Regional Water Supply Plan

Town of Blacksburg and Town of Christiansburg

8/30/2011

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Chapter 1 **Introduction**

Regulation Background

The Commonwealth of Virginia in response to a drought condition during the years of 1999-2002 passed Senate Bill 1221 in 2003. The resulting State Code (9 VAC 25-780) is the Local and Regional Water Supply Planning regulation which was effective on November 2, 2005. The regulation requires all counties, cities, and towns in the Commonwealth of Virginia to develop and submit a water supply plan to the State Water Control Board.

The Water Supply Plan regulation requirements include; existing water source information, existing water use information, existing resource information, water demand management, drought response and contingency plans, projected water demand, and statement of need based on existing and future water sources and demands.

The Town of Blacksburg and Town of Christiansburg submitted a resolution approving development of a regional water supply plan between the two localities to the Virginia Department of Environmental Quality on September 17, 2008. The development and submittal of a regional water supply plan shall be submitted by November 2, 2011 in accordance with state code 9 VAC 25-780-50.

Chapter 2 Existing Water Resource Information (9 VAC 25-780-70)

This section contains a description of existing water resources within the planning area outlined in Table 2.1. The community water systems in this regional water supply plan utilize water from a stream intake located at the New River as their sole resource. The Blacksburg, Christiansburg, VPI Water Authority which is jointly owned by the two towns and Virginia Tech is responsible for water treatment from the stream intake. The towns maintain the distribution systems and storage tanks that provide water and fire protection for customers within the service area.

Table 2.1 Planning Area

Locality	Population	Population Per Household
Town of Blacksburg (Includes Va. Tech)	42,620*	2.4
Town of Christiansburg	21,041*	2.3

** 2010 census number*

Community Water System Using Ground Water- (B)

The Town of Blacksburg does not have any permitted community ground water systems.

The Town of Christiansburg does not have any permitted community ground water systems.

Community Water System Using Surface Water Reservoirs- (C)

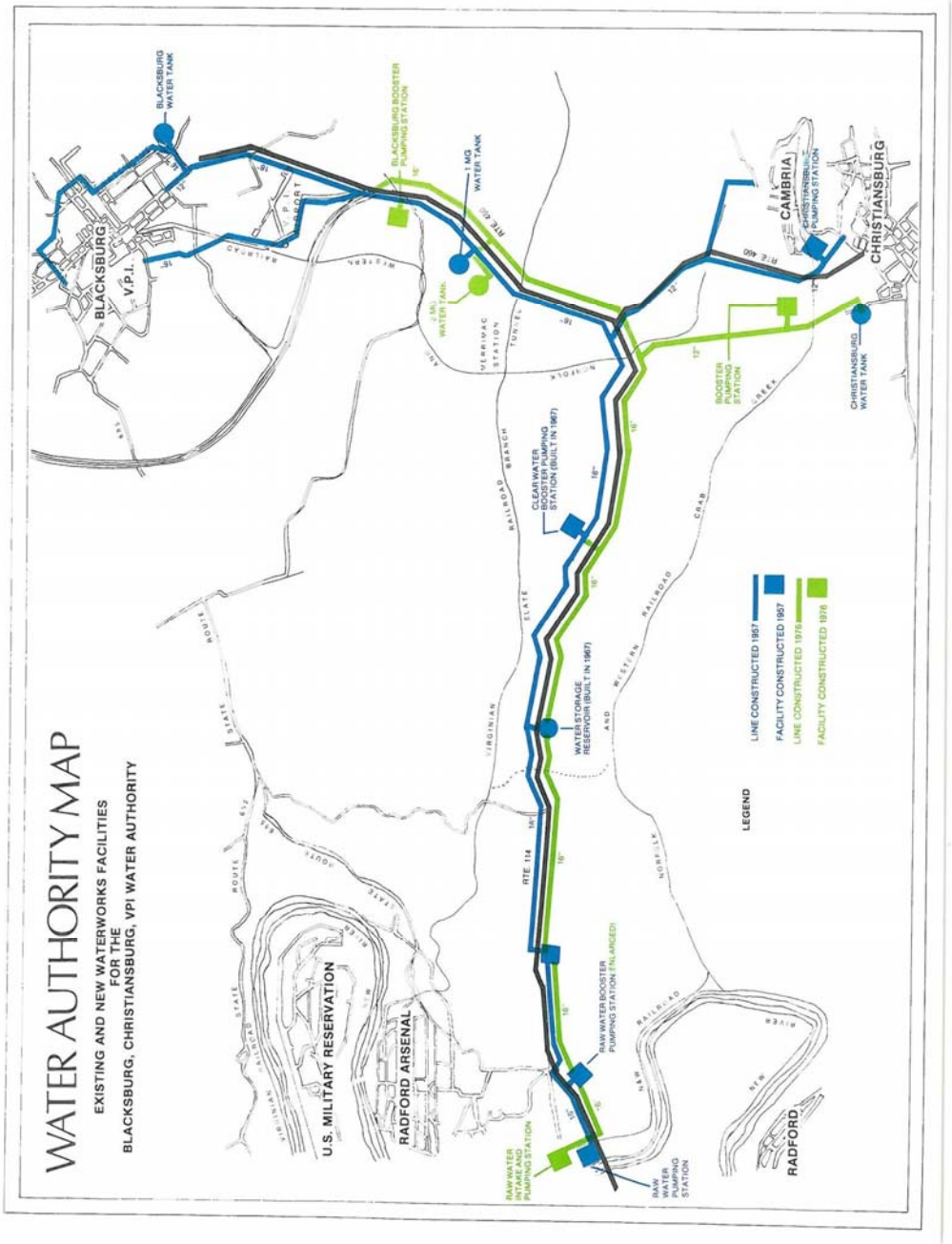
The Town of Blacksburg does not have any permitted community surface water reservoir systems.

The Town of Christiansburg does not have any permitted community surface water reservoir systems.

Community Water System Using Stream Intake- (D)

The Towns of Blacksburg and Christiansburg purchase water from the Blacksburg, Christiansburg, VPI Water Authority, which receives its water from the New River as shown in Figure 2.1. The stream intake and design capacities information was obtained from the Water Authority's Health Department permit. Both the Towns of Blacksburg and Christiansburg operate and maintain the distribution systems that receive water from the Water Authority. Each locality utilizes pumps to supply water to distribution systems and tanks. The pump station design capacities noted in Table 2-2 shows the gallons per day of water that can be utilized. Virginia Tech also receives water from the Water Authority through the Town of Blacksburg distribution system; therefore we have included Virginia Tech numbers with Town of Blacksburg.

