design an entry plaza space that utilizes ruderal grassland and woodland species as a concept device and ecological device to frame views of off-site architecture

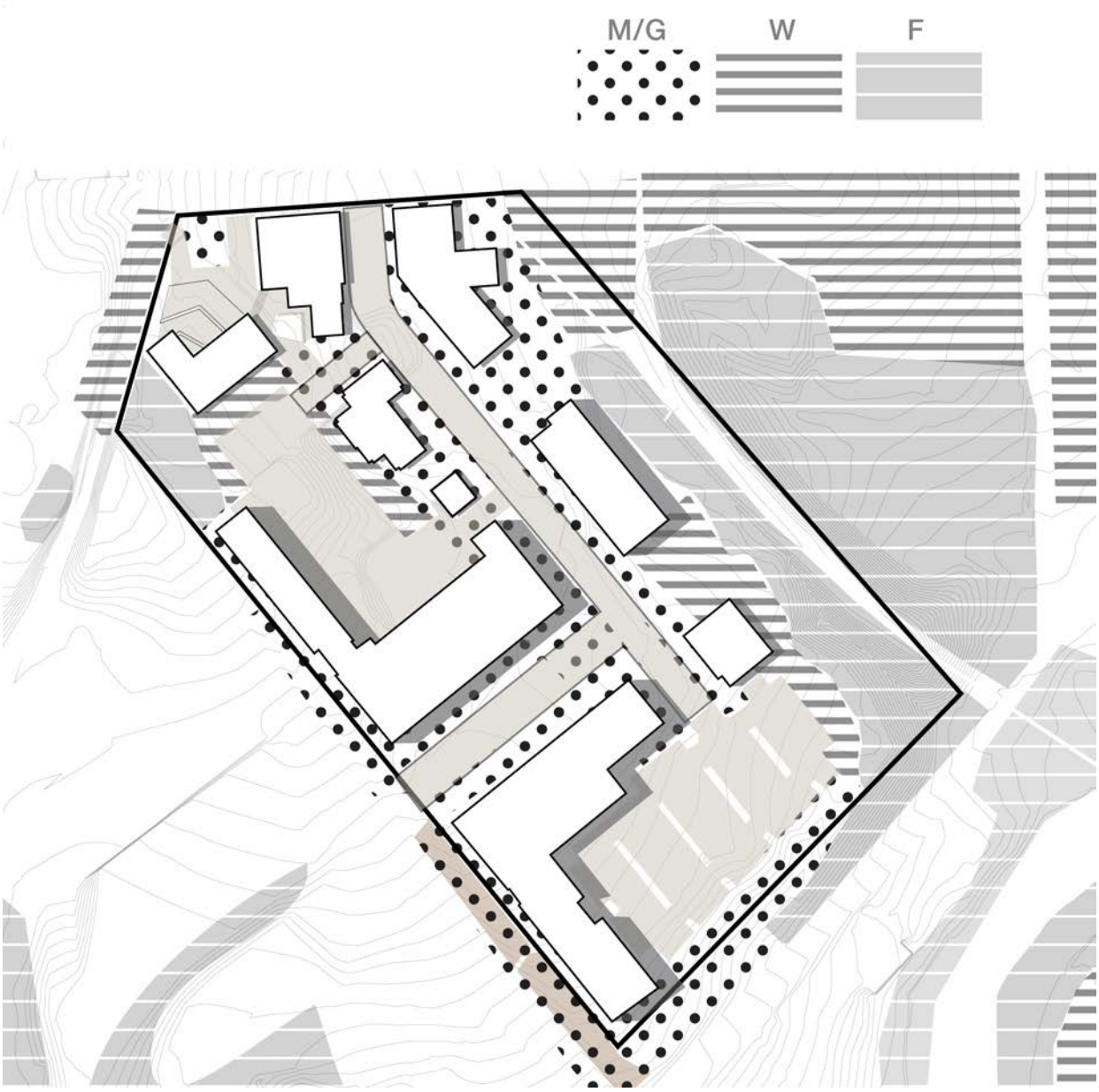


Figure 61 Conceptual design for proposed typologies. General hatch patterns are used to indicate typologies on and off-site – M/G stands for meadow/grassland, W indicates woodland, and F is for ruderal forest. The entire site will be established in the grassland/meadow typology and successional management will be used to guide succession into woodland and forest typologies, as indicated on this conceptual plan.

Ruderal Biotope Meadow Establishment

There are two main strategies for the controlled colonization of ruderal grasslands based on the type of initial disturbance. The landscape designer must decide to establish a grassland community using a soil disturbance or non-soil disturbance strategy.

1. Disturbance through earthwork, i.e. soil disturbance

When site grading and earthwork are part of the initial site disturbance, the strategy for establishment becomes similar to the model used in fallow agriculture fields. Cover crops such as annual rye, hairy vetch, or crimson clover should be sown to cover soil and prevent erosion and weed competition. Depending on time of year, warm or cool seasons, the cover crop species will change based on their growth strategy. Crimson clover, hairy vetch, and other legume cover crops can help build soil nitrogen. Annual rye grass, when sown in the fall, will build biomass quickly and suppress winter weed species. The uniformity of annual rye, and the quick green-up after germination, will provide uniformity and intent in the application to landscape architecture. Overall, it is important to suppress perennial cool-season species, as they will inhibit germination of *Andropogon* seeds. Meadow rye grass (*Lolium pratense*) is one example of a cool-season (C3) forage crop that will be problematic when trying to establish an *Andropogon virginicus* grassland.

Cover crops act like the ruderal crabgrass, horseweed, and ragweed that were discussed in chapter 3. During these first stages of Piedmont succession each plant has its role. In year one, crabgrass covers bare soil and helps the soil retain moisture needed for horseweed to germinate. The horseweed in year two competes out or inhibits the crabgrass and builds organic matter for the next year. In year three, asters and ragweed begin to dominate and shade out the horseweed and crabgrass from the previous years. This cycle builds organic matter and moisture into the soil

while adding nitrogen from decomposing biomass. This process of early-succession creates the necessary conditions for *Andropogon* and *Solidago* to germinate in years 3-5.

In general, the use of disking or tilling is important to prepare a meadow/grassland restoration site. Transplanting meadow species is difficult as they generally have extensive root systems (Harker 1999). Seedbed preparation is important, and weed-free seedbed will help the establishment of *Andropogon virginicus.*

The best method of establishment usually involves seeding in early spring when the soil has begun to warm (Harker 1999). Sowing in fall is also possible in the South, provided that the correct winter cover crop is selected and terminated at the right time for spring/summer germination. Broadcast seeding requires more seed and has the potential that seeds will wash away in heavy rain events or on sites with steep slopes. Seed can be mixed with sand for a more uniform sowing and should be raked in at a depth of a quarter inch. Drill-seeding at a depth of 1-3" may be necessary depending on site conditions such as slope and accessibility of machinery. *Andropogon* seeds would germinate at greater uniformity if drill-seeded (Harker 1999).

2. Disturbance by clearing of existing vegetation, i.e. no soil disturbance

When establishing a meadow/grassland from existing site vegetation, and no grading is necessary, site preparation and controlled performance of existing vegetation becomes key. Existing vegetation should be carefully evaluated and it may be worthwhile to burn existing biomass and wait a full growing season in order to see what ruderal grassland species might develop naturally on the site (Harker 1999).

Pauly (1984) demonstrated successful no-till techniques for establishing grassland communities in Wisconsin. Existing vegetation was mown and treated with herbicide late in the growing season (September). The following spring (April) a controlled burn was conducted to

clear remaining. Herbicide was again applied in June, and seed mix was broadcasted three weeks afterwards. The seed mix included thirty-three species in a ratio (40:60) of forbs to grasses. The seed application rate used was 4lbs/ac forbs and 7lbs/ac grasses (Pauly 1984).

