



State of the Environment in Jefferson County

28 April 2009

A Report from the Environment Foundation Team

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Jefferson County's Air Quality

At the end of 2004, Jefferson County was designated with “nonattainment” status for EPA’s health-based standards for 8-hour ozone pollution.

Final Validated Ambient Ozone Data for Jefferson County

HIGH OZONE DAYS	2007 Report
Ozone Grade:	D
Weighted Average:	2.5
Orange Ozone Days:	6
Red Ozone Days:	1
Purple Ozone Days:	0

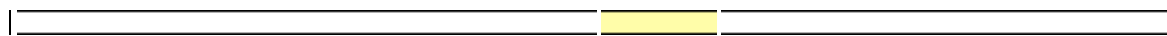
Note: The ozone grade is based on a weighted average calculated using the Air Quality Index. The number of unhealthy days experienced by the county was assigned a factor for weighting purposes: each orange day, a factor of 1; each red day, 1.5; each purple day, 2. By multiplying the total number of days within each category by its assigned factor, a total was determined. The grade was determined using the weighted average. Grade is assigned by weighted average as follows: A=0.0; B=0.3-0.9; C=1.0-2.0; D=2.1-3.2; F=3.3+

American Lung Association

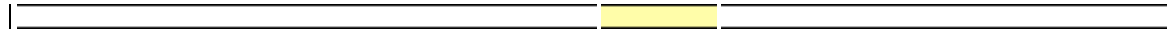
Jefferson County's Air Quality Rankings, Health Risks, Exposure, and Emissions

Cleanest/Best Counties in US **Percentile** **Dirtiest/Worst Counties in US**
 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

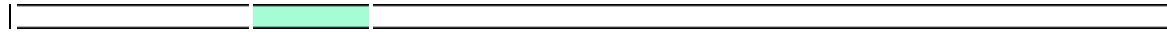
Carbon Monoxide emissions:



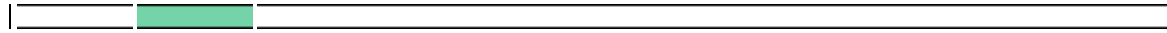
Nitrogen Oxides emissions:



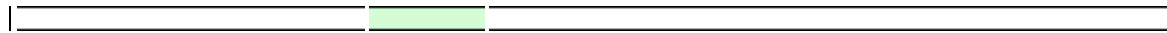
PM-2.5 emissions:



PM-10 emissions:



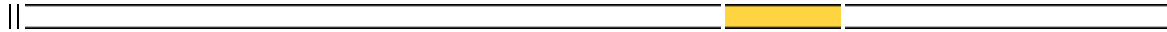
Sulfur Dioxide emissions:



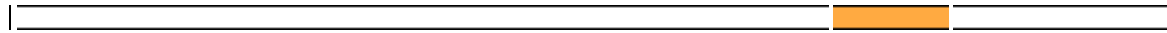
Volatile Organic Compound emissions:



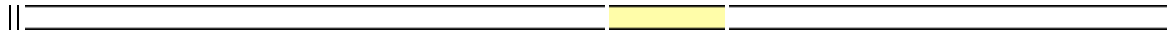
Air Quality Index:



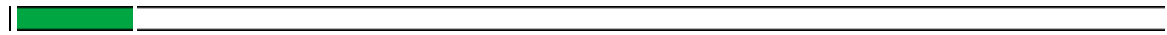
Ozone 1-hour average concentration:



Ozone 8-hour average concentration:



Person-days in exceedance of national air quality standard for ozone (1-hour):



Person-days in exceedance of national air quality standard for ozone (8-hour):



Jefferson County Exposure to Criteria Air Pollutants

2003 Air Quality Index for Jefferson County

Percentage of days with good air quality	89
Percentage of days with moderate air quality	9
Percentage of days with unhealthful air quality for sensitive populations	2
Percentage of days with unhealthful air quality	0
Maximum AQI level in 2003 (rated "Unhealthy")	140
Median AQI level in 2003 (rated "Good")	37
90th Percentile AQI level in 2003 (rated "Moderate")	54

2003 Summary of Pollutant Concentrations for Jefferson County

Pollutant	NAAQS Standard	Highest Recorded Concentration (HRC)	Second HRC	Number of NAAQS Exceedances	Stations Monitoring Pollutant
Ozone (1-hour average)	0.12 ppm	.13 ppm	.1 ppm	1	1
Ozone (8-hour average)	0.08 ppm	.1 ppm	.09 ppm	4	1

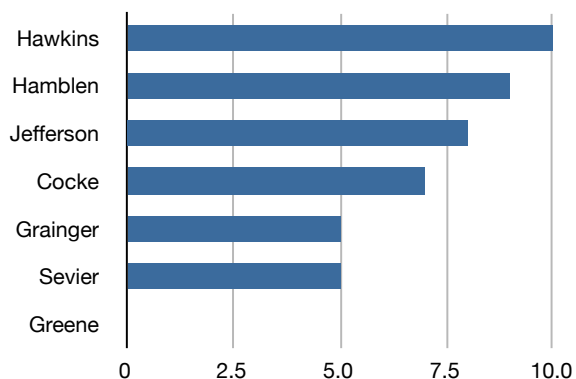
1999 Emissions Summary of Criteria Air Pollutants (expressed in tons) for Jefferson County

	Carbon Monoxide	Nitrogen Oxides	PM-2.5	PM-10	Sulfur Dioxide	Volatile Organic Compounds
Mobile Sources	14,253	3,180	303	1,068	171	1,547
Area Sources	2,556	61	532	1,263	39	1,294
Point Sources	2	8	36	45	23	848
All Sources	16,812	3,249	870	2,376	233	3,689

Data for above three charts derived from U.S. EPA's Air Quality System and National Emissions Trend database.

2008 Permit Violations

In 2008, the Tennessee Department of Environment and Conservation recorded Jefferson County as having **eight** Air Pollution Control Permit Violations. For a comparison with neighboring counties, see chart at right.



■ Pollution Control Permit Violations, 2008

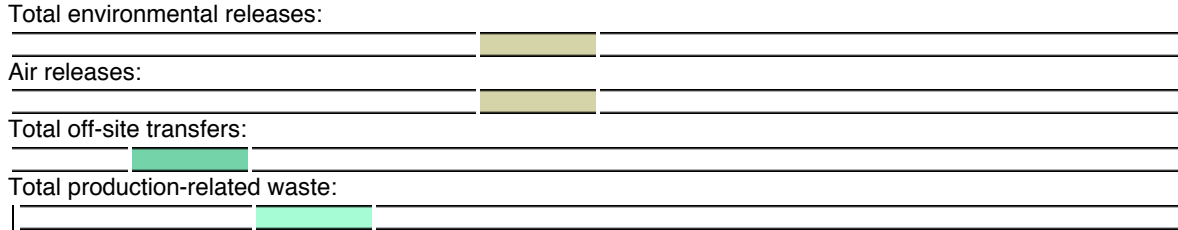
TDEC Enforcement Database, 2008

Jefferson County's 2002 National Rankings: Major Chemical Releases / Waste Generation

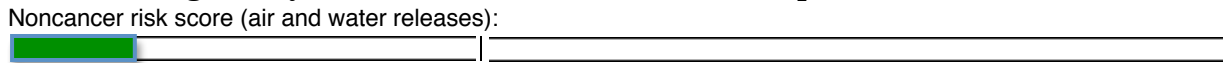
WITHIN Tennessee, Jefferson County ranks # 43 out of 80 counties with major chemical releases or waste generation. For a national comparison, see below.