Figure 2.1 Source water intake and treatment facility map



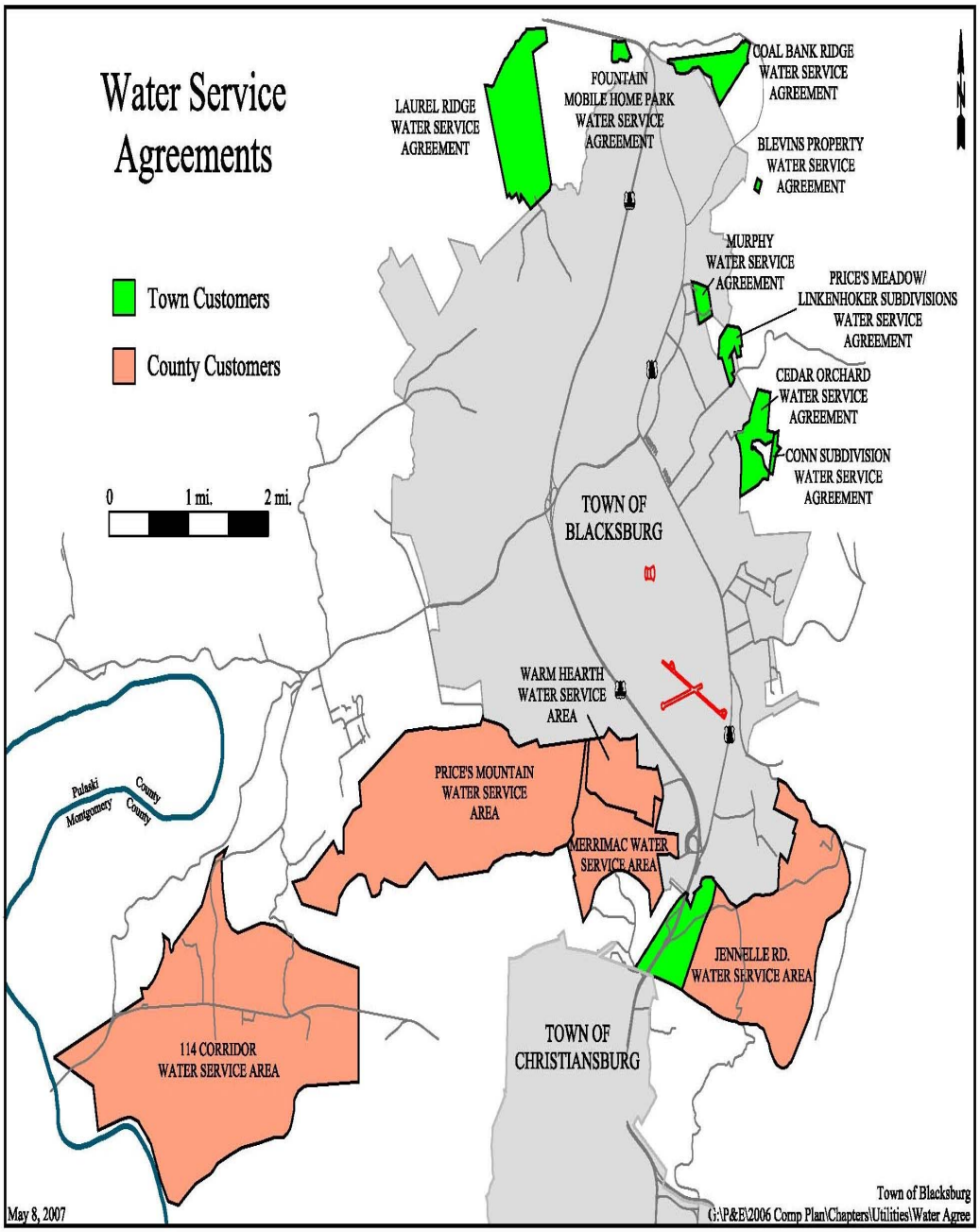
Town of Blacksburg

The Town of Blacksburg maintains nine pressure zones, seven storage tanks, and four pump stations within the service area. The Town has an effective storage volume of approximately seven and a half million gallons with a critical capacity of 37,650 equivalent residential connections. Safe yield, treatment capacity, and pumping capacity are based on the Blacksburg-Christiansburg-VPI Water Authority's water treatment plant and pump stations.

Metered connections to the Town of Blacksburg distribution system provide water to Virginia Tech. In addition, both Towns sell water to the Montgomery County Public Service Authority which owns waterworks connected at various points. Montgomery County PSA-owned consecutive waterworks that receives water from the Town of Blacksburg are Warm Hearth, Merrimac, and Prices Fork Community (as a backup source). The Montgomery County PSA has contracts with the Town of Blacksburg for the following capacities:

Warm Hearth	130,000 gpd	650 single family residential connections
Merrimac	216,000 gpd	720 connections
Prices Fork	510,000 gpd (but not more than 500 gpm)	
Jennelle and Yellow Sulphur Roads	100,000 gpd and 150,000 gpd for VDOT Smart Road	
Route 114 Corridor	250,000 gpd	625 water connections
Price's Mountain	104,400 gpd	348 water connections

Figure 2.2 Town of Blacksburg Water Service Agreements



Town of Christiansburg

The Town of Christiansburg maintains four pressure zones, two subzones with two pump stations within one of those pressure zones, seven storage tanks, and one pump station within the town's service area. The Town has an effective storage volume of approximately 3.7 million gallons with a critical capacity of 18,425 equivalent residential connections. Similar to the Town of Blacksburg, safe yield, treatment capacity, and pumping capacity are based on the Blacksburg-Christiansburg-VPI Water Authority's water treatment plant and pump stations.

The Town of Christiansburg sells or has the potential to sell water to the Montgomery County Public Service Authority at three points of the Town's waterworks. Current Montgomery County PSA-owned consecutive waterworks receiving water from Christiansburg are the Shawsville / Elliston and the Mud Pike service areas. The Midway / Merrimac and Price Mountain service area currently is disconnected from the Town's water system but has the potential to be connected if requested by the Montgomery County PSA. The Montgomery County PSA has an agreement with the Town of Christiansburg for the following capacity:

Shawsville / Elliston	500,000 gpd
Mud Pike	265,000 gpd
Midway / Merrimac and Price Mountain	150,000 gpd

