



Environmental Health

The environment in which individuals live and work affects their health. Contaminants in water and air can have adverse health consequences. Both short-term and chronic exposure to pollution can cause serious health risks. Air pollution from ozone can lead to respiratory symptoms, disruption in lung function, and inflammation of airways. Water pollution has been linked to both acute poisonings and chronic long-term effects. The worksite is another aspect of the environment that is important to consider with respect to the public's health. Unsafe work conditions can lead to poor health and even to extreme outcomes such as death.¹

This chapter includes:

- ❖ [Air quality](#)
- ❖ [Water quality](#)
- ❖ [Lead poisoning](#)
- ❖ [Waste management](#)
- ❖ [Food safety](#)

Section 11.01 *Air quality*

Overview

Human health can be negatively affected by poor air quality, which may cause lung damage and increased risk for allergies, asthma, cancer, and other respiratory conditions. Air pollution is caused by a variety of sources, and thus, it is a concern both indoors and outdoors. To protect human health, both federal and state governments have passed legislation regulating sources of air pollution. The U.S. Environmental Protection Agency (EPA) provides numerous resources describing air pollutants and their effect, measures of air quality, and the standards that regulate air quality.²

Healthy NC 2020 Objective

Environmental Health

Healthy NC 2020 Objective ³	Current Durham	Current NC ⁴	2020 Target
1. Increase the percentage of air monitor sites meeting the current ozone standard of 0.075ppm.	100% (2009) ⁵	62.5%	100%

Secondary Data: *Major findings*

Outdoor Air Quality

In 1970 the EPA passed the Clean Air Act, establishing the National Ambient Air Quality Standards (NAAQS) which, by 1990, regulated several air pollutants, called criteria pollutants, including particulate matter, carbon monoxide, nitrogen dioxide, sulfur dioxide, lead, and ozone. Of these criteria pollutants, by far the most persistent pollutant is ozone.⁶ Ozone has been linked to increased frequency of asthma attacks and use of health care services. Ozone exposure may also affect respiratory system development in very young children.

Durham County measures ozone concentrations on an hourly basis using only one air monitoring station located at the Durham Armory building on Stadium Drive. In 2009, ozone levels in Durham County met the current Healthy NC 2020 8-hour standard of 0.075ppm and 1-hour standard of 0.12ppm without a single day exceeding the standards.⁷ This is shown in Figure 11.01(a) below.

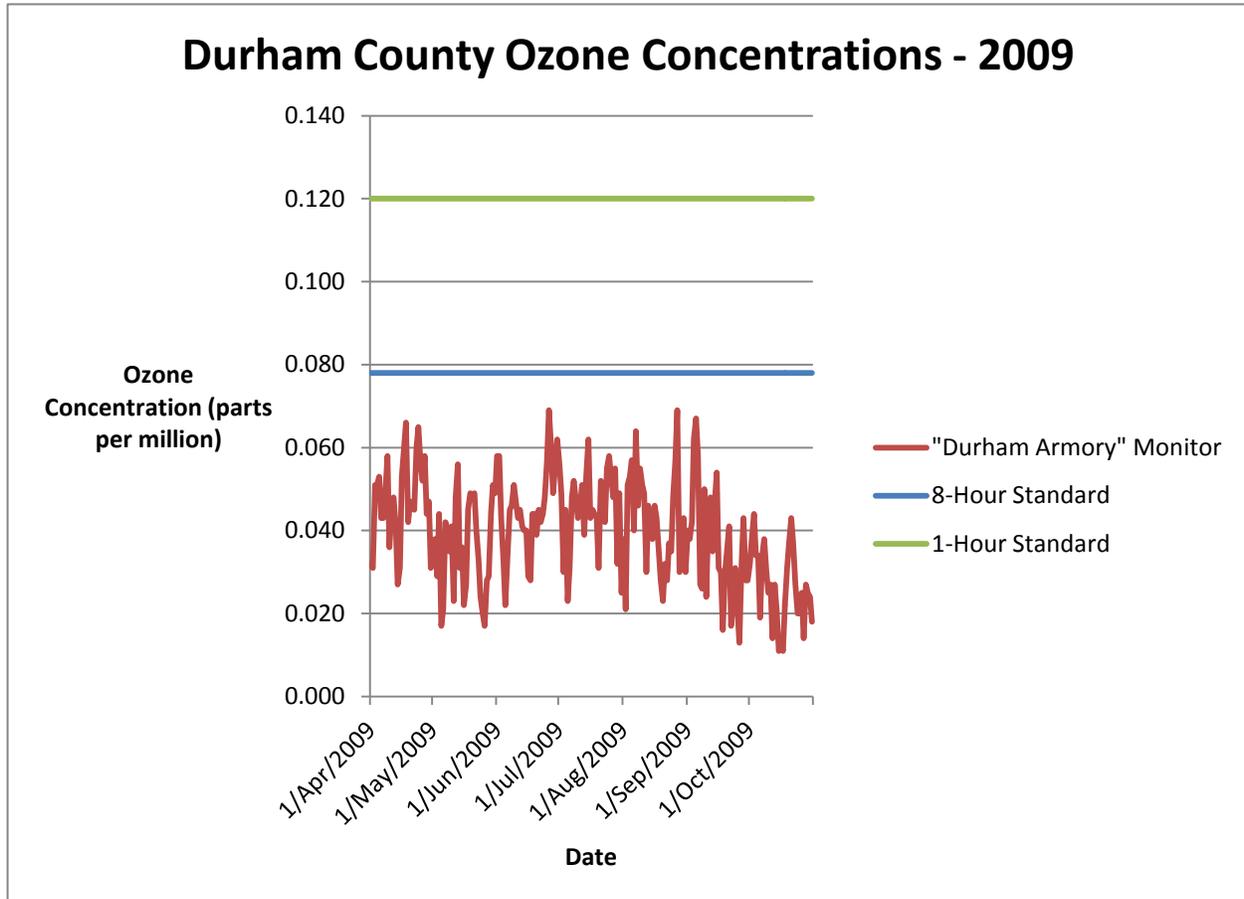


Figure 11.01(a) Durham County Ozone Concentrations

Indoor Air Quality

Despite the fact that there is no Healthy NC 2020 Objective that addresses indoor air quality, it is estimated that on average, Americans spend at least 90% of their time indoors,⁸ which indicates that indoor air quality is just as important as outdoor air quality.

As environmental tobacco smoke (ETS) has been proven to cause cancer, heart disease, and asthma attacks, the North Carolina General Assembly banned smoking in public places and places of employment in January 2010 and in many cases, in and around government-owned buildings.⁹ The Board of Health & County Commissioners is currently considering amending the smoking ordinance at their December 2011 meeting. This amendment will cover City of Durham ground, City of Durham parks system (athletic fields and playgrounds), City and County bus stops, Durham County grounds, Durham station transportation centers, and sidewalks owned or leased or occupied by the City or County of Durham, in addition to the the City of Durham hospital grounds.

- ❖ For more information on smoking and secondhand smoke in Durham County, please see Section 5.03 on Tobacco.

There are other sources of indoor air pollution that should not be ignored. These include combustion sources (such as oil, gas, and wood) radon, mold, and other allergens.¹⁰ More information on sources of indoor air pollution and their impacts on human health can be found on the website for the U.S. EPA's Indoor Air Quality.