Cleanest/Best Counties in US **Percentile** **Dirtiest/Worst Counties in US**
 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

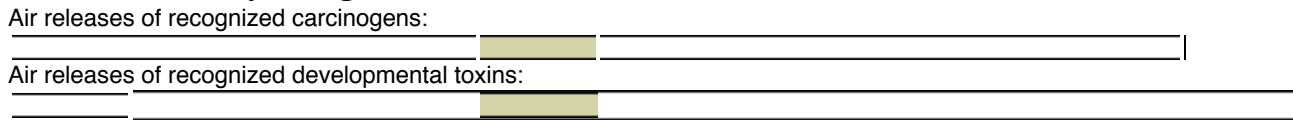
Major Chemical Releases / Waste Generation



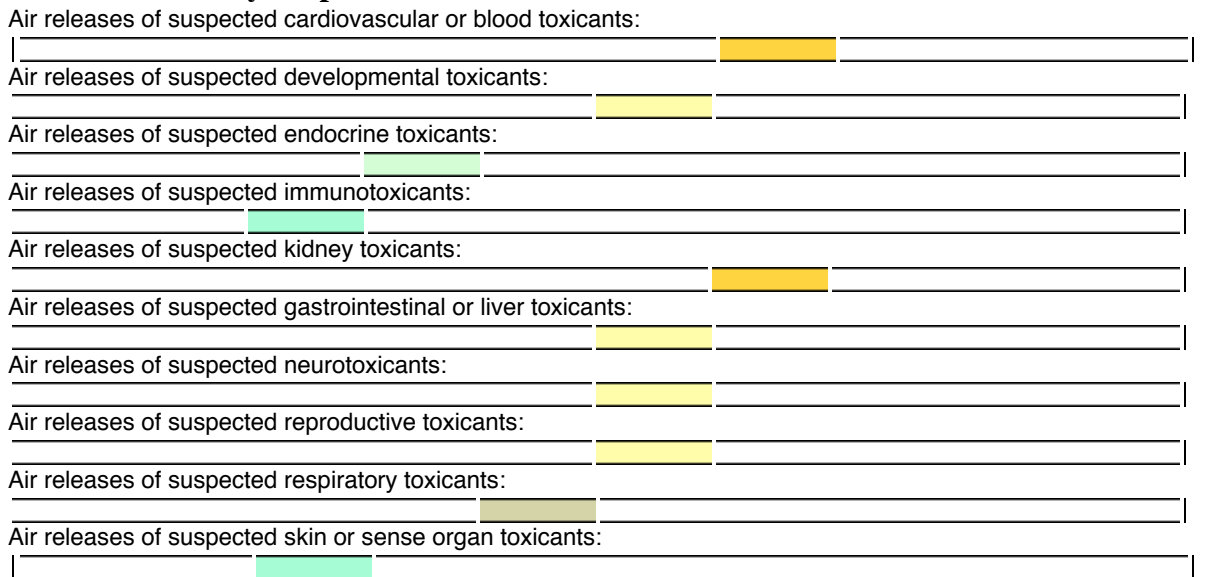
Releases Weighted by Potential Environmental Health Impacts



Releases Sorted by Recognized Health Effects



Releases Sorted by Suspected Health Effects



0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Cleanest/Best Counties in US **Percentile** **Dirtiest/Worst Counties in US**

Data for above four charts derived from Toxics Release Inventory, U.S. Environmental Protection Agency, 2002.

Vehicle Emissions

Vehicles emit many pollutants into the air, including carbon monoxide, carbon dioxide, hydrocarbons, nitrogen oxides, sulfur oxides, and volatile organic compounds. These pollutants then also combine to form secondary pollutants such as fine particulate matter and ozone. The resulting air quality is harmful to all who breathe it, although some groups are more at risk than others.

Average Daily Traffic Volumes for Major Jefferson County Thoroughfares	2006	2007
I-40 (Sevier County to I-81)	57,971	60,477
I-40 (I-81 to Cocke County)	29,196	29,171
HWY 11E (Jefferson City to Hamblen County)	21,525	22,413
HWY 11E (Jefferson City to Knox County)	15,822	15,987
HWY 25W/70	3,890	3,462
HWY 92	14,115	14,207
HWY 25E	11,045	11,432
HWY 139	3,034	3,365
HWY 66	4,102	4,023

Tennessee Department of Transportation, 2009

Groups at Risk for Health Issues Related to Air Quality Problems

County	Total Pop	Under 18	65 & Over	Pediatric Asthma	Adult Asthma	Chronic Bronchitis	Emphysema	Cardiovascular Disease	Diabetes
JEFFERSON	48,394	10,223	6,881	910	2,927	1,572	699	12,290	2,901
KNOX	404,972	86,801	51,226	7,725	24,393	13,029	5,543	98,927	23,549
SEVIER	79,282	17,066	10,945	1,519	4,803	2,588	1,156	20,434	4,842

American Lung Association, "State of the Air: 2007" report

Estimated Prevalence and Incidence of Lung Disease in 7 Tennessee Counties

County	Total Population	Pediatric Asthma	Adult Asthma	Chronic Bronchitis	Emphysema	Lung Cancer
Cocke	34675	639	2437	1167	490	26
Grainger	21928	406	1536	731	300	16
Greene	64718	1158	4584	2208	951	48
Hamblen	59489	1142	4121	1962	812	44
Jefferson	47593	878	3328	1576	643	35
Knox	400061	7322	28014	13165	5212	294
Sevier	77270	1425	5424	2587	1070	56

American Lung Association of Tennessee, 2006

Jefferson County's Energy Consumption

Note: The following consumption of kilowatt hours (KWH) reported occurred within a single month (March) of 2009. Energy use will always vary according to season, weather, etc.

*March 2009 Power Consumption by Jefferson County **Residential** Members of Appalachian Electric Cooperative*

# of Members	24,205
KWH	51,458,500

(Average AEC residential member consumes about 2,100 KWH per month)

*March 2009 Power Consumption by Jefferson County **Commercial** Members of Appalachian Electric Cooperative*

# of Members	283
KWH	8,137,099

*March 2009 Power Consumption by Jefferson County **Industrial** Members of Appalachian Electric Cooperative*

# of Members	5
KWH	3,067,400

Green Power Switch (GPS) Program

TVA and Appalachian Electric Cooperative offer 150-KWH blocks of power to be associated with renewable forms of energy such as solar, wind, and methane, available for purchase at a small percentage above regular electric rates. Currently, this program has **31 residential members** in Jefferson County, purchasing 57 blocks of renewable power, which totals 8,550 KWH. As well, **one commercial member**, located in Dandridge, purchases 5 blocks, totaling 750 KWH.

