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THE NATURAL CAPITAL CRISIS IN SOUTHERN U.S. CITIES

BLAKE HUDSON*

The relentless and accelerating disappearance of natural habitats dominated by communities of wild plants and animals, replaced by biologically impoverished artificial habitats dominated by human structures and communities, contributes cumulatively to what may become a “state shift” or “tipping point” in Earth’s biosphere.¹

I. INTRODUCTION

The natural environment in the United States is nothing more than the aggregate of the many, smaller environments that make up America’s urban and rural areas. Yet, with population on the rise and land development proceeding at an exponential rate relative to population,² crucial components of the natural environment in the United States are becoming increasingly degraded. Facing particularly acute threats are natural resources—also referred in this Article as natural capital³—providing critical services to both municipalities and, in the aggregate, the nation. These resources include wetlands, forests, biodiversity, grasslands, and the entire assemblage of ecological systems that they constitute.

Cities have long maintained policy tools to address the management of these resources, through state government-sanctioned zoning and other exercises of the “police power,”⁴ but have been reticent to utilize them for a

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1. LEON KOLANKIEWICZ, ROY BECK, & ANNE MANETAS, NUMBERSUSA, VANISHING OPEN SPACES: POPULATION GROWTH AND SPRAWL IN AMERICA 11 (2014), <https://www.numbersusa.com/sites/default/files/public/assets/resources/files/vanishing-open-spaces-study.pdf> [https://perma.cc/8A9Q-5ZX5] (last visited Feb. 25, 2017).

2. See, e.g., DANA BEACH, PEW OCEANS COMM’N, COASTAL SPRAWL: THE EFFECTS OF URBAN DESIGN ON AQUATIC ECOSYSTEMS IN THE UNITED STATES ii (2002), [http://www.pewtrusts.org/~media/legacy/uploadedfiles/wwwpewtrustsorg/reports/protecting_ocean_lif e/envpewoceanssprawlpdf.pdf](http://www.pewtrusts.org/~media/legacy/uploadedfiles/wwwpewtrustsorg/reports/protecting_ocean_life/envpewoceanssprawlpdf.pdf) [https://perma.cc/7ZXS-PUWV] (last visited Feb. 25, 2017).

3. Robert Costanza & Herman E. Daly, *Natural Capital and Sustainable Development*, 6 CONSERVATION BIOLOGY 37, 38 (1992).

4. In the United States, private land use regulation is reserved to state and local governments under the Constitution. The Tenth Amendment of the United States Constitution reserves for the states powers not delegated to the federal government and acts as a limit on Congress’ regulatory authority,

number of reasons, including economic disincentives.⁵ In fact, one of the mechanisms traditionally touted as alleviating a number of the social and economic crises faced by cities (elsewhere addressed in this symposium issue) is land development. Such development provides—among a number of other benefits—homes, jobs, tax revenue, and income for those who sell the property. But at what cost? When cities sprawl and consume evermore natural capital, the cost is ultimately a loss of critical resources needed by future generations to sustain the same economic and social well-being that current generations enjoy.

While sprawl is a problem in every major metropolitan region in the nation, it can truly be labeled a crisis in the southeastern United States (the “South”). A vast majority of the fastest-sprawling regions of the country are located in the South, which correlates with southern states lagging behind the rest of the nation in household wealth, life expectancy, overall health, and a number of other metrics of well-being. It is time that we begin calling urban development in the United States, and in the South in particular, what it is—a crisis.

While the problems of urban sprawl have been thoroughly analyzed in the literature, this brief essay attempts to provide a fresh lens through which to analyze the problem. I will utilize an analytical framework consisting of three components foundational to understanding land development in the U.S. South as a crisis. While all three components overlap to a degree, the first relates to characteristics of human behavior, namely, the tendency to fixate on short term gains while ignoring long term harms—effectively a tragedy of the commons in the land development context. The

“particularly in ‘traditional areas of state and local authority,’ such as land use.” James R. May, *Constitutional Law and the Future of Natural Resource Protection*, in *THE EVOLUTION OF NATURAL RESOURCES LAW AND POLICY* 124, 132 (Lawrence J. MacDonnell & Sarah F. Bates eds., 2009). State and local governments regulate private property under their “police power” authority to protect the “general welfare.” See generally *Mugler v. Kansas*, 123 U.S. 623 (1887). Scholars have observed that “[t]he weight of legal and political opinion holds that this allocation of power in the [United States] leaves the states in charge of regulating how private land is used,” (JOHN R. NOLON, PATRICIA E. SALKIN, & MORTON GITELMAN, *LAND USE AND COMMUNITY DEVELOPMENT* 17 (7th ed. 2008)) and that “[l]and use law has always been a creature of state and local law.” Marci A. Hamilton, *Federalism and the Public Good: The True Story Behind the Religious Land Use and Institutionalized Persons Act*, 78 *IND. L.J.* 311, 335 (2003). The U.S. Supreme Court case that established the foundation for the land use regulatory patterns we see today, *Euclid v. Ambler Realty* (272 U.S. 365 (1926)), has been described as a “sweeping paean to the supremacy of state regulation over private property.” PAUL GOLDSTEIN & BARTON H. THOMPSON, JR., *PROPERTY LAW: OWNERSHIP, USE, AND CONSERVATION* 967 (2006). Furthermore, the U.S. Supreme Court has recognized “the States’ traditional and primary power over land . . . use,” (*Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Eng’rs*, 531 U.S. 159, 174 (2001)) and that “[r]egulation of land use . . . is a quintessential state and local power.” *Rapanos v. United States*, 547 U.S. 715, 738 (2006).

5. See generally Blake Hudson, *Realigning Metrics of Economic Well-Being in Housing and Land Use Planning*, 54 *WASHBURN L.J.* 575 (2015).

second relates to the inherent characteristics of the modern environment, which exhibits and increasing dynamism perhaps best exemplified by climate change. The third relates to the interplay between the first two components, and the aggregated effects of localized human-natural environment interfaces through both geographic space and time. While this Article leaves the articulation of solutions for how exactly to address the natural capital crisis facing southern U.S. cities to future research, I am hopeful that this Article achieves two objectives. First, I hope that, as a society, we can begin to accept and describe the current dominant forms of land development as a crisis. This admission would have value in and of itself, because we must identify the gravity and nature of the problem before we can address it through sufficient means. Second, I hope this framework and its components are helpful for thinking anew about the drivers of the crisis so that policy-makers can more properly shape necessary responses. Viewing the crisis through this lens provides a more direct description of just how threatening the problem of disaggregated land use regulation in the United States is to our collective natural resource base. And we should not, through economic development efforts, solve certain social and economic crises by creating another, potentially more devastating crisis.