Installing the Ruderal Picturesque

With an understanding of the aesthetic principles of the contemporary picturesque (Chapter 2), the landscape designer can begin to use it as a new tool for representing the beauty of ruderal plants in the landscape. As previously stated, the 18th century construct of picturesque was influential to the general public's perception and appreciation of natural landscapes (Townsend 1997) but it also left a negative legacy on our cultural expectations (Carlson 2009). Traditional picturesque representations aim to aestheticize nature and offer nature as a distant scene, which led to a distorted view of the natural landscape (Rees 1975, Conron 2000, Budd 2002, Carlson 2009). In developing our taste for picturesque landscapes we have also developed distaste for the un-scenic nature of the everyday, common, ruderal landscape.

The designer application of contemporary picturesque principles relies on the creation of visual compositions of nature as process. The imagery should emphasize the passage of time (looking to the future) and present 'ruins' in a contemporary way. This aesthetic principle should not strive to create imitations of nature, or create neoclassical ruins similar to those offered by the early landscape practitioners that were influenced by Gilpin and Price. Furthermore, a contemporary approach to the picturesque should not romanticize nature or attempt to evoke a false or idealized experience with nature. These approaches distance landscape users from the reality of nature and do not strengthen the case for ecological design in contemporary landscape architecture. Figures 62 – 65 illustrate the author's process of utilizing contemporary picturesque aesthetics to visualize design intervention in successional plantings.

Figure 62 Perspective visualizing ruderal grassland and deciduous oak woodland species along the proposed Firefly greenway.

Figure 63 Perspective visualizing a plaza space and connection to downtown Athens.

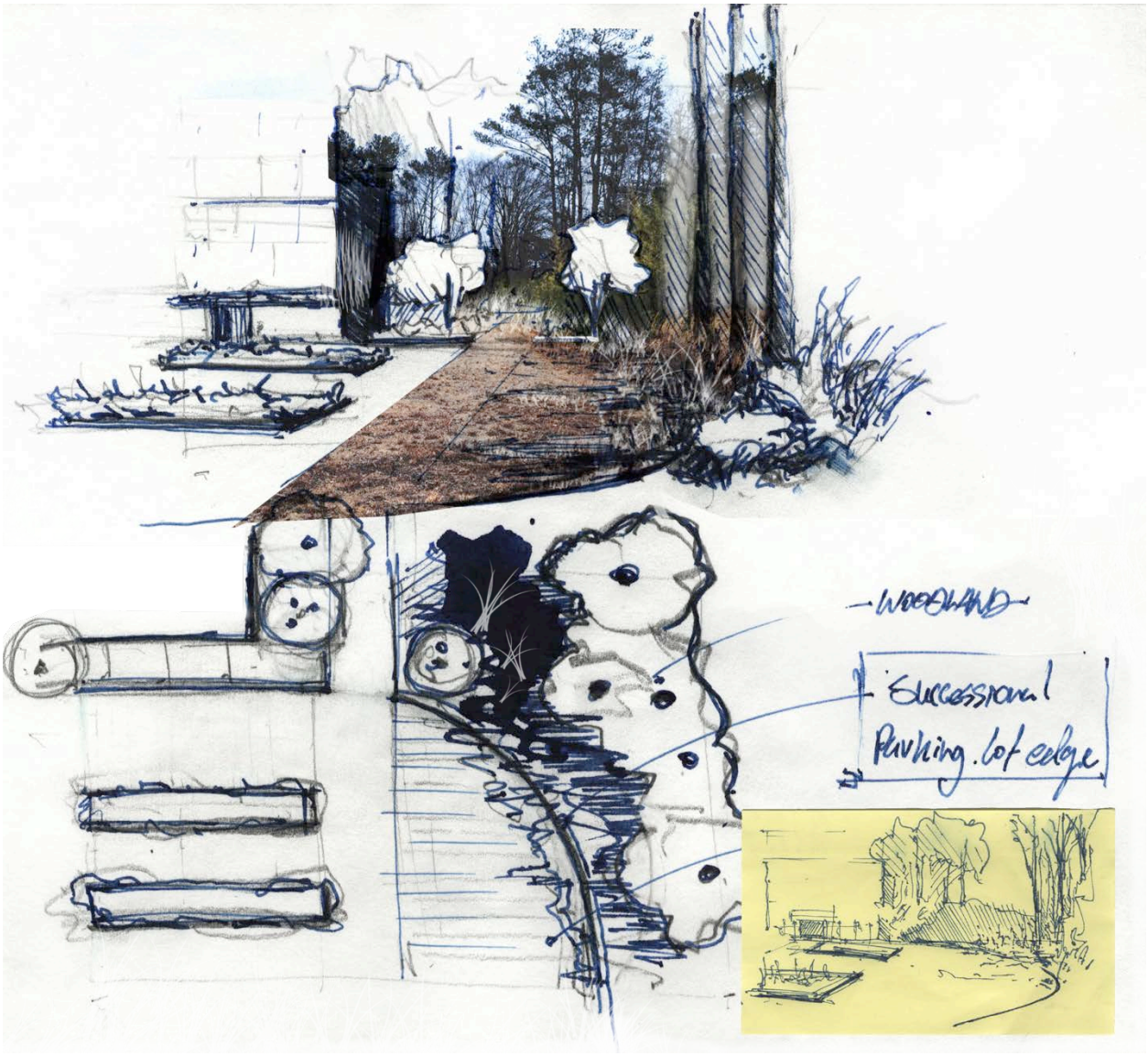


Figure 64 Visualization for successional surface parking lot and woodland edge.