Primary Data

Results from the 2010 Durham Community Health Opinion Survey show that air quality is an issue of importance to Durham residents. This survey involved 207 Durham households chosen at random; and entailed 52 questions. One question asked respondents to prioritize what they felt were the top three environmental issues in Durham County; close to 20% of respondents felt that outdoor air pollution is a top environmental issue in Durham County. Results from this question are depicted in Figure 11.01(b) below.¹¹

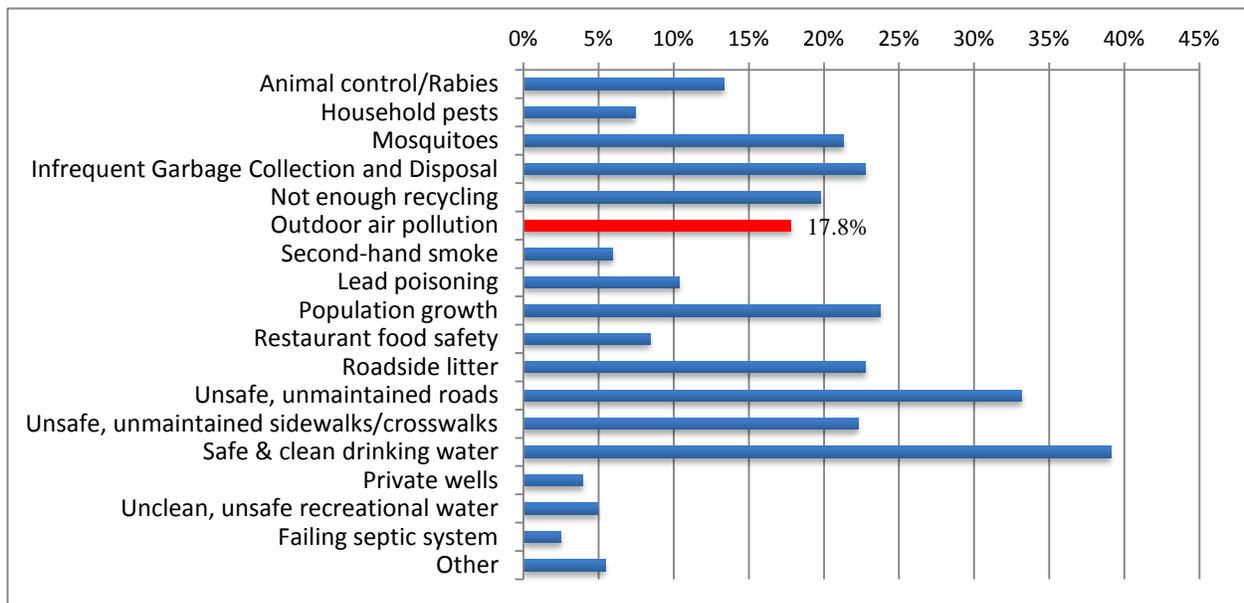


Figure 11.01(b) “What are the top 3 environmental issues in Durham County?”

Interpretations: Disparities, gaps, emerging issues

Air pollution is not evenly distributed across the country, or even within a state. Affected by factors such as weather patterns, air pollution oftentimes impacts areas and communities that are not directly causing the pollution. Certain populations – such as children, older adults, people with lung diseases, such as asthma, or heart disease, and those who are active outdoors – are more sensitive, and therefore, at greater risk from ground-level ozone, particulate pollution, and other pollutants.¹² Furthermore, research has shown that facilities which report to the Environmental Protection Agency's Toxics Release Inventory (TRI) are more concentrated in communities of color and that these communities are also more likely to be characterized by low median income, low homeownership, and are more linguistically isolated.^{13,14,15,16}

Recommended Strategies

Table 11.01(a) Evidence-Based and Promising Practices¹⁷

Category	Name	Description	Website	Matching 2010 Objective
Individual	Ozone Monitoring	This article provides the procedures for ozone monitoring site calibration and operation. By using the information in this resource, programs can be formed and educational intervention can be made	http://daq.state.nc.us/monitor/QAPLans/o3/o3_operator.pdf	Environmental Health Objective 1
Individual	N.C.Air Awareness Program: Take Action	Ozone and particle pollution, the two biggest air quality concerns in North Carolina, come from many of the same sources, primarily motor vehicles and industry (including power plants). Our individual activities create air pollution, and all of us have the power to improve air quality through our actions	http://daq.state.nc.us/airaware/takeaction.shtml	Environmental Health Objective 1

- Recommendation: Create an Interagency Leadership Commission to Promote Healthy Communities, Minimize Environmental Risks, and Promote Green Initiatives**

The Governor or the North Carolina General Assembly should create an Interagency Leadership Commission to develop a statewide plan to promote healthy communities, minimize environmental risks, and promote sustainability and “green” initiatives that will support and improve the public’s health and safety. The Interagency Leadership Commission should create an implementation plan that includes the roles that each agency will play in implementing the plan, the costs of the plan, and potential funding sources. The plan should emphasize local sustainability, environmental justice, protection of vulnerable populations, and precautions. Contents of the plan should include, but not be limited to, statewide efforts to promote active, walkable, livable communities; reduce environmental exposures and risks that negatively impact population health; promote clean, renewable energy, green technology, and local production of food, energy, goods, and services; and increase opportunities for mass transportation.¹⁸

- Recommendation: Develop an Environmental Assessment for North Carolina that Links Environmental Exposures to Health Outcomes**

The Department of Environmental Sciences and Engineering in the University of North Carolina (UNC) Gillings School of Public Health should collaborate with the North Carolina Division of Public Health, North Carolina Department of Environment and Natural Resources, North Carolina Department of Agriculture and Consumer Services, and North Carolina Agromedicine Institute (East Carolina University, North Carolina State University, and North Carolina Agricultural and Technical State University) to develop an environmental assessment for the state that links environmental exposures/risks to health outcomes and includes strategies to address the exposures/risks. This environmental assessment should be

conducted to address the priorities and needs of the state as identified by the recommendation regarding an Interagency Leadership Commission. The North Carolina General Assembly should appropriate \$3 million in non-recurring funds in SFY 2012 to the UNC Gillings School of Public Health to support this effort.¹⁹

Current Initiatives & Activities

- ***Triangle Air Awareness***

The Triangle Air Awareness Program website enables students, teachers, individuals, and businesses to quickly access information about Air Quality in our region. Its goal is to help everyone in the area learn how to take action, be informed, and help reduce air pollution to keep the air clean and healthy for everyone.

Website: <http://triangleairawareness.org/>
Phone Number: (919) 715-7647

- ***Clean Energy Durham***

Clean Energy Durham is a non-profit in Durham with the mission of moving America toward cleaner and safer energy by creating organizations of neighbors helping neighbors save energy.

Website: <http://www.cleanenergydurham.org/>

- ***US EPA - Office of Air and Radiation's Environmental Justice Website***

This website provides descriptions of community-based air toxics projects designed to assess and address health and environmental issues at the local level. EPA supports air toxics in about thirty communities across the nation to help inform and empower citizens to make local decisions concerning the health of their communities.

Website: <http://www.epa.gov/air/toxicair/community/>

Section 11.02 *Water quality*

Overview

Water is one of the vital natural resources upon which all life depends and clean water is essential for healthy living. According to the Centers for Disease Control and Prevention (CDC), the United States is fortunate to have one of the safest public drinking water supplies in the world.²⁰ Our public drinking water systems are comprised of both community and non-community systems. A community water system, or CWS, supplies water to the same population year-round, serving municipalities, subdivisions, mobile park homes and more.²¹ Non-community water systems are composed of both transient and non-transient water systems. Transient non-community water systems (TNCWS) supply water to 25 or more people for at least two months out of the year, but not to the same people and not on a regular basis (for example, gas stations, campgrounds).²² Non-transient non-community water systems (NTNCWS) regularly supply water to at least 25 of the same people at least six month per year, but not year-round (for example, schools, factories, office buildings, and hospitals which have their own water systems).²³

