

Undergraduate Thesis Prospectus

Balancing Conservation and Recreation at Biscuit Run State Park

(technical research project in civil engineering)

The Competition to Shape America's Greenspaces

(sociotechnical research project)

By

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On my honor as a university student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for thesis-related assignments

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## **General Research Problem: What constitutes a successful greenspace?**

The natural environment of human settlements is just as important to human quality of life as the built environment, if not more so. Greenspaces—whether they be conserved environments or architecturally-landscaped parks—provide a wide array of socioeconomic benefits. Economically, American homes within 2km of a major open space—like a national park or state forest—have sold for 9.8% higher on average than those further away (Loomis, 2024). As it concerns human health, communities containing or near greenspaces—particularly the topographically and biologically diverse—statistically suffer from lower rates of diastolic blood pressure, salivary cortisol, diabetes, and other chronic ailments (Wheeler, 2015; Twohig-Bennet, 2018). These health benefits likely stem from the environmental impact of greenspaces, which have been found to improve surrounding air and water quality primarily via carbon sequestration and pollution filtration, respectively (Mitsch, 2023; Xie, 2019). The benefits of greenspaces even extend to mental health and societal stability, as urban parks in Philadelphia, PA; Chicago, IL; and New Haven, CT reported lower levels of criminal activity in neighborhoods containing parks (Wo, 2024). In short, greenspaces benefit their communities economically, healthfully, environmentally, criminologically, etc. Nonetheless, not all greenspaces are created equal, varying in size, landscape, wildness, among other characteristics. To understand these varying characteristics and the factors that led to their being is to understand what exactly sets certain greenspaces above others.

## **How can Biscuit Run State best balance recreation and conservation?**

My capstone project—hosted by the UVA CEE Department, advised by Dr. James Smith, and in collaboration with peers Emmy Chen, Grace Franklin, Mark Ayala, Bailey Stumbaugh, and Jordan Colbert—concerns the development of Phase II of under-construction Biscuit Run

State Park. The goal of the project is to address the lack of passive and active recreational facilities in southern Albemarle County; however, there has been conflict between conserving the park's natural and historic features versus building ball fields and parking lots. The main entrance to the park is almost entirely occupied by 585,900 sf of athletic fields, along with 80,000 sf of parking, as shown below (fig. 1).

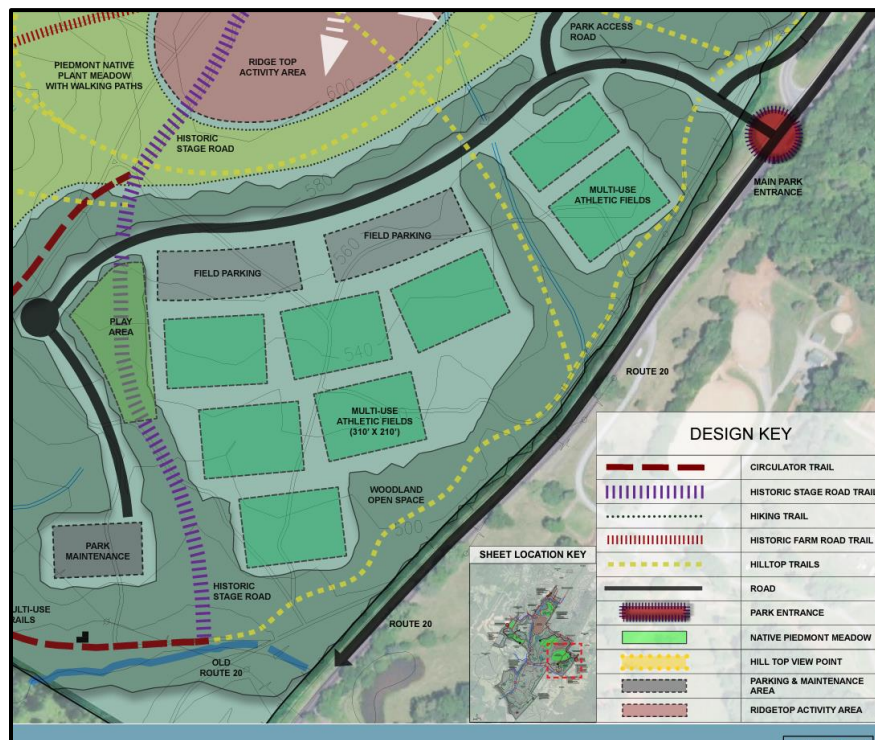


Figure 1. Master plan for Biscuit Run State Park main entrance (Albemarle County, 2019)