Part II provides background on the problem of sprawl in the United States generally, while Part III details the crisis of land use in the South more specifically. Parts II and III rely heavily on two of the latest comprehensive reports on urban sprawl, both issued in 2014, by Smart Growth America (the “SGA Report”)⁶ in conjunction with the Metropolitan Research Center and the University of Utah, and by NumbersUSA Education & Research Foundation (the “NUSA Report”).⁷ Part IV then details the above-mentioned three-component framework for assessing the crisis of sprawl in the U.S. South. Part V concludes.

6. REID EWING & SHIMA HAMIDI, MEASURING SPRAWL 2014, Smart Growth America, *available at* <https://www.smartgrowthamerica.org/app/legacy/documents/measuring-sprawl-2014.pdf> [<https://perma.cc/RSW5-TFHZ>]. Smart Growth America worked in conjunction with the Metropolitan Research Center and the University of Utah, and prepared the report for the National Institutes of Health and the Ford Foundation. The report analyzed development patterns in 221 metropolitan regions with at least 200,000 people across the United States, and assessed the relationship between development and quality of life in those regions. *Id.* at 1–2.

7. Kolankiewicz, *supra* note 1. The report was undertaken by NumbersUSA Education & Research Foundation, which focuses in part on dealing with the effects of population growth on the environment and on American citizens’ quality of life.

II. SPRAWL IN THE UNITED STATES

In the eighteen years from 1982 to 2010, approximately 65,000 square miles of undeveloped land was converted to urban development, with 41% of that land being forest, 27% cropland, and 29% pasture and rangeland.⁸ From 2002 to 2010, over 13,000 square miles of natural capital were “cleared, scraped, filled, paved and built over.”⁹ Eighty-five percent of the land developed since 1982 is located on the periphery of America’s most sprawling urban areas, with the remainder resulting largely from second-home construction, rural recreation, and rural transportation.¹⁰

Of course, land use change is not a one-way street. The nation has experienced an ebb and flow of natural capital on its land since the founding of the country. Typically, however, that ebb and flow involves forest or other forms of natural capital (rangelands and prairies) being converted for agricultural use, subsequently being converted back to forest, and so on. Clearly, there remains some land in the United States, such as farmlands, that have reverted back to other forms of natural capital (forests, wetlands), and this ebb and flow will most likely continue into the future.¹¹ Yet recognition of this ebb and flow tells us little about the dangers of urban sprawl. While agricultural and similar human developments have reverted to natural landscapes, urban sprawl is far less likely to do so. A more relevant inquiry is to compare how much natural capital is permanently paved over and altered with human-built structures with how much land previously altered with human-built structures is reverting to the “natural” landscape. There are certainly some areas around the country, like Detroit,¹² where a sort of “reverse urban sprawl” is occurring and where nature is reclaiming developed lands (though human structures continue to leave their mark on these lands for a very long time). Overall though, the trend at the urban development-natural environment interface is overwhelmingly in one direction—the replacement of natural capital with human-built capital.

8. *Id.* at ix.

9. *Id.* at iv.

10. *Id.* at v.

11. NASA, Land-Cover, Land-Use Change Program, Afforestation in the Midwestern United States, <http://lcluc.umd.edu/hotspot/afforestation-midwestern-united-states> [https://perma.cc/S7BB-A646] (last visited Feb. 25, 2017).

12. Mickey Mellen, *Historical Street View Imagery Shows Detroit Being Reclaimed by Nature*, GOOGLE EARTH BLOG (June 11, 2014), <http://www.gearthblog.com/blog/archives/2014/06/historical-street-view-imagery-shows-detroit-reclaimed-nature.html> [https://perma.cc/UE9B-66PU] (last visited Feb. 25, 2017); Mary Beth Griggs, *Detroit’s Dumps are Slowly Being Reclaimed by Nature*, SMITHSONIAN MAG. (Sept. 12, 2014), <http://www.smithsonianmag.com/smart-news/detroits-dumps-are-slowly-being-reclaimed-nature-180952676/> [https://perma.cc/68PB-WACD] (last accessed Feb. 25, 2017).

The NUSA Report identifies two primary components of “urban sprawl.” The first is sprawl associated with population growth alone—what can be termed “population sprawl.”¹³ The second is sprawl associated with the average person consuming more land, or what researchers call “per-capita sprawl.”¹⁴ A more precise definition of per-capita sprawl is the degree to which “land-use and consumption choices [] lead to an increase in the average amount of urban land per resident.”¹⁵ The combination of these two types of sprawl are what the researchers call “overall sprawl.”¹⁶

During the most pronounced growth of overall sprawl in our nation’s history, the 1990’s, about half of total sprawl could be attributed to population growth and half to per-capita sprawl.¹⁷ Over the last decade, however, 73% has been driven by population growth.¹⁸ The NUSA Report is particularly critical of federal immigration policy, claiming that it has contributed to population sprawl. Since 1990, the United States has allowed one million immigrants to enter its borders annually; and after accounting for immigrant births, the country adds a full twenty million new residents to the nation each decade.¹⁹ While acknowledging that movements like Smart Growth, LEED, New Urbanism, and similar programs are helpful for reigning in per-capita sprawl, the NUSA Report argues that they are of limited utility in addressing overall sprawl because it is primarily perpetuated by population growth.²⁰ It argues that “[u]ntil the numerical level of national immigration is addressed, even the best local plans and political commitment will be unable to stop sprawl.”²¹

III. SOUTHERN SPRAWL

Drivers of urban population growth include not only immigrants entering the nation, but also citizens migrating from one region of the nation to another. And both immigration and migration have contributed to a popula-

13. Kolankiewicz, *supra* note 1, at 44.

14. *Id.*

15. *Id.* at 7.