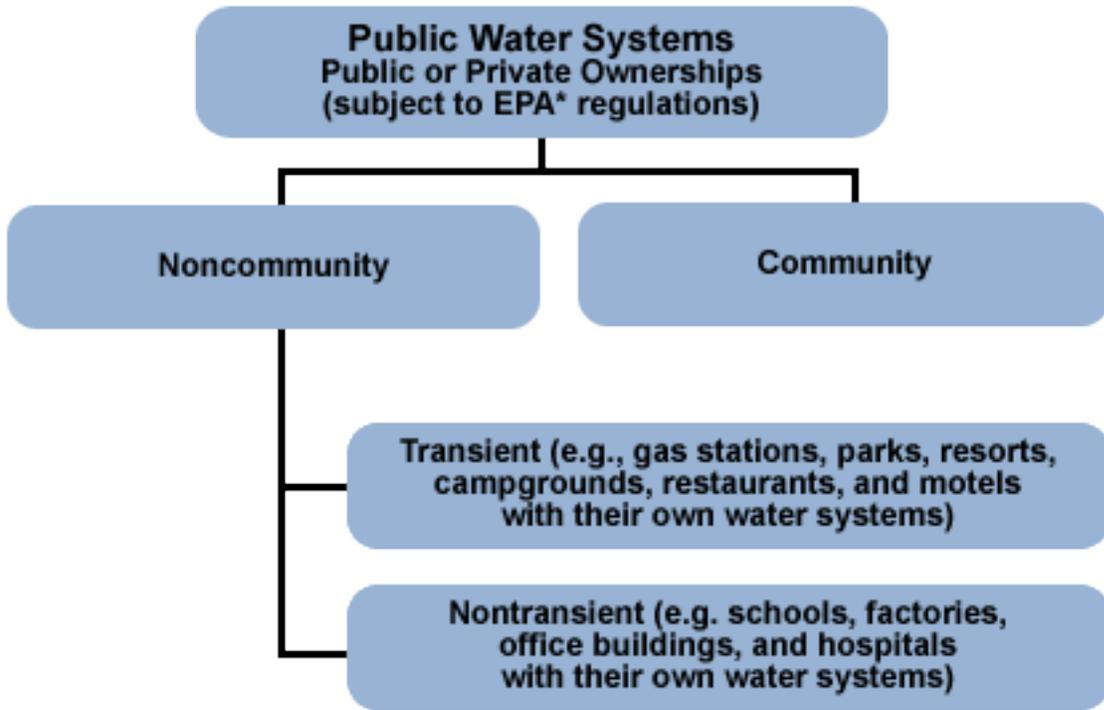


Figure 11.02(a) Drinking Water- Public Water Systems²⁴

The water source for a CWS may be lakes serving as reservoirs or wells constructed to CWS standards. Other Durham residents have their water provided by private wells constructed to private well water standards. These private wells are typically found outside of the city limits.

The Little River and Lake Michie reservoirs, both located in northern Durham County, supply raw water to Durham’s treatment plants for distribution to properties connected to municipal water.

Healthy NC 2020 Objective

Environmental Health

Healthy NC 2020 Objective ²⁵	Current Durham*	Current NC ²⁶	2020 Target
1. Increase the percentage of the population being served by community water systems (CWS) with no maximum contaminant level violations (among persons on CWS).	100% (2010) ²⁷	92.9% (2009)	95%

* In 2009, Durham County had only 1.56% of the population served by a CWS drinking from systems with no mcl violations, compared to 92.9% statewide. This is because there were two violations reported in 2009; one of those violations came from the City of Durham serving 232,226 people and another came from a system serving 183 people. There were a total of 236,070 people served in Durham County by CWS in 2009. Hence, a compliance rate of only 1.56%. For 2010, no mcl violations were found. Thus the compliance rate rose to 100% for Durham in 2010. A one-time violation detected in a year can cause the compliance rate for the entire year to go up or down by close to 100%, for that reason this reporting system may not be the best fit at the County level.

Secondary Data: Major findings

Municipal Drinking Water

Durham County has two drinking water reservoirs, Lake Michie and the Little River. Surface waters treated for public water supplies in Durham are stored in these two reservoirs. Two other lakes partially located within Durham County are Jordan and Falls Lakes, which serve as drinking water supplies for municipalities in other North Carolina counties.

Lake Michie and the Little River Reservoir have a combined safe yield of 37 million gallons per day (MGD), which is treated in one of two plants.²⁸ The Williams Water Treatment Plant at Hillendale Road has a capacity of 22 MGD. The Brown Water Treatment Plant at Infinity Road has a capacity of 30 MGD. These plants treat raw water to meet stringent State and Federal water quality criteria before pumping into Durham’s distribution system. The annual daily average water production of the combined facilities was approximately 27.65 MGD in 2005 with a peak daily production of 38.3 MGD in July of 2005.²⁹

The Brown Plant terminal reservoir holds approximately 90 million gallons and the Williams Plant Terminal reservoir holds approximately 45 million gallons representing a two to three day supply of water and providing a constant supply of raw water for the treatment plants should any interruption in delivery occur from the reservoirs due to water line servicing or breaks.³⁰

Current Conditions

Days of Supply³¹

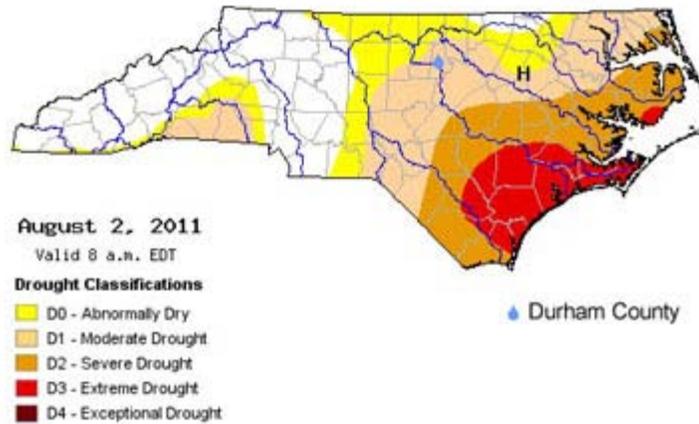


Figure 11.02(b)

Figure 11.02(b) above depicts the 30-day running average demand as of August 09, 2011 of 35.55 MGD:³²

- Days of supply of easily accessible, premium water remaining (Lake Michie, Little River Reservoir): 144 days
- Days in Teer Quarry storage remaining: 17 days
- Days of less accessible water below the intake structures remaining: 34 days
- Total days of supply = 195.

Quality of Drinking Water

The City of Durham is dedicated to providing high quality drinking water to its customers, while protecting the environment through effective wastewater treatment. To achieve this, the City's water treatment plants and water reclamation facilities are staffed 24 hours a day, 365 days a year. Lab staff perform thousands of analyses every year to ensure that drinking water and wastewater discharge meets all state and federal standards. Cross connection control program staff inspect back-flow prevention installations to ensure that Durham's high quality drinking water is not compromised by contamination.³³

The City of Durham produces an annual water quality report, [Tap Into Quality](#). This report presents updates on Durham's drinking water and treatment processes. Durham also prepares an annual sewer system report which explains the City's wastewater treatment and collection system performance; both of these reports are available online.³⁴ The City of Durham is required to test for more than 150 different constituents in the drinking water. During 2010, all detected substances were below the water quality levels allowed by the Environmental Protection Agency (EPA).³⁵

Wastewater reuse will increase dramatically in the future as demand for safe drinking water supplies climb. A massive worldwide trend towards wastewater reuse is taking place. Durham is a part of this movement. This water will then be available for safe non-drinking water purposes such as industrial processing, irrigation, and other uses.

Community Water Supplies

Community Water Supplies are defined by state regulations and fall under a variety of classifications. As a general rule, a community water system consists of one or several drinking water wells constructed to state standards which supply multiple connections. Durham County has 58 community water supplies.³⁶ Federal and state agencies regulate these public water supplies and enforce national guidelines for drinking water. During the assessment period, public water supplies maintained compliance with these standards.³⁷

Private Drinking Water Wells

Many county households, businesses, and facilities depend upon wells for a water supply. Approximately two million of North Carolina's nine and a half million residents (source: 2010 Census data) have their drinking water provided from wells.³⁸ Although older private wells are still found within the current city limits, most city properties are connected to municipal water. Private wells are generally not found in areas served by community water supplies. The vast majority of private drinking water wells within Durham County are located around the city's fringe where municipal water is not yet available or in the rural areas of the county. Wells are constructed per NCAC 15A Subchapter 2C Well Construction Standards. The roughly 37% of the county land area classified as rural is served by these wells, plus an ever-changing percentage of the 55% of the county land area classified as suburban.³⁹

Between January 2008 and December 2010, 67 new wells were drilled in Durham County. During this same time, 367 bacterial samples were collected from new and existing wells; 40% of these tested positive for total coliform. Total coliform is not a health threat in itself; it is an indicator bacteria. When present, other potentially harmful bacteria which are difficult and costly to test for may be present. Fifteen percent of the samples from these wells were positive for fecal coliform, and this type of coliform is associated with the presence of human and animal fecal waste. Pathogens associated with fecal coliform pose a serious health risk. When detected, environmental health staff provide guidance and services to help remediate the problem.⁴⁰

Durham County also offers water sampling for inorganic elements (such as lead and arsenic), nitrates and nitrites, petroleum, and pesticides. These samples are sent to the State Public Health Laboratory for analysis, with risk assessments provided by a state epidemiologist when applicable. The Durham County Environmental Health Division collected 284 of these samples from 2008 through 2010. Two sample results reported elevated lead levels, and one was found high in arsenic.⁴¹