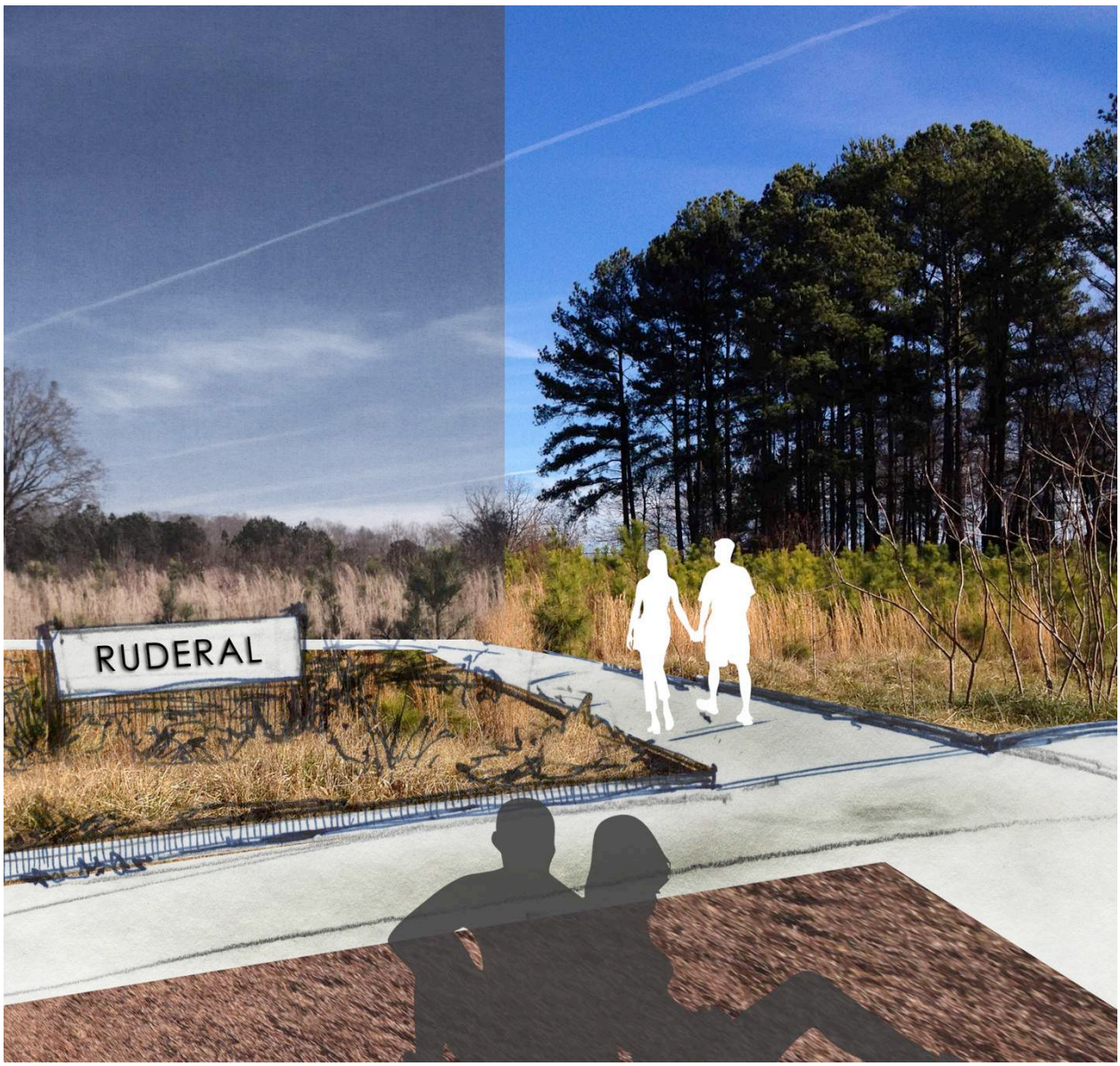


Figure 65 Perspective illustrating how a successional grassland/meadow can be utilized for recreation and education of plant ecology.

Installing the ruderal biotope grassland

Once the ruderal picturesque visualizations have been completed it is necessary to explain how to actually install the design. Because ruderal plant associations require time and succession to develop, it is important for the landscape architect to illustrate management and seasonal interest over time.

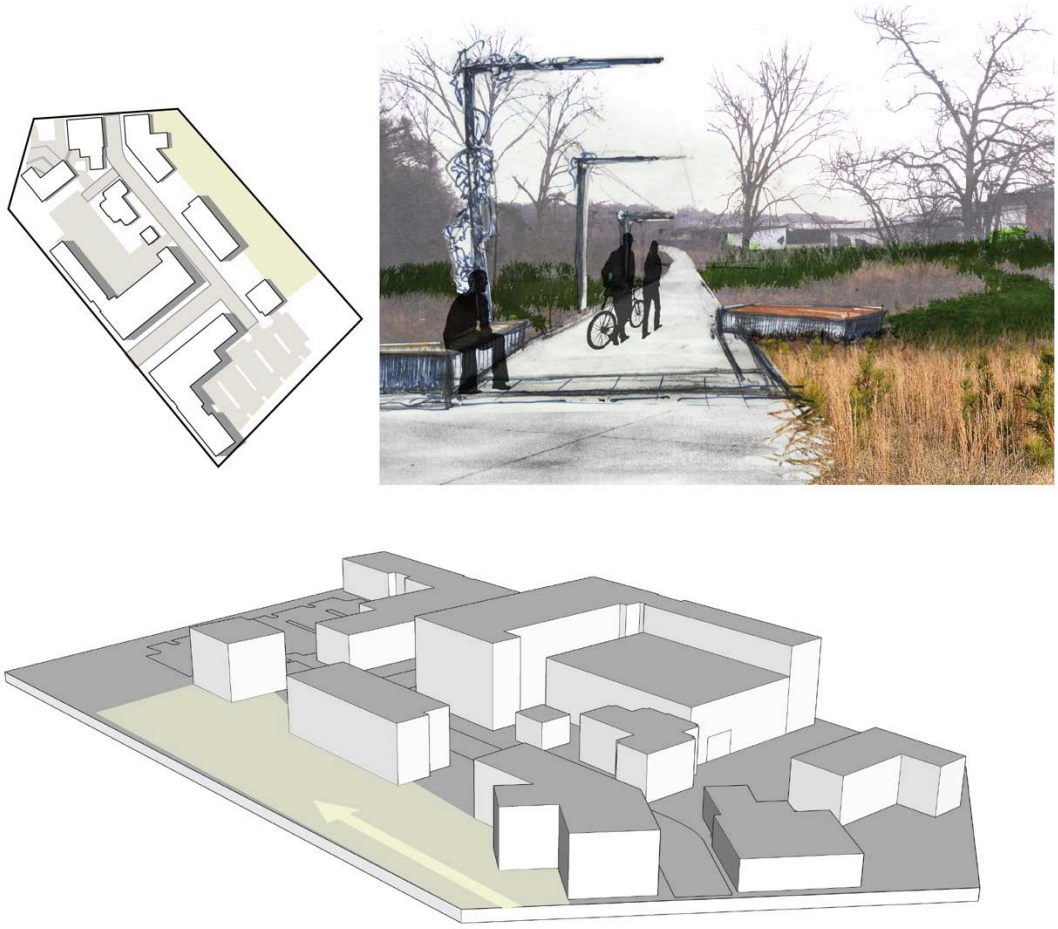


Figure 66 Design focus for the planting plan and implementation of a ruderal biotope meadow.

The area represented in Figure 66 will be used to show an example of the ruderal grassland biotope in a site-specific planting plan. Once the design has been completed, species selection is necessary (Figure 67-68). Phenology and spatial organization is considered during the species selection process as illustrated in Figures 69- and 70.

Figure 67 Diagram showing how structural and meadow plants are used to develop the ruderal picturesque.

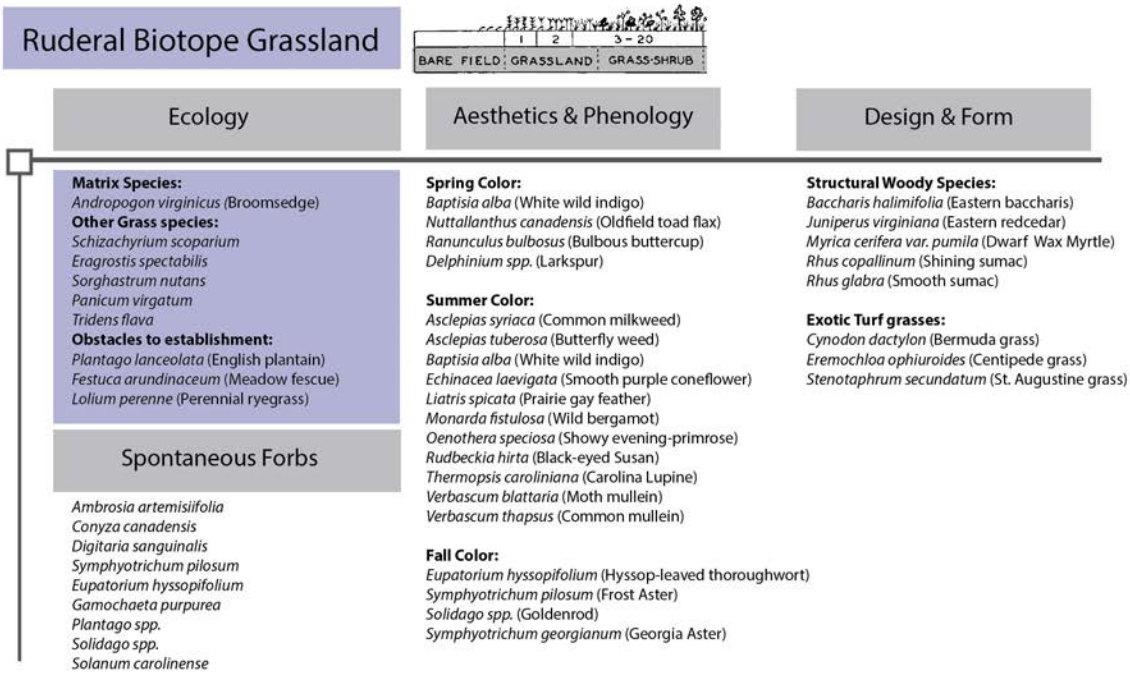


Figure 68 Key species for the aesthetic and ecological development of a Piedmont ruderal biotope meadow.

