



ASHE COUNTY

2007 COMMUNITY HEALTH ASSESSMENT

Volume Two: Environmental Data

**Final Technical Report
October, 2007**



North Carolina Institute for Public Health



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Introduction

This volume presents an overview of data describing major features of the natural environment of Ashe County. It is intended to complement Volume I of the Ashe County Community Health Assessment, *Demographic, Socioeconomic and Health Data*, by describing the environmental context in which the people of Ashe County are living. An environmental assessment of this type has not been a part of the County's previous community health assessment process. Therefore, it does not serve as a trend document but rather as a baseline for future comparisons.

The information in this report is broadly based on the Center for Disease Control's (CDC's) list of environmental public health indicators (EPHIs). These indicators identify specific areas that should be evaluated in order to track environmental exposures and adverse health effects within a community. The report describes in general terms the quality of water, air, and land in Ashe County, using primarily data from the public domain supplemented by local data where appropriate and available. It lists the major contaminants and pollutants affecting ambient and drinking water quality and outdoor ambient and indoor air quality in the County, and names the sources of the pollutants. It describes chemicals and wastes affecting the County's land and soil, and describes municipal waste management and water and wastewater sanitation practices. The report also identifies community exposure to lead, pesticides, and toxics. Finally, it contains data on environment-related health issues such as water-, food- and vector-borne diseases.

Chapter One: Water Quality

One measure of a community's environmental health is the status of its waters as evaluated according to the process established by the Federal Clean Water Act of 1972. Water is a renewable resource, but clean water is in limited quantity; as the population continues to grow, the demand for clean water rises every year.

The Division of Water Quality (DWQ) in the NC Department of Environment and Natural Resources (DENR) operates the Ambient Monitoring System (AMS) in order to monitor and assess the State's water quality. The AMS consists of a network of stations established to provide site-specific, long-term water quality information on significant rivers, streams, and estuaries throughout the State (1). Program objectives include:

- To monitor water bodies of interest for determination of levels of chemical, physical, and bacterial pathogen indicators for comparison to a selection of the State's water quality standards and action levels.
- To identify locations where exceedances of water quality standards and action levels for physical and chemical indicators occur in more than 10% of samples/measurement (20% for coliforms).
- To identify long-term temporal or spatial patterns.

In response to the stipulations of Section 303(d) of the Clean Water Act, NC DWQ is charged with submitting a biennial report to the US Environmental Protection Agency (US EPA) that assesses water quality in North Carolina according to standards set by the State. This report traditionally describes the quality of surface waters, groundwaters, and wetlands, according to how well they support the designated uses (e.g., swimming, water supply) and what might be causes and sources of impairment for those designated uses. North Carolina conducts its water quality assessment and planning on a watershed-based schedule, with each of the State's existing 17 watershed basins being monitored once in a five-year rotation (2).

In order to understand water quality monitoring in North Carolina it is necessary first to understand the terminology and ecological and hydrogeological principles that apply.

Surface Water

A geographic area's surface waters are its fresh flowing water (rivers, streams and creeks), and its fresh standing waters (lakes, ponds and reservoirs). Also included among surface waters are the estuaries, bays and coasts of oceanic environments, which, of course, do not pertain to Ashe County. Surface waters serve many purposes that affect the quality of life in a community: sources of water for human and industrial consumption, sources of food, sites for recreation, routes for transportation and commerce, and sites for disposal of byproducts and wastes of manufacturing and sewage treatment.

As of 1998, Ashe County ranked among the 30% of counties in the nation with the cleanest surface waters (that is, having a low *percentage* of waters with threatened or impaired uses). When the *number* of water bodies in Ashe County that are actually impaired are compared to the rest of the nation, the County falls just above the national average, in the 60th percentile, indicating it has a slightly higher quantity of impaired water bodies compared to the national

average (3). A water body is considered *impaired* if it does not attain minimum EPA water quality standards. Standards may be violated due to an individual pollutant, multiple pollutants, thermal pollution, or an unknown cause of impairment. A water body is considered *threatened* if it currently attains water quality standards but is predicted to violate minimum water quality standards by the time the next assessment is submitted to EPA (4).

According to the 1999 list of impaired waters, which was compiled on the basis of state data from 1997-1998, four percent of the surface waters in Ashe County had reported water problems (). For comparison, the North Carolina county with the highest percentage (80-90%) of impaired water bodies in that report was Richmond County, which was also in the top percentile of counties, ranked nationwide, with threatened and impaired water bodies.