Residential members of the GPS program are found in the following areas:

Jefferson City Area: 15 members – purchasing 29 blocks

Dandridge Area: 9 members – purchasing 12 blocks of power

White Pine Area: 3 members – purchasing 5 blocks of power

South of the River (Swannsylvana, Muddy Creek, Sandy Ridge): 1 member –2 blocks

New Market / Strawberry Plains Area: 3 members – purchasing 9 blocks of power

Generation Partners Program in Jefferson County

Members who “generate” electricity by means of renewable resources (solar, wind, etc.), and then are able to sell their surplus power back to TVA can participate in the “Generation Partners” Program. **Currently there are no members of this program.**

Jefferson County School System Power Consumption

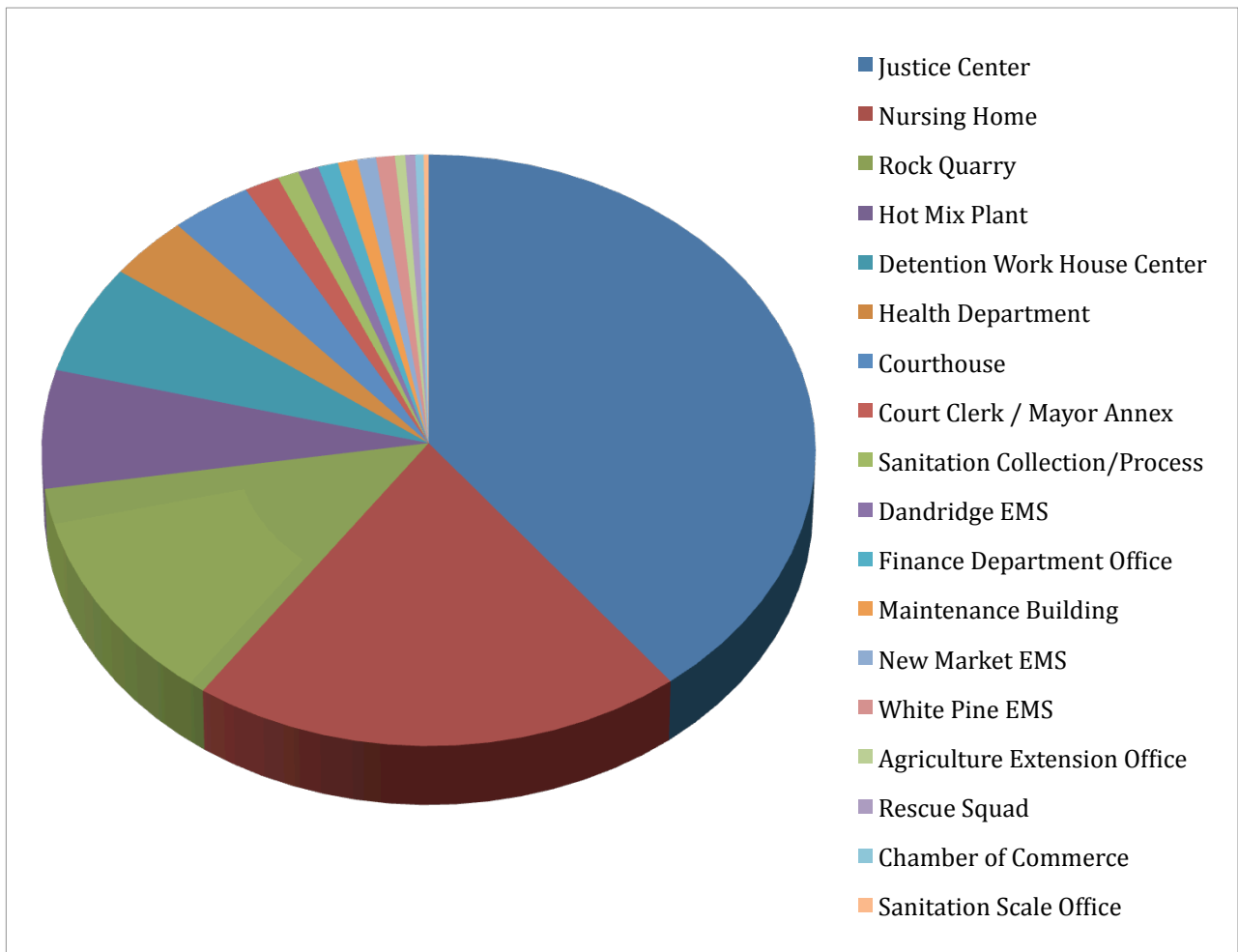
During 2007-2008 school year (August – July): KWH 10,237,236

That year, county schools spent approximately 10.4 percent more per square foot for energy needs than East Tennessee regional average spending.

Biofuels Use in Jefferson County’s Fleet of Government Vehicles

Currently, no vehicles in Jefferson County’s fleet operate on biofuels.

Energy Consumption for Jefferson County Government Facilities (as percentages)



Jefferson County Land Statistics

Forest Cover

Jefferson County total area	274 square miles (175,360 acres)
Forested area	115 square miles (73,350 acres)
Percent forest cover	42%

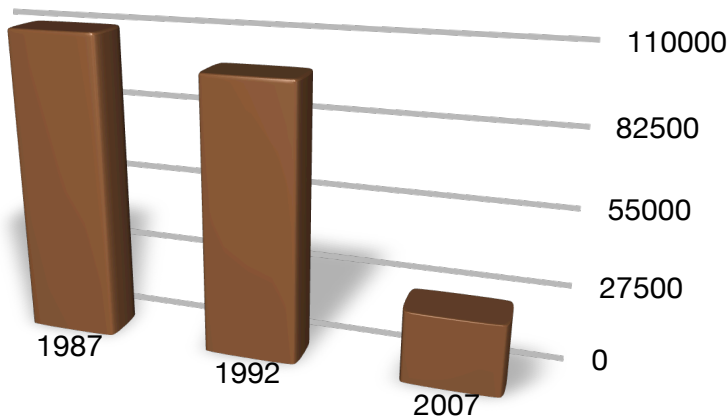
USDA Forest Service, Southern Research Station, FIA Estimates, 2007

Impervious Cover

Of Jefferson County’s total 175,360 acres of land (not counting the lake areas), **2,139** are covered with impervious surfaces (roadways, rooftops, parking areas, etc.), which do not allow penetration of water into the earth.

Source: National Land Cover 2001 Data Set, USGS

Agricultural Land



During the time frame shown, **76.7 percent** of Jefferson County’s farmland was converted to other uses. In 1987, there were 109,592 acres of farmland; in 1992, 98,669; in 2007, 25,586.

■ Agricultural Land Area (in acres)

National Agricultural Statistics Service and 1992 Census of Agriculture

Conservation Easements

Easements are parcels of land that are kept from development and preserved permanently as wilderness, agricultural lands, or open space. The government or a specific organization, called a “land trust,” helps landowners manage these lands in perpetuity. Currently, Jefferson County has two areas totaling **828 acres** in trust.

Blount	7000 acres
Cocke	675 acres
Grainger	none
Greene	380 acres
Hamblen	none
Jefferson	828 acres
Sevier	700 acres