The key to developing the ruderal biotope planting is to display human (design) intention through direct planting. Figure 68 categorizes the species make-up of a Piedmont ruderal biotope meadow. Spring, summer, and fall herbaceous forbs were selected to increase the seasonal interest (Figure 69). Additionally, structural plants are listed for the internal ordering strategies discussed in Chapter 2 (Figure 68). Design elements in the biotope meadow— i.e. opportunities for displaying picturesque or painterly lines in the landscape— are evergreen shrubs, flowering herbaceous forbs, and a limited amount of exotic turf-grass areas. The designer's role in biotope planting lies in combining these elements in the matrix (*Andropogon virginicus*) to provide spatial organization and an aesthetic display of design intention.

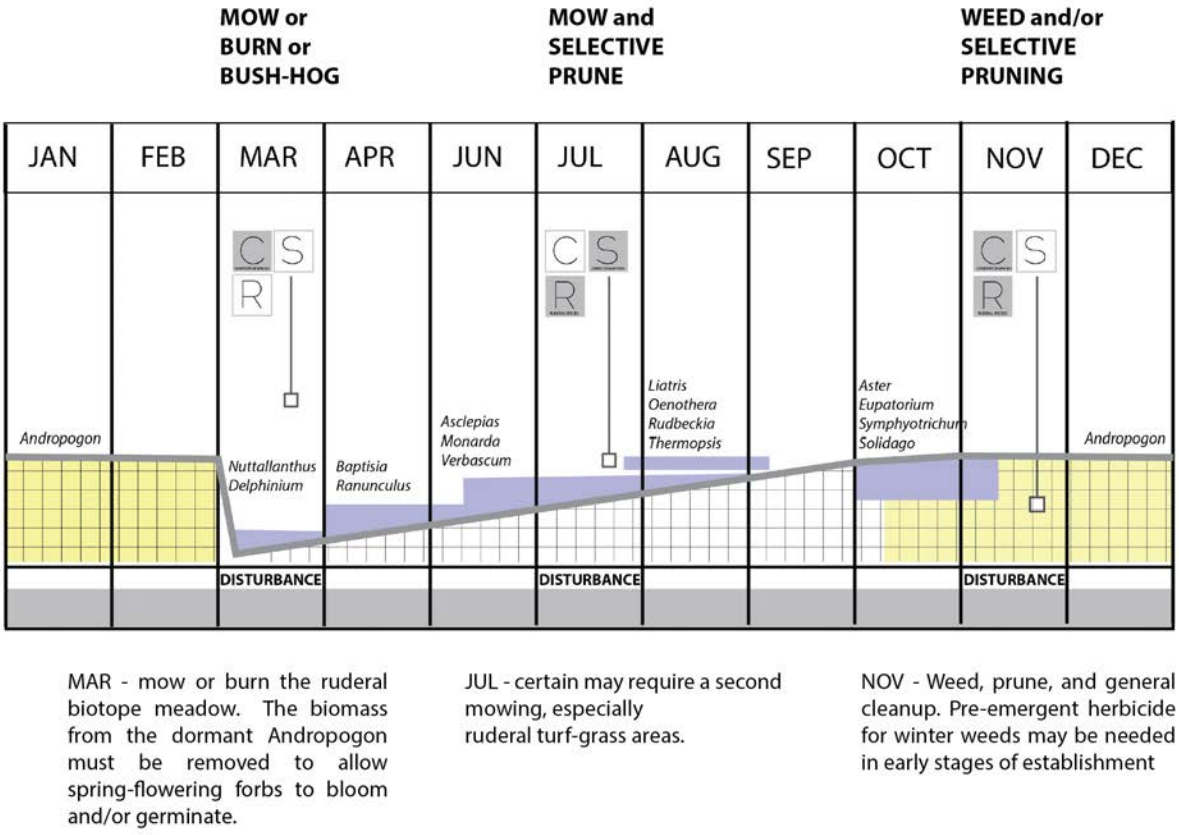
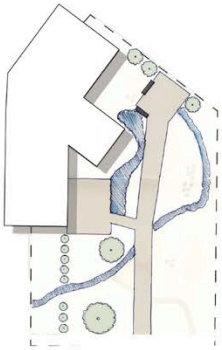


Figure 69 Diagram showing phenology and management sequence of the ruderal biotope meadow/grassland

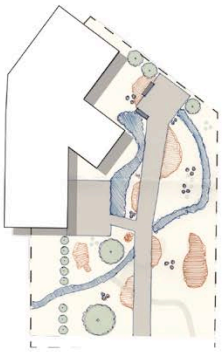
To establish the matrix species– Broomsedge (*Andropogon virginicus)*– cover crops such as annual rye, hairy vetch, or crimson clover should be sown to cover soil and prevent erosion and weed competition. These cover crops act like the early stages of old field succession (crabgrass, horseweed, and ragweed) that were discussed in chapter 3. Depending on time of year, warm or cool seasons, the cover crop species will change based on their growth strategy. Crimson clover, hairy vetch, and other legume cover crops can help build soil nitrogen. Annual rye grass, when sown in the fall, will build biomass quickly and suppress winter weed species. The uniformity of annual rye, and the quick green-up after germination, will provide uniformity and intent in the application to landscape architecture.

Because *Andropogon virginicus* is a warm-season (C4) grass, it is most important to suppress perennial cool-season species, as they will inhibit germination of *Andropogon virginicus* seeds. Meadow rye-grass (*Lolium pratense*) is one example of a problematic cool-season (C3) species that will be problematic when trying to establish an *Andropogon virginicus* biotope grassland.

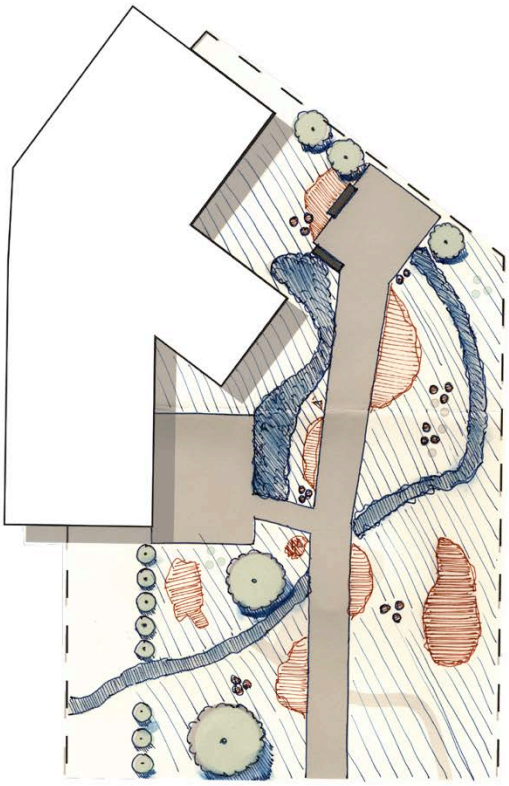
The best method for establishing a *Andropogon virginicus* biotope meadow is to drill-seed in early spring when the soil has begun to warm (Harker 1999). Sowing in fall is also possible in the South, provided that the correct winter cover crop is selected and terminated or mown short in time for early-summer germination of *Andropogon virginicus*. Drill-seeding at a depth of 1-3" is preferred because *Andropogon virginicus* seeds are very light and broadcast sowing will increase the potential that seeds will wash away in heavy spring rain events. If drill-seeding is not feasible than seeds should be mixed with sand and raked in at a depth of a quarter inch for best uniformity (Harker 1999).