16. *Id.* at v. Data for calculating sprawl was gathered by two federal agencies, the U.S. Census Bureau and the Natural Resources Conservation Service of the Department of Agriculture. Since 1950, Census has calculated changes in the size of the nation’s urban areas every ten years, while NRCS has done the same every five years since 1982. *Id.* at 23.

17. *Id.* at vi.

18. *Id.* at 45.

19. *Id.* at xi. The NUSA Report posits that a far more sustainable immigration level is approximately a half-million immigrants a year, as proposed by the President’s Council on Sustainable Development in 1996. *Id.* at 73.

20. *Id.* at 32.

21. *Id.* at xi.

tion boom in the South. Population and associated economic growth have increased more rapidly in the South than any other region of the United States, “with the resulting urbanization steadily consuming forests and other rural lands.”²² From 1970 to 2010, population in the South grew by 88%.²³ From 1990 to 2008, population in the South grew at a rate approximately one-third faster than the nation as a whole,²⁴ and growth of southern urban regions will not slow down—population in the South is expected to grow yet another 40–60% from 2010 to 2060.²⁵

The South is presently witnessing a perfect storm that is facilitating rapid sprawl. The South’s pervasive culture of lax land use controls exacerbate per-capita sprawl, while population growth in the region contributes to population sprawl. Consider the rank of southern cities among the most sprawling regions of the United States. The United States’ most sprawling small metro area is Hickory, North Carolina, its most sprawling medium-sized metro area is Baton Rouge, Louisiana, and its most sprawling large metro area is Atlanta, Georgia.²⁶ So whether small, medium, or large, southern cities are leaders in sprawl. The trend continues: eight of the ten most sprawling metro areas nationally are in southern states.²⁷ Breaking into small, medium, and large categories, seven of the top ten most sprawling large metro areas are southern,²⁸ *all* of the top ten most sprawling medium metro areas are southern,²⁹ and seven of the top ten most sprawling small metro areas are southern.³⁰ In fact, of the 221 metro areas analyzed in

22. DAVID N. WEAR & JOHN G. GREIS, U.S. FOREST SERV., THE SOUTHERN FOREST FUTURES PROJECT: SUMMARY REPORT 5 (2011), http://www.srs.fs.usda.gov/futures/reports/draft/summary_report.pdf [https://perma.cc/2XA9-6U3K] (last accessed Feb. 25, 2017).

23. *Id.* at 6 fig.2.

24. *Id.* at 71.

25. *Id.* at 12–13.

26. Ewing, *supra* note 6, at 4.

27. These include Kingsport/Bristol/Bristol, Tennessee-Virginia, Augusta/Richmond County, Georgia-South Carolina, Greenville/Mauldin-Easley, South Carolina, Baton Rouge, Louisiana, Nashville-Davidson/Murfreesboro/Franklin, Tennessee, Clarksville, Tennessee-Kentucky, Atlanta/Sandy Springs/Marietta, Georgia, and Hickory/Lenoir/Morganton, North Carolina. *Id.* at 6.

28. These include Houston/Sugar Land/Baytown, Texas, Richmond, Virginia, Birmingham-Hoover, Alabama, Memphis Tennessee-Mississippi-Arkansas, Charlotte/Gastonia-Rock Hill, North Carolina-South Carolina, Nashville/Davidson/Murfreesboro/Franklin, Tennessee, and Atlanta-Sandy Springs/Marietta, Georgia. *Id.* at 7.

29. These include Little Rock/North Little Rock/Conway, Arkansas; Durham/Chapel Hill, North Carolina; Jackson, Mississippi; Knoxville, Tennessee; Columbia, South Carolina; Chattanooga, Tennessee-Georgia; Greensboro/High Point, North Carolina; Augusta/Richmond County, Georgia-South Carolina; Greenville/Mauldin-Easley, South Carolina; and Baton Rouge, Louisiana. *Id.*

30. These include Fort Smith, Arkansas-Oklahoma; Lynchburg, Virginia; Winston-Salem, North Carolina; Florence, South Carolina; Kingsport/Bristol/Bristol, Tennessee-Virginia; Clarksville, Tennessee-Virginia; and Hickory/Lenoir/Morganton, North Carolina. *Id.* at 8.

the SGA report, thirty-eight of the forty-five most sprawling regions of the United States are in the South.³¹

Southern urban sprawl has severe environmental and social ramifications. As noted earlier, forestland has been the number one target of conversion to urban developments,³² which is problematic, considering all the ecosystem and economic services forests provide.³³ Indeed, specifically in the context of southern U.S. forests—86% of which are privately owned³⁴—the U.S. Forest Service has warned³⁵ that population growth and urban development are two primary factors that will “define the South’s future forests.”³⁶ Urban development, is “forecasted to result in forest losses, increased carbon emissions, and stress to other forest resources,”³⁷ including water-related ecosystem services to the point of threatening public health.³⁸ Population pressures in the South are expected to “result[] in declines in forest cover, increases in demand for ecosystem service[s], and restrictions that complicate the ability to manage forests for the full spectrum of uses.”³⁹ The Forest Service projects that thirty to forty-three million additional acres of southern land will be converted to urban development by 2060, with total forest losses potentially as high as thirty-three million acres, or approximately 13% of all forestland in the South.⁴⁰ And this is only one negative environmental consequence. Forests are proxies for many other resources, and wetlands, biodiversity, and other resources are just as at risk. Southern waterways are at increased risk of

31. *Id.* at 19–20.

32. Kolankiewicz, *supra* note 1, at 12.

33. See Ecosystem Services, UNITED STATES DEP’T. OF AGRIC., FOREST SERV., <http://www.fs.fed.us/ecosystemservices/> [<https://perma.cc/7L54-9STD>] (last visited Feb. 25, 2017).

34. See WEAR, *supra* note 22, at 58.

35. See *generally id.* (the report addresses thirteen southern states, including: Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Tennessee, Kentucky, Mississippi, Arkansas, Louisiana, Oklahoma and Texas).

36. *Id.* at 4.

37. *Id.* Since the 1970s total forest area has been stable, but this stability is a result of agricultural lands being reforested at the same rate that urbanization has reduced forest cover. *Id.* at 15. While urbanization is expected to increase at even higher rates, conversion of agricultural lands to forests is not expected to continue. *Id.* at 31.