Jefferson County Assessor and Foothills Land Conservancy, 2009

Conservation Practices in Jefferson County

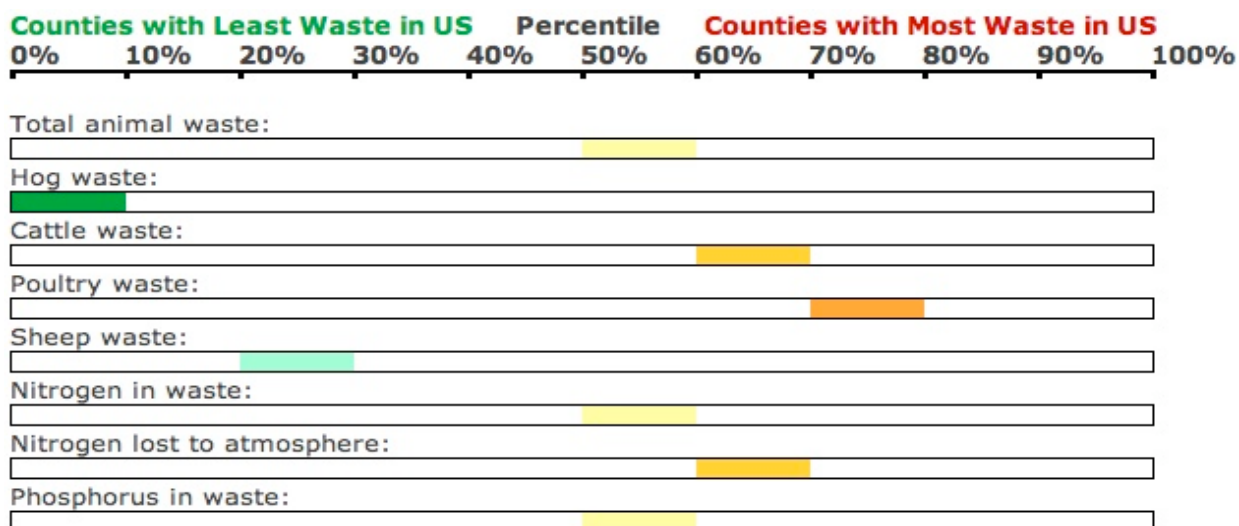
In 2008, the Natural Resources Conservation Service funded **11** contracts for conservation practices in Jefferson County under the Environmental Quality Incentive program (EQIP), totaling over \$157,000, while the Tennessee Department of Agriculture funded **15** contracts, totaling over \$44,000. These addressed water quality / quantity, soil erosion, and air quality — and included cross fencing for rotational grazing systems, pipeline and freezeproof watering facilities for alternative watering sources, and stream fencing.

District Conservationist, Natural Resources Conservation Service, 2009

Animal Waste Trends in Jefferson County

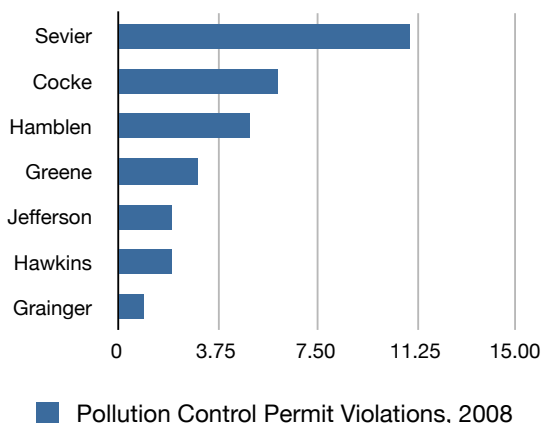
Hogs	Decreased by 96% from 1987 to 1997
Cattle	Decreased by 14% from 1987 to 1997
All Animals	Decreased by 12% from 1987 to 1997

1997 National Rankings: Animal Waste in Jefferson County



U. S. Department of Agriculture, National Agricultural Statistics Service, 1997 Census of Agriculture.

Underground Storage Tanks



In 2008, there were **two** Pollution Control Permit Violations for underground storage tanks in Jefferson County.

TDEC Enforcement Database, 2008

Evaluating Jefferson County's Development Rules

The Codes and Ordinance Worksheet allows users to evaluate local development rules against the Center for Watershed Protection's "Model Principles of Better Site Design." It is designed to help communities see how they are doing in terms of managing growth while minimizing impacts to water quality and other resources. The scoresheet below was completed with guidance from TVA and the Local Planning Assistance Office as part of the Growth Readiness Workshop Series.

Jefferson County Growth Readiness Workshops, 2008

Jefferson County Baneberry Dandridge Jeff City New Mkt White Pine **Max Points** County Avg. Needs Improvement

STREETS AND PARKING

	Jefferson County	Baneberry	Dandridge	Jeff City	New Mkt	White Pine	Max Points	County Avg.	Needs Improvement
1. Street Width									
a. Pavement 18-22 ft wide in low density developments	4	0	4	0	4	0	4	2	WP, Jeff
b. Parking lanes serve as traffic lanes in higher density	0	0	0	0	0	0	3	0	n/a
2. Street Length									
a. Promote efficient street layouts reducing overall length	0	0	1	1	0	0	1	.333	JC, Baneberry, NM, WP
3. Right-of-Way Width									
a. Minimum right-of-way (ROW) width < 45 ft	0	0	0	0	3	0	3	.5	All except NM
b. Allow utilities under paved section of ROW	0	0	0	0	1	1	1	.333	
4. Cul-de-Sacs									
a. Minimum cul-de-sacs radius < 35 ft or < 46 ft	0	1	1	0	0	1	3	.5	Consult EMS
b. Landscaped island permitted within the cul-de-sac	1	0	1	1	1	0	1	.667	Baneberry, WP
c. Hammerheads and other alternatives allowed	1	0	0	1	1	1	1	.667	Looped Road
5. Vegetated Open Channels									
a. Curb & gutters not required for most residential streets	2	2	0	2	2	0	2	1.33	Dandridge, WP
b. Criteria established for swales to treat storm water	0	0	0	0	0	2	2	.333	All except WP
6. Parking Ratios									
a. Professional office minimum < 3 spaces per 1000 gsf	1	1	0	1	1	1	1	.833	Dandridge
b. Shopping center minimum <= 4.5 space per 1000 gsf	0	0	1	1	1	1	1	.667	JC, Baneberry
c. Single family residential <= 2 spaces per home	0	1	1	1	1	1	1	.833	JC
d. Set as maximum or median rather than minimum	0	0	0	0	0	0	2	0	Set Max Impervious?
7. Parking Codes									
a. Shared parking arrangements promoted	0	0	0	0	0	0	1	0	
b. Model shared parking agreements provided	0	0	0	0	0	0	1	0	
c. Parking ratios reduced if shared parking in place	0	0	0	0	0	0	1	0	
d. Parking ratios reduced when mass transit is nearby	0	0	0	0	0	0	1	0	n/a
8. Parking Lots									
a. Minimum stall width <= 9 ft	0	0	0	1	0	0	1	.167	
b. Minimum stall length <= 18 ft	0	0	0	1	1	1	1	.5	
c. > 30% of spaces in large lots are smaller for compacts	0	0	0	0	0	0	1	0	
d. Pervious materials can be used for spillover parking	2	0	0	2	2	0	2	1	Baneberry, Dandridge, WP
9. Structured Parking									
a. Incentives for parking garages rather than surface lots	0	0	0	0	0	0	1	0	
10. Parking Lot Runoff									
a. Minimum % of a parking lot must be landscaped	0	0	2	0	0	0	2	.333	All but JC, Baneberry, NM
b. Practices allowed in landscaped areas or setbacks	2	0	2	0	0	2	2	1	
SUBTOTALS	13	5	13	12	18	11	40	12	