Surface Waters

As mentioned previously, two major water features falling partially within Durham County are the Jordan and Falls lakes. These lakes serve as wildlife habitat and recreational waters, but also as drinking water supplies for municipalities within other North Carolina counties. Elevated levels of chlorophyll—a form of algae—in both lakes in recent years has led to legislation and rules to reduce the levels of nitrogen and phosphorous reaching the lakes. Considerable effort and expense will be required to improve water quality in the lakes over the next several decades. Strategies are being formulated to reduce nutrients in the lakes originating from wastewater treatment plant discharge, storm water, new and existing development, and agriculture. Increased monitoring of existing septic systems, the connection of septic systems to public sewer, and improved septic tank system performance may also become a part of the strategy.^{42, 43}

Primary Data

The issue of safe drinking water has shown to be a relatively significant concern among Durham County residents. According to results from the 2010 Durham County Community Health Opinion Survey, when respondents were asked to choose what they felt were the top 3 important environmental issues in Durham County, close to 40% cited safe drinking water as one of their top three.⁴⁴ Results from this question of the survey are shown in Figure 11.02(c) below:⁴⁵

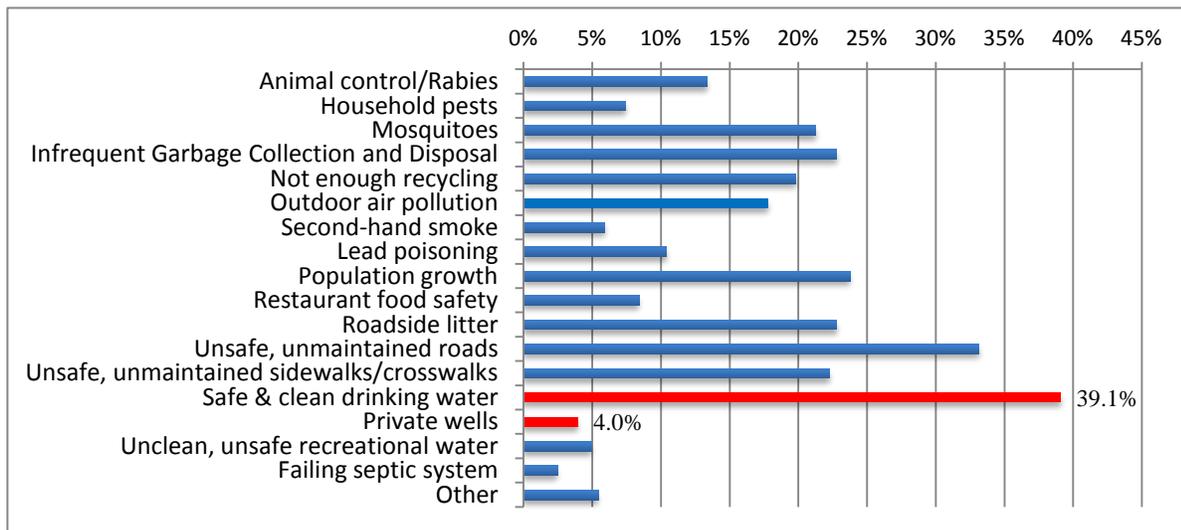


Figure 11.02(c) Results from the 2010 Durham County Community Opinion Survey

Interpretations: Disparities, gaps, emerging issues

The advantages of municipal water over private well water can be debated. The costs of well drilling can vary due to the depth at which the water is found and the quality and quantity of that water; however, private wells serve a substantial portion of North Carolina's rural population and as a general rule are deemed as a reliable and safe supply of drinking water. Certain individuals actually prefer well water because they deem it as free of certain additives found in municipal supplies. Nevertheless, the economic status of some private well owners can impact their ability

to perform needed water sampling and/or repairs for wells identified with contamination problems.

Current Initiatives & Activities

Currently, the Durham County Triangle Wastewater Treatment Plant is being up-graded. Upon project completion by mid December 2011, 5.2 MGD of wastewater will be treated to reuse standards.

- ***Environmental Protection Agency (EPA)-Drinking Water Contaminants***

This EPA site discusses the National Primary Drinking Water Regulations, or primary standards. Primary standards protect public health by limiting the levels of contaminants in drinking water.

Website: <http://water.epa.gov/drink/contaminants/>

Phone Number: (202) 566-1729

- ***The Centers for Disease Control (CDC) and Prevention-Drinking Water***

Here the CDC approaches a variety of drinking water topics, such as public water drinking systems, water fluoridation, private water systems and more. For more information please visit the CDC website.

Website: <http://www.cdc.gov/healthywater/drinking/index.html>

Phone Number: 1 (800) 232-4636

- ***The City of Durham Department of Water Management***

The Department of Water Management is responsible for the operation and maintenance of Durham's water supply, water treatment and water reclamation (wastewater treatment) facilities, the wastewater collection and water distribution systems (including meter reading), and customer billing services.

Website: <http://www.durhamnc.gov/departments/wm/>

Phone Number: (919)560-4381

- ***The City of Durham Department of Water Management- Water Quality***

The City of Durham provides annual water quality reports. For more information on the water quality in Durham and to understand the water treatment process, please visit the website shown below.

Website: http://www.durhamnc.gov/departments/wm/water_quality.cfm

Phone Number: (919) 560-4362

▪ ***North Carolina Department of Environment and Natural Resources***

States can use funds that the EPA makes available through the Drinking Water State Revolving Fund program to help their water suppliers improve drinking water quality. You can view North Carolina's Public Water Supply Section for more information.

Website: <http://www.ncwater.org/pws/>

Phone Number: (919) 733-2321

▪ ***Environmental Protection Agency- Safe Drinking Water Hotline***

The Hotline responds to factual questions in the following program areas:

- Local drinking water quality
- Drinking water standards
- Public drinking water systems
- Source water protection
- Large capacity residential septic systems
- Commercial, and industrial septic systems
- Injection well
- Drainage wells.

Website: <http://water.epa.gov/drink/hotline/index.cfm>

Phone Number: 1 (800) 426-4791

Section 11.03 *Lead poisoning*

Overview

Childhood lead poisoning is the most common environmental pediatric problem in the United States.⁴⁶ Nationally, a quarter million children under the age six have elevated levels of lead in their blood.⁴⁷ An Elevated Blood Lead Level (EBLL) is a lead level in the blood greater than or equal to 10 micrograms per deciliter (ug/dL). Exposure to lead can cause serious health effects in young children and the fetus of a pregnant woman because lead can be easily absorbed into their growing bodies. Lead can attack a child's developing brain; causing learning disabilities, reduced attention span, behavior problems and damage to the nervous system.⁴⁸ Young children, especially toddlers, are at greatest risk for exposure to lead because they tend to place their hands and other objects in their mouths. The most common cause of childhood lead poisoning is deteriorated lead-based paint, lead-contaminated dust, and lead contaminated soil found in and around the home.⁴⁹

Secondary Data: *Major findings*

In 2009, 4,017 one and two-years old in Durham County were tested for lead poisoning, with 80.2% of Medicaid enrolled children being tested. Of the children tested, 15 (or 0.4%) had blood lead levels in the range of 10 to 19 (ug/dL).⁵⁰ In 2008, 3,536 children ages one and two-years old in Durham County were tested for lead poisoning, with 77.6% of Medicaid enrolled children being tested. Of the children tested, 15 (or 0.4%) had blood lead levels in the range of 10 to 19 (ug/dL).⁵¹

*Table 11.03(a) Ages 1 and 2 Years Tested for Lead Poisoning in Durham County*⁵²

Year	Number Tested	Tested Among Medicaid	Lead ≥ 10	Percent ≥ 10
2009	4,017	80.2	15	0.4
2008	3,536	77.6	15	0.4

The data suggests that health care providers in Durham County have increased the number of one and two-year old children, enrolled in Medicaid, tested for lead by 2.6%. Although Durham County's efforts have increased from the previous year, the positivity rate remains the same.