STEP 1 – DESIGN INTENT
Directly plant structural trees and woody shrub species for spatial design. Select evergreen shrubs such as *Myrica cerifera var. pumila, Juniperus virginiana, Rhus glabra,* and *Baccharis halimifolia* to maintain design structure in winter.



STEP 2 – BIOTOPE MEADOW
Directly plant and/or sow herbaceous perennials to increase phenological aesthetics. See suggested species provided in Chapters 5 and 6.



STEP 4 – ESTABLISH MATRIX
Plant cover-crop seed mix. Drill seed *Andropogon virginicus* as soil temperatures warm in spring or early summer. Follow meadow establishment guidlines in Chapter 6.

STEP 5 – DESIGNED DISTURBANCE
Arrest succession through designed disturbance. Mow or burn annually. Selective cutting and herbicide may be used to control invasion from woody species.

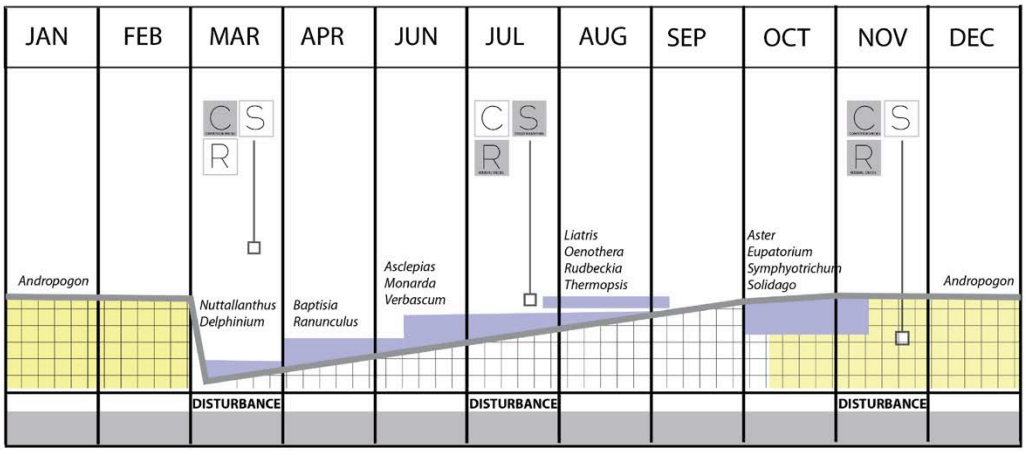


Figure 70 Conceptual planting plan that shows structural planting and steps to develop the biotope meadow scheme

Conclusion

This chapter illustrates how landscape designers can utilize ruderal species in the design of three landscape typologies. This approach is not an intensive reworking of land into habitats that 'ought to be', but instead is a new way of managing and embracing site-specific natural selection that already occurs along the successional pathway of the Georgia Piedmont (chapter 3).

The projective design portion of this chapter simulates the process of utilizing ruderal plant associations in landscape design. Site observation, photographic inventories, historical research, and context analysis all guided the author's design of an urban site in Athens, Georgia. This process and corresponding graphics illustrate how ruderal species can be utilized as both an aesthetic device (chapter 2) and ecological device (chapters 3 and 4) in landscape design. Furthermore, the projective design in this chapter has focused on site-specific methods for designing and establishing biotope meadows with a matrix species of *Andropogon virginicus.*

CHAPTER 7

CONCLUSION: EXPANDING THE ROLE OF RUDERAL

> *"An understanding of ecological succession provides a basis for resolving man's conflict with nature."*
>
> Eugene P. Odum (1969:262)

Ruderal monsters

A recent book entitled *Love Your Monsters – Postenvironmentalism and the Anthropocene* (Latour 2011) contains a collection of essays that address the rhetoric and underlying assumptions of the modern environmental movement. One chapter examines humanity's relationship with technology through the story of Frankenstein. Latour writes:

> "Dr. Frankenstein's crime was not that he invented a creature through some combination of hubris and high technology, but rather that he abandoned the creature to itself. When Dr. Frankenstein meets his creation on a glacier in the Alps, the monster claims that it was not born a monster, but that it became a criminal only after being left alone by his horrified creator, who fled the laboratory once the horrible thing twitched to life. "*Remember, I am thy creature,"* the monster protests, "*I ought to be thy Adam; but I am rather the fallen angel, whom thou drivest from joy for no misdeed . . . I was benevolent and good; misery made me a fiend. Make me happy, and I shall again be virtuous."*

Ruderal landscapes can also be seen as monsters – they are by-products of human actions, created deliberately or inadvertently regardless of our intentions. Latour's analog is fitting for landscape design, and our professions role in utilizing ruderal landscape systems. Either we can choose to abandon our creation of ruderal 'monsters' (the Dr. Frankenstein's approach), or we can recognize their existence and intervene to change their trajectories. Unlike Frankenstein's monster, ruderal systems can have multiple outcomes (Chapters 3 and 4), and the designer's role lies in the decision making process – i.e. how and when it is appropriate to intervene (Hobbs, Higgs et al. 2013). Designers must first be willing to recognize that our actions, disturbance and erasure, start the process of plant succession, and only then can we begin to use disturbance as a resource for ecological design (Chapters 5 and 6).

Expanding the Role of Ruderal

The conventional approach to naturalistic planting design, erasure and insertion of a preconceived historic ecology that is intended to remain static, is no more natural, or extensive in management, than a French knot garden (Marris 2011). Both are a complete manifestation of control over nature. Both require conventional planting and maintenance to keep in a static 'climax' stage.

This thesis has established that ruderal associations are commonplace on the Georgia Piedmont landscape. These plant assemblages occur naturally and thrive in neglect. The *Andropogon virginicus* meadow/grassland seral stage of secondary succession on the Georgia Piedmont – something that occurs naturally in the presence of human disturbance – can provide landscape architects a culturally accepted way to implement more sustainable and resilient plant communities through the method of biotope planting. This is a more extensive approach to naturalistic planting design. Using the successional management techniques discussed in Chapter

5 landscape architects can utilize disturbance as a design resource. By reframing ruderal plants with the aesthetic conventions established in chapter 2 – termed 'contemporary picturesque' – landscape architects can expand the role of these seral stage communities in design.

One of the many aspirations of the profession of landscape architecture is to design contextually, with the goal of instilling sensitive landscape interventions that are regionally correct (Crandell 1993). This sounds good in theory, yet it is the author's premise that landscape architects often yield to cultural pressures and the desire to create landscapes that are disconnected from nature, often creating contrived attempts to recreate nature. The author's adopted definition of landscape, as defined by J. B. Jackson, is *"a space deliberately created to speed up or slow down the process of nature"* (1984:26) shows that plant succession is the basic underlying process of landscape architecture. In a sense, landscape design has always emphasized an aesthetic way to deliberately speed up or slow down natural processes. But it is the contention of the author that the future of ecological planting design is in need of a reevaluation of our conventional concept of nature and aesthetics – the solution provided in this thesis is the ruderal biotope meadow.

Aldo Leopold, one of the foremost environmentalists of the 20th century, was keenly aware of the role of aesthetics in conservation and landscape stewardship. In his well-known land ethic statement he writes: "Examine each question in terms of what is ethically and *esthetically* right . . . A things is right when it tends to preserve the integrity, stability, and *beauty* of the biotic community (Leopold 1970:26)."