LOT DESIGN

1. Open Space Design										
a. Open space or cluster development designs allowed	3	3	3	3	3	3	3	3	Ordinance needed /already achieved	
b. Rules conserve land & reduce imperviousness	0	0	1	0	0	0	1	.167		
c. Process same as for conventional development	1	1	1	1	1	1	1	1	already achieved	
d. Open space or cluster design is by-right	1	0	0	1	1	1	1	.667	already achieved	
e. Flexible site design criteria available for developers	2	0	2	0	0	2	2	1	already achieved	
2. Setbacks and Frontages										
a. Irregular lot shapes allowed	1	0	1	1	1	1	1	.833	already achieved	
b. Min front setback for ½ acre residential lot <= 20 ft	0	1	0	0	0	0	1	.167	already achieved	
c. Min rear setback for ½ acre residential lot <= 25 ft	1	0	1	1	1	1	1	.833	already achieved	
d. Min side setback for ½ acre residential lot <= 8 ft	1	0	0	1	1	0	1	.5	already achieved	
e. Min frontage for ½ acre residential lot < 80 ft	2	0	2	2	2	2	2	1.667	already achieved	
3. Sidewalks										
a. Minimum sidewalk width <= 4 ft	2	0	2	0	0	2	2	1	achieved	
b. Sidewalks not always required on both sides of streets	2	0	0	0	0	2	2	.667		
c. Sidewalks generally sloped so they drain to front yard	0	0	0	0	0	0	1	0		
d. Alt pedestrian networks can substitute for sidewalks	0	0	0	0	0	1	1	.167		
4. Driveways										
a. Min. drive width <= 9 ft (1 lane) or <= 18 ft (2 lane)	0	0	0	0	0	0	2	0	need ordinance to allow and perhaps require	
b. Pervious material allowed for single family driveways	2	0	2	2	2	2	2	1.667	need ordinance to allow and perhaps require	
c. "Two track" design allowed for single family driveways	1	0	0	0	1	1	1	.667	need ordinance to allow and perhaps require	
d. Shared driveways permitted in residential development	1	0	0	0	1	1	1	.667	need ordinance to allow and perhaps require	
5. Open Space Management										
a. Requirements for associations to manage open space	2	0	2	0	0	2	2	1		
b. Open space must be consolidated into larger units	0	0	0	0	0	0	1	0		
c. Minimum % of space must be managed in natural state	0	0	0	0	0	0	1	0		
d. Defined uses for space in residential developments	0	0	0	0	0	0	1	0		
e. Third party management allowed	1	0	0	0	0	1	1	.333		
6. Rooftop Runoff										
a. Rooftop runoff can be discharged to yard	2	0	2	2	2	2	2	1.667	allowed	
b. Temporary ponding on front yards or rooftops allowed	0	0	0	2	0	2	2	.667	allowed	
SUBTOTALS	25	5	19	18	16	27	36	18.3		

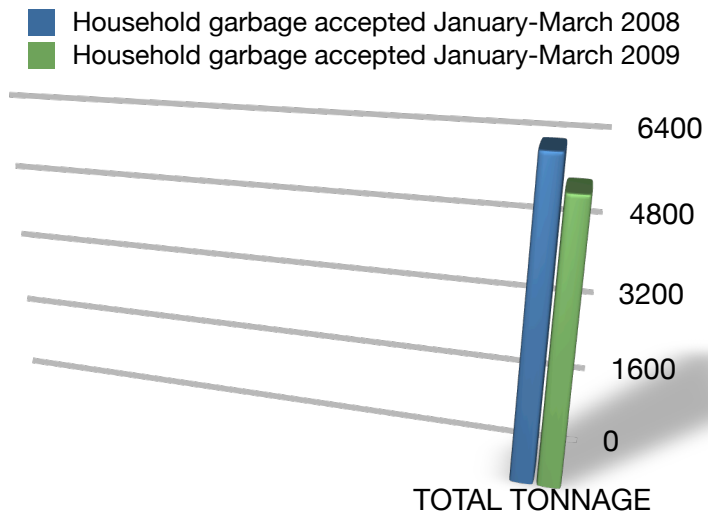
Jefferson County's Waste Stream

Jefferson County Landfill

Jefferson County's current landfill was built in 1993 with the expectation that it would provide sufficient capacity for 30 years. Since that time, there have been 11 new permits for height added. Newer, more efficient equipment for compacting trash has offered an increase of 52 days (per year) longer. At present, the Jefferson County Sanitation Department expects this landfill to last yet *another* 31 years.

Class One Garbage (Household Trash)

During the first quarter of 2008, the landfill accepted 6,301 tons of class one garbage from Jefferson County. For the same period in 2009, it accepted 5,602 tons, or 699 less than the previous year's first quarter total.



Hazardous Waste Collection

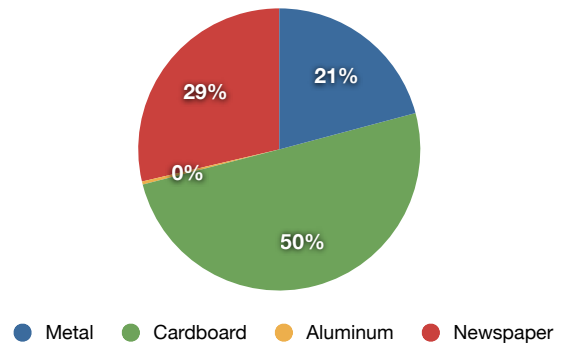
The County Sanitation Department was able to offer one hazardous waste collection day in 2008, at which time they accepted 13.9 tons of paint, oil, batteries, televisions, computers, and household insecticides.

Recycling Through the Jefferson County Sanitation Department

The Jefferson County Sanitation Department’s recycling program has reported that totals during the first quarters of two years show that increased recycling volume resulted in **144.23 more tons** of recyclable materials shipped off for processing in 2009.

	<i>Tons Shipped Jan-Mar 2008</i>	<i>Tons Shipped Jan-Mar 2009</i>
Metal	84.50	80.03
Cardboard	45	192.50
Aluminum	1.65	1.35
Newspaper	108.50	110
Plastic	0	0
Glass	0	0
Total	239.65	383.88

For first quarter 2009, aluminum was the smallest percentage of recycled materials, at only 1.35 tons.



Jefferson County Sanitation Department, 2009

Jefferson County's Water Quality

State Scenic Rivers

The Scenic Rivers Program was established in 1968 with the passage of the Tennessee Scenic Rivers Act. Since passage of this act, the General Assembly has designated sections of 13 rivers as State Scenic Rivers. Many of these Scenic Rivers are managed cooperatively with other local, state and federal agencies as well as with non-governmental organizations. The Scenic Rivers Program seeks to preserve valuable selected rivers, or sections thereof, in their free-flowing natural or scenic conditions and to protect their water quality and adjacent lands. Jefferson County has **one stream** with this designation, **Tuckahoe Creek**. The entire creek is a Class III - Developed River Area.

Tennessee Department of Environment and Conservation

Exceptional Tennessee Waters

As well, **a portion of the Holston River** that flows through Jefferson County has been placed on the State's list of "Exceptional Tennessee Waters." This classification includes waterbodies with good water quality, important ecological values, valuable recreational uses, and outstanding scenery. The area so designated flows **from the confluence with the French Broad River to McBee Island**. The basis for inclusion on this list is its being a habitat for the federal endangered Pink Mucket and the federal threatened Snail Darter.

Division of Water Pollution Control/July 2008

Bacteriological Advisories for Jefferson County Streams

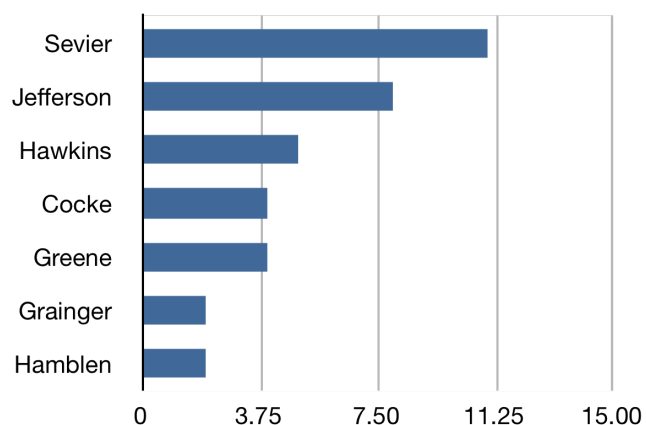
Consistent with EPA guidance, any stream or reservoir in Tennessee with an advisory is assessed as not meeting the recreational designated use. Clearly, if fishermen cannot safely eat the fish they catch, the waterbody is not supporting its goal to be fishable. Likewise, streams and lakes with high levels of bacteria are not suitable for recreational activities such as swimming or wading.