Figure 2.3 Town of Christiansburg Water Agreement Boundaries

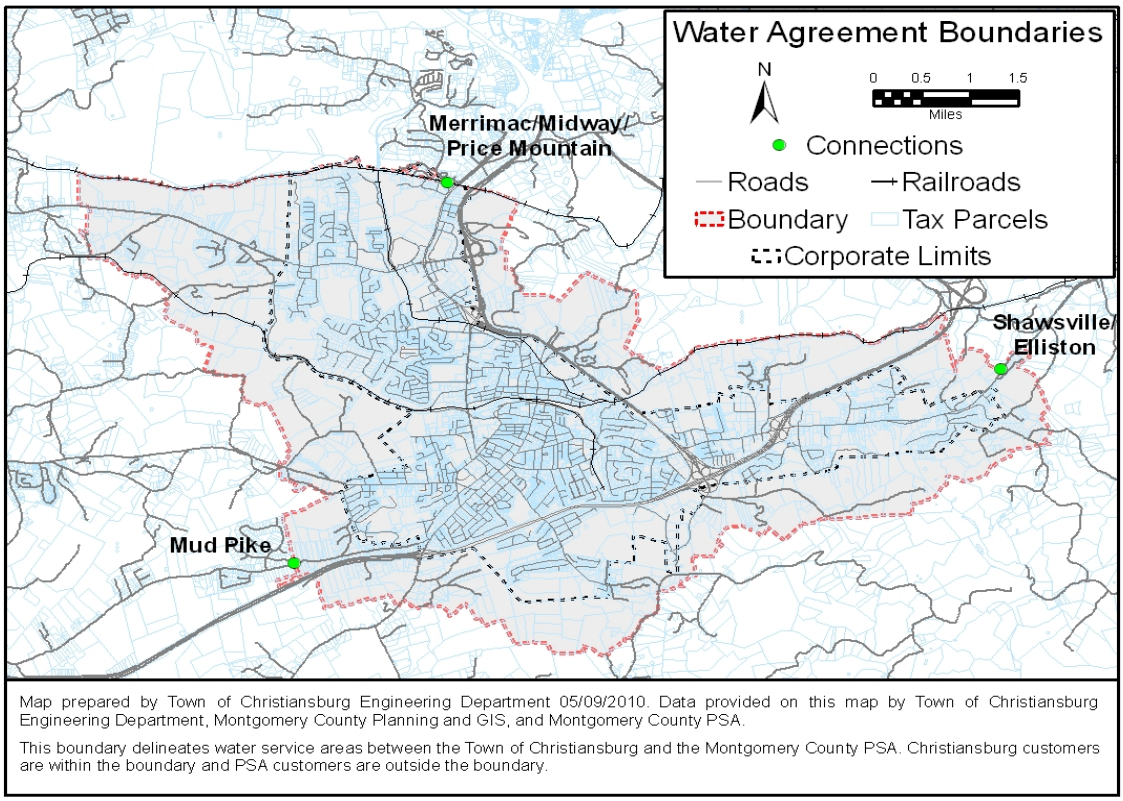


Table 2.2 Blacksburg, Christiansburg VPI Water Authority

Water System	Water Authority	Town of Blacksburg (Includes Va. Tech)	Town of Christiansburg
PWSID	1121057	1121052	1121090
Name of River	New River		
Basin of Intake	Upper New		

Intake Drainage Area	2767 mi^2		
Average Daily Withdrawal Design Capacity	12.4 (MGD) (12,400,000 gpd)		
Maximum Daily Withdrawal	15.4 (MGD) (15,400,000 gpd)		
Pump Station Design Capacity	15.4 (MGD) (15,4000,000 gpd)	6.77 (MGD)	0.504 (MGD)
Water Treatment Plant Design Capacity	12.4 (MGD) (12,400,000 gpd)		
Safe Yield of River	400.0 (MGD)		
Lowest Daily Flow of Record	568 cfs *		
VDH Permitted Capacity	12.4 (MGD)		
Limitations on Withdrawal Permit	N/A		

Information from USGS stream gauge #03171000 (New River at Radford, Va.). Data from 10/1/1907 to 2/1/2009.

Self-supplied Nonagricultural Users>300,000 Gallons per Month from Surface Water Sources- (E)

The Town of Blacksburg has no self-supplied surface water users >300,000 gallons per month.

The Town of Christiansburg has no self-supplied surface water users >300,000 gallons per month.

Self-supplied Nonagricultural Users>300,000 Gallons per Month from Ground Water Sources- (F)

The Town of Blacksburg has no self-supplied ground water users >300,000 gallons per month.

The Town of Christiansburg has no self-supplied ground water users >300,000 gallons per month.

Water Purchased Outside Local Boundaries- (G)

The Town of Blacksburg does not purchase water or have agreements in place to purchase water from outside sources.

The Town of Christiansburg does not purchase water or have agreements in place to purchase water from outside sources.

Water Available for Purchase beyond Local Boundaries- (H)

The Town of Blacksburg could potentially purchase water from the RFAAP through current connections or with minimal infrastructure upgrades. The RFAAP is not a local government but currently provides water to Montgomery County and Pulaski County. RFAAP facilities are limited due to aging infrastructure, but the facility is permitted to withdraw up to 82 MGD from the New River.

Another option for both Towns is obtaining water from the City of Radford which also has excess capacity and withdraws from the New River; however this would require more extensive infrastructure upgrades.

Self-Supplied Agricultural Users >300,000 Gallons per Month- (I)

The Town of Blacksburg has 126 parcels within Town limits that are designated as having an agricultural use. Most of the parcels are located on Virginia Tech property or in the Toms Creek basin. A combination of surface water (Toms Creek and Stroubles Creek), wells, and CWS are utilized for water supply. Beef cattle, sheep, and horses are the primary livestock with hay and corn the primary crops produced. VPI is the largest Agricultural producer in the Town of Blacksburg.

The Town of Christiansburg has 522 parcels within town limits that have an Agricultural zoning designation (as shown in Figure 2.4) however, some parcels have split zoning. A combination of surface water (Crab Creek) including small ponds, possible wells, and CWS are utilized for water supply. Multiple parcels currently are utilized for limited private beef cattle and similar livestock operations.

There are no known self-supplied agricultural users using greater than 300,000 gallons per month within the planning area.

