

Watauga County Environmental Assessment

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Why Environmental Assessment

- Health happens (or not) in a context
- The natural environment is part of that context
 - Air
 - Water
 - Land
 - Climate/weather
- The built environment is also part of that context
- Environmental data in Volume II complements health data in Volume I



Environmental Assessment

- Included in accreditation benchmarks for community assessment
- New concept to most health agencies and Healthy Carolinians coalitions
 - Unfamiliar terminology
 - Unfamiliar information and data sources
 - Probably a baseline process (no previous data for comparison)
 - Data more technical in nature
 - Requires inclusion of definitions and explanations
 - More data-driven than opinion-driven (first effort)



Ecological Context

- **Water**
 - Surface water
 - Ground water
 - Drinking water
- **Air**
 - Outdoor air
 - Indoor air
- **Agriculture**
 - Animals and crops
 - Chemicals
- **Vector animals**



Data Focus

- **Environmental contaminants**
 - Air, water, and land pollution
 - Toxic and hazardous chemicals and particulates
 - Solid waste
 - Wastewater
 - Animal wastes
- **Other hazards and risks**
 - Natural disasters, UV radiation, etc.
- **Health outcomes**
 - Not necessarily cause and effect



Water Quality

- **Surface Waters**

- Fresh flowing and standing waters
- Monitored by NC DWQ against standards set by state to determine impairment (process complies with Federal CWA)
- Surface waters used for:
 - Sources of water for human and industrial consumption
 - Sources of food
 - Sites for recreation
 - Routes for transportation and commerce
 - Sites for disposal of byproducts and wastes of manufacturing and sewage treatment.



Water Quality

- **Waterbodies in the Watauga River Basin (2005 Basinwide Report)**
 - **Subbasin 01**
 - Watauga River is a tributary of the Holston River and eventually drains into the Tennessee River
 - Contains the town of Banner Elk and the western part of Boone
 - Rapid land development near stream and river corridors
 - 28 permitted dischargers (largest are Valley Creek and Sugar Mountain WWTPs; Sugar Mountain and Beech Mountain WWTPs required to monitor effluent toxicity)
 - No waterbodies in Watauga County listed as impaired
 - Bioclassification stations in Watauga County rated from Excellent to Good-fair



Water Quality

- **Waterbodies in the New River Basin (2004 Basinwide Report)**
 - **Subbasin 01**
 - 9 permitted dischargers; (largest are Boone, Blowing Rock and Jefferson WWTPs)
 - No waterbodies in Watauga listed as impaired
 - All bioclassification stations in Watauga rated Excellent to Good-fair
 - **Subbasin 02 (mostly in Ashe County)**
 - 5 permitted dischargers; (largest is the West Jefferson WWTP)
 - No waterbodies in Watauga listed as impaired
 - All bioclassification stations in Watauga rated Excellent or Good



Water Quality

- **Waterbodies in the Yadkin-Pee Dee River Basin (2007 Basinwide Report)**
 - **Subbasin 01**
 - Contains headwaters of the Yadkin River
 - Largest dischargers in subbasin are downstream of Watauga County (Wilkesboro and North Wilkesboro WWTP and the Louisiana Pacific Corp. ABTCO Plant)
 - No waterbodies in Watauga County listed as impaired
 - Bioclassification station in Watauga County rated Excellent (Laurel Creek)



Water Quality

- **Waterbodies in the Catawba River Basin (2003 Basinwide Report)**
 - **Subbasin 31**
 - Most of the subbasin is downstream of Watauga County
 - Most water quality impacts are from the cities of Moaganton, Lenoir, Drexel and Granite Falls
 - Largest dischargers in subbasin are downstream of Watauga County (Wilkesboro and North Wilkesboro WWTP and the Louisiana Pacific Corp. ABTCO Plant)
 - No waterbodies in Watauga County listed as impaired
 - No bioclassification stations in Watauga County



Water Quality

- **Watersheds in Watauga County**
 - **Upper New**
 - Better water quality
 - Low vulnerability for impairment
 - **Upper Yadkin**
 - Better water quality
 - Low vulnerability for impairment
 - **Upper Catawba**
 - Less serious water quality problems
 - High vulnerability for impairment
 - **Watauga**
 - Better water quality
 - High vulnerability for impairment

Main vulnerabilities: hydrologic modification, aquatic/wetland species at risk, agricultural run-off, and population change



Water Quality

- **Fish Kills**

- Two fish kill events were reported for Watauga County between 1997 and 2006.

