

The Environmental Consequences of Growth

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As you arrive from the South through Cape Hatteras National Seashore Park, you see nothing but sand and surf and sea bats and water birds in great profusion, and your impression is of "the Goodliest Land Under the Cope of Heaven." If you arrive from the North, through Kitty Hawk and Nags Head, which is the way most people arrive, you pass through a clutter of clap-

board and a forest of billboards . . . and a chaos of hot dog stands and T-shirt shops and strip malls and amusement parks. These two environments collide at the Mobil Station at Whalebone Junction. North of the gas station, nothing but scenic discord, which depresses people. South of it, all natural harmony, which elevates people. I think of that Mobil Station as the fulcrum upon which is balanced the worst nightmare and the best hope of all of us . . .

—Charles Kuralt¹

Just as bees are attracted to the most vibrant flowers, the mobile citizens of the United States migrate to communities with vibrant economies. North Carolina's strong economy has contributed to an increase in the state's population of 16.6 percent over the last de-

cade. Further, the state is expected to grow by approximately 200,000 people per year through 2020.²

New residents create a demand for more housing, more roads, and more goods and services. Although a strong economy is vital to the quality of life

in North Carolina, unplanned and unfettered growth can undermine the foundations of a healthy environment. A damaged environment will, in turn, harm economic growth. As the Roman Marcus Aurelius said in the *Meditations* nearly 2,000 years ago, "That which is



not good for the beehive cannot be good for the bees.”

In one way or another, almost all human-induced environmental problems can be traced to population growth. The environmental consequences of an expanding population can be minimized, however, if North Carolina grows smart. This article outlines the specific consequences of growth for North Carolina in terms of impacts on the water, the air, and the earth of this “Goodliest Land.” Because the consequences of unplanned growth often go well beyond its direct impacts, the article also explores cumulative and secondary impacts. Finally, it briefly introduces an alternative approach to growth that is more environmentally friendly than current patterns.

Direct Consequences of Growth

Data indicate that North Carolina currently is on an unsustainable path. Many environmental trends show that North Carolinians’ use of natural resources is outstripping the capacity of the environment to sustain them. As Governor James B. Hunt observed in 1998,

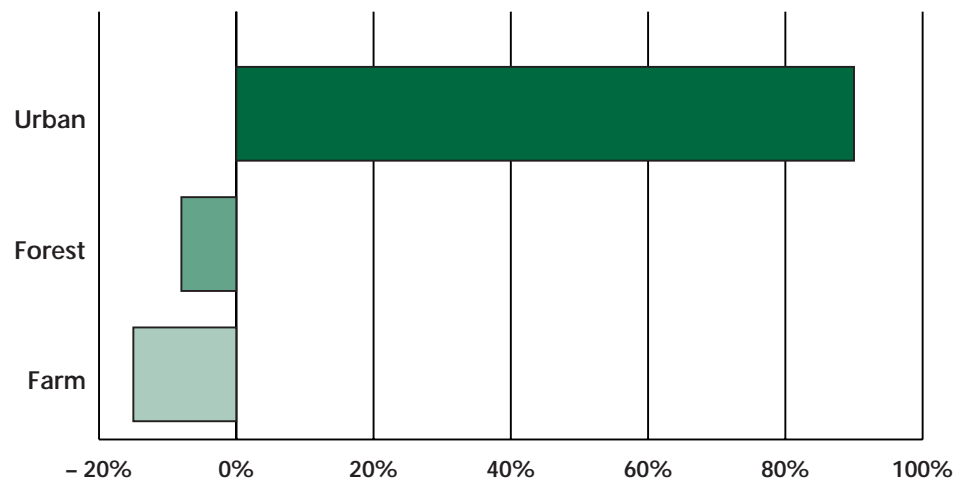
*Over the centuries of human progress, we came to think of Earth merely as a giant storehouse of raw material and the ultimate disposal site. And only now, at the close of this millennium, are we coming to realize that this thinking was a vast oversimplification of people’s relationship to the environment.*³

The environmental consequences of unmanaged growth include the following:

- Loss of open space and biodiversity
- Depletion of water resources
- Degradation of air quality
- Degradation of water quality
- Increased generation of waste

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Figure 1. Percent Change in North Carolina Land Use, 1982–97



Source: IOWA STATE UNIV. STATISTICAL LAB., FOR U.S. DEP’T OF AGRIC., NATURAL RESOURCE CONSERVATION SERV., NATURAL RESOURCES INVENTORY (Washington, D.C.: NRCS, Dec. 1999).