The aesthetic principles in Chapter 2 offer a new alternative to conventional approach to landscape design. The connection to landscape painting of the 19th century still pervades our approach to creating natural landscapes, while contemporary landscape painting has moved

beyond naturalism, shifting the perception of nature to accept the ways in which humans manipulate landscape in an heterogeneous way (Crandell 1993). The principles of contemporary picturesque (Chapter 2) are being used in 21st century photography and environmental art, and are key to the future landscape design. An aesthetic shift is vital to creating landscapes that embrace successional change and a more experiential connection with nature.

In different regions of North America and Europe, the profession is already in the midst of a redefinition of its values of nature and aesthetics (Schäfer 2014). The traditional picturesque landscape aesthetic is making way for a more contemporary one that emphasizes ecological structure and function (Pleijster, Veeken et al. 2014). Furthermore, the acceptance of ruderal communities has begun under the term 'urban wildscapes', which is defined as a transitional space between programmed, or formally designed, and un-programmed urban space. They are marginal landscapes between controlled and uncontrolled urban environments and often reflect informal changes made by users and/or maintainers. (Jorgensen 2009) Urban wildscapes are simply another term for ruderal landscapes as they develop incrementally over time and are the result of natural processes such as aging, degeneration, and overgrowth of vegetation. They are essentially the product of unintentional neglect and have the potential to support a diverse range of human and non-human activity (Jorgensen and Keenan 2012). This research is a response to the fact that novel ecosystems have become the basis for a movement in landscape architecture centered on the idea of 'urban wilderness'. But when these ruderal, or urban wild, landscapes become the inspiration behind landscape design concept in North America, they are often executed in a highly stylized way. The example of the High Line in New York (Chapter 2) and Joel Sternfeld's photography of pre-development ruderal conditions is just one example of the type of conventional approach to naturalistic planting design in contemporary practice.

The picturesque conventions that founded 19th century American landscape architecture were invented in 18th century England. Many of the methods of landscape design in present day Georgia reflect these same picturesque conventions. Grazing (sheep) was the primary source of disturbance that maintained the picturesque landscape of 18th century England. The influence of grazers has largely been removed from the system here in Georgia, especially in urban and suburban settings. The 'contemporary picturesque' of the Georgia Piedmont is a system that requires a different kind of disturbance, one that mimics the natural disturbances found in the natural history of the native plants that co-evolved in the system. Historical research supports that fire was the predominate tool used by aboriginals to manage Piedmont landscapes (Del Court and Del Court 2004). Fire management has largely been removed from the local system of landscape management. Disturbance intervals and techniques that mimic natural disturbance, such as fire, need to be placed back into the system of landscape architecture management. Prescribed fire provides the best disturbance for woodland and grassland/meadow typologies in the region, and an understanding of designed disturbance will foster more diverse plantings in the human built environment, and hopefully a better experience with nature.

Ruderal or disturbed landscapes offer a model for the future of landscape design in the Southeastern Piedmont because they thrive in the harshest conditions of change and can reproduce with little or no maintenance inputs. They offer measurable ecosystem services that equal or exceed those of traditional ecological restoration methods (Robinson and Lundholm 2012). Ruderal vegetation, both exotic and native, should be considered and embraced as a tool in sustainable planting design in urban landscapes (Del Tredici 2010, Hitchmough 2010, Kingsbury 2013). This research uses the term ruderal associations rather than communities because it is unknown how species interact with each other. 'Ecological fitting' is another term

that describes the cooperative assemblages formed by ruderal plants, both native and non-native species. Regardless of the terminology, ruderal species can provide ecosystem services in urban greenspace at a fraction of the management and implementation costs of conventional horticultural vegetation, while still providing beautification (Kingsbury 2004).

There is further application potential for successional management strategies in cities experiencing economic decline or increased derelict land due to decrease in population (Del Tredici 2010). Due to the nature of commercial development in our American economic system, landscape planting schemes usually only consider a brief window of time, sometimes the landscape is released in short as 20-30 years. Our boom-and-bust economy often cultivates a built environment with a rapid turnover. This turnover yields to vacancy, abandonment, and feral landscapes that form ruderal associations prior to infill or reuse (Woodward 2004). This problem expands the role of ruderal ecologies in landscape architecture. The author feels that there are possibilities for utilizing successional strategies in the planning and management of 'placeholder landscapes' – or landscapes that have been abandoned due to economic or cultural shifts. As America moves towards a denser urban fabric, the future built environment will have to deal with ruderal ecologies, or novel ecosystems left behind by shrinking suburbia.

Further Research

This thesis conceptualizes and represents the designer's role in utilizing plant succession across three landscape typologies. It has framed three seral stages of secondary plant succession as a design resource. The next step for this research should be in application and testing. Future research should also focus on user perception of ruderal plants, both physical and emotional reactions (i.e. investigate if users have similar feelings of wilderness in ruderal landscapes). Here are a few ideas for future research:

- Design experimentation for biotope meadow seed mixes and successional management strategies.
- Survey analysis of user perception of ruderal species in landscape design.
- Economic study for cost comparison and analysis of the successional planting design approach versus that of conventional planting design.
- Long-term study that monitors resiliency of horticulture species in biotope plantings within the context of Georgia Piedmont urban landscapes.
- Long-term study comparing the extensive management strategies proposed with the traditional intensive management strategies of conventional urban landscapes.

Conclusion to the conclusion

Uvedale Price (1810), one of the leading theorists of the English picturesque movement, uses the term 'improver' to describe the designer or artist creating a picturesque drawing. The whole purpose of design – or improvement – is to intentionally change things. But this change must take into consideration the contemporary social fabric of the landscape, and the processes that are a result of modernity. This thesis looks at 'improving' – or providing intention – to an ecological phenomenon that happens unintentionally by using the chaotic spontaneous nature of ruderal plants as a design advantage rather than something to be suppressed all together. Improving nature by taking a purist approach– excluding non-native species– to naturalistic planting design is unlikely to work in the future change that faces our urban environments. This thesis offers biotope planting as a non-purist approach to ecological planting design within the region.

The purpose of this thesis was to explore the designer's role in guiding plant succession across three landscape typologies while utilizing ruderal species that are specific to the Georgia

Piedmont. With an in-depth understanding of the Georgia piedmont successional pathways, ruderal species, and the seral stages of secondary succession, can be incorporated into the decision making process of landscape architecture. Successional management has only become more common practice in recent decades, particularly in the fields of land resource management and fire ecology, but landscape architecture practice in Georgia has yet to consider these successional approaches to design.

The author views ruderal plants as a new opportunity for landscape architects to promote a paradigm shift in our societal perception of nature, by incorporating an understanding of plant ecology and viewing design intervention as the beginning of a process. Furthermore, by using successional management techniques there is potential for ruderal associations to foster more diverse and resilient plantings. The purpose of this thesis is to present the early seral stages of succession within the context of a new kind of landscape stewardship – one embodied in both our social and ecological system.

This thesis builds the theory necessary to advance the shifting aesthetic in contemporary landscape architecture within the context of landscape design practice on the Georgia Piedmont. With a theoretical understanding of plant ecology, there is a new opportunity for landscape architects within the region to experiment with implementing the early seral stage (ruderal grassland) in design. This research shows landscape architects how designed disturbance can lead to more diverse plant communities, and how ruderal plants are an expression of the localized picturesque aesthetic. The author feels that the future of mainstream landscape architectural planting design should shift its perception of nature in design to accept human disturbance, and the resulting ruderal vegetation, as a more sustainable approach to naturalistic planting design in urban settings. Practicing in this way will utilize landscape design intervention

for what it truly is, the beginning of a process rather than the full manifestation of control over nature.