- 1999 – 120 fish killed in Sharp Creek due to washing out of drums of Percol by a private party
- 2003 – 14,300 fish killed in the New River due to a 3,000 gallon spill of sodium hydroxide from the town of Blowing Rock water filtration plant



Water Quality

- **Ground Water**

- **Bacteria in Well Water (2004-2006)**

- Only 1 well water samples was submitted to the State Public Health Laboratory
 - Results of local testing of well water were not available by press time

- **Ground Water Incidents (2001-2006)**

- No leak/spill incidents were reported



Air Quality

- **Outdoor Ambient Air Quality**

- **Criteria Air Pollutants (CAPs)**

- Carbon monoxide (CO)
 - Lead (Pb)
 - Nitrogen oxide (NO_x)
 - Ozone (O₃)
 - Particulate matter (PM)
 - Sulfur dioxide (SO₂)

- **Effects:** injure human health (harm lung function/organ systems, may cause cancer); harm the environment, cause property damage



Air Quality

- **Outdoor Ambient Air Quality**

- **Criteria Air Pollutants (CAPs)**

- Carbon monoxide – 75% from transportation sources
 - Lead – mostly from gasoline additives
 - Nitrogen oxides – transportation and combustion
 - Ozone – chemical reactions involving VOC and NO_x
 - Particulate matter – vehicles, factories, power plants
 - Sulfur dioxide – burning sulfur-containing fuels



Air Quality

- **Outdoor Ambient Air Quality**

- **Criteria Air Pollutants (CAPs)**

- There is one AQI monitoring site in Watauga County
 - 2007 annual mean for small particulates (PM_{2.5}) was the only measure reported: 9.2 µg/m³ (below the AQI standard of 15 µg/m³)
 - Area sources predominate: dry cleaners, gas stations, auto body paint shops, heating and cooling systems of residential and commercial buildings, open burning, landfills and wastewater treatment plants.



Air Quality

- **Outdoor Ambient Air Quality**

- Watauga County **is not** among the 25 NC counties with highest CAPs
- Watauga County **is not** one of 32 NC counties listed as “non-attainment” for ozone standards, or one of the 3 counties listed as “non-attainment” for particulate matter.
- Watauga County **is not** among the 48 NC counties that have mandatory vehicle emission testing



Air Quality

- **Outdoor Ambient Air Quality**

- **Hazardous Air Pollutants (HAPs)**

- 200 chemicals that can have adverse effects on human health and the environment
 - Some are known carcinogens
 - Some have respiratory, neurological and reproductive effects in humans
 - Described as contributing to either “added lifetime cancer risk” for carcinogenic HAPs or “cumulative hazard index” for chemicals with non-cancer effects
 - *Exposure* is ultimately a factor in an individual’s risk; this report cannot assess individual exposures



Air Quality

- **Outdoor Ambient Air Quality**
 - **HAPs in Watauga County with Added Cancer Risk (Goal = 1)**
 - Overall score: 360
 - Average for NC counties = 480
 - Overall state rank: 40th
 - Mecklenburg ranks 1st (Overall score = 800)
 - Primary increased cancer risk pollutant in Watauga County
 - *Diesel emissions* from mobile sources



Air Quality

- **Outdoor Ambient Air Quality**

- **HAPs in Watauga County with Added Non-Cancer Risks (Goal = <1)**

- Overall cumulative hazard index score: 1.7
 - Average for NC counties = 2.0
 - Overall state rank: 27th
 - Mecklenburg ranks 1st (CHI = 3.5)
 - Primary increased non-cancer risk pollutant in Watauga County
 - *Acrolein* (in cigarette smoke, auto exhaust, burning plants and oil; building materials; pesticides)