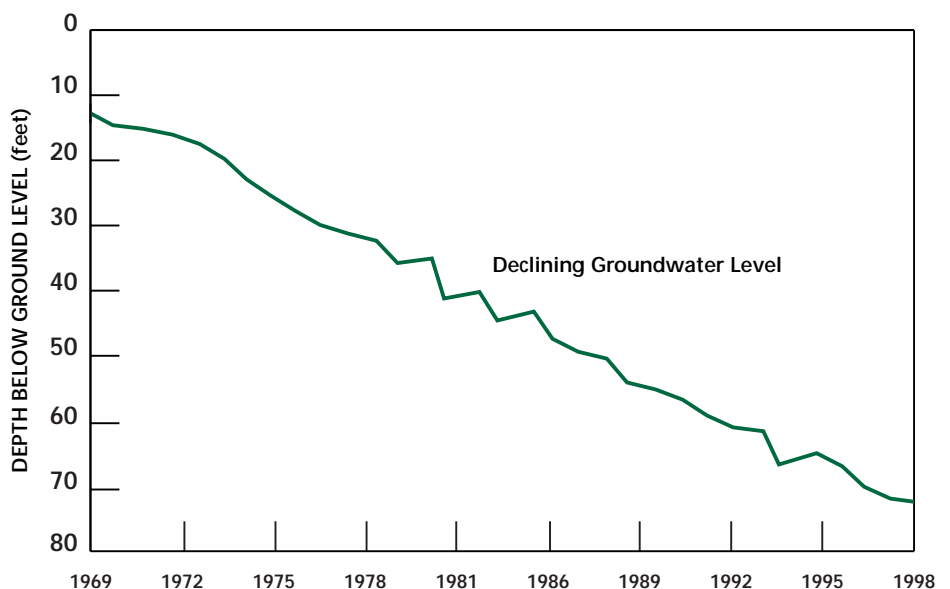
Loss of Open Space and Biodiversity

Loss of open space or undeveloped land is a direct and obvious consequence of poorly planned growth. Urban areas, including sprawling developments, are increasing at the expense of farmland and forests (see Figure 1). Development encroaches on “riparian buffers” (the zones of vegetation adjacent to rivers and lakes that protect water quality). It reduces the quantity of natural areas and forests. It threatens wildlife habitats and “biodiversity” (the array of plant and

animal species that make up a healthy ecosystem). And it reduces North Carolina’s capacity to provide the outdoor recreational opportunities required by an expanding population.

North Carolina is the fifth-fastest urbanizing state in the nation. Currently, 14.7 percent of its land area has been developed, compared with 10.2 percent only ten years ago.⁴ At this rate, 37.2 percent will be urbanized by 2050. Only 8.6 percent of the state’s land area is currently set aside as permanent open space.⁵

Figure 2. Rate of Depletion of the Black Creek Aquifer, 1969–98



Source: North Carolina Dep’t of Env’t and Natural Resources, Div. of Water Resources, DENR Monitoring Well Database, as measured at the Wilmar Monitoring Station, Black Creek Aquifer, well #P21K9 (as of July 26, 2000), available on the Internet at <http://dwr32.ehn.state.nc.us/cgibin/foxweb.exe/c:/foxweb/leveltab>.

More than 50 percent of North Carolina's Significant Natural Heritage Areas (places that include plants and animals so rare that they merit special consideration as land-use decisions are made) remain unprotected from development.⁶

Depletion of Water Resources

Increased use of water is another consequence of more people. North Carolinians can no longer assume that their water supply is adequate. For example, "aquifers" (underground layers of water that serve as sources of drinking water) are being depleted in eastern North Carolina. The Black Creek Aquifer, a huge reservoir underneath more than fifteen coastal counties, supplies water to communities such as Greenville, Jacksonville, Kinston, and New Bern. The rapid pace of growth on the coast is surpassing the Black Creek Aquifer's ability to recharge itself naturally (for a graphic representation of the consistent and rapid decline of this aquifer, see Figure 2, page 47). Once areas of an aquifer are depleted, the geological structure becomes compacted and permanently loses its ability to hold groundwater.