38. The report notes that:

[s]trong population growth and associated urbanization has increased demand for water and challenged water availability in several areas . . . Conversion of forests to urban and other land uses has resulted in a loss of natural buffering, increasing water pollution loads, elevating peak flows, and reducing base flows in affected watersheds. The consequences are more frequent and more severe flooding, lower stream flows during drought conditions, and water quality that is degraded—sometimes to the point of threatening public health . . . [T]he link between conversion of forest land to urban uses and degraded water quality in affected watersheds is well accepted.

Id. at 24.

39. *Id.* at 26.

40. *Id.* at 35.

nutrient and other forms of pollution as impervious surfaces expand in sprawling urban developments.⁴¹ While the South is one of the most biodiverse regions of the United States,⁴² sprawl is increasingly fragmenting species habitats. Habitat fragmentation positively correlates with the loss of biodiversity.⁴³ The list could go on.

Negative environmental and social consequences are interlinked of course, but in addition to direct environmental impacts, sprawl in the South exacerbates the dysfunction of several already-compromised social systems. The South is the poorest region of the United States.⁴⁴ Ten of the eleven most obese U.S. states are located in the South,⁴⁵ and the region contains the top eight most diabetic states in the nation (Type II).⁴⁶ It is not surprising, then, that the South has the lowest life expectancy of any region of the United States.⁴⁷ The South also contains at least half of the most violent states in the Union, with the highest rates of violent crime.⁴⁸

Compare the presence of these societal disadvantages in the sprawling South with the fact that citizens in less sprawling areas—from locales as diverse as California, Wisconsin, and New Jersey⁴⁹—are on the opposite end of the spectrum regarding each of these metrics. Cities in these areas

41. Kristen M. Fletcher, *Managing Coastal Development*, in OCEAN AND COASTAL LAW AND POLICY 147–48 (Donald C. Baur et al. eds., 1st ed. 2008)

42. Over half of the top 20 most diverse states in the nation are in the Southeast. See Bruce A. Stein, *States of the Union: Ranking America's Biodiversity*, NatureServe (2002), available at <http://www.natureserve.org/library/stateofunions.pdf> (last accessed Apr. 21, 2017).

43. JAMES RASBAND ET AL., NATURAL RESOURCES LAW AND POLICY 329-330 (2d ed. 2009).

44. Eight of the top ten poorest states in the nation are located in the South (including Washington, D.C.). SARAH BARON, CTR. FOR AM. PROGRESS ACTION FUND, 2014 STATE OF THE STATES REPORT 5 (2014), <https://cdn.americanprogress.org/wp-content/uploads/2014/12/StateofStates2014-report.pdf> [<https://perma.cc/MR6X-AT7X>] (last accessed Feb. 25, 2017). Natasha Bertrand, *The Ten Poorest States in America*, BUS. INSIDER (Dec. 17, 2014), <http://www.businessinsider.com/the-10-poorest-states-in-america-2014-12> [<https://perma.cc/SJC9-W955>] (last accessed Feb. 25, 2017).

45. *Adult Obesity in the United States*, <http://stateofobesity.org/adult-obesity/> [<https://perma.cc/6WJL-J3BC>] (last visited Feb. 25, 2017).

46. *States with the Highest Type 2 Diabetes Rates*, THE STATE OF OBESITY, (Sept. 1, 2016), <http://stateofobesity.org/lists/highest-rates-diabetes/> [<https://perma.cc/T3ZH-RB7W>] (last visited Feb. 25, 2017).

47. Nine out of the ten states with the lowest life expectancy are located in the South. KRISTEN LEWIS & SARAH BURD-SHARPS, AMERICAN HUMAN DEVELOPMENT REPORT, THE MEASURE OF AMERICA 2013–2014 18 (2014), <http://www.measureofamerica.org/wp-content/uploads/2013/06/MOA-III.pdf> [<https://perma.cc/WA9H-9K4Z>] (last visited Feb. 25, 2017).

48. Thomas C. Frohlich, Samuel Stebbins, & Michael B. Sauter, *America's Most Violent (and Peaceful) States*, USA TODAY (July 29, 2016), <http://www.usatoday.com/story/money/business/2016/07/29/americas-most-violent-and-peacefulstates/87658252/> [<https://perma.cc/M7LA-MLDY>] (last visited Feb. 25, 2017); Andrew Meola, *The Most Violent Crime-Ridden States in America*, THE STREET (Nov. 23, 2014), <https://www.thestreet.com/story/12963542/1/the-most-violent-crime-ridden-states-in-america.html> [<https://perma.cc/TP2J-AV4N>] (last visited Feb. 25, 2017).

49. Ewing, *supra* note 6, at 12-14.

have more economic mobility, accumulate more household wealth, and they “live longer, safer, healthier lives” than citizens in sprawling areas.⁵⁰ The SGA Report concluded that for every 10% improvement in an urban area’s score on the sprawl index, there is a “4.1 percent increase in the probability that a child born to a family in the bottom quintile of the national income distribution reaches the top quintile of the national income distribution by age 30.”⁵¹ SGA also found that “[a]s metropolitan compactness increases, transportation costs decline faster than housing costs rise, creating a net decline in household costs.”⁵² Also, for every doubling of index score, life expectancy increases nearly 4%, which, given the life expectancy of the average American, equates to three additional years of life.⁵³ SGA attributes longer life expectancy to lower driving rates (fewer vehicle accidents), reduced body mass index (“BMI”), improved air quality, and less violent crime in more compactly developed areas.⁵⁴ Consider that “as a metro area sprawls more . . . the BMI of its population increases, after accounting for sociodemographic differences. . . Similarly, the likelihood of obesity increases.”⁵⁵ People in less sprawling regions also have much lower blood pressure and rates of diabetes.⁵⁶

Ultimately, the SGA report concludes that:

metro areas with more compact, connected neighborhoods are associated with better overall economic, health and safety outcomes—on average a better quality of life for everyone in that community. As residents and their elected leaders recognize the health, safety, and economic benefits of better development strategies, many decisionmakers are reexamining their traditional zoning, economic development incentives, transportation decisions and other policies that have helped to create sprawling development patterns.⁵⁷

Given the continued lax land use regulatory culture in southern states, however, it is unclear that southern decision makers are taking the negative correlation between sprawl and all the above social ills seriously—even though southern urban areas top the charts tracking both sprawl and low quality of life metrics associated with sprawl.