Air Quality

- **Indoor Ambient Air Quality**
 - **Environmental Tobacco Smoke**
 - 2006 Watauga Region (Watauga, Alleghany, Ashe, Avery and Wilkes) BRFSS
 - 19.6% residents self-identified as “current smokers”
 - 26.6% of residents allowed smoking in their home (down from 34.0% in 2004)



Air Quality

- **Indoor Ambient Air Quality**
 - **Environmental Tobacco Smoke**
 - Tobacco-free schools – Watauga County Schools are among 86 tobacco-free NC School Districts (September 2007)
 - Smoke-free restaurants – As of July 2007 70% of Watauga County restaurants were smoke-free



Air Quality

- **Indoor Ambient Air Quality**

- **Carbon Monoxide**

- Released in heater and car exhaust
 - No intentional or unintentional deaths from CO in Watauga County in 2005 (there were 14 accidental and 35 intentional CO deaths in NC in 2005).



Air Quality

- **Indoor Ambient Air Quality**

- **Radon**

- Radioactive decay product of radium (via uranium)
- Naturally occurring in soil, rock and water
- Gets into homes from substrate below
- Can be in well water (home and community)
- Can be in building materials (concrete, brick, granite and drywall)
- Highest levels in NC: in upper Piedmont and mountains
- Harmful when trapped in buildings
- Major health effect: increased risk of lung cancer



Air Quality

- **Indoor Ambient Air Quality**

- **Radon**

- Watauga is among the 8 NC counties with predicted average indoor radon levels in the highest range.
 - Average level in Watauga County in 2004 (n=144) was 8.06 pCi/L (EPA action level = 4 pCi/L)



Toxic Chemical Releases

- **US Toxic Release Inventory**
 - Inventory in existence since 1986
 - Monitors 650 chemicals
 - Based on industry-reported *estimates* of emissions to air, water and land
 - Watauga County ranked 70th of 80 NC counties in pounds of total emissions in 2002 (7,000 pounds)
 - 100% of 2002 Watauga County emissions were to air



Toxic Chemical Releases

- **Watauga County TRI Emitters (2002)**
 - International Resistive Company, Boone
 - N-methyl-2-pyrrolidone (7,000 lbs)



Toxic Chemical Releases

- **Watauga County TRI Releases Cancer Risk Scores (2002)**
 - Not ranked among 66 NC counties with cancer risk scores
- **Watauga County TRI Releases Non-Cancer Risk Scores (2002)**
 - Not ranked among 78 NC counties with non-cancer risk scores



Land Contamination

- **Superfund Sites (EPA)**
 - Nation's worst toxic waste sites
 - None in Watauga County
- **Brownfield Sites (EPA)**
 - Properties where contamination hinders development
 - Program alleviates liability for developers
 - One in Watauga County: State Farm Road Site in Boone
- **Inactive Hazardous Sites (State)**
 - State oversees remediation of sites not covered by other programs
 - 3 sites in Watauga County: Moses Cone Memorial Park (Blowing Rock), Old John's River Road Dump (Blowing Rock) and Vermont American site (Boone)



Lead Hazards

- Source: deteriorating lead-based paint, lead-contaminated dust and lead-contaminated soil
- Most common in housing built before 1950
- Most commonly involve residents with income below the poverty level
- Children are at greatest risk from lead contamination, especially children in poverty
- Other sources: Decomposing plastic mini-blinds, certain ceramic pots, some herbal medicines and candies popular in the Hispanic community



Lead Hazards

- **As of 2000 Census, Watauga County:**
 - Ranked 50th of 50 NC counties for % housing units at high risk for lead contamination: 2% (n=250)
 - Ranked 47th of 50 NC counties for number of housing units with low income: 3,100
 - Ranked 21st of 50 NC counties for % of housing units with low income: 19%
- **Watauga County Children Ages 1 and 2 with Blood Lead Levels >10µg/dL**
 - 2005: 2
 - 2004: 4
 - 2003: 7