Droughts, combined with increased population, have forced other communities, such as Asheville and Greensboro, to restrict water use. The swell of growth in

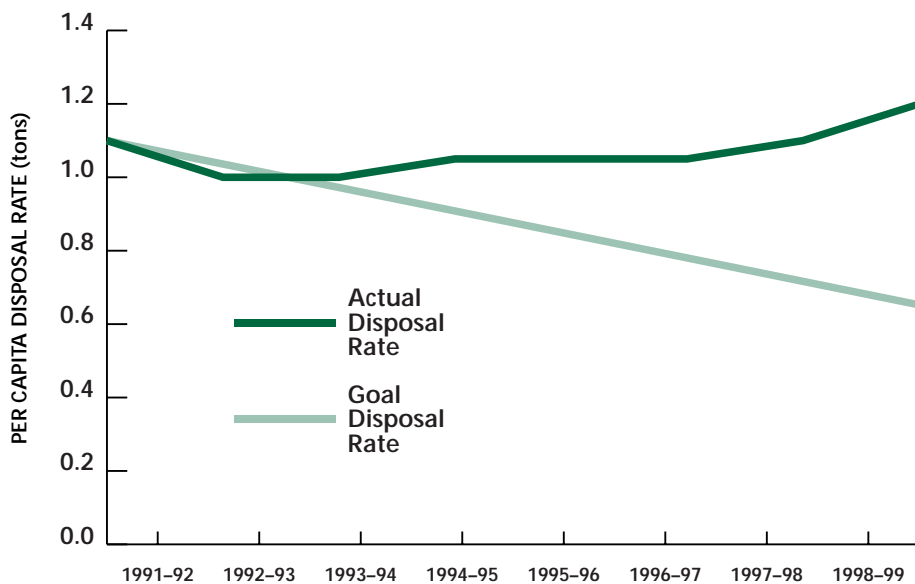
Cary compelled that community to put a moratorium on new development in 1999 because of limited water resources.

Degradation of Air Quality

The miles that North Carolinians travel in their automobiles and the electricity that they consume are increasing at even faster rates than the state's population.⁷ Currently, both automobile travel and energy consumption depend largely on the combustion of fossil fuels. These fuels are the source of most of North Carolina's air quality problems, including ground-level ozone pollution (smog). For example, of the thirty-two counties monitored for ozone pollution, twenty-four are not in compliance with North Carolina standards, posing public health risks to all residents, especially children, older people, and people with asthma. In 1998 the North Carolina Division of Air Quality began forecasting ozone pollution to inform the public when the air quality is good to moderate (Codes Green and Yellow), unhealthy for sensitive groups (Code Orange), unhealthy (Code Red), and very unhealthy (Code Purple). The number of unhealthy days (Codes Orange, Red, and Purple) doubled from the early 1990s to 1999.⁸

Visibility is reduced as well. For example, officials in Great Smoky Moun-

Figure 3. Rates of Solid Waste Generation, 1991–92 through 1998–99



Source: NORTH CAROLINA DEP'T OF ENV'T AND NATURAL RESOURCES, NORTH CAROLINA SOLID WASTE MANAGEMENT ANNUAL REPORT, JULY 1, 1998–JUNE 30, 1999 (Raleigh: NCDENR, Mar. 2000).



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Top to bottom: Congestion on Capital Boulevard north of Raleigh's beltline; a fish kill on the lower Neuse River; industrial smokestacks; power grids, companions to development.



BELOW: JOHN D. SIMMONS / THE CHARLOTTE OBSERVER. LEFT: KEITH GREENE / THE NEWS AND OBSERVER

Stormwater runoff caused by the construction of a residential development.

tains National Park estimate that pristine visibility should be approximately 60 miles in the summertime. Today, average summertime visibility is only 15 miles.