Primary Data

Results from the 2010 Durham County Community Health Assessment Survey show that lead poisoning is an issue of concern for Durham County residents. Survey respondents were asked to cite what they feel are the top three environmental issues in Durham County; of the 207 respondents, 10.4% cited lead poisoning as one of their top 3 issues, which is depicted in Figure 11.03(a) below.⁵³

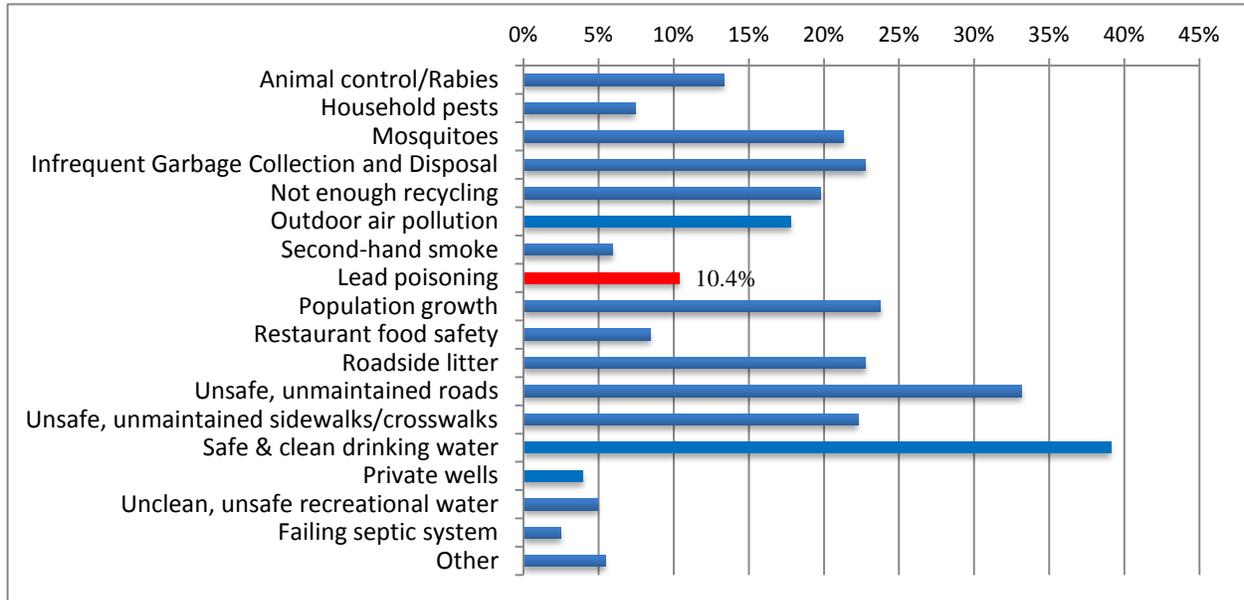


Figure 11.03(a) Results from the 2010 Durham County Community Health Opinion Survey

Interpretations: Disparities, gaps, emerging issues

Durham residents are at increased risk for lead exposure depending on their socioeconomic status, racial, ethnic, and age group. Lead poisoning poses particular risks to minority and low-income children. Minority and low-income families are more likely to live in substandard housing and polluted communities, increasing their risk of childhood lead poisoning.⁵⁴ Children living in residences containing deteriorated lead-based paint are exposed primarily from environmental sources of lead incorporated into the infrastructure, including paint, water systems, and soil.⁵⁵

According to the Centers for Disease Control (CDC), childhood lead poisoning, injuries, respiratory diseases such as asthma, and quality of life issues have been linked to more than 6 million substandard housing units nationwide. Residents of these units are also at increased risk for fire, electrical injuries, falls, rodent bites, and other illnesses and injuries.⁵⁶

As a result of housing-related hazards, the CDC coordinated a comprehensive and holistic approach to preventing diseases and injuries called the Healthy Homes Initiative. The focus of the initiative is to identify health, safety and quality-of-life issues in the home environment and to act systematically to eliminate or mitigate problems.⁵⁷

The Healthy Homes Initiative has been implemented in Durham County and seeks to:⁵⁸

- Broaden the scope of single-issue public health programs, such as childhood lead poisoning prevention and asthma programs, to address multiple housing deficiencies that affect health and safety.
- Build capacity and competency among environmental public health practitioners, public health nurses, housing specialists, managers, and others who work in the community, to develop and manage comprehensive and effective healthy homes programs.

- Promote, develop, and implement cross-disciplinary activities at the federal, state, tribal, and community levels to address the problem of unhealthy and unsafe housing through surveillance, research, and comprehensive prevention programs.
- Facilitate the collection of local data and monitor progress toward reducing or eliminating housing deficiencies and hazards.
- Expand collaborations with the U.S. Department of Housing and Urban Development, national associations and organizations, academia, community-based organizations, and others, including the American Public Health Association, National Environmental Health Association, and the World Health Organization.
- Promote research to determine causal relations between substandard housing and adverse health effects.
- Develop guidelines to assess, reduce, and eliminate health and safety risks.
- Identify and implement low-cost, reliable, and practical methods to reduce health and safety risks in substandard housing.

Recommended Strategies

Durham County and its partners came up with a comprehensive plan to target the assessment of housing conditions and link vulnerable populations. The group will target assessments in high-risk areas through door-to-door outreach, neighborhood, faith-based and other organizations in the target areas. Durham will build a Healthy Homes program by strengthening alliances that have already been forged by the lead program and will build a network of additional partners to assess and resolve Healthy Homes issues.

Current Initiatives & Activities

- ***Durham County Health Department (DCHD)***
Offers lead poisoning education and free onsite testing for children six-months to six years old. Conducts lead home investigations. Provides nutritional counseling with children who have elevated blood lead levels.

Website: <http://www.co.durham.nc.us/departments/phth/>
Phone Number: (919) 560-7664

- ***Durham Affordable Housing Coalition (DAHC)***
Promotes safe, fair and affordable housing in Durham, NC.

Website: <http://www.dahc.org>
Phone Number: (919) 683-1185

- ***Partnership Effort for the Advancement of Children's Health/Clear Corps (PEACH/CC)***

Addresses environmental issues, such as lead poisoning in children of color who live in deteriorated housing, older housing, and low income communities.

Website: <http://www.clearcorps.org>

Phone Number: (919) 682-1300

- ***Duke University's Children Environmental Health Initiative (CEHI)***

Conducts research, education, and outreach programs committed to fostering environments where all children can prosper.

Website: <https://cehi.nicholas.duke.edu/share/projects>

Phone Number: (919) 613-8723 or (866) 264-7891 toll free

- ***North Carolina Childhood Lead Poisoning Prevention Program (CLPPP)***

Coordinates clinical and environmental services aimed at eliminating childhood lead poisoning.

Website: http://www.deh.enr.state.nc.us/ehs/Children_Health/Lead/lead.html

Phone Number: (919) 733-2884

Section 11.04 Waste management

Overview

Waste that is not properly managed can create serious health and social problems in a community. Through waste treatment and reduction, recycling, and appropriate wastewater disposal, waste management provides part of the solution to preventing such health and social problems in the community, in addition to protecting the environment. Consistent waste reduction and recycling activities means there will be less waste materials to be sent to landfills. Reusing and recycling of used items will also result in conservation of our natural resources.

Durham County's long-range vision is for a comprehensive solid waste management program. The components of the program would provide waste disposal capacity, waste collection services, and waste reduction programs to all members of the community at an equitable price.⁵⁹ The vision includes: the elimination of improper disposal of waste and expanded waste reduction opportunities that are convenient for residents; a community that understands the environmental benefits of waste reduction and proper waste disposal; foresees financial expenditures, but intends to keep them at a reasonable level; and is translated into the following long range planning goals:

- To provide everyone in the community with waste disposal capacity, waste collection services, and waste education opportunities.
- To increase the efficiency and cost effectiveness of the solid waste program.
- To meet the established local waste reduction goals.
- To decrease improper waste removal.
- To protect public health and the environment.⁶⁰

Healthy NC 2020 Objective

There is no Healthy NC 2020 Objective pertaining to Waste Management.

Secondary Data: *Major findings*

Solid Waste

The City of Durham transfer station disposed of 147,167 tons of municipal solid waste/yard waste in 2009-2010.⁶¹ This figure does not include tires, recycled materials, or white goods (such as refrigerators or washing machines). In fiscal year 2008-2009, solid waste brought to the City of Durham transfer station was estimated to be approximately 35% residential, 56% commercial waste, and 5% industrial waste.⁶² Statewide estimates from the North Carolina Department of Environment and Natural Resources (NCDENR) indicate that the typical statewide waste stream is 28% residential, 23% commercial, 29% construction and demolition, and 20% industrial.⁶³

Durham County contracts with TFC Recycling Services to provide bi-weekly roadside recycling collection services to residents and convenience center drop-off collection services at the County's four centers. Since the County does not operate a sanitary landfill, the County depends

on the City of Durham as its primary source of solid waste disposal. The City of Durham operates a solid waste transfer station which transfers the City and the County's solid waste (delivered to the transfer station by Republic Services, Inc.) to a landfill in Lawrenceville, Virginia called the Brunswick Waste Management Facility. The City is considering other options in managing its waste such as finding a solid waste landfill and a yard waste facility within the boundaries of the State of North Carolina.