Agricultural Pollution

- **Watauga County Agricultural Census**

- **Main Crops (2006)**

- All hay – 5,900 acres
 - Tobacco – 100 acres

- **Main Livestock (2002)**

- Cattle – 9,832 animals
 - Hogs and pigs – 32 animals
 - Poultry – 256 animals
 - Sheep and lambs – 456 animals



Agricultural Pollution

- ***Estimated Pesticide Applications on Crops***

- **Hay**

- NC Department of Agriculture and Consumer Services does not list agricultural chemicals applied to hay



Agricultural Pollution

- **Watauga County Agricultural Census (continued)**

- **Horticulture**

- Watauga County ranks 5th in NC and 37th in US for Christmas tree production
- 1,789 acres of cut Christmas trees in 2002
- NCSU: 14 commonly used pesticides



Agricultural Pollution

- **Watauga County Agricultural Census (continued)**
 - **Viticulture**
 - 2 wineries (not necessarily vineyards) in Watauga County
 - NCSU: grape growing can be chemical intensive (21 commonly used pesticides)



Agricultural Pollution

- **Animal Waste (2002)**

- Watauga County ranked 73rd of 98 NC counties in total weight of waste generated: 63,000 tons
- Animal waste generation in highest-ranked NC counties (Duplin, Sampson, Bladen and Wayne) ranged between 1.5 – 4.5 *million* tons
- Percent of waste generated in Watauga County
 - Cattle – 99.8%



Waste Management

- **Solid Waste Management**
 - FY2004-2005 Watauga County *per capita* solid waste management rate = 1.52 tons (a 54% **increase** from FY1991-1992)
 - Overall state *per capita* solid waste management rate **increased** 21% over approximately the same period
 - The county operates a solid waste transfer station, a landclearing center, and 10 recycling convenience centers.



Wastewater Management

- **Wastewater Systems (1990 Census)**
 - 7,260 (37%) housing units on public sewer (local municipal, not county systems)
 - The Towns of Boone, Beech Mountain and Blowing Rock operate WWTPs
 - 11,582 housing units (59%) on septic systems
 - 696 housing units (4%) on “other” (e.g., straight pipe systems and outhouses)



Drinking Water

- **Drinking Water Systems (1990 Census)**
 - 8,534 (44%) year-round housing units on water from a city or county water department, a water district, a private water company, or a well serving six or more housing unit
 - 7,640(39%) on water from individual wells
 - 3,364 (17%) on “other” (springs, creeks, cisterns)



Drinking Water

• **Drinking Water Systems (2007)**

- EPA listed 103 water systems in Watauga County
 - 28 are “community” water systems that serve a total of 36,547 people
 - The community systems had had 12 health-based drinking water standards violations between 2000-2006, some as recent as 2005
 - 4 community systems draw from surface water sources; all other community water systems use groundwater



Water Usage

- **Water Usage (total from surface and ground water sources)**
 - Total water usage in Watauga County decreased 10% from 1995 to 2000
 - Domestic use increased
 - Municipal/community, irrigation, and livestock use decreased
 - Industrial use remained the same



Food-, Water- and Vector-Borne Diseases

- **Food- and Water-Borne Diseases (2002-2005)**
 - 17 cases of *Campylobacter*
 - 1 case of *E. coli* O157
 - 4 cases of Shiga toxin producing *E. coli*
 - 2 cases of Listeriosis
 - 15 cases Salmonellosis



Food-, Water- and Vector-Borne Diseases

- **Arboviral Diseases**

- 4 cases of Lyme disease (2002-2005)
- No human cases of EEE, WNV or LAC in Watauga County between 2002 and 2006
- 1 wild bird cases of WNV (2003)



Food-, Water- and Vector-Borne Diseases

- **Rabies**

- 24 cases in animals from 2001 through 2006

- 15 raccoon
 - 4 cat
 - 3 skunk
 - 1 fox
 - 1 dog



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