Stream	Portion
Leadvale Creek	Douglas Lake to headwaters (1.5 miles)

TN Department of Environment and Conservation, 2008, Bacteriological and Fishing Advisories in Tennessee

Pollution Control Permit Violations

Eight water pollution control permit violations were documented in Jefferson County during 2008. This number is for both municipal and private entities.

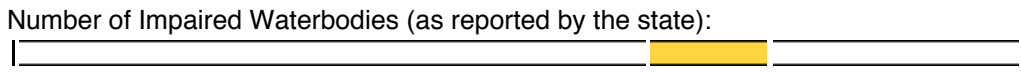
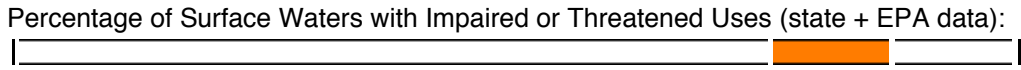


TDEC Enforcement Database, 2008

■ Pollution Control Permit Violations, 2008

1998 Clean Water Act Comparative Ranking for Jefferson County

Cleanest/Best Counties **National Average** **Dirtiest/Worst Counties**
 0%-----50%-----100%



United States Environmental Protection Agency, 1999

1998 Clean Water Act Status

Jefferson County contains portions of three different watersheds: the Holston, the Lower French Broad, and the Nolichucky. Categories of water quality are listed according to section 303(d) of the Clean Water Act. A waterbody is considered “impaired” if it does not attain water quality standards due to an individual pollutant, multiple pollutants, thermal pollution, or an unknown cause.

Priority for Regulation	Number of Jefferson County Waterbodies Affected
Targeted	0
High	8
Medium	0
Low	19
Not Assessed for TMDL Priority	1
Not Reported to US EPA for TMDL Priority	0

Leading Sources of Water Quality Problems for Rivers, Streams, and Creeks

Source	Percent of Jefferson County’s Waterbodies Affected
Agriculture	37%
Hydromodification/Habitat Modification	33%
Construction	22%
Septic Systems	22%
Resource Extraction	19%

United States Environmental Protection Agency, 1999

Polluted Streams in Jefferson County

—TDEC, Final Year 2008 303(d) List

Affected Waterbody	Miles Impaired	CAUSE / TMDL Priority	Pollutant Source	COMMENTS
LOST CREEK	26.8	Loss of biological integrity due to siltation H Escherichia coli H	Pasture Grazing Septic Tanks	Stream is Category 5. (One or more uses impaired.)
BEAVER CREEK	21.0	Escherichia coli H	Pasture Grazing	Stream is Category 5. (One or more uses impaired.)
HOLSTON RIVER	26.9	Low DO L Habitat loss due to stream flow alteration NA	Upstream Impoundment	Below Cherokee Reservoir. Category 5 (one or more uses impaired), but flow alteration is 4c (impact not caused by a pollutant). Provides habitat for the federally listed pink mucket pearly mussel (<i>Lampsilis abrupta</i>). TVA has attempted to improve dissolved oxygen and flow levels.
MOSSY CREEK	9.1	Zinc M Loss of biological integrity due to siltation H Escherichia coli H	Collection System Failure Discharges from MS4 area Subsurface Mining	Stream is Category 5. (One or more uses impaired.)
LEADVALE CREEK	4.4	Escherichia coli M	Pasture Grazing	Water contact advisory. Stream is Category 5. One or more uses impaired.
CLEAR CREEK	3.3	Escherichia coli NA	Pasture Grazing	Stream is Category 4a. Impaired, but EPA has approved a pathogen TMDL that addresses the pollutant.
CLEAR CREEK	13.6	Escherichia coli NA	Pasture Grazing	Stream is Category 4a. EPA has approved a pathogen TMDL that addresses the known pollutant.
CLEAR CREEK	13.6	Nutrients	Pasture Grazing	Originally assessed as affected by nutrients from visual assessment of algae during a biological survey. In 2005, TDEC collected a SQSH at mile 2.7 (Rainwater School Road). The results of the survey generated a passing Index score of 32. Four EPT genera and 31 total genera were documented. The stream will remain listed for pathogens, but still appears to have improved and no longer has an obvious algae problem.
DUMPLIN CREEK	19.1	Loss of biological integrity due to siltation NA Physical Substrate Habitat Alterations Escherichia coli M	Pasture Grazing Land Development Channelization	Stream is Category 5. (One or more uses impaired.) EPA approved a TMDL for some of the known pollutants.
SARTAIN CREEK	4.4	Loss of biological integrity due to siltation H Physical Substrate Habitat Alterations H	Pasture Grazing Unrestricted Cattle Access	Stream is Category 5. (One or more uses impaired.)
CARTER BRANCH	3.5	Loss of biological integrity due to siltation H Physical Substrate Habitat Alterations H	Pasture Grazing Unrestricted Cattle Access	Stream is Category 5. (One or more uses impaired.)
CEDAR CREEK	7.5	Loss of biological integrity due to siltation H	Pasture Grazing	Stream is Category 5. (One or more uses impaired.)
LONG CREEK	13.5	Escherichia coli NA	Pasture Grazing	Category 4a. Impaired, but EPA approved a TMDL for known pollutants.

Ecological Health Ratings for Cherokee Reservoir

Dissolved oxygen: Poor As in previous years, dissolved oxygen rated poor. Much of the water column had low dissolved oxygen levels during the summer months, and there were extended periods of time when virtually no oxygen was present in the water near the bottom.

Chlorophyll: Good Chlorophyll rated good as concentrations were slightly elevated but remained within the expected range. Ratings have fluctuated between good, fair and poor where annual variations in the amount of rainfall and runoff have been an important factor.

Fish: Fair The fish community rated fair, similar to all previous years; the fish community has consistently rated fair or at the low end of the good range. Typically, a good variety of fish are collected, but many of the species are tolerant of degraded water quality.

Bottom life: Fair Ratings for bottom life were “low fair.” Relatively few organisms were collected, and most were species able to tolerate poor conditions.

Sediment: Good Sediment quality rated good. Chlordane, a pesticide previously used to control termites and crop pests, has been found in some previous years.

Tennessee Valley Authority, 2006

NOTE: Information presented above relates to samples taken from the reservoir FOREBAY only, as this is the part of the lake found in Jefferson County. Cherokee Reservoir as a whole rated “poor” in 2006 monitoring.

Ecological Health Ratings for Douglas Reservoir

Dissolved Oxygen: Poor Consistent with findings from previous years, dissolved oxygen concentrations were very low during the summer, especially in the bottom half of the water column.

Chlorophyll: Poor Chlorophyll rated poor at the mid-reservoir monitoring location. Summer chlorophyll averages are generally higher at the mid-reservoir site, rating poor in most years.