Figure 2.4 Town of Christiansburg Agricultural Zoning

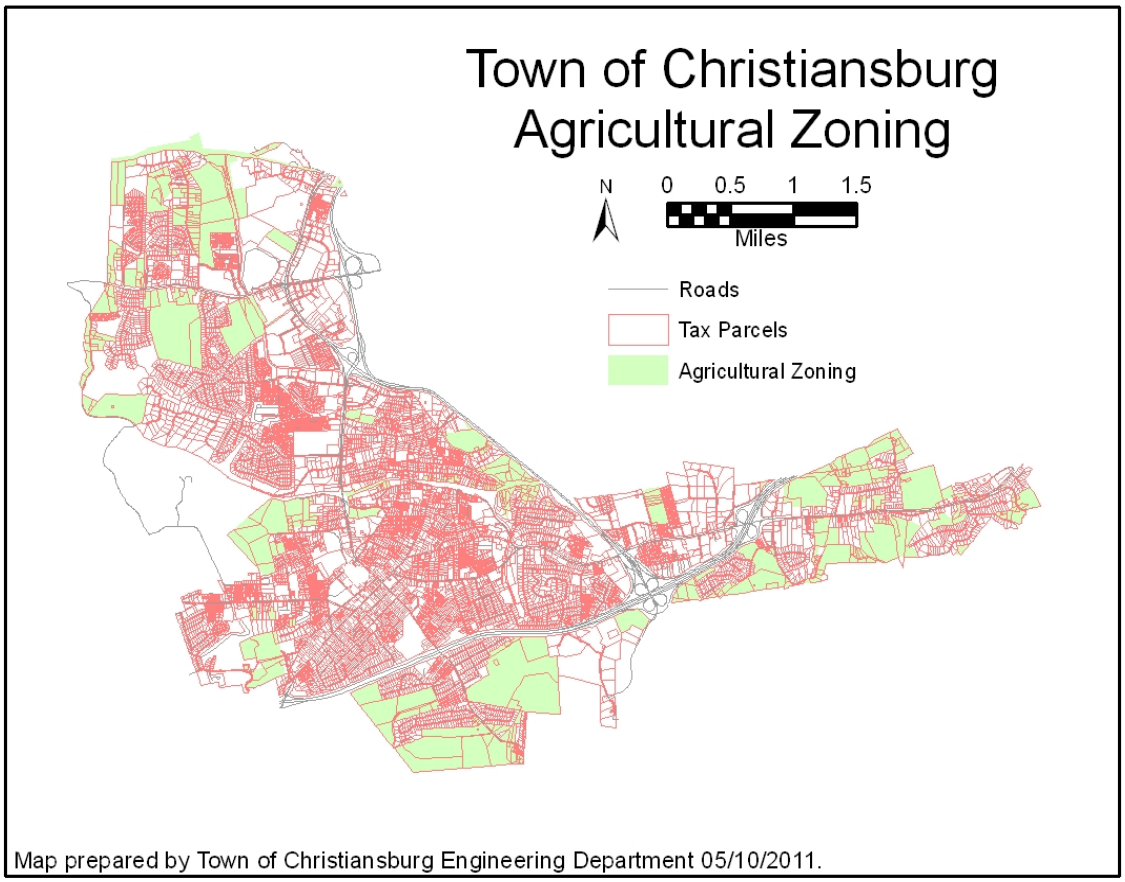


Table 2.3 Parcels designated as having an agricultural use

Locality	VPI parcels designated Ag	Town parcels designated Ag
Town of Blacksburg	15	111
Town of Christiansburg	N/A	522*

Includes parcels with split zoning.

Self-Supplied Users <300,000 Gallons per Month- (J)

Residents and businesses that utilize wells make up less than one percent of the population within the Town of Blacksburg service area.

Residents and businesses that utilize wells make up less than one percent of the population within the Town of Christiansburg service area.

Table 2.4 Residential Wells in each Service Area

Locality	Total Population	Est. Population served by CWS	Est. Population Served by Wells	Percent Served by Wells	Est. Residences on Wells	Est. Businesses on Wells
Town of Blacksburg	42,620*	42,322	298	< 1%	124	4
Town of Christiansburg	21,041*	22,136	69	< 1%	30	1

2010 Census

Summary of Findings from Wellhead and Source Water Protection Programs- (K)

1. There are no known Wellhead Protection Programs in place in the Planning Area.

2. The U.S. Environmental Protection Agency, in accordance with the 1996 Safe Water Drinking Act Amendments, mandated each state to develop a Source Water Assessment Program (SWAP). The SWAP delineates boundaries of assessment areas, identifies potential sources of contamination, and determines the susceptibility of the public water supply systems.

The Upper New River Source Water Assessment Plan prepared by Draper Aden Associates includes an assessment for the Blacksburg-Christiansburg-VPI Water Authority which supplies the Towns of Blacksburg and Christiansburg.

The water source for the Blacksburg-Christiansburg-VPI Water Authority is considered to have a high susceptibility according to the definitions presented in the Virginia SWAP manual.

The plan can be found in Appendix A.

Chapter 3 Existing Water Use Information (9 VAC 25-780-80)

This section includes the most recent previous annual compilation (2010) of existing water use information for each community water system within the planning area.

- Population
- Number of connections
- Average and maximum daily withdrawal
- Amount of water used on an annual average basis and monthly average basis expressed in terms of million gallons per day
- Peak day water use by month
- Estimate of the water used on an average annual basis by self-supplied nonagricultural users of more than 300,000 gallons per month of surface and groundwater within the service area
- Estimate of the water used on an average annual basis by self-supplied agricultural users of more than 300,000 gallons per month of surface and groundwater within the service area
- Estimate of the number of self-supplied users of less than 300,000 gallons per month of groundwater, and an estimate of their water consumption on an average annual basis
- Estimate of the disaggregated amounts of water used in categories appropriate for each system
- Qualitative description of existing in-stream beneficial uses within or outside the planning area that may be affected by the point of stream withdrawal
- Estimate of the water used on an average annual basis by self-supplied nonagricultural users of more than 300,000 gallons per month of surface and groundwater outside the service areas
- Estimate of the water used on an average annual basis by self-supplied agricultural users of more than 300,000 gallons per month of surface and groundwater outside the service areas

- Estimate of the number of self-supplied users of less than 300,000 gallons per month of ground water and estimate of the total amount of water used on an annual average basis outside the service areas.

Populations Served by Community Water Systems and Withdrawal Statistics - (B.1, B.2, B.3, B.4)

The data provided in this section was obtained from each localities' water records and the latest Census Bureau numbers.

Table 3.1 Existing Water Use Information for Community Water Systems

CWS	Population Served	# of connections	Avg. Daily Withdrawal (MGD)	Max. Daily Withdrawal (MGD)	Avg. Monthly Use (MG/mo)	Annual Average Use (MGD)
Town of Blacksburg	42,620*	8756 residential 350 commercial	4.081 includes Va. Tech	6.122** includes Va. Tech	124.12 includes Va. Tech	1489.40 includes Va. Tech
Town of Christiansburg	21,041*	9137 residential 921 commercial	1.614	2.421**	49.10	589.19

**** 2010 census***
***** Used 1.5 for maximum daily multiplier***

Peak Day Water Use by Month - (B.5)

Table 3.2 Peak Day Estimates per Month (2010), Community Water Systems

Month	Town of Blacksburg (including Va. Tech) Peak Day Readings (MGD)	Town of Christiansburg Peak Day Readings (MGD)
January	6.172	1.583
February	6.900	1.519
March	6.271	1.622
April	6.656	1.571
May	6.341	1.484
June	5.851	1.804
July	6.161	1.669
August	6.473	1.697
September	7.382	1.658
October	6.730	1.487
November	5.915	1.682
December	5.257	1.592
Total	*76.109*	19.370

Self-supplied Nonagricultural Users > 300,000 Gallons per Month of Surface and Groundwater within service areas of each CWS - (B.6)

Table 3.3 Nonagricultural users >300,000 Avg. Annual Water Use

Locality	Facility	GW/SW	Average Annual Water Use (MGD)
Town of Blacksburg	N/A		
Town of Christiansburg	N/A		

Self-Supplied Agricultural Users >300,000 Gallons per Month within Service Areas – (B.7)

There are no known self-supplied agricultural users within the Town of Blacksburg using more than 300,000 gallons per month. Va. Tech reported 3 wells within the service area all using less than 300,000 gallons per month, the remaining demand is supplied by the CWS.

There are no known self-supplied agricultural users within the Town of Christiansburg service areas using more than 300,000 gallons per month.