50. *Id.* at iv.

51. *Id.* at 9.

52. *Id.* at 10.

53. *Id.* at 11.

54. *Id.*

55. *Id.*

56. *Id.*

57. *Id.* at 12.

Of course, correlation is not always causation. It could certainly be that other factors cause non-southern urban areas to maintain enough wealth and other societal advantages to be healthier, live longer, legislate better land use policies, and so on. Perhaps people who maintain better eating habits, exercise more regularly, and maintain lifestyles that lead to lower blood pressure and rates of diabetes and obesity are also more inclined to enact better land use policies. On the other hand, some degree of causation is undoubtedly at work: people who drive less wreck less and save more money on transportation; people who walk more are less obese, have lower blood pressure, diabetes, and so on. Sprawl, environmental destruction, and social ills are inextricably linked regardless of the relative degrees of correlation versus causation, and no region of the country demonstrates this link to such a high degree as the South.

IV. FRAMEWORK FOR ASSESSING THE SPRAWL CRISIS

Sprawl is a problem across the United States, and especially in the South. So, can we rightly call it a crisis? Without sounding hyperbolic, can we characterize urban development as a disease on the landscape that could lead to the death of the U.S. environment as we know it? On a planet that has never—in 4.5 billion years—witnessed 7.5 billion people consuming resources at such a torrid pace, and rapidly changing its climate in the process, there is a fine line between hyperbole and terrifying fact. The unprecedented fragmentation of crucial ecosystems upon which U.S. society depends is a terrifying fact. This section details three intersecting phenomena that are foundational to characterizing land development in the South as a crisis. The first relates to characteristics of human behavior—namely, the tragedy of the commons—that is playing out before our eyes in the urban development context. The second relates to the inherent, dynamic characteristics of the modern environment, perhaps illustrated best by a quickly warming world and rising seas poised to destroy the most important human developments in the nation within the next century or two. The third relates to the interplay between human behavior and a dynamic environment—that is, how the interplay between the two on small scales, when aggregated, threatens the viability of the United State's current environmental systems and the ecosystem services they provide.

A. The Commons Dynamic Played out in U.S. Land Use Law

Scholars have thoroughly detailed the mechanisms by which private land owners, and even the governments regulating them, can behave like

the “rational herders” in the tragedy of the commons tale made popular by Garrett Hardin.⁵⁸ Hardin described in stark terms the circumstances under which “appropriators” of resources seek to maximize self-interest to the detriment of society’s collective interest in commonly held “resource units” of natural capital, ultimately leading to resource destruction.⁵⁹ His work has been expanded to demonstrate that in the absence of federal, state, or local regulation in the United States, private landowners can “appropriate” resource units of natural capital from their property to the detriment of the commonly shared environment that stretches across the nation.⁶⁰ They are incentivized to do so because they gain 100% of the benefit from, say, clearing their land for commercial development (or selling it to someone who will do the same); on the other hand, the cost of that development is spread across society, which suffers the negative externalities from resource units of natural capital being removed from the environment.⁶¹ Local governments can facilitate this appropriation in the absence of state or federal mandates, and states can do so in the absence of federal regulation. Thus, we see many “commons” nested within our federal system of government, each of which can contribute to tragic overconsumption of resources at the national scale.⁶²

Therein lies the crisis, particularly since the commons dynamic is pervasive in the South. Most local governments in the region maintain extremely lax land use controls, primarily out of a cultural predilection to resist government regulation at every turn.⁶³ Unlike Oregon and Washington, which maintain at least some state-level inputs into how local land use proceeds, most state governments in the South leave land use regulation entirely to local governments. The state of Tennessee is the only southern state that purports to require municipalities to enact growth boundaries, and while this mandate supposedly contemplates the reduction of urban sprawl,

58. See generally Blake Hudson, *Commerce in the Commons: A Unified Theory of Natural Capital Regulation Under the Commerce Clause*, 35 HARV. ENVTL. L. REV. 375 (2011); Blake Hudson & Michael Hardig, *Isolated Wetland Commons and the Constitution*, 2014 BYU L. REV. 1443 (2014); BLAKE HUDSON, CONSTITUTIONS AND THE COMMONS: THE IMPACT OF FEDERAL GOVERNANCE ON LOCAL, NATIONAL, AND GLOBAL RESOURCE MANAGEMENT (2014).

59. See Garret Hardin, *Tragedy of the Commons*, 162 SCIENCE 1243 (1968); ELINOR OSTROM, GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION 31 (1990).

60. See Blake Hudson & Jonathan Rosenbloom, *Uncommon Approaches to Commons Problems: Nested Governance Commons and Climate Change*, 64 HASTINGS L.J. 1273, 1276 (2013).

61. See Blake Hudson, *Federal Constitutions: The Keystone of Nested Commons Governance*, 63 ALA. L. REV. 1007 (2012).

62. *Id.* at 1013.

63. For an insightful perspective on the roots of southern culture and government regulation, see Colin Woodward, *Up in Arms*, TUFTS MAG., Fall 2013, <http://emerald.tufts.edu/alumni/magazine/fall2013/features/up-in-arms.html> [https://perma.cc/6FJ3-QZM7] (last visited Feb. 25, 2017).

it seems primarily aimed at ensuring that growth occurs in the most economically efficient manner possible.⁶⁴ A handful of southern cities have growth boundaries as well,⁶⁵ with Lexington, Kentucky's being probably the most effective from an environmental perspective. Other southern cities, such as Miami, seem preoccupied with guiding how land is inevitably developed rather than thoughtfully weighing whether it should be developed at all.⁶⁶

Among additional laudable goals, local governments like Miami and other southern metro areas are obviously seeking to grow their citizenry, tax base, and economic productivity. But they do so primarily through the conversion of greenfields into new developments, as evidenced by the sprawl data presented in the previous section. To say that concepts of urban infill, urban growth boundaries, and other policies that encourage redevelopment of previously developed lands are lagging in the South would be a severe understatement. Local governments in the South and the citizens who populate their jurisdictions are content to maximize their short-term economic welfare while ignoring long-term harm spread both geographically across the nation and temporally, since future generations will bear the brunt of today's poor land use decisions.