*Table 11.04(a) City of Durham Transfer Station: Total Municipal Solid/Yard Waste*⁶⁴

Fiscal Year (July 1 to June 30)	Total Tonnage
2006-07	206,554
2007-08	194,837
2008-09	170,317
2009-10	147,167
10-11(though May,2011)	136,597

All figures are taken from the DURHAM COUNTY WASTE DISPOSAL Reports Durham County (<http://www.wastenotnc.org>) that are created by NCDENR based on annual reports that all solid waste facilities are required to file with the state.

As the City does not operate a sanitary landfill and does not have any plans to build a landfill in the foreseeable future, in January of 2006, it closed its Land Clearing Inert Debris (LCID) landfill. A closure plan submitted to NCDENR and was approved.

The City of Durham Solid Waste Department has eight identified initiatives for fiscal year 2011. The two that are most quantifiable are:

- Reduce tonnage by 10 percent within three years; 15 % within the next five years.
- Increase recycling participation to 95 percent through aggressive marketing campaigns, continued education of citizens, and partnering with multi-family dwellings.⁶⁵

Recycling

The City of Durham provides recycling for most of the residential sector (excluding multi-family complexes) inside the city limits. The amount of recycling collected has increased by 21% since fiscal year 2006-07.⁶⁶

*Table 11.04(b) Recycling Collected in City of Durham*⁶⁷

Fiscal Year	Recycling Tons
2006-07	11,501
2007-08	11,541
2008-09	12,297
2009-10	13,960

In the unincorporated areas of Durham County, the tons of recyclable materials from residential

households and from the four solid waste convenience sites are shown in Table 11.04(c) below.⁶⁸ Residents in these areas are required to transport their own recyclable materials which may explain why the amount of recycled materials collected has not seen the increases that the City of Durham has experienced.

*Table 11.04(c) Recycling Collected in Unincorporated Durham County*⁶⁹

Fiscal Year	Recycling Tons
2006-07	1,797
2007-08	2,008
2008-09	2,238
2009-10	1,978

In 1997, Durham passed an ordinance making it unlawful to place target recyclables in the garbage. The ordinance applies to all waste generators – residential, commercial, and industrial. Target recyclables currently include:⁷⁰

- Aluminum cans
- Steel cans
- Glass bottles and jars
- Newspaper
- Plastic bottles
- Corrugated cardboard
- Computer equipment – effective July 1, 2011
- Televisions – effective July 1, 2011

The City provides recycling opportunities for the targeted items as well as several other items through drop-off centers and curbside collections. Residents and businesses may face financial penalties for not complying with the ordinance.

In addition to the City's recycling ordinance, state law also bans the following items from being disposed of in a landfill:

- Antifreeze – effective July 1, 1994
- Aluminum cans – effective July 1, 1994
- Appliances – effective January 1, 1991
- Beverage containers from ABC permit holders – effective January 1, 2008
- Lead-acid batteries - effective January 1, 1991
- Oil filters – effective October 1, 2009
- Plastic bottles - effective October 1, 2009
- Scrap (whole) tires – effective March 1, 1990
- Televisions and electronics – January 1, 2011
- Used oil – effective October 1, 1990
- Wood pallets (may be disposed in C&D landfill) – effective October 1, 2009
- Yard Waste – effective January 1, 1993

Wastewater Treatment

There are three municipal wastewater treatment plants located in Durham County; two are operated by the City and one by the County. The City of Durham operates the North Durham Water Reclamation Facility on East Club Boulevard and the South Durham Water Reclamation Facility near Farrington Road. Additionally, Durham County operates the Triangle Wastewater Treatment Plant, located at 5926 Hwy 55 in southern Durham County.

The City of Durham is located on a ridgeline that generally runs along Pettigrew Street and the railroad tracks. Wastewater on the north side of the ridgeline flows to the North Durham Water Reclamation Facility and, after treatment, is ultimately discharged into the Neuse River Basin. The South Durham Water Reclamation Facility receives wastewater that flows south of the ridgeline. After processing, the discharge flows into the Cape Fear Basin. The Triangle Wastewater Treatment Plant serves most of Research Triangle Park, Parkwood and a few other southern Durham neighborhoods both inside and outside the City limits.

Both the City and the County systems implement an Industrial Pretreatment Program to control pollutants from industrial users which may pass through or interfere with plant operation. Permits are issued to facilities determined by the type of business activity they conduct or the type(s) of wastewater discharged from their facility. All together, the City and County monitors and inspects at least 27 significant industrial users and hundreds of commercial establishments with high-strength discharges.

The table below details the capacities and average daily flow for the three municipal treatment plants in Durham. Included in the flow for the Triangle Plant is wastewater from the Town of Cary, under an Interlocal Agreement between Durham County and the Town of Cary, to treat up to 6 million gallons per day of Cary's wastewater through 2013.⁷¹

*Table 11.04(d) Wastewater Treatment Facilities in Durham County*⁷²

Municipal Treatment Plants	Permitted Capacity (million gal/day)	Average Daily Flow (million gal/day)				
		2006	2007	2008	2009	2010
North and South Durham Water Reclamation Facilities ⁷³	20 (each facility)	17.87 (total)	19.34 (total)	17.28 (total)	19.97 (total)	20.38 (total)
Triangle Wastewater Treatment Plant ⁷⁴	12	4.40	4.50	4.79	5.07	5.29

Other areas of Durham County are served by municipal sewer connections from treatment facilities not located in Durham. An area of Durham adjacent to Chapel Hill is served by the Orange Water and Sewer Authority; and another area of Durham adjacent to Wake County is served by the Raleigh Municipal Sewer System.

Approximately 17% of Durham's population is served by private on-site septic systems; according to GIS and Durham Environmental Health data, there are approximately 19,600 private septic systems in Durham.⁷⁵ Assuming the census average of 2.34 persons per household, this translates to approximately 46,000 persons served by septic systems out of a total Durham population of 267,587.^{76 77}

Primary Data

Waste management is a community issue of relative importance according to results from the 2010 Durham County Community Health Opinion Survey.⁷⁸ When survey participants were asked to choose what they felt were the top 3 environmental issues in Durham County, 22.8% cited infrequent garbage collection and disposal, 19.8% cited not enough recycling, and 22.8% cited roadside litter. Results from this question on the survey are shown in Figure 11.04(a) below:

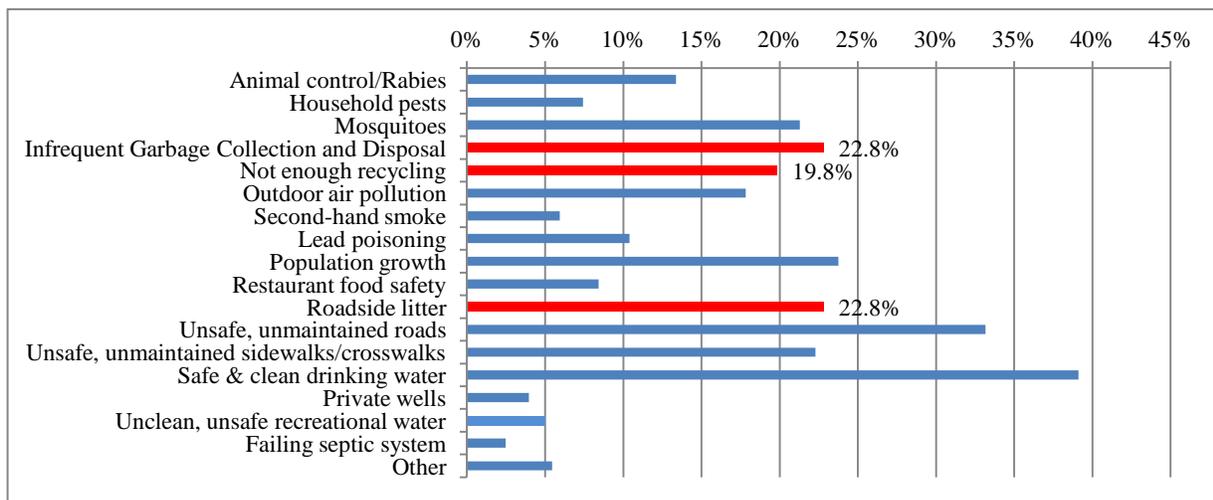


Figure 11.04(e) "What are the top 3 environmental issues in Durham County?"