Greater energy consumption and automobile usage worldwide also increase carbon dioxide and other greenhouse gases. The resulting global warming threatens North Carolina in ways that scientists are just beginning to understand, from a rise in the sea level and coastal flooding to reduction in crop yields. The average temperature in North Carolina has increased 1.5 degrees Fahrenheit over the last century, and it is expected to rise another 3 degrees by 2100.⁹

Degradation of Water Quality

The development that often accompanies growth also damages water quality through increased “sedimentation” (depositing of eroded soil in rivers and lakes), encroachment on riparian buffers and wetlands, and increased runoff pollution from impervious surfaces such as

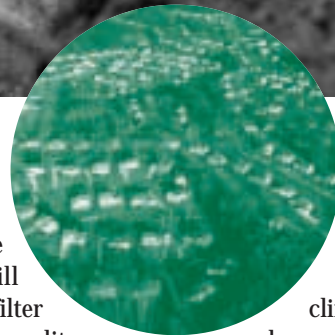
roads. For example, 34 percent of North Carolina’s coastal wetlands have been altered in some way and no longer fulfill their natural function to filter runoff and protect water quality.

Because wetlands act as a sponge, the draining of wetlands for development contributes to the extent of flooding after a disaster such as Hurricane Floyd.¹⁰

The health of waters inhabited by shellfish is an indicator of water quality on the coast. Currently, 17 percent of all shellfish waters are closed to harvesting, primarily because of high levels of pollutants. The vast majority of the pollution affecting shellfish can be attributed to sedimentation and runoff from impervious surfaces such as roads, and from increased development.¹¹

Increased Generation of Waste

More people generate more waste. Wastewater treatment facilities and landfills in North Carolina are processing greater amounts of waste than ever before. For



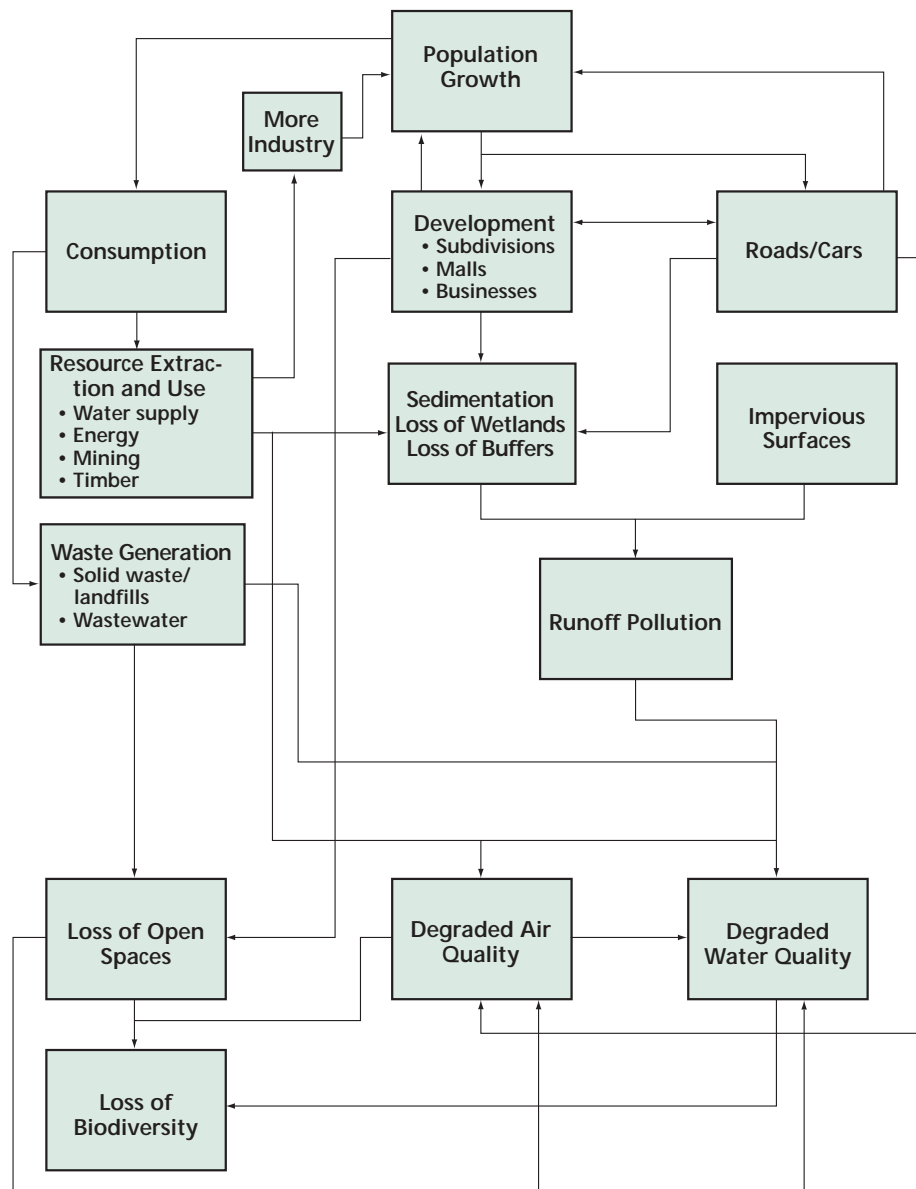
example, in 1999, North Carolina generated over 9.2 million tons of garbage, up 29 percent from 1990.¹² Even though recycling has increased significantly