Indeed, this phenomenon is playing out globally. A few years ago researchers at Brown University determined that one of the most accurate mechanisms for determining GDP growth for countries was from outer space.⁶⁷ The researchers tracked, via satellite, nighttime changes in the intensity of artificial light over countries around the globe, and found that increases in light parallel increases in countries' household incomes—thus signaling growing economies.⁶⁸ The implication, of course, is that the clearing of evermore land and the creation of evermore sprawl and associated environmental degradation facilitates economically desirable outcomes, over the short term at least, even if at odds with the preservation of crucial global natural capital. Intensity of light as a metric for economic

64. *Tennessee Growth Policy*, TENN. ADVISORY COMM'N ON INTERGOVERNMENTAL RELATIONS, <https://www.tn.gov/tacir/section/tacir-growth-policy> [<https://perma.cc/C2PB-3EZW>] (last visited Feb. 25, 2017).

65. *A Coastal Community Enhancement Initiative: An Approach for Addressing Growth, Land Use & Environmental Impacts in Southern Delaware*, UNIVERSITY OF DELAWARE, www.scc.udel.edu/sites/default/files/urbangrowthboundary.pdf [<https://perma.cc/4TZY-GDP5>] (last visited Feb. 25, 2017).

66. Mazzei, Patricia, *Miami-Dade Commissioners Expand Urban Development Boundary*, MIAMI HERALD (Oct. 2, 2013), www.miamiherald.com/2013/10/02/3666008/miami-dade-commissioners-expand.html [<https://perma.cc/64C5-AP9N>] (last visited Feb. 25, 2017).

67. See J. Vernon Henderson et al., *Measuring Economic Growth from Outer Space*, 102 AM. ECON. REV. 994, 996 (2012).

68. *Id.*

well-being is not inherently insidious, *if* society was, for example, building up and creating light from renewable energy resources. But as it stands, society is building *out* on pristine lands and creating light by burning mostly fossil fuels that are warming the planet and threatening the stable existence of mankind. Society remains nothing more than rational herders appropriating resource units of natural capital from the global commons—and it is a dangerous game.

In a prime example of the “free-rider” problem presented by common-pool resource management, people *say* they care about protecting open space—ninety-two percent of Americans support protecting farmlands from development, 75% consider it unethical to pave over good farmland to provide housing, 85% say it is important to be able to get to natural areas quickly from where they live, and 85% say the loss of forest cover over the last three decades is a significant problem for wildlife.⁶⁹ The NUSA Report interprets these data as proof that “Americans still value our rural land, oppose longer commute times to work and to daily, weekly, and monthly open-space destinations, increased environmental degradation, and higher economic costs, all of which are part of the price tag of sprawling urban development.”⁷⁰ But if people feel so strongly about protecting open space, why do they do such a poor job of protecting it in their own jurisdictions? The pro-open space sentiment certainly has not translated into policy in the South. It seems what people really mean is they want to protect open space “as long as it is not in my city” or “as long as it does not interfere with our local growth.” Lax land use standards and rapid development of southern lands highlight a disconnect between what people say they want and what they demand from their state and local governments regarding land use.

We must come to understand that the land use development dynamic at play in the United States is nothing more than a new form of the tragedy of the commons. The difference is that instead of herders, it is private property owners appropriating common-pool resources, and instead of an open pasture being degraded, it is an ecosystem that spreads across the boundaries of many private property owners and ultimately across the nation. We must understand that the problems that plague common-pool resource regimes are also at play in the urban development context, setting us on a path to a tragic land use crisis.

69. Kolankiewicz, *supra* note 1, at x.

70. *Id.* at 22.

B. Dynamic Modern Environment

Managing common-pool resources within a society seemingly determined to “rationally” appropriate finite resources is difficult enough. Yet, when the health and availability of those resources change dynamically, management becomes even more arduous. Take the example of coastal lands; over half of the U.S. population lives in the coastal zone, within miles of the sea.⁷¹ That coastline is changing dramatically. Scientists are increasingly adjusting upward their estimates of coastal sea level rise by 2100, as new evidence comes to light.⁷² One reason is that ice is melting faster in Antarctica and Greenland than originally projected. In a recent study in *Nature*, scientists found that if trends continue oceans could rise by nearly two meters by 2100, and by fifteen meters by 2500.⁷³ As a result, “the 22nd century would be the century of hell . . . There would really be an unthinkable level of sea rise. It would erase many major cities and some nations from the map . . . That century would become the century of exodus from the coast.”⁷⁴ Miami, New Orleans, Boston, New York—all would be threatened at the two-meter mark.⁷⁵ While the year 2500 may seem far off at present, at fifteen meters, many major coastal cities are gone, and large swaths of the entire east coast from Washington to South Florida are underwater for miles. At some point, without dramatic reduction in atmospheric greenhouse gas concentrations, a significant amount of the U.S. population will need to relocate away from the coastal zone.

Consider what a retreat from the coast means for the inland environment. People will not only need to live in new developments, but settlement will invariably compete with agriculture and the forests, wetlands, and other resources that remain. Coastal retreat will put even more strain on

71. SUSANNE C. MOSER & MARGARET A. DAVIDSON, NAT'L CLIMATE ASSESSMENT, COASTAL ZONE DEVELOPMENT AND ECOSYSTEMS (2014), <http://nca2014.globalchange.gov/report/regions/> [<https://perma.cc/K6FX-LD7Y>] (last visited Feb. 25, 2017).

72. See William v. Sweet, Robert E. Kopp, Christopher P. Weaver, Jayantha Obeysekera, Radley M. Horton, E. Robert Thieler, and Chris Zervas, *Global and Regional Sea Level Rise Scenarios for the United States*, National Oceanic and Atmospheric Administration, NOAA Technical Report NOS CO-OPS 083, January 2017, available at https://tidesandcurrents.noaa.gov/publications/techrpt83_Global_and_Regional_SLR_Scenarios_for_the_US_final.pdf (last visited Apr. 22, 2017).