Interpretations: Disparities, gaps, emerging issues

City vs. County Solid Waste Management

The City of Durham provides trash pick-up, yard debris pick-up and recycling for those living within City limits only. Those residing outside City limits have to dispose of their own trash at four different locations scattered about the County, as mentioned previously.⁷⁹ This could negatively impact the health of County residents who have limited or no access to these disposal locations, or cannot afford to hire a private trash collection service, as solid waste will likely accrue in or around their homes.

Additionally, the majority of homes inside the city limits are served by municipal sewer. Areas outside of the city limits are predominantly served by on-site septic systems. Approximately

71% (14,000) of the septic systems in Durham County are greater than 32 years old. Due to age, many of these septic systems will need repair or replacement in the near future.⁸⁰

Electronic Waste

One of the fastest-growing waste streams in the world is disposing of technology such as computers, televisions and other electronic devices.⁸¹ Durham County has implemented a new electronic waste (or “e-waste”) program. Technology that is still working and can be re-used can be dropped off at the County Swap Shop, located at the Redwood Convenience Site (on the corner of Redwood Road and Electra Road). Non-working technological items can be recycled at the City of Durham’s Waste Reduction and Recycling Center located at 2115 E. Club Boulevard in Durham or the HHW Facility located at 1900 E. Club Boulevard.⁸²

On May 1, 2011, the City of Durham hosted a shred and e-waste event in honor of Earth Day. It was highly successful, as approximately 500 people participated in the event and 13 tons of paper was shredded and three 48-foot trailers were filled with electronic recyclables.⁸³ The city plans to host more of these events in the future.

Current Initiatives & Activities

▪ ***Durham County Solid Waste Management***

There are 4 locations in which Durham residents living outside City limits can dispose of their trash and recyclables.⁸⁴

Area	Location	Phone Number
Parkwood	Highway 55 & Alexander Dr	919 - 560-0460
Redwood	Redwood Road & Electra Dr	919 - 682-8200
Bahama	Quail Roost Road & Ball Road	919 - 477-8552
Rougemont	Bill Poole Road and Highway 501 North	919- 477-4325

Access to the centers is gained by the display of a Durham County Solid Waste Sticker. Call number below for more details.

Website: <http://www.durhamcountync.gov/departments/gnsv/Documents/Revised%20Handbook2.pdf>

Phone Number: (919) 560-0430

▪ ***Durham County Roadside Trash Collection***

County residents can contact the companies below for trash pick- up service rates:

- Waste Industries - (919) 596-1363
- Republic Services, Inc. - (919) 772-1316
- Clayton & Hurdle Disposal - (919) 688-4993

Website: http://www.durhamcountync.gov/departments/gnsv/Solid_Waste_Division.html

Phone Number: (919) 682-8200

- ***Durham County Swap Shop (Re-usable e-waste)***

County residents can dispose of functional, but outdated, technology such as computers, televisions and cell phones. Residents who are in need of items such as these can pick them up free of charge.

Website: http://www.durhamcountync.gov/departments/gnsv/Swap_Shop.html

Phone Number: (919) 682-8200

- ***Durham County E-Waste Recycling***

There are two e-waste recycling locations for technology that is no longer working and/or extremely outdated:

City of Durham's Waste Reduction and Recycling Center	2115 E. Club Boulevard
Household Waste (HHW) Facility	1900 E. Club Boulevard

Website: http://www.durhamcountync.gov/departments/gnsv/recycle/Computer-Electronic_Waste.html

Phone Number: (919) 560-4186.

- ***City of Durham Solid Waste Management Department***

City residents can get more information on solid waste disposal and recycling.

Website: http://www.ci.durham.nc.us/departments/solid/index_new.cfm

Phone Number: (919) 560-4186

- ***City of Durham Solid Waste Management Department- Trash and Bulky Service Pick-Up***

City residents can access an online, color-coded map to verify their garbage pick-up day. Just plug in your address and the map will find your location and notify you on what days to put out your trash, yard debris and recyclables.

Website: <http://gisweb.durhamnc.gov/durhamMaps/SWCollection/SWCollection.html>

Phone Number: (919) 560-4186

- ***Earth 911***

Visit this website for a list of local companies that provide electronic recycling options

Website: <http://earth911.com/>

Phone Number: 1-800-CLEANUP

Section 11.05 *Food safety*

Overview

The Centers for Disease Control and Prevention (CDC) defines food borne disease as an illness caused by consuming contaminated foods or beverages.⁸⁵ Many different disease-causing microbes, or pathogens, can contaminate foods and more than 250 different food borne diseases have been described. Most food borne diseases are infections caused by varying bacteria, viruses and parasites.⁸⁶ In addition, poisonous chemicals, or other harmful substances can cause food borne diseases if they are present in food.

Since there are so many different diseases with varying symptoms, there is no single "syndrome" that is food borne illness. However, a microbe or toxin enters the body through the gastrointestinal tract and often causes symptoms which typically include nausea, vomiting, abdominal cramps and diarrhea. These are common symptoms in many food borne diseases.⁸⁷

Food borne diseases cause about 47.8 million illnesses, 127,839 hospitalizations, and 3,037 deaths every year in the United States.⁸⁸ Improper holding temperatures, poor personal hygiene of food handlers, unsafe food sources, inadequate cooking, and contaminated equipment are the top five food safety risk factors identified by the CDC.ⁱ Critical violations are based upon these identified risk factors.

Healthy NC 2020 Objective

Environmental Health

Healthy NC 2020 Objective ⁸⁹	Current Durham	Current NC ⁹⁰	2020 Target
1. Decrease the average number of critical violations per restaurant / food stand.	6.8 (2009) ⁱⁱ	6.1 (2009)	5.5

Secondary Data: *Major findings*

According to data from the Durham County Health Department of Environmental Health, critical violations have been on the rise in Durham County for the last three years. This trend is depicted in Figure 11.05(a) below.

ⁱ State Center for Health Statistics, North Carolina Department of Health and Human Services. Written (email) communication. May 13, 2010.

ⁱⁱ Healthy Carolinians 2020: Food Protection Branch, North Carolina Department of Environment and Natural Resources. Written (email) communication. September 29, 2011.

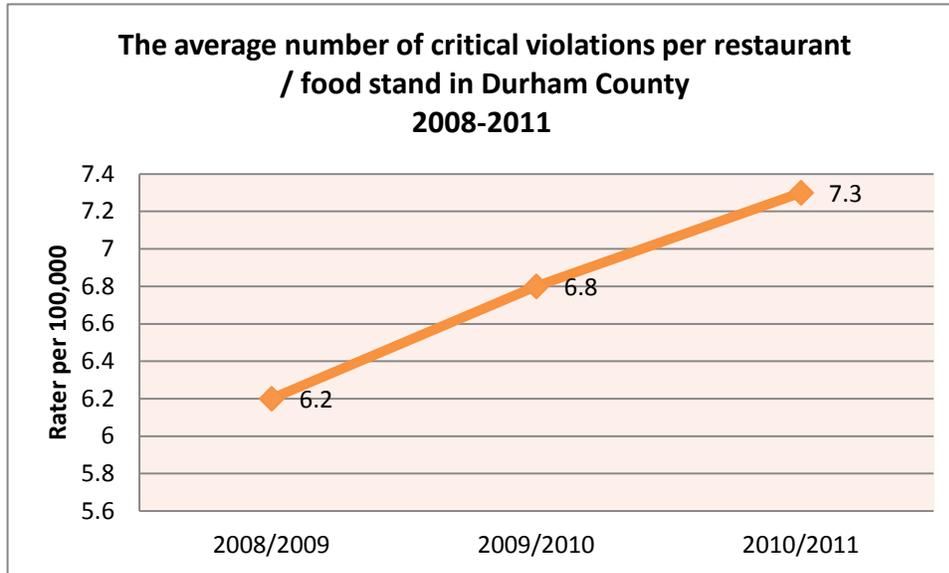


Figure 11.05(a) The Number of Critical Food Violations in Durham County from 2008-2011⁹¹