Closing Remarks

On a final note, this research is part of a much broader dialog about humanity's changing relationship with nature in the process of landscape design (Hobbs, Higgs et al. 2013). The issues around ruderal landscapes – or anthropogenic plant communities or novel ecosystems – are complex and pervasive, but landscape designers must be willing to face the new challenges of our rapidly changing ecosystem of the future. The future model of ecological design must consider a much more anthropocentric view of nature in habitat restoration. Conventional approaches to habitat restoration often take an optimistic, idealized, or even purist view of nature, which tend to be based on dogmatic arguments for the use of native plant communities. Instead, the future should consider embracing a more realist approach, accepting the novel ecosystems that are the product of our environmental actions. Ruderal ecologies may become the new normal, or "natural", landscape of future generations (Hobbs, Higgs et al. 2013).

The practice of landscape architecture, being a blend of both art and ecology, can help facilitate a paradigm shift by representing ruderal ecologies through a new interpretation of the picturesque aesthetics that are so deeply ingrained in our societal perception of natural landscapes. Just as the picturesque movement of the 18th century was the vehicle for shifting our societal perception of nature, it can be used again as a tool for the aesthetic shift needed in the 21st century. It is the hope of the author that this thesis will make a small contribution to the future of landscape design, a future embodied in a more experiential – rather than pictorialized – perception of nature. Landscape architects can lead and perpetuate the aesthetic revolution needed to change the trajectory of ecological planting design.

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APPENDIX A

Discovering the local picturesque of the Piedmont of Georgia.

Appendix A –Watercolor (top) illustrating the golden color of *Andropogon* in contrast with a dark green shrub in a seral stage ruderal community. Sketch (bottom) illustrating the picturesque beauty of a ruderal forest on the Piedmont.

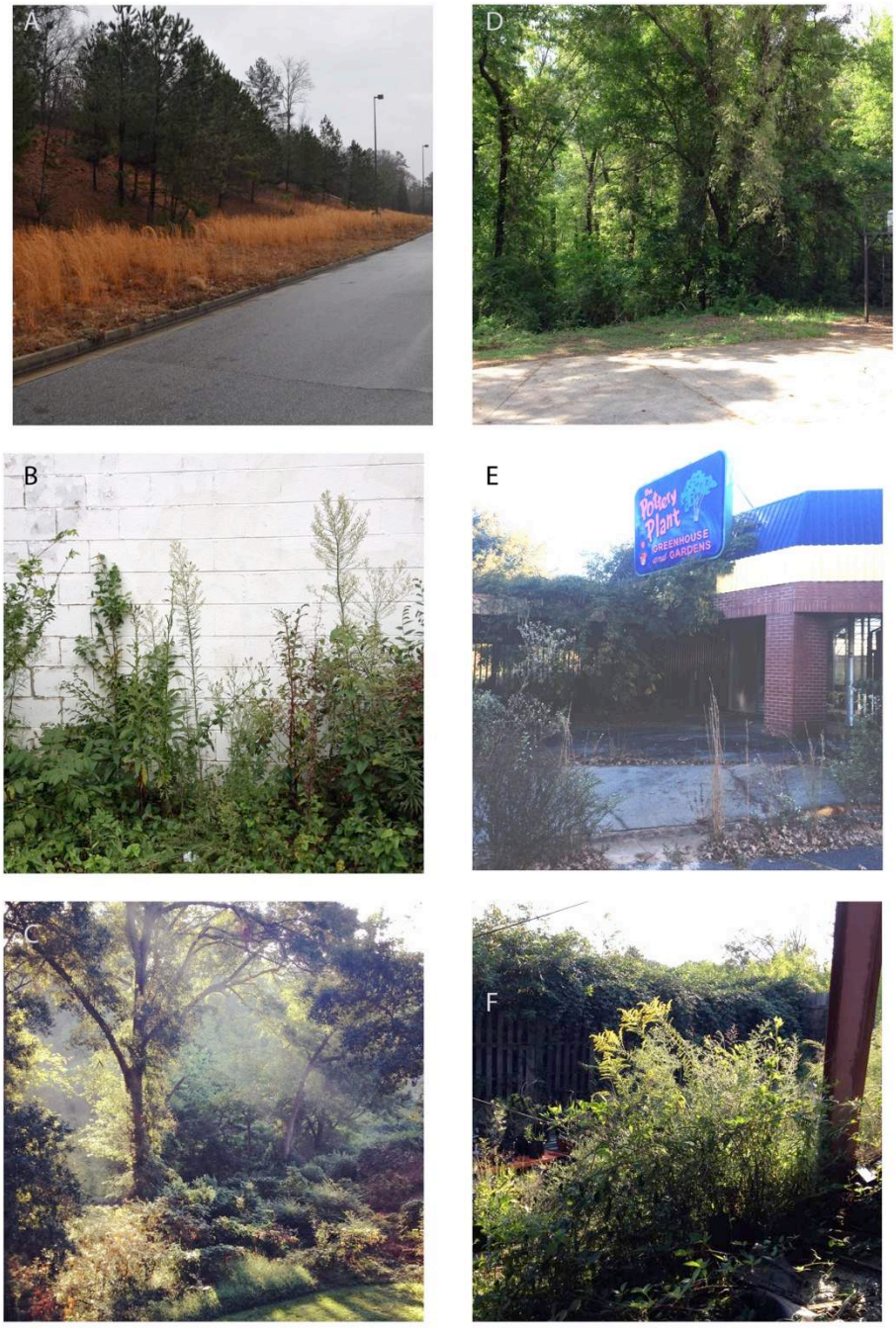
Appendix A – (top) watercolor of pine woodlands and (bottom) sketch of the edge of a pasture on a farm in Ogelthorpe County. The golden color *Andropogon* is more prevalent along the pasture's edge because disturbance interval is longer that the Bermuda hay field.

APPENDIX B

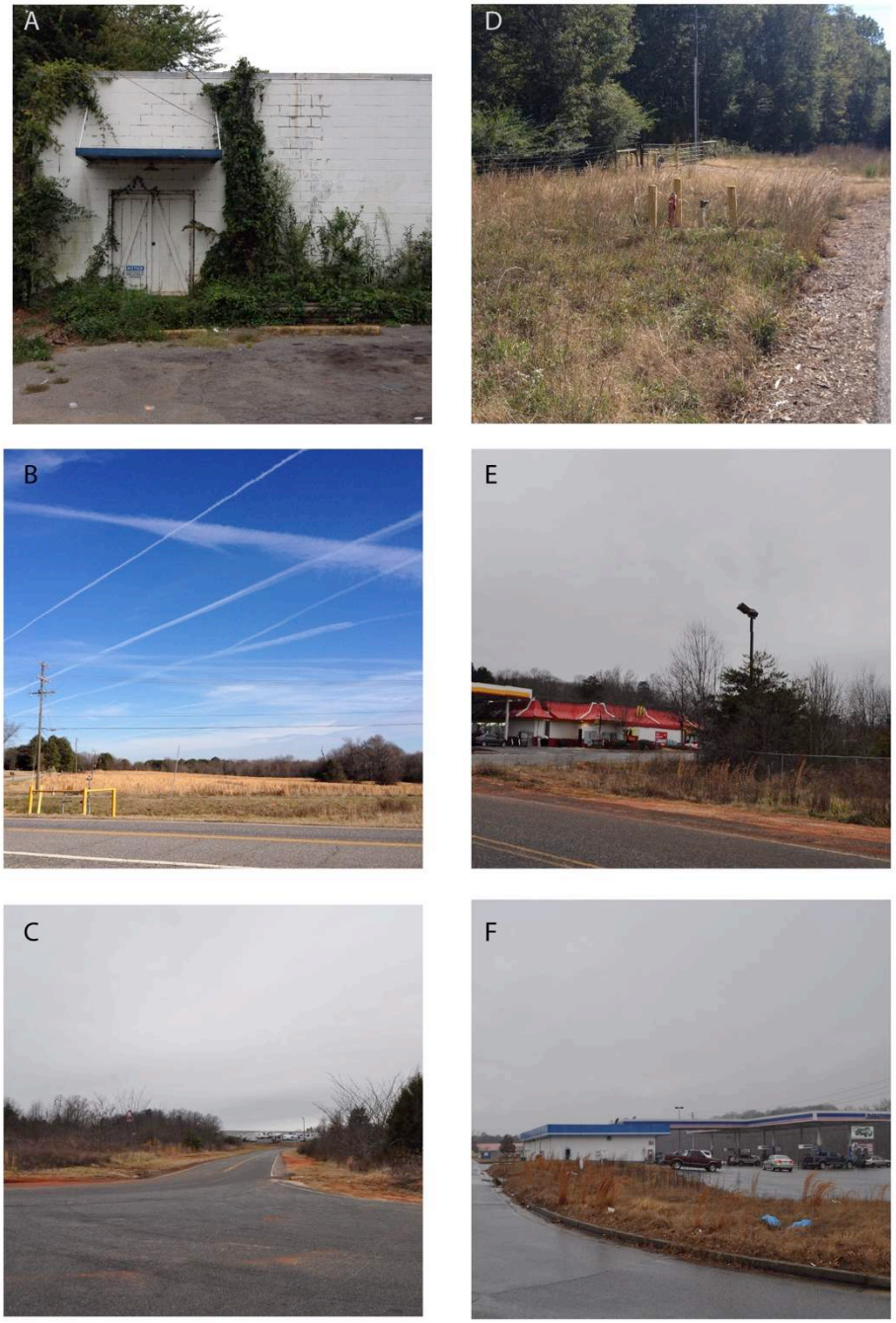
Discovering ruderal associations on the Piedmont of Georgia.