73. Brady Dennis & Chris Mooney, *Scientists Nearly Double Sea Level Rise Projections for 2100, Because of Antarctica*, WASHINGTON POST (Mar. 30, 2016), https://www.washingtonpost.com/news/energy-environment/wp/2016/03/30/antarctic-loss-could-double-expected-sea-level-rise-by-2100-scientists-say/?utm_term=.d649387b9ede [<https://perma.cc/SN6J-7F5N>] (last visited Feb. 25, 2017).

74. *Id.*

75. *Global Sea Level Rise Map*, GEOLOGY.COM, <http://geology.com/sea-level-rise/> [<https://perma.cc/2DP2-CFWX>] (last visited Feb. 25, 2017).

inland natural capital. Beyond this concern, the “next” coastline will need to be developed much differently than the current one—society cannot afford to make the same mistake again. Rather than sprawling developments abutting a still-rising sea, we will need to integrate natural capital buffers between human settlements and the rising sea. This will be important not only to prolong the life of those settlements until the next retreat, if necessary, but also to buffer storm surge, erosion, and other natural phenomena that wreak havoc on human coastal settlements.

The NUSA Report argues that even now “the potent combination of unrelenting development and land degradation from soil erosion and other factors is reducing America’s productive agricultural land base even as the demands on that same land base from a growing population are increasing.”⁷⁶ Society will have even fewer agricultural lands from which to cultivate when humans retreat from the coast and replace agricultural lands with human settlements. Consider that if cropland continues to be converted at the same rate that it was between 1982–2010, by 2100 the United States will have lost over half of its remaining cropland, adding to the 15% that has already been lost.⁷⁷ If trends continue, by 2050 another 92,000 square miles of cropland will have been lost to residential and commercial developments.⁷⁸ One would hope that cropland would not continue being converted at present rates out of precaution for preserving agricultural productivity. Yet, when large swaths of over half of the U.S. population inevitably retreat from the coast and look for new settlements, it is likely that agricultural land will be converted as a result. In the alternative, new urban developments may take aim at forests and other non-agricultural natural lands. Either way, the environment degrades further.

Whether it is retreat from coastal sea level rise, the recent flooding in south Louisiana,⁷⁹ or the recent wildfires that burned down half of Gatlinburg, Tennessee,⁸⁰ the natural environment is increasingly dynamic—a dynamism aided in no small part by human activities leading to a quickly changing climate. This dynamism cautions against society maintaining the land development patterns to which it has adhered to date, and it represents

76. Kolankiewicz, *supra* note 1, at 12.

77. *Id.* at 14.

78. *Id.* at 68.

79. Jim Sargent et al., *Louisiana’s Historic Floods*, USA TODAY (Aug. 23, 2016), <http://www.usatoday.com/pages/interactives/la-floods-august-2016/> [https://perma.cc/VP23-WZ4L] (last visited Feb. 25, 2017).

80. Judson Jones, ‘Gatlinburg was made to burn,’ professor says, CNN (Dec. 2, 2016), <http://www.cnn.com/2016/12/02/us/weather-gatlinburg-was-made-to-burn/> [https://perma.cc/RD9S-5NAD] (last visited Feb. 25, 2017).

an independent layer of environmental crisis on top of the land development crisis created by sprawl.

C. Aggregation of Small-scale, Social-environmental Interactions

What happens when individually rational actors (whether state and local governments or the individuals that they govern) are free to appropriate natural capital at will from an increasingly dynamic environment? Each interaction at the society-environment interface may not seem significant, but when aggregated the ramifications are severe. Climate change, urban sprawl, and a host of other global environmental problems demonstrate as much. A 2012 *Nature* article concluded that “planetary scale critical transitions have occurred previously in the biosphere, albeit rarely, and . . . humans are now forcing another such transition, with the potential to transform Earth rapidly and irreversibly into a state unknown in human experience.”⁸¹

Historical frames of reference provide stark corollaries to the present. Consider the tragedy of Easter Island. When the first European visited Easter Island in the 1700’s, he found a starving, cannibalistic people, with only scrubby, small trees sparsely scattered across the island and makeshift, unseaworthy boats used for limited transportation.⁸² But as anyone familiar with the iconic Easter Island Moai knows, at one point Easter Island had been home to a culture advanced and wealthy enough to erect artistic statues up to 30 feet high and weighing 80 tons and place them all over the island.⁸³ In what might be considered a corollary to urban sprawl in the U.S. South, Easter Island had once been heavily vegetated with a palm forest, but “[o]ver time, the islanders cleared the vegetation, providing wood to cook their meat, timber to build their ocean-going canoes, and logs to transport and erect their massive statues . . . By the Fifteenth Century, however, the island had been cleared, the last palms chopped down.”⁸⁴ Native birds and other pollinators went extinct due to loss of canopy cover, while soil erosion caused a leaching of nutrients and a reduction in crop yields.⁸⁵ People were forced to stop building wooden houses from timber and to live in caves.⁸⁶ There was no wood to burn or to build statues and

81. A.D. Barnosky et al., *Approaching a state shift in Earth’s biosphere*, 486 NATURE 52, 52 (2012).

82. JAMES RASBAND, JAMES SALZMAN, & MARK SQUILLACE, NATURAL RESOURCES LAW AND POLICY 41 (2011).

83. *Id.*

84. *Id.* at 42.