on a per capita basis in North Carolina, the sprawling developments, the high levels of construction waste, and the high rates of consumption will keep North Carolina from meeting its goals of reducing waste by 40 percent by 2001. In fact, waste generation is headed in the wrong direction (see Figure 3).

Cumulative and Secondary Impacts

More people leads to more development, which in turn attracts more people and leads to more development. The environment can be the victim of this relentless cycle, particularly if growth is poorly planned. The consequences of new developments or roads often go

Figure 4. A Partial Inventory of the Secondary Impacts of Population Growth



A Smart Growth Approach for North Carolina

Ralph Waldo Emerson said in the *Conduct of Life*, “We learn geology the morning after the earthquake.” Clearly, North Carolinians have felt the tremors of sprawl. Fortunately an earthquake is not inevitable. North Carolina can take a number of steps to reverse current environmental trends, such as tightening emission standards for cars and power plants; conserving additional land as permanent open space; enforcing regulations to reduce stormwater pollution; and limiting development in wetlands, riparian buffers, and the 100-year floodplain.

But all these efforts will be like Sisyphus eternally pushing the boulder uphill if society is unable to tackle the root cause of environmental problems: rapid and unplanned growth. To create a sustainable future, growth must be based on a common vision, and the tools that a community uses to grow must support this vision.

For many communities, growth is desirable or at least inevitable. To develop a common vision, communities and regions of the state must determine what they need and want from growth. In other words, they must decide (1) how to grow in a way that will enhance quality of life and (2) what they want their community or region to look like twenty or fifty years from now. A common vision for a community might include a vibrant downtown, abundant parks, widely available bike paths and footpaths, and a sufficient industrial tax base to help support local government services. An element that must be present in all common visions, however, is growth occurring in a way that protects, and even enhances, the quality of the environment.¹³

Tools that shape growth must be employed to support the determined purpose. Conventional approaches to growth must be modified to be more protective of the environment (see Table 1).

All economic activity occurs within the confines of the environment. The environment provides the resources to power industries and build homes, and it provides an outlet for absorption of wastes. North Carolina’s actual carrying

beyond the direct and immediate environmental impacts, to cumulative and secondary impacts.

“Cumulative impacts” are the incremental effects of activities when they are added to other past, present, and future impacts on the environment. For example, if a community builds a wastewater treatment plant, the cumulative impacts would be the combined effect on water quality of the new discharges plus the discharges from all the existing sources that affect a water body such as a river. Even when the environmental impacts of a single project, such as a wastewater treatment plant, are not notable, the

cumulative impacts of many projects may pose considerable threats to the environment.

“Secondary impacts” are the impacts of an activity that occur later in time or are more removed in distance. For example, a new or expanded road may directly result in runoff or loss of open space, but it also may lead to more subdivisions, shopping malls, and traffic, each of which may harm air and water quality. (For some common secondary impacts of growth, see Figure 4, which shows the causal relationships—direct and indirect—between human actions and environmental impacts.)