The following table describes the 1998 Clean Water Act status of Ashe County as well as the leading surface water pollutants and stressors. Note that there are possible inconsistencies in data on impaired water bodies and the percentage of water bodies assessed. For further explanation, see http://www.scorecard.org/env-releases/def/water_inconsistency.htm.

Table 1. Ashe County Clean Water Act Status, 1998

Surface water type	Surface Waters with Reported Problems		Leading Pollutants and Stressors (% Affected)				
	No.	%	Impaired Biological Community	Sediments	Ammonia	Pathogens	Mercury
Rivers, Streams, Creeks	21	4	29%	19%	19%	19%	5%
Lakes, Reservoirs, Ponds	0	-	-	-	-	-	-

Source: Environmental Defense Scorecard, Pollution Locator, Water. Available at http://www.scorecard.org/env-releases/water/cwa-county.tcl?fips_county_code=37009#report. (Accessed January 2007).

Pollutants and stressors were not reported for 19% of the impaired water bodies. A complete list of the 21 water bodies with reported problems can be found at http://www.scorecard.org/env-releases/water/cwa-waterbodies-in-region.tcl?fips_county_code=37009.

The major stressor (29% of impaired water bodies) in Ashe County is impaired biological communities. Impaired Biological Communities are aquatic ecosystems that provide habitat for a variety of species but have been adversely affected by human activities. (5).

Other leading stressors include sediments (19%), ammonia (19%), pathogens (19%), and mercury (5%). Sedimentation occurs when soil particles enter the water from eroding land, or sometimes through agricultural production. Because of the high clay content of North Carolina soil, most rivers have a high natural sediment load after a rainfall. Sedimentation is considered a pollutant when it exceeds this natural level and has detrimental effects, such as clogging and abrading fish gills, suffocating fish eggs and aquatic insect larvae, or reducing water clarity and so interfering with recreational activities. Nutrients and chemicals may attach to sediment particles on land and enter the surface waters, where pollutants settle with sediment or detach and become soluble. Ammonia is an inorganic form of nitrogen, which in conditions of increased temperature and pH, can become de-ionized and therefore be toxic to aquatic life ().

Pathogens, such as waterborne bacteria, viruses and protozoa can enter waters through inadequately treated sewage, storm water drains, septic systems, runoff from livestock pens, and sewage dumped overboard from recreational boats. Regulatory agencies usually measure indicator bacteria, because it is impossible to test waters for every disease causing organism. The presence of indicator bacteria like *E.coli* suggests that the water *may* be contaminated with untreated sewage and that other dangerous organisms may be present. Lastly, Mercury is “a naturally occurring element that can be toxic when consumed by animals and humans. Sources of mercury include weathering of the earth's crust, the burning of garbage and fuels, and industrial emissions” ().

The following table indicates the leading sources of water quality impairment in Ashe County for each surface water type.

Table 2. Ashe County Leading Sources of Water Quality Impairment, 1998

Surface water type	Surface Waters with Reported Problems		Source of Impairment (% Affected)			
	No.	%	Non-point	Agriculture	Municipal	Urban Runoff/Storm Sewers
Rivers, Streams, Creeks	21	4	38%	29%	19%	19%
Lakes, Reservoirs, Ponds	0	-	-	-	-	-

Source: Environmental Defense Scorecard, Pollution Locator, Water. Available at http://www.scorecard.org/env-releases/water/cwa-county.tcl?fips_county_code=37009#report. (Accessed February 2007).

The primary sources of water quality problems for rivers, streams, and creeks in Ashe County come from non-point sources, which affected 38% of the impaired water bodies in the county. Agriculture sources account for 29% of the impairment, while 19% of sources are attributable to municipal sources and urban runoff/storm sewers. Additionally resource extraction and silviculture account for 5% of impairment. Impairment sources are not reported in 14% of water bodies and are unknown in 5% of water bodies ().

Non-point source pollution occurs when rainfall or snowmelt picks up chemicals, biological agents and sediments and carries them to surface and ground waters. These inputs include agricultural and residential fertilizers, herbicides and insecticides; oil, grease and toxic chemicals from urban run-off and energy production; sediment from construction sites, crop and forest lands; and bacteria and nutrients from livestock, pet wastes and faulty septic systems (6).

Agriculture can cause pollutants that affect water quality. Agricultural activities that can contribute to pollution include confined animal facilities, grazing, plowing, pesticide spraying,