Fish: Fair The fish community rated fair. The fish community received its lowest score to date because the catch rate was relatively low and fewer fish species were collected than normal. Sampling results were affected by low water levels, a result of the extremely dry conditions.

Bottom life: Fair Bottom life rated at the low end of the fair range. As in previous years, TVA found relatively few animals in samples collected from the reservoir bottom, and the animals collected were primarily species capable of tolerating poor conditions.

Sediment: Good Sediment quality rated good. Low levels of chlordane, a pesticide previously used to control termites and crop pests, were detected in sediment samples in some previous years, resulting in a “Fair” rating.

Tennessee Valley Authority, 2007

NOTE: Information presented above relates to samples taken from the MID-RESERVOIR sampling location only, as this is the part of the lake found in Jefferson County. Douglas Reservoir as a whole rated “poor” in 2007 monitoring.

Cherokee Lake Water Quality (E. Coli Counts) – Spring 2009 Report

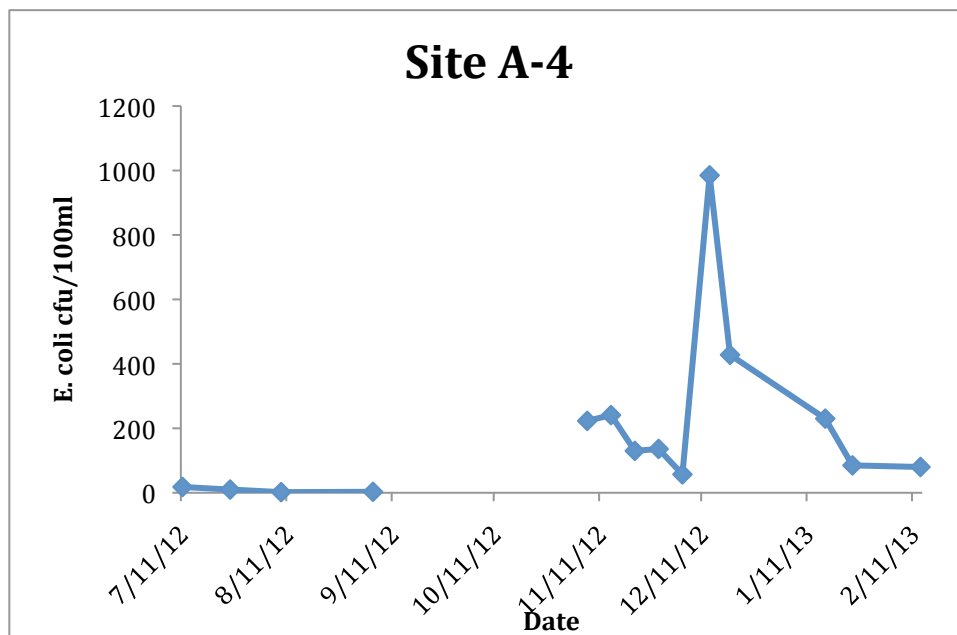
The Cherokee Lake Users' Association, a group of local residents who are concerned about the water quality of the lake, has partnered with the Carson-Newman College Biology Department to collect and evaluate water samples on a regular basis for fecal contamination (*E.coli* counts). *E. coli* is a bacterium found in fecal samples. Its presence in environmental waters suggests fecal contamination such as animal waste or sewage. Waste can enter surface waters via direct dumping into the lake or stream, via runoff from wooded areas, pastures, feedlots, and septic systems, as well as from sewage treatment facility overflows. Fecal contamination in surface waters typically increases after a heavy rain in areas with wildlife or livestock due to increased runoff. Small amounts of fecal coliforms are always present in environmental waters. State standards for Tennessee (water quality standards for *recreational use* classification) are as follows:

- *E. coli* not to exceed 126 cfu*/100 ml (average of at least 5 samples collected within one month)
- *E. coli* in any individual sample shall not exceed 487 cfu/100 ml

*cfu = colony forming units; an indication of the number of bacteria cells present in the sample.

Water samples are collected by members of the Cherokee Lake Users' Association in sterile plastic collection bags at predetermined sites designated by A, B, C, D, E, F followed by a number. Collected samples are immediately transported to Carson-Newman where they are processed for coliform testing (24 hour counts using m-ColiBlue 24 broth/membrane filtration). Results are tabulated and any site that shows high, or higher than normal, counts is re-sampled more frequently in order to monitor that area more closely. If unacceptable coliform levels are detected, the Users' Association contacts TDEC and tries to try identify the source of the contamination.

As seen in the graph below and on the data table on the next page, only one site (A-4) has had periods of consistently high *E. coli* counts. *E. coli* counts for this site exceeded the allowable 5-sample average (maximum allowed 126 cfu/100 ml) with an average of 157.4 cfu/100ml for 11/6/08 - 12/04/08. One sample (12/12/08) exceeded the individual maximum allowed of 487 cfu/100ml by more than double with 985 cfu/100ml.



Two other sites, A1 and E2 showed higher than average readings compared to samples from that site for previous and subsequent samples. The sample taken on 9/4/08 from E-2 showed very high E.coli levels (471 cfu/100ml), coming just under the single sample cutoff of 487cfu/100ml. The User's Association is monitoring these sites and will try to identify the source of the contamination. All results are shown in the table below.

Date of Count	Site																								
	A				B				C				D					E				F			
	1	2	3	4	1	2	3	4	1	2	3	1	2	2 ¹	3	3 ¹	5	1	1 ¹	2	3	4	1	2	
7/9/08									0	0	0	1	0	0	16	3		0	0	0	8				
7/10/08	7	6	1	18		7	6	7																	
7/24/08	4	6	3	10	1	1	0	0	6	0	4	1	5		3			0		31	8	22	0	1	
8/8/08	0	0	0	2	0	0	0	0	0	0	0	0	0		5			1					0	16	
9/4/08	0	0	5	3	2	2	0	0	8	0	0	2	0				7	0 ²		471	4		0	6	
																		0							
9/9/08																		1		10	2				
																				12					
11/6/08	216	1	2	223	3	0	0	0		0	0 ³	0	3		7			1					0	0	
											0														
11/13/08	5	0	16	241																					
11/20/08	162			130																					
11/27/08				136																					
12/04/08				57																					
12/12/08	2	16	16	985⁴								0	4		0			10 ²		2	6				
																		14							
12/18/08				428																					
01/15/09				230																					
				283																					
01/23/09				85																					
02/12/09	100	110	65	80																					

E. coli counts expressed as colony forming units (cfu) per 100 ml water

¹ sample in ziplock bag, not the sterile whirl bags

² counts from 9/4, 12/12 = two "E1"

³ Two sample bags labeled C3

⁴ A4 E. coli counts of 12/12 = 985/100ml (20 ml filtered resulted in 197 CFU)

12/18/08, 1/15/09 and 1/23/09: A4 counts = 20 ml filtered, x 5 for CFU per 100ml (average for 3 plates)

Jefferson County's Wildlife Resources

Cherokee Reservoir

Sportfish Survey Results

<u>Parameter</u>	<u>2007</u>	<u>2006</u>	<u>2004</u>	<u>2003</u>
Hours electrofished	6	6	6	6
Total number of black bass	329	172	74	101
Percent harvestable (over 10")	40.46	63.1	69.4	64.3
Number of largemouth bass	304	160	72	95
Number of smallmouth bass	2	1	0	0
Number of spotted bass	23	11	2	6
Number of crappie	17	42	3	7
Number of white crappie	7	17	1	3
Number of black crappie	10	25	2	4
Electrofishing catch rate (per hr)	54.8	28.7	12.3	16.8
Average weight (pounds)	1.6	2	1.2	1.5
Largest black bass (pounds)	5.1	4.5	3.1	4.4
Disease/parasites (percent)	7.90	26.2	10.8	15.8
Number weighing > 5 pounds	1	0	0	0
Number weighing > 4 pounds	3	2	0	1
Number weighing > 3 pounds	7	10	1	NA