Table 1. Issues That Influence Growth

Issues	Conventional Growth Approach	Environmental and Smart Growth Approach
Transportation	Focus on automobile	Consumer choice among automobiles, mass transit, and other options
Planning	Sporadic land-use planning	Widespread, integrated land-use, transportation, and air quality planning
Density	Sprawl outward	Denser, mixed-use developments
Industrial Recruitment	Environment considered only after site selection	Environmental issues integral in process of site selection; brownfields emphasized*
Conservation of Open Space	Land conservation not emphasized	Permanent conservation of some open spaces
Energy Use	Population and energy use growing in tandem	Conservation and alternative energy sources emphasized
Authority	Responsibility for growth lying with local government only	Responsibility for growth lying with partnership among local government, state government, business, citizens, and others
Tax Policy	Taxes often favoring or even subsidizing population growth	Taxes creating incentives for smart growth and disincentives for unplanned growth

*See Richard Whisnant, *Brownfields in a Green State*, POPULAR GOVERNMENT, Winter 1999, at 2 (discussing efforts to reuse abandoned, idle, or underused properties that have been contaminated in the past by hazardous substances).

capacity for the human population may never be known, but it is known that every additional person consumes resources and produces wastes. To minimize the impact of growth on the environment, North Carolina must grow smart.

As Charles Kuralt's words at the beginning of this article remind readers, North Carolina is at a junction. If it fails to grow smart, the environmental damage caused by additional people will undermine the state's quality of life and economic vitality.

Notes

1. Kuralt: *A Look Homeward* [excerpts from "North Carolina Is My Home," by Charles Kuralt and Loonis McGlohon], CHARLOTTE OBSERVER, July 5, 1997, at 17A.

2. North Carolina Office of State Planning, *State Demographics* (as of June 13, 2000), available at <http://www.ospl.state.nc.us/>.

3. Governor James B. Hunt, Speech at the North Carolina Emerging Issues Forum (Feb. 26, 1998).

4. United States Dep't of Agriculture, Natural Resource Conservation Serv., 1997 Natural Resources Inventory, Acreage and Percentage of Non-Federal Land Developed (as of June 28, 2000), available at <http://www.nhq.nrcs.usda.gov/CCS/pcentnon.html>.

5. North Carolina Center for Geographic Information and Analysis, *Farmland and Open Space Preservation in North Carolina*, handout at presentation (Mar. 10, 2000).

6. North Carolina Natural Heritage Program, *Protection Actions* (as of July 26, 2000), available at <http://ils.unc.edu/parkproject/nhp/index.html>.

7. North Carolina Dep't of Env't and Natural Resources, Div. of Air Quality, *Presentation to the N.C. Env'tl. Management Comm'n* (Feb. 9, 2000). See also Figure 1, page 54.

8. Telephone conversation with Sheila Holman, Chief for Attainment Planning, Div. of Air Quality, N.C. Dep't of Env't and Natural Resources (June 19, 2000). See also

Governor Hunt's Clean Air Plan for North Carolina (as of January 14, 2000), available at <http://daq.state.nc.us/News/>.

9. UNITED STATES ENVTL. PROTECTION AGENCY, OFFICE OF POLICY, *CLIMATE CHANGE AND NORTH CAROLINA*, EPA DOC. NO. 236-F-98-007Q (Washington, D.C.: USEPA, Sept. 1998).

10. Curtis Richardson, *Hurricane's Devastation Teaches Some Lessons*, WETLAND WIRE (newsletter of Duke Univ., Nicholas School of the Environment, Wetland Center), Autumn 1999, at 1.

11. Telephone conversation with George Gilbert, Section Chief, Shellfish Sanitation Program, Div. of Env'tl. Health, N.C. Dep't of Env't and Natural Resources (May 31, 2000).

12. NORTH CAROLINA DEP'T OF ENV'T AND NATURAL RESOURCES, *NORTH CAROLINA SOLID WASTE MANAGEMENT ANNUAL REPORT, JULY 1, 1998-JUNE 30, 1999* (Raleigh: NCDENR, Mar. 2000).

13. The smart growth principles developed by the Triangle Smart Growth Coalition (available at <http://www.mindspring.com/~tsgc/>) represent an expression of a common vision.