Self-supplied Users of <300,000 Gallons per Month of Ground Water within Service Areas- (B.8)

Table 3.4 Estimated Small Self-Supplied Water Use in Service Area

Locality	Number of Users	Population per Household Factor	Estimated Annual Average Use (MGD)
Town of Blacksburg	124	2.4	.030
Town of Christiansburg	30	2.3	0.007

Va. Dept. of Health water consumption rate per person- 100 gpd

Estimate of the Disaggregated Amounts of Water Used- (B.9)

Table 3.5 Disaggregated Amounts of Water Used by each Community Water System (2010)

CWS	Residential Use (MGD)	Commercial (MGD)	Industrial (MGD)	Va. Tech (MGD)	Water Sales (MGD)	Accounted Water Loss (MGD)	Unaccounted Water Loss (MGD)	Total (MGD)
Town of Blacksburg	1.266	1.126	.054	1.243	.165*	.013**	.427	4.294
Town of Christiansburg	1.131	0.388	0.019	N/A	0.285*	UR***	.076**	1.899

*** Sold to Montgomery County**
**** Town of Blacksburg accounted water loss includes flushing water lines, tank maintenance, and any water use not metered but observed.**
***** Unable to report figure at this time due to Town of Christiansburg's water billing software limitations. All water loss reported as unaccounted at this time.**

Existing In-stream Beneficial Uses- (B.10)

Existing beneficial uses inside and outside the planning area that may be affected by the point of stream withdrawal include the following:

- Fish and wildlife habitat
- Recreational uses (hunting, fishing, and boating)

Self-supplied Nonagricultural Users >300,000 Gallons per Month Outside Service Areas- (C)

There are no known self-supplied users outside the service area using more than 300,000 gallons per month.

Montgomery County	Auburn Hills Golf Course	NI	

Self-supplied Agricultural Users >300,000 Gallons per Month Outside Service Areas- (D)

No self-supplied agricultural users using more than 300,000 gallons per month were identified

outside the immediate service area of the Town of Blacksburg.

No self-supplied agricultural users using more than 300,000 gallons per month were identified outside the immediate service area of the Town of Christiansburg.

Self-supplied Users <300,000 Gallons per Month of Ground Water Outside Service Areas- (E)

There are no known self-supplied users using < 300,000 gallons per month of ground water outside the service areas, which are not already accounted for in the New River Valley Regional Water Supply Plan.

Health water consumption rate per person- 100 gpd

Table 3.7 Summary of Daily and Annual Water Withdrawals

Water Withdrawals	Town of Blacksburg	Town of Christiansburg	Montgomery County
Average Daily Withdrawals (MGD)			
Community Water Systems	4.08	1.61	15.638
Large Self-supplied Nonagricultural Users	N/A	N/A	NI
Large Self-supplied Agricultural Users	N/A	N/A	NI
Small Self-supplied Users	.030	.007	NI
Grand Total	**4.11**	**1.617**	**15.638**
Average Annual Withdrawals (MG)			
Community Water Systems	1489.40	589.19	5,707.87
Large Self-supplied Nonagricultural Users	N/A	N/A	NI
Large Self-supplied Agricultural Users	N/A	N/A	NI
Small Self-supplied Users	10.86	2.56	8,613.91
Grand Total	**1500.26**	**591.75**	**14321.78**

Chapter 4 Existing Resource Information (9 VAC 25-780-90)

This section of the Water Supply Plan will describe the existing geology, hydrology, meteorological, and environmental conditions within the planning area, and near point of withdrawal.

Geologic, Hydrologic, and Meteorological Data for planning area- 9 VAC 25-780-90A

Geological

The Towns of Blacksburg and Christiansburg are located in the Valley and Ridge physiographic province. This province is characterized by northeastern trending ridges and valleys of steeply folded and faulted bedrock. The ridges are generally underlain by sandstones, while the valleys are generally underlain by limestone and shale. Bedrock age in this basin ranges from Cambrian to Mississippian. The limestone valleys are characterized by karst topography with associated springs, caves, and sinking streams.

Soils are principally of the Frederick, Groseclose, and Hagerstown associations. Thin surface layers lie above clay subsoil which is underlain by limestone. Permeability is moderate to slow. Forests are predominately hardwood, containing numerous species of oak, maples, hickory, and basswood.

Source: Upper New River Source Water Assessment Plan. January 7, 2002 and FEMA Flood Insurance Study, September, 2009

Hydrologic Data

Town of Blacksburg

Blacksburg lies atop the eastern continental divide where Toms Creek and Stroubles Creek flow into the New River. Eventually the water carried by these streams reaches the Gulf of Mexico. Cedar Run and North Fork Tributary flow to the Roanoke River, which flows to the Atlantic Ocean. Land elevations range from 1,850 to 2,050 feet along the streams and up to 2,300 feet along the continental divide. The Blacksburg area, characterized by rolling hills cut with rugged valleys, is located in the Valley and Ridge physiographic province.

Watershed Resources

Located on the eastern continental divide, Blacksburg has self-contained watersheds, and thus the Town receives little surface runoff from outside its boundaries. The headwaters of five watersheds begin within Town limits; Toms Creek, Upper Stroubles Creek, Slate Branch of Stroubles Creek, Dry Run of the Northfork Roanoke River, and Wilson Creek of the Northfork Roanoke River. These watersheds are the source of water for several streams located in Town: Toms Creek, Stroubles Creek, Slate Branch, Cedar Run, Wilson Creek, and Dry Run. These stream systems recharge the region's aquifer through sinkholes and other pervious areas, and discharge at springs and creek beds. Several natural watershed features, such as wetlands, ephemeral stream channels, and water impoundments are located throughout the Town.

Flooding Hazards

The Town experiences two types of flooding hazards. One type of flooding occurs in natural floodplains running along Toms Creek, Stroubles Creek, and Cedar Run. To mitigate flooding in these areas, the Town complies with the Federal Emergency Management Agency (FEMA) National Flood Insurance Program by restricting land use in this zone. The Town has adopted a Creek Valley Overlay District, which includes the entire 100-year flood plain as well as slopes greater than 25 percent within the floodplain or land within 50 feet of the stream, whichever the greater distance. One-hundred-year floodplains are also protected in the Flood Hazard Overlay area in the remainder of Town. Additionally, the Town has created a regional stormwater management plan for the central branch of Stroubles Creek that identifies the construction of seven detention ponds within this section of Town to more effectively control stormwater runoff.

The second type of flooding occurs during severe storm events in urbanized areas, especially in portions of the Stroubles Creek basin in the vicinity of Downtown and the Virginia Tech campus. This flooding is partially attributed to the covering of the floodplain and main creek channel with building construction, which constrains flow and infiltration. It is exacerbated by impervious surfaces associated with the continued urban development of the drainage basin, which increases stormwater runoff. The Town receives little storm runoff from outside the jurisdiction because of its location along the continental divide, and the Town can control runoff impacts and water quality within its own storm drainage system. Current stormwater drainage and detention systems are designed for a statistical storm frequency occurring once every two and ten years on new development. However, larger storms result in yard, street, and sometimes structural flooding. Existing development in the central branch of the Stroubles Creek watershed, which is highly urban, is planned to drain to one of the seven stormwater management facilities proposed in the 1998 regional stormwater management study. The advantage of a regional management plan for a watershed is that it allows the Town to strategically plan stormwater detention areas to best benefit the watershed on the whole, rather than piece by piece as the land develops.