Sportfish Ratings

<u>Fish Species</u>	<u>2007 Score</u>	<u>2007 Valleywide Average</u>
Black Basses	32	36
Black Crappie	50	34
Largemouth Bass	30	33
Smallmouth Bass	24	30
Spotted Bass	28	33
Striped Bass	46	37

Douglas Reservoir

Sportfish Survey Results

<u>Parameter</u>	<u>2008</u>	<u>2007</u>	<u>2006</u>
Hours electrofished	18	18	18
Total number of black bass	1061	722	967
Percent harvestable (over 10 inches)	54.3	45.1	70.7
Number of largemouth bass	1034	704	914
Number of smallmouth bass	27	18	53
Number of spotted bass	0	0	0
Number of crappie	109	98	74
Number of white crappie	69	48	31
Number of black crappie	40	50	43
Electrofishing catch rate (per hour)	57.4	40.1	53.7
Average weight (pounds)	1.2	1.26	1.26
Largest black bass (pounds)	6	4.4	6.3
Disease/parasites (percent)	24.0	4.06	4.2
Number weighing more than 5 pounds	6	0	8
Number weighing more than 4 pounds	19	5	17
Number weighing more than 3 pounds	42	17	41

Sportfish Ratings

<u>Fish Species</u>	<u>2007 Score</u>	<u>2007 Valleywide Average</u>
Black Basses	31	36
Black Crappie	32	34
Bluegill	30	27
Channel Catfish	31	33
Crappie	42	36
Largemouth Bass	33	33
Sauger	24	24
Smallmouth Bass	24	30
Walleye	32	34
White Bass	44	38
White Crappie	28	28

Threatened and Endangered Species in Jefferson County

Rare Species observed in Jefferson County (see key to ranks and status codes on following page)

Type	Scientific Name	Common Name	Global Rank	St. Rank	Fed. Prot.	St. Prot.	Habitat
Bird	<i>Haliaeetus leucocephalus</i>	Bald Eagle	G5	S3	**	D	Areas close to large bodies of water. Roosts in sheltered sites in winter. Communal roost sites common.
Fish	<i>Cycleptus elongatus</i>	Blue Sucker	G3G4	S2	**	T	Swift waters over firm substrates in big rivers.
Flowering Plant	<i>Arabis patens</i>	Spreading Rockcress	G3	S1	**	E	Moist Rocky Woods
Flowering Plant	<i>Cimicifuga rubifolia</i>	Appalachian Bugbane	G3	S3	**	T	Rich Woods
Flowering Plant	<i>Panax quinquefolius</i>	American Ginseng	G3G4	S3S4	**	S-CE	Rich Woods
Mammal	<i>Myotis grisescens</i>	Gray Bat	G3	S2	LE	E	Cave obligate year-round; esp. forested areas; migratory.
Mammal	<i>Myotis sodalis</i>	Indiana Bat	G2	S1	LE	E	Hibernates in caves; spring/summer maternity roosts are normally under the bark of standing trees.
Mollusc	<i>Cumberlandia monodonta</i>	Spectaclecase	G3	S2S3	C	**	Medium to large rivers; in substrates from mud and sand to gravel, cobble, and boulders; Cumberland and Tennessee river systems
Mollusc	<i>Dromus dromas</i>	Dromedary Pearlymussel	G1	S1	LE	E	Medium-large rivers with riffles and shoals w/ relatively firm rubble, gravel, and stable substrates; Tennessee & Cumberland systems
Mollusc	<i>Fusconaia cor</i>	Shiny Pigtoe	G1	S1	LE	E	Shoals and riffles of small-medium sized rivers with mod-fast current over sand-cobble substrates; upper Tennessee River watershed
Mollusc	<i>Isofluvialis</i>	Spiny Riversnail	G2	S2	**	**	Shallow waters of shoals that are rapid to moderate and well-oxygenated; Tennessee River & main tributaries; E Tennessee.
Mollusc	<i>Lampsilis abrupta</i>	Pink Mucket	G2	S2	LE	E	Generally a large river species, preferring sand-gravel or rocky substrates with mod-strong currents; Tennessee & Cumberland river systems.
Mollusc	<i>Plethobasus cicatricosus</i>	White Wartyback	G1	S1	LE	E	Presumed to inhabit shoals and riffles in large rivers; Tennessee & Cumberland river systems. Very rare & poss extirpated in TN.
Non-Vascular Plant	<i>Archidium alternifolium</i>	**	G4G5	S1	**	T	Limestone Barrens

Description of Federal and State Ranks & Status Codes

GLOBAL RANK - The global or world-wide rank of a species which is a non-legal rank indicating the rarity and vulnerability of a species

G1 Extremely rare and critically imperiled in the world with five or fewer occurrences, or very few remaining individuals, or because of some special condition where the species is particularly vulnerable to extinction

G2 Very rare and imperiled within the world, six to twenty occurrences, or few remaining individuals, or because of some factor(s) making it vulnerable to extinction

G3 Rare and uncommon in its range or found locally in a restricted range, generally from 21-100 occurrences

G4 Widespread, abundant, and apparently secure globally, but with cause for long-term concern

G5 Demonstrably widespread and secure globally

STATE RANK - The state rank of a species in Tennessee. Like the G_rank, this is a non-legal rank indicating the rarity and vulnerability of a species at the state level.

S1 Extremely rare and critically imperiled in the state with five or fewer occurrences, or very few remaining individuals, or because of some special condition where the species is particularly vulnerable to extinction

S2 Very rare and imperiled within the state, six to twenty occurrences, or few remaining individuals, or because of some factor(s) making it vulnerable to extinction

S3 Rare and uncommon in the state, from 21-100 occurrences

S4 Widespread, abundant, and apparently secure within the state, but with cause for long-term concern

FEDERAL STATUS - The federal listing under the U.S. Endangered Species Act

LE, Listed Endangered Taxon is threatened by extinction throughout all or a significant portion of its range

C, Candidate species Taxon for which the USFWS has sufficient information to support proposals to list the species as threatened or endangered, and for which the Service anticipates a listing proposal

STATE STATUS -The legal listing in Tennessee

E, Endangered Any species or subspecies whose prospects of survival or recruitment within the state are in jeopardy or are likely to become so within the foreseeable future

T, Threatened Any species or subspecies that is likely to become an endangered species within the foreseeable future

D, Deemed in Need of Management Any species or subspecies of nongame wildlife which the executive director of the TWRA believes should be investigated in order to develop information relating to populations, distribution, habitat needs, limiting factors, and other biological and ecological data to determine management measures necessary for their continued ability to sustain themselves successfully. This category is analogous to "Special Concern."

S-CE, Special Concern - Commercially Exploited Special Concern Species means any species or subspecies of plant which is uncommon in Tennessee, or has unique or highly specific requirements or scientific value and therefore requires careful monitoring of its status. Commercially Exploited, due to large numbers being taken from the wild and propagation or cultivation insufficient to meet market demand. These plants are of long-term conservation concern.