Appendix B – Photos of secondary succession and broomsedge grasslands on the Piedmont. (A) seral shrub community. (B, D, E, F) broomsedge meadows mixed with woodland typologies, (C) *Pinus taeda* emerging through *Andropogon virginicus* and *Eupatorium capillifolium*

Appendix B – The aesthetics of neglect on Georgia Piedmont landscapes - A) ruderal fescue pasture. (B, D) - ruderal parking lots (C,E,F) - abandoned home sites and seral community in the absence of mowing (mixture of exotic horticulture species and early successional ruderal species.)

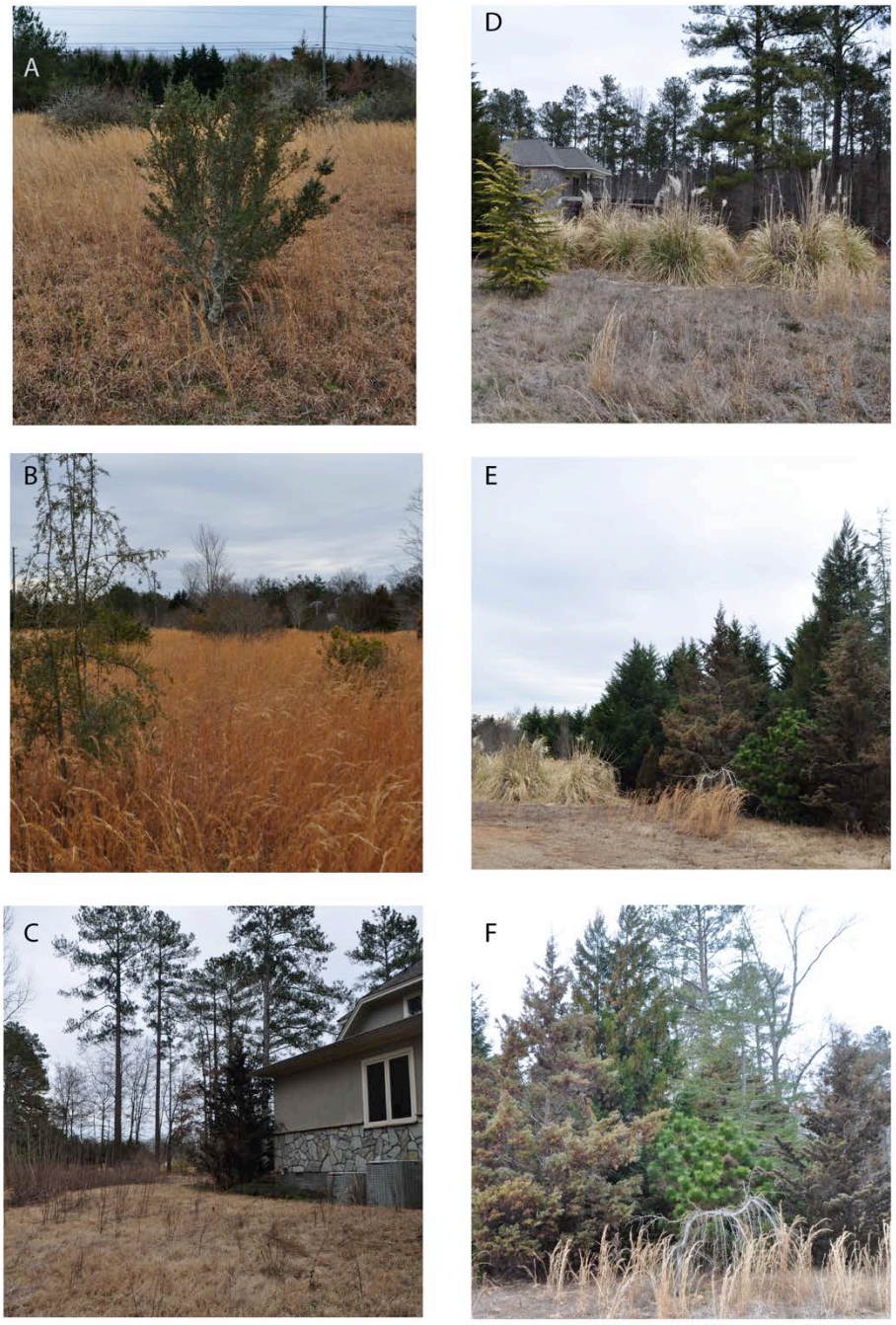


Appendix B – (A) Planted pines and ruderal *Andropogon* grassland at the edge of a parking in Clarke County, GA (B) horseweed emerges through a neglected shrub border, initiating the process of secondary succession (C) different disturbance intervals at the transition between mown lawn and ruderal forest (D) ruderal forest edge (E) abandoned plant nursery near Commerce, GA (F) Solidago spp. in a lumber yard, Clarke County GA.



Appendix B – (A) Virginia creeper vine climbing a neglected building. (B) *Andropogon* grassland and the bright blue sky of a January day in the Piedmont (C) cleared land for speculative development that has been neglected during an economic recession (D) Piedmont prairie restoration at the State Botanical Garden of Georgia (F) roadside meadow/grassland near a gas station in Clarke County, GA.

Appendix B – (A) ruderal broomsedge grassland (B) bare soil from disturbance and early stages of secondary succession beyond (C) woodland typology, represents the correct density and herbaceous understory (D) Pampas grass line an abandoned home site, broomsedge meadow in background (E) ruderal vegetation emerges through cracks in pavement (F) Woody shrub and tree species starting to overtake the ruderal grassland stage.



Appendix B – All pictures of abandoned home sites (A, B) exotic horticulture cultivars mixed with Andropogon grassland (C, D) Horseweed and broomsedge starting to emerge through an unmown lawn (E, F) a grove of ornamental conifer species from three different continents are mixed with the vegetation of the local picturesque of the Georgia Piedmont.