Groundwater is used only minimally as a drinking water source within Town limits, on Old Mill Road and a small section of Bishop Road. The Town does impact regional aquifers, however,

through land use activities near recharge areas and karst features.
Town of Blacksburg Comprehensive Plan

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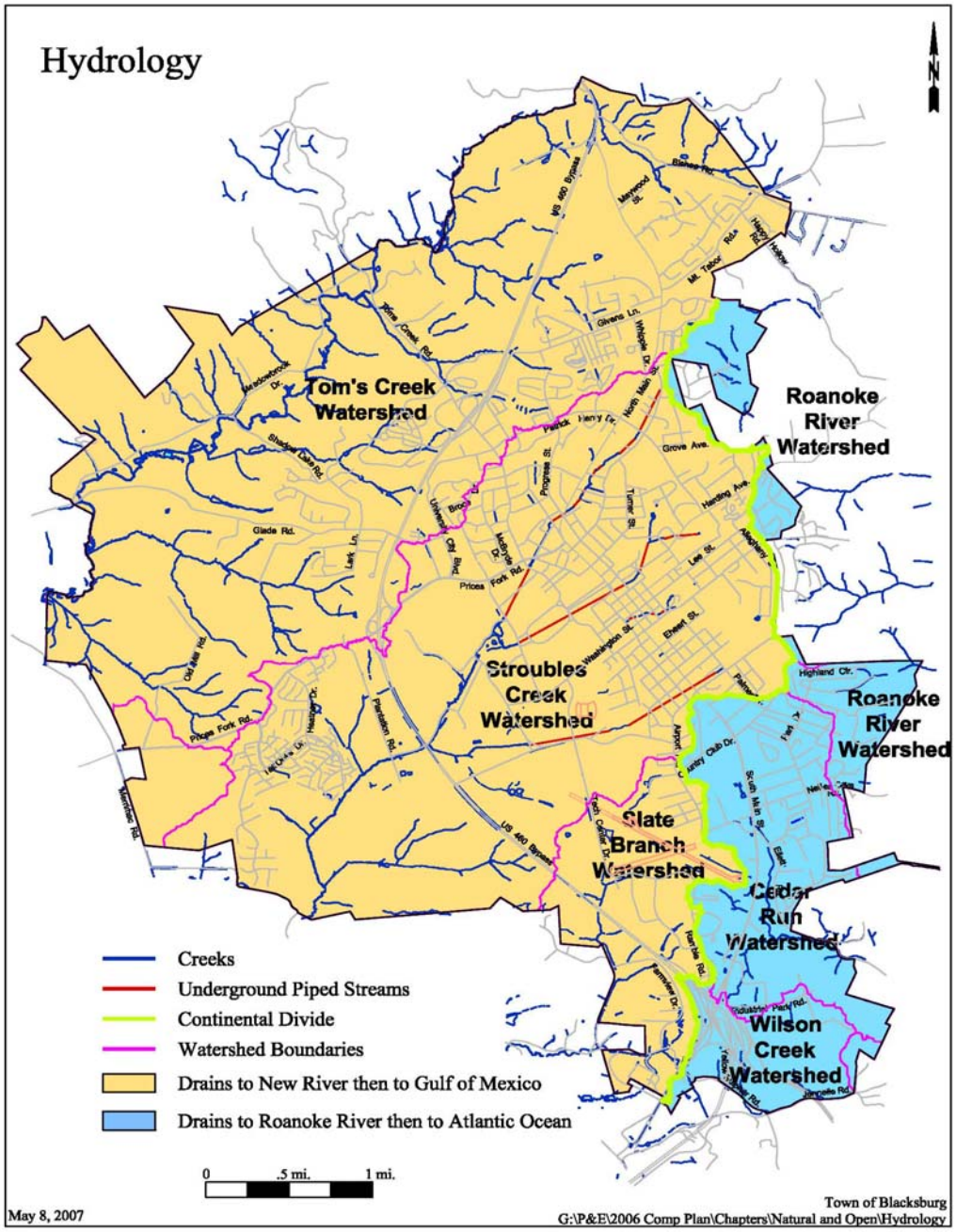
Figure 4.1 Town of Blacksburg Hydrology



Town of Christiansburg

The Town of Christiansburg is drained primarily by Slate Branch and Crab Creek and its tributaries: Town Branch and Walnut Creek. A number of other creeks located mostly outside the Christiansburg limits drain smaller portions of the Town. These creeks include: Wilson Creek, Den Creek, Spring Branch, Falling Branch, Smith Creek and Elliot Creek. Crab Creek and Slate Branch are within the New River basin, which eventually drains to the Gulf of Mexico. The other drainage ways are all within the Roanoke River Basin, which drains to the Atlantic Ocean.

Few surface water quality problems have been reported in the Town of Christiansburg. Current water quality in the streams appears to be good. Nutrient enrichment had been observed prior to the closing of the Crab Creek sewage treatment plant. Treated water flowing into Crab Creek from the Town's former sewage treatment plant generally had a lower concentration of nutrients than the Creek water. The present wastewater treatment plant discharges to the New River.

According to the Groundwater Map of Virginia, the Town of Christiansburg lies within the Carbonate Groundwater Area of the Valley and Ridge Province. Due to the prevalence of carbonate bedrock (limestone and dolostone), the presence of underground drainage ways in Christiansburg is fairly widespread. Such paths are formed when slightly acidic groundwater dissolves the bedrock, forming breaks, fractures, and caves.

Groundwater pumping rates are generally up to 50 gallons per minute (gpm) and may approach 1000 gpm in some areas. Such rates are more than adequate for industrial and public use. In the bottom lands, pumping rates of 2000 gpm and higher have been experienced. Such high well yields are the product of the open nature of water circulation in the subsurface caves, which are rapidly recharged through sinkholes. A consequence of such a drainage system, however, is its high susceptibility to contamination from surface sources and the potential for rapid movement of polluted groundwater due to its relatively unimpeded flow through the underground cave system.