Greenspaces are meant to be retreats from the built environment; however, in the case of Biscuit Run State Park that aim has been greatly encumbered by the 685,900 sf of impervious surface at the park's primary entrance. With these athletic fields and parking lots being required by Albemarle County, the project's goals have come to include the minimization of heat island effect, reduction of peak stormwater runoff, and maximization of native flora into the park's main entrance (). The heat-inducing and runoff-driving effects of the parking lots can be reduced

by one of either a green-roof covering or permeable pavement (Liu, 2012). Of these state-of-the-art methods, green roofs were deemed preferable to permeable pavement by our technical advisor, seeing as the former requires less maintenance and specialized equipment than the latter. The green roofs—fitted out with native flora—will provide shade, water absorption, runoff filtration, and additional habitat for local animal life. Presently, I have yet to finalize a solution for the heat and runoff issues of the impervious athletic fields; however, I have considered creating green walls from the fields’ fencing. Green walls—likely in the form of native vines—could provide a more natural aesthetic to the fields while also cooling the surrounding air and providing habitat for native insect and avian life (Collins et al, 2017). Ideally, the success of our project would see Biscuit Run being more than another suburban playground. Instead, it will set the standard for biophilic parks across the United States by designing with respect to the landscape rather than without regard for it.

### **Battles over Land, Sea, and Air: the Human interests and Forces Shaping America’s Greenspaces**

*How have American Policymakers, Corporations, and Citizen Advocates Influenced the Development and Implementation of Greenspaces since 1890?*

Even prior to first Earth Day in 1970, greenspaces like municipal parks, greenways, preserves, national parks, etc. are generally understood to have significant benefits beyond sightseeing and leisure. Ecological economists have found that greenspaces can improve surrounding air quality, protect drinking and irrigation water, promote tourism, increase property

values, among other benefits (Loomis et al, 2024; Mansor et al, 2017). Despite being respites of the natural world, greenspaces are primarily shaped by various and often competing human dynamics. Understanding how social groups influence the development and implementation of greenspaces is to know what benefits a specific greenspace will offer to its users.

Categories of participants present greenspace development typically include national officials, corporations, local officials, and citizen advocates. A recent example of these groups at play can be found in Bears Ears National Monument. Located in southeastern Utah and established by President Barrack Obama in 2016, its reception ranged from jubilation among the Navajo Nation and environmentalists to scathing among white locals and the Utah Republican Party, as noted by environmental sociologists at the University of Oregon (Ricketts, 2024). Local Navajo resident, James Akdai, described how the monument meant his people had “Won the century-old fight”, while local Utah State Representative, Phil Lyman, equated the park to “grand theft” (Turkewitz, 2017). Less than a year later, President Donald Trump reduced the monument to 15% of its original size, opening the rest to resource extraction (Ricketts, 2024). A month after the reduction took effect, Energy Fuels Resources (USA) Inc., a Canadian mining company that had lobbied the Trump Administration to reconsider the monument’s boundaries and called the monument “red tape”, staked fourteen mining claims across the reduced land (Peterson, 2021; Eilperin, 2017). These claims and Trump’s reduction of the monument would be litigated in court by the Navajo Nation and environmentalists, culminating in the monument’s complete restoration by President Joseph Biden in October 2021 (Peterson, 2021). Here, national officials, corporations, local officials, and citizen advocates were represented by the Trump Administration, EFR-USA, Representative Lyman, and the Navajo Nation respectively. The final paper will delve further into Bears Ears along with, tentatively, Adirondack State Park and Green

Spring National Historic District. Adirondack State Park draws interest for the decentralized, multi-polar management of the park's wilderness and natural resources, with no single entity having full control over the park (Michaels, 1999). I intend to explore the dynamics between the Adirondack Park Agency, New York State Department of Environmental Conservation, private landowners, local trade associations, and local environmental advocacies. Additionally, Green Springs National Historic District intrigues me not in its present management, but in its grass-roots formation through conservation easements established by local property owners in response to plans by the Commonwealth of Virginia to establish a state penitentiary upon the historic countryside (Balough, 2024). Social groups whose interactions I will explore include the Holton Administration, the Byrd Machine, Green Springs' citizen groups, and W&R Grace & Co.

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