These numbers reflect a fiscal year beginning July 1 and ending June 30. Trends in these numbers reflect the application of the risk-based inspection protocols during the inspection routines. These protocols place increased emphasis on active management and control of critical areas, as well as instruction on best practices during the inspection routine. Food industry managers are being held accountable for their performance, and inspectors are reflecting the management failures to correct violations. Although the rate of critical violations has increased in Durham County between 2008 and 2011, this rate is expected decrease as management implements corrective actions required to control (manage) their operations. The CDC has evidenced declines in certain food borne illnesses due to the improved inspection processes.⁹²

According to 2007-2011 data provided by North Carolina Electronic Disease Surveillance System, *salmonellosis* and *E. coli* remain some of the more prevalent food borne illnesses in Durham County.⁹³ Likewise, *E. coli* is the most prevalent food borne illness on the national level, according to the CDC FoodNet reports.⁹⁴

Primary Data

Food safety proves to be an issue of concern to the Durham community, according to results from the 2010 Durham County Community Health Opinion Survey. When survey respondents were asked to list what they felt were the top three most important environmental issues in Durham County, 8.4% cited restaurant food safety as one of their top three.⁹⁵ Results are shown in Figure 11.05(b) below.

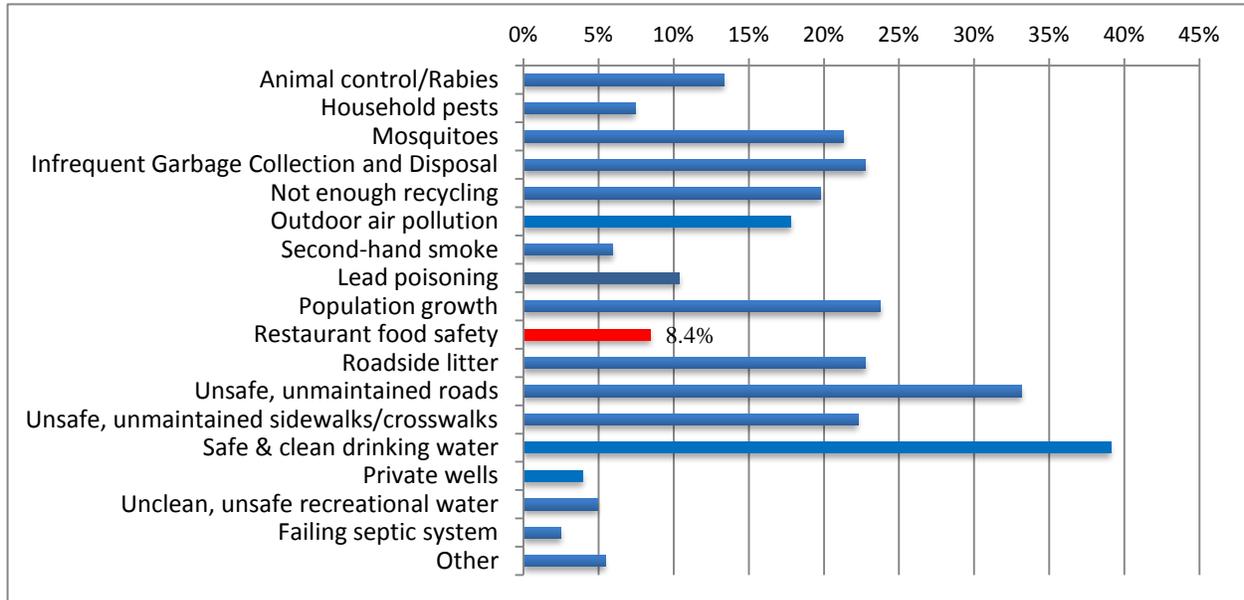


Figure 11.05(b) Results from the Durham County Community Opinion Survey

Interpretations: Disparities, gaps, emerging issues

Every four years, the U. S. Food and Drug Administration (FDA) publishes the *Food Code*, a model that assists food control jurisdictions at all levels of government by providing them with a scientifically sound technical and legal basis for regulating the retail and food service segment of the industry (restaurants, grocery stores and institutions such as nursing homes).⁹⁶ In sum, the FDA *Food Code* is a science-based compendium for best practices in food safety. Local, state and federal regulators use the *FDA Food Code* as a model to develop or update their own food safety rules and to be consistent with national food regulatory policy.⁹⁷

The State of North Carolina has passed the required legislation to move the State food regulation program to the FDA *Food Code* in mid-2012; these regulatory changes will directly affect food service establishments in North Carolina.

The food industry is very competitive and ever-evolving with innovations to service, delivery and food offerings. One trend that has recently been increasing in this industry is mobile food sales, such as food trucks and hotdog carts. This trend takes the restaurant offerings away from the brick and mortar fixed location and brings the food to a variety of locations where food was not available previously.

Recommended Strategies

Table 11.05(a) Recommended Evidence –based Promising Practices⁹⁸

Category	Name	Description	Website	Matching 2010 Objective
Individual	Comprehensive Foodborne Illness Investigation	These procedures were developed by a cross-departmental team to make food borne illness complaint follow-up more efficient and consistent, to identify	http://www.naccho.org/topics/modelpractices/database/pr	ID/FBI Objective 3

		foodborne outbreaks and their underlying causes, to prevent further disease transmission, and to provide education for community members and food service workers.	actice.cfm?PracticeID=110	
Individual	Section .2600 - The Sanitation of Food Service	Guidelines for Food Service Establishments in North Carolina.	http://www.deh.enr.state.nc.us/ehs/images/rules/t15a-18a.26.pdf	ID/FBI Objective 3

As a division of the Durham County Health Department, the Environmental Health staff will be trained in the new FDA food regulation program prior to the 2012 State adoption. The training will orient the staff and operators to the provisions of the FDA *Food Code* prior to implementation. Notably, North Carolina is stricter in some areas of food regulation and silent in other areas that the *Food Code* addresses; this marriage should benefit both regulatory bodies. A routine State Manpower study is underway to assess the State recommended staffing levels for the general inspections program.

Current Initiatives & Activities

- **Public information access**

Durham County Environmental Health implemented data management software mid 2007 to better capture the information and violations from routine inspections. In July of 2008 the State changed the inspection form to reflect the CDC risk factors and a corresponding change in the data set reflects the assessment methodology. Since the Durham Health Department started publishing grade results of the restaurant on the Health department website it has been the most frequently accessed page in the County website.

Website: <https://public.cdpehs.com>

- **Food Service Educational Program**

Durham County has partnered with Orange County and the Cooperative extension agencies for Durham and Orange Counties since 1997 in providing ServSafe food safety educational programs. Classes are offered twice a year and have participation from 50 to 90 for each class. The classes have produced over a thousand certified food service managers and food handlers trained in the industry standards.

Website: www.servsafe.com

Phone Number: (866) 901-7778

- ***Durham County Health Department-Food borne Illness***

An investigation is initiated when a confirmed case of food poisoning arises and when several individuals have a common source of illness. An Environmental Health Specialist (EHS) interviews those persons affected or potentially exposed to determine foods consumed, symptoms experience, and time of onset of symptoms. For more information please visit the link below.

Website: <http://www.durhamcountync.gov>

Phone Number: (919) 560-7600

- ***Centers for Disease Control and Prevention (CDC) – Food borne Illness***

To learn more about food borne illness both nationally and statewide, visit the CDC's website.

Website: <http://www.cdc.gov/ncidod/dbmd/diseaseinfo/foodborneinfections>

Contributors

#	Name of Section	Name, Credentials	Affiliation
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11.02	Water quality	Amanda Mata, MPH	Partnership for a Healthy Durham, Project Assistant, Community Health Assessment
11.03	Lead poisoning	Lakieta Boyd, BS	Durham County Health Department
11.03	Lead poisoning	Joshua Worthy	Duke University's Children Environmental Health Initiative
11.03	Lead poisoning	Jan Jackson, R.E.H.S.	Durham County Health Department
11.04	Waste management	Robert M. Brown, R.S., L.S.S.	Durham County Health Department, Environmental Health Specialist
11.05	Food Safety	Marc R. Meyer, REHS	Durham County Environmental Health, General Inspections Supervisor

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