85. *Id.*

86. *Id.*

canoes. Without canoes people could no longer fish, and they lost a key protein in their diet.⁸⁷ Ultimately, “the Easter Islanders were unable to escape the consequences of their self-inflicted environmental collapse. Destruction of their natural environment presaged the destruction of their flourishing society and economy, leaving in its place the pathetic settlement of undernourished cave dwellers.”⁸⁸

Jared Diamond has speculated on how this could have happened:

any islander who tried to warn about the dangers of progressive deforestation would have been overridden by vested interests of carvers, bureaucrats, and chiefs, whose jobs depended on continued deforestation . . . The changes in forest cover from year to year would have been hard to detect . . . Only older people, recollecting their childhoods decades earlier, could have recognized a difference.⁸⁹

As was the case with Easter Island, in the context of modern urban sprawl, “[c]orrective action is blocked by vested interests, by well-intentioned political and business leaders, and by their electorates, all of whom are perfectly correct in not noticing big changes from year to year. Instead, each year there are just somewhat more people, and somewhat fewer resources, on Earth.”⁹⁰

Thus, whether on Easter Island or in the U.S. South, the aggregation of societal-environment interactions has both geographical and temporal components. There is perhaps no better chronicling of this geographic-temporal dynamic than Time Magazine’s Timelapse website,⁹¹ a project undertaken in conjunction with Google. Timelapse allows a user to zoom in on any area around the world and view land use changes from 1984 to 2016.⁹² Zooming in on virtually every southern city will demonstrate the year-by-year destruction of evermore natural capital on the fringe of expanding cities. One could imagine a 16th and 17th century satellite view of Easter Island demonstrating the same. One can witness the rapid transition of horse farms, wetlands, and forests in central Alabama to residential developments and limestone quarries; the continued, destructive expansion of Houston, Texas—arguably the U.S. metropolis with the laxest land use controls of any major city; and the rapid clearing of land in Baton Rouge,

87. *Id.*

88. *Id.*

89. Jared Diamond, Easter Island’s End, DISCOVER MAG., Aug. 1995, <http://discovermagazine.com/1995/aug/eastersend543>.

90. *Id.*

91. Jeffrey Kluger, *Time and Space*, TIMELAPSE, <http://world.time.com/timelapse/> [<https://perma.cc/L5QE-BUT3>] (last visited Feb. 25, 2017).

92. *Id.*

Louisiana and the “North Shore” of Lake Pontchartrain.⁹³ A common quip in land use circles is that Atlanta, Georgia and Raleigh-Durham, North Carolina will soon connect in one continuous metro area. And a review of the region on Timelapse helps one understand why.

But even outside the South, areas that tout good land use planning, like Portland, Oregon, are still witnessing new sprawl. Portland is perhaps the iconic local government (and Oregon the iconic state) for modeling stringent land use planning. Oregon requires all metro areas to have an urban growth boundary,⁹⁴ and Portland has one of the most stringent. Yet between 2000 and 2010 Portland sprawled outward an additional 50.4 square miles, primarily because Portland added 266,760 more people during the decade.⁹⁵ Even though Portland’s density increased, reducing its per-capita sprawl, it gained in population sprawl. Raleigh, North Carolina also became denser, but due to the addition of 300,000 residents during the decade it sprawled outward an additional 198.5 square miles.⁹⁶ Thus “[i]t seems as though even the best-intentioned and politically palatable urban planning policies, are only able to slow, not halt, Urban Sprawl.”⁹⁷

Southern states adopting the Oregon approach would certainly be a step in the right direction, but it seems that the sprawl snowball is rolling downhill and accumulating inertia faster than even forward thinking states can manage. Perhaps what we need is better coordination across state and local governmental levels.⁹⁸ This is, of course, supposedly the role of the federal government. Yet most federal statutes implicating land use only address the symptoms of problems, not the problems themselves. The federal Endangered Species Act keeps species on life support but does little to address the habitat fragmentation that imperils species to begin with.⁹⁹ The Clean Air Act regulates mobile source emissions (in conjunction with the states) but does not take aim at one of the primary contributors to mobile source pollution—land use patterns that lead to more vehicle miles traveled

93. *Id.*

94. See *Urban Growth Boundary*, OREGON METRO, <http://www.oregonmetro.gov/urban-growth-boundary> [<https://perma.cc/WBS6-P2Z7>] (last visited Feb. 25, 2017).

95. Kolankiewicz, *supra* note 1, at 69.

96. *Id.*

97. *Id.* at 71.

98. See Jonathan Rosenbloom, *New Day at the Pool: State Preemption, Common Pool Resources, and Non-Place Based Municipal Collaborations*, 36 HARV. ENVTL. L. REV. 445, 451 (2012).

99. *Ecological Principles for Managing Land Use*, ECOLOGICAL SOCIETY OF AMERICA, <http://www.esa.org/esa/science/reports/managing-land-use/> [<https://perma.cc/KSU5-X5BU>] (last visited Feb. 25, 2017).

to sprawling outlying regions in metro areas.¹⁰⁰ The Clean Water Act does not even address the most significant threat to the nation's waterways, non-point source water pollution, due to its connection with the "traditional" state and local government function of land use regulation.¹⁰¹

It seems clear that whether at the federal, state, or local level more aggressive measures aimed not only at land use regulatory controls, but economic drivers, population pressures, behavioral economics, and related drivers will be needed to prevent small scale appropriative harms from heightening the aggregated land development crisis that our nation, and particularly the South, faces.

IV. CONCLUSION

The United States, and the U.S. South in particular, face a crisis at the intersection of its cities and the natural environment. Poor land use planning and development threaten not only the natural environment, but also the overall health and well-being of southern U.S. citizens. We must acknowledge and come to better understand the characteristics of human behavior (the "commons" mentality) that drives our land development decisions. We must understand how the quickly changing and dynamic modern environment hastens the negative ramifications of our current land development crisis. And we must quickly educate ourselves on the interplay between the commons herder mentality and our dynamic environment, so that we can avoid arriving at the destination to which our current path leads. Only by, first, acknowledging, and, second, setting about resolving the land development crisis can society provide a healthy and stable environmental context for addressing all of the other societal and economic crises faced by U.S. cities.

100. See HOWARD FRUMKIN, LAWRENCE FRANK, RICHARD J. JACKSON, URBAN SPRAWL AND PUBLIC HEALTH: DESIGNING, PLANNING, AND BUILDING FOR HEALTHY COMMUNITIES 22–23, 67 (2004).

101. *Nonpoint Source Pollution: The Nation's Largest Water Quality Problem*, ENVTL. PROT. AGENCY, <http://water.epa.gov/polwaste/nps/outreach/point1.cfm> [<https://perma.cc/WDF6-ATAA>] (last visited Feb. 25, 2017); see Robin Kundis Craig, *Local or National? The Increasing Federalization of Nonpoint Source Pollution Regulation*, 15 J. ENVTL. L. & LITIG. 179, 181, 182, 186 (2000).