Floodplains

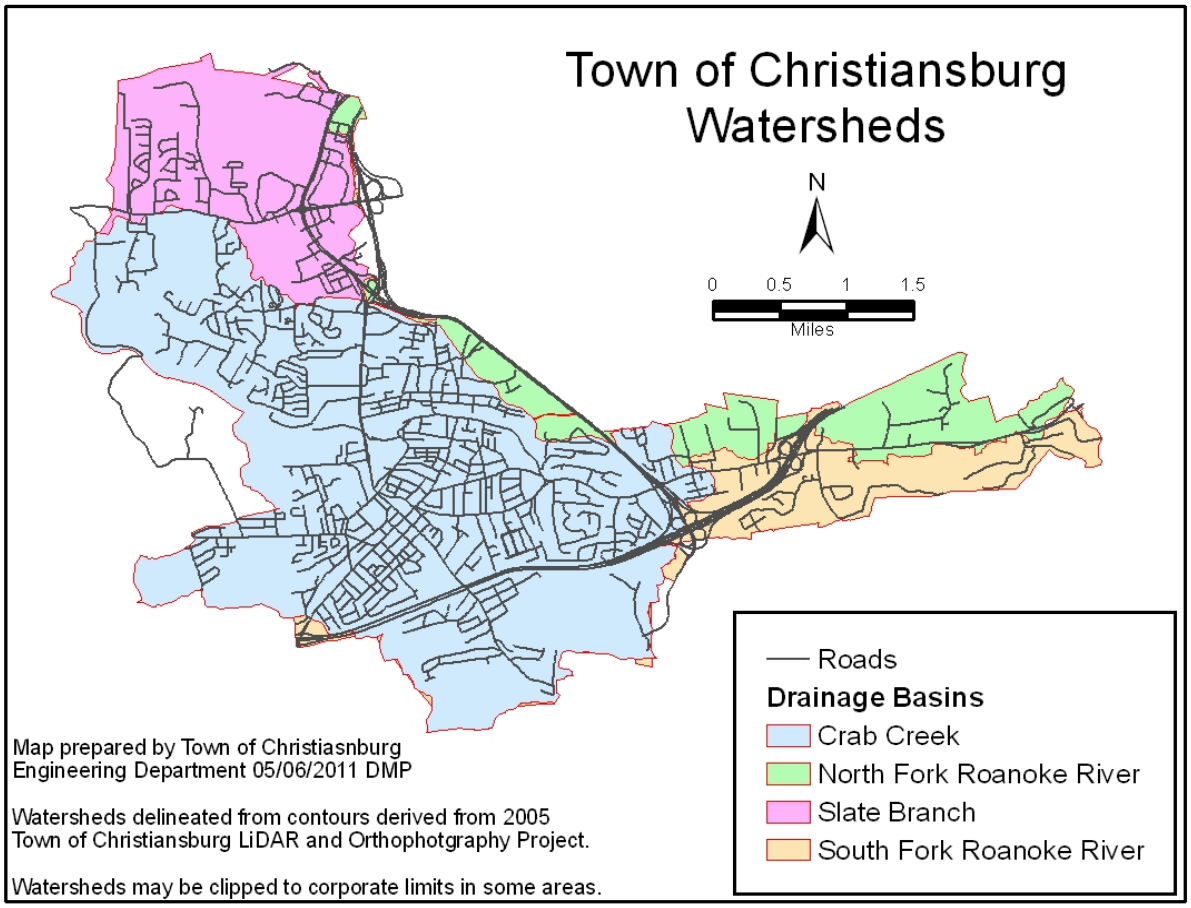
While the majority of Christiansburg lies in upland areas not generally subject to flooding, the Town does experience limited flooding from Crab Creek and its tributaries. Some of the most severe flooding has been the result of heavy rains associated with major weather fronts or local thunderstorms, as occurred in 1940, 1972, and 1978.

The Town's Floodplain Ordinance, adopted in 1980 and amended several times since, governs the use of land within the floodplain. Floodplains are defined as areas that have a one percent chance of being flooded in any given year. The floodplain limits are based upon Flood Insurance Studies prepared by the Federal Emergency Management Agency (FEMA) for Christiansburg and Montgomery County. In order to qualify for flood insurance, FEMA prohibits development

within the floodway and strongly discourages development in the adjacent 100-year floodway fringe. The floodway consists of the stream channel and those portions of the floodplain that must be kept open in order to carry the 100-year flood without an increase in flood height of more than one foot.

Although development within the floodplain is discouraged, a number of properties within the floodplain limits along Crab Creek, Town Branch, and Walnut Branch were developed prior to FEMA floodplain regulation. Most of the flood-prone lots are in either commercial or industrial use. A number of these are located along Reading Road and Depot Street, particularly where the latter intersects with Roanoke, Cambria, and North Franklin Streets.
Properties in residential use that are within the floodplain are located primarily on the south side of Montgomery Street.
Source: Town of Christiansburg 2003 Comprehensive Plan

Figure 4.2 Town of Christiansburg Watersheds



Meteorological Data

Due to its elevation, the climate of the Planning Area is either classified as mountain temperate or humid continental. Summers are warm and humid, although cooler than in the lowlands, and winters are generally cool to cold with warm periods.

Normal temperatures

Table 4.1 Normal Temperatures for Service Area

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Max °F	41.1	44.8	53.3	62.9	71.5	78.6	82.5	81.3	75.3	65.3	55.0	44.9	63.0
Mean °F	30.9	33.5	41.4	50.0	58.9	66.9	71.1	69.6	63.0	51.7	42.8	34.1	51.2
Min °F	20.6	22.1	29.4	37.0	46.3	55.2	59.7	57.8	50.7	38.0	30.6	23.2	39.2

Normal precipitation

Table 4.2 Normal Precipitation for Service Area

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Inch	3.37	3.02	3.83	3.83	4.39	3.93	4.17	3.68	3.39	3.19	2.96	2.87	42.63

BLACKSBURG Weather station, 2.06 miles (3.32 km) from Blacksburg

State or Federal Listed or Endangered Species or Habitats of Concern- 9 VAC 25-780-90B.1

FEDERAL STATUS

The Division of Natural Heritage uses the standard abbreviations for Federal endangerment developed by the U.S. Fish and Wildlife Service, Division of Endangered Species and Habitat Conservation.

LE - Listed Endangered

LT - Listed Threatened

PE - Proposed Endangered

PT - Proposed Threatened

C - Candidate (formerly C1 - Candidate category 1)

E(S/A) - treat as endangered because of similarity of appearance

T(S/A) - treat as threatened because of similarity of appearance

SOC - Species of Concern species that merit special concern **(not a regulatory category)**

STATE LEGAL STATUS

The Division of Natural Heritage uses similar abbreviations for State endangerment:

LE - Listed Endangered	**PE** - Proposed Endangered	**SC** - Special Concern - animals that merit special concern according to VDGIF (**not a regulatory category**)
LT - Listed Threatened	**PT** - Proposed Threatened	**C** - Candidate

For information on the laws pertaining to threatened or endangered species, please contact:

U.S. Fish and Wildlife Service for all **FEDERALLY** listed species;

Department of Agriculture and Consumer Services, Plant Protection Bureau for **STATE listed plants and insects**

Department of Game and Inland Fisheries for all other **STATE listed animals**

Table 4.3 Endangered Species

Scientific Name	Common Name	Federal Status	State Status	Last Year Observed
Montgomery				
AMPHIBIANS				
Cryptobranchus alleganiensis	Hellbender		SC	1979
BIRDS				
Cistothorus platensis	Sedge Wren		SC	2003
BIVALVIA (MUSSELS)				
Lasmigona subviridis	Green Floater		LT	1981
COLEOPTERA (BEETLES)				
Pseudanophthalmus pusio	A Cave Beetle	SOC		pre1
CRUSTACEA (AMPHIPODS,				

ISOPODS & DECAPODS)				
Stygobromus fergusoni	Montgomery County Cave Amphipod	SOC		1969
DIPLOPODA (MILLIPEDES)				
Pseudotremia cavernarum	Ellett Valley Pseudotremia Millipede	SOC	LT	pre1
DIPLURA (DIPLURANS)				
Litocampa sp. 3	A Cave Dipluran	SOC		1971
FISH				
Noturus gilberti	Orangefin Madtom	SOC	LT	2004
Percina rex	Roanoke Logperch	LE	LE	2010
LEPIDOPTERA (BUTTERFLIES & MOTHS)				
Erynnis persius persius	Persius Duskywing	SOC		1974
Pyrgus centaureae wyandot	Appalachian Grizzled Skipper	SOC	LT	1975
MAMMALS				
Myotis sodalis	Indiana Bat	LE	LE	1947
VASCULAR PLANTS				
Carex juniperorum	a sedge		LE	2009
Clematis addisonii	Addison's Leatherflower	SOC		2008
Echinacea laevigata	Smooth Coneflower	LE	LT	2010
Paxistima canbyi	Canby's Mountain-lover	SOC		2003
Phlox buckleyi	Sword-leaved Phlox	SOC		1990

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status	Last Year Observed
Montgomery						
COMMUNITIES						
Natural Community	Calcareous Fen	G2	SNR			2007
Natural Community	Calcareous Spring Marsh / Muck Fen	G2	SNR			2001
Natural Community	Central Appalachian Shale Barren	G3G4	SNR			1988
Natural Community	Limestone / Dolomite Barren	G2	SNR			1995
Natural Community	Montane Dry Calcareous Forest / Woodland	G2	SNR			2008
Natural Community	Montane Mixed Oak / Oak - Hickory Forest	G3G4	SNR			1994

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status	Num Occurences Statewide
Significant cave	Significant Cave	G3	SNR			352

Anadromous, trout, and other significant fisheries- 9 VAC 25-780-90B.2

Table 4.4 Fish found in the New River Watershed

Status	Common Name	Scientific Name	Game Fish
	Alewife	*Alosa pseudoharengus*	√
	Rock Bass	*Ambloplites rupestris*	√
	Brown Bullhead	*Ameiurus nebulosus*	
	Flat Bullhead	*Ameiurus platycephalus*	
	Bowfin	*Amia calva*	√
	American Eel	*Anguilla rostrata*	
	Central Stoneroller	*Campostoma anomalum*	
	Goldfish	*Carassius auratus*	
	White Sucker	*Catostomus commersoni*	
	Rosyside Dace	*Clinostomus fundloides*	
	Atlantic Herring	*Culpea harengus*	
	Black Sculpin	*Cottus baileyi*	
	Mottled Sculpin	*Cottus bairdi*	
	Banded Sculpin	*Cottus carolinae*	
	Carolinae Sculpin ssp.	*Cottus carolinae ssp.*	
	Sculpin, unknown	*Cottus spp.*	
	Whitetail Shiner	*Cyprinella galactura*	
	Shiner, unknown	*Cyprinella spp.*	
	Spotfin Shiner	*Cyprinella spiloptera*	
	Common Carp	*Cyprinus carpio*	√

	Gizzard Shad	*Dorosoma cepedianum*	
	Threadfin Shad	*Dorosoma petenense*	
	Creek Chubsucker	*Erimyson oblongus*	
	Muskellunge	*Esox masquinongy*	✓
	Chain Pickerel	*Esox niger*	✓
	Greenside Darter	*Etheostoma blennioides*	
	Rainbow Darter	*Etheostoma caeruleum*	
ST	Greenfin Darter	*Etheostoma chlorobranchium*	
	Fantail Darter	*Etheostoma flabellare*	
FS	Kanawha Darter	*Ethestoma kanawhae*	
	Johnny Darter	*Etheostoma nigrum*	
	Tesselated Darter	*Etheostoma olmstedi*	
FS,SS	Candy Darter	*Etheostoma osburni*	
	Snubnose Darter	*Etheostoma simoterum*	
	Darter, unknown	*Etheostoma spp.*	
	Tonguetied Minnow	*Exoglossum laurae*	
	Cutlips Minnow	*Exoglossum maxillingua*	
	Banded Killifish	*Fundulus diaphanous*	
	Northern Hog Sucker	*Hypentelium nigricans*	
FS	Roanoke Hog Sucker	*Hypentelium roanokense*	
	Channel Catfish	*Ictalurus punctatus*	✓

	Redbreast Sunfish	*Lepomis auritus*	✓
	Green Sunfish	*Lepomis cyanellus*	✓
	Pumpkinseed	*Lepomis gibbosus*	✓
	Bluegill	*Lepomis macrochirus*	✓
	Longear Sunfish	*Lepomis megalotis*	
	Redear Sunfish	*Lepomis microlophus*	✓
	White Shiner	*Luxilus albeolus*	
	Crescent Shiner	*Luxilus cerasinus*	
	Striped Shiner	*Luxilus chrysocephalus*	
	Warpaint Shiner	*Luxilus coccogenis*	
	Common Shiner	*Luxilus cornutus*	
	Shiner, unknown	*Luxilus spp.*	
	Rosefin Shiner	*Lythrurus ardens*	
	Smallmouth Bass	*Micropterus dolomieu*	✓
	Spotted Bass	*Micropterus punctulatus*	✓
	Largemouth Bass	*Micropterus salmoides*	✓
	White Bass	*Micropterus chrysops*	✓
	Striped Bass hybrid	*Morone hybrid*	✓
	Striped Bass	*Morone saxatilis*	✓
	Black Jumprock	*Moxostoma cervinum*	
	Golden Redhorse	*Moxostoma erythrurum*	
	Shorthead	*Moxostoma macrolepidotum*	

	Redhorse		
	Torrent Sucker	*Moxostoma rhothoecum*	
	Bluehead Chub	*Nocomis leptocephalus*	
	River Chub	*Nocomis micropogon*	
	Bigmouth Chub	*Nocomis platyrhynchus*	
	Bull Chub	*Nocomis raneyi*	
	Chub, unknown	*Nocomis spp.*	
	Golden Shiner	*Notemigonus crysoleucas*	
	Comely Shiner	*Notropis amoenus*	
	Redlip Shiner	*Notropis chiliticus*	
	Spottail Shiner	*Notropis hudsonius*	
	Highland Shiner	*Notropis micropteryx*	
	Silver Shiner	*Notropis photogenis*	
	Swallowtail Shiner	*Notropis procne*	
	Saffron Shiner	*Notropis rubricroceus*	
	New River Shiner	*Notropis scabriceps*	
	Minnow, unknown	*Notropis spp.*	
	Telescope Shiner	*Notropis telescopus*	
	Mimic Shiner	*Notropis volucellus*	
	Margined Madtom	*Noturus insignis*	
FS	Spotted-margin Madtom	*Noturus insignis ssp. 1*	
	Rainbow Trout	*Oncorhynchus mykiss*	✓

	Yellow Perch	*Perca flavescens*	✓
	Logperch	*Percina caprodes*	
	Piedmont Darter	*Percina crassa*	
FS	Appalachian Darter	*Percina gymnocephala*	
	Blackside Darter	*Percina maculata*	
	Sharpnose Darter	*Percina oxyrhynchus*	
	Roanoke Darter	*Percina roanoka*	
FS	Kanawha Minnow	*Phenacobius teretulus*	
	Redbelly Mountain Dace	*Phoxinus oreas*	
	Bluntnose Minnow	*Pimephales notatus*	
	Fathead Minnow	*Pimephales promelas*	
	White Crappie	*Pomoxis annularis*	✓
	Black Crappie	*Pomoxis nigromaculatus*	✓
	Flathead Catfish	*Pylodictis olvaris*	✓
	Blacknose Dace	*Rhinichthys atratulus*	
	Longnose Dace	*Rhinichthys cataractae*	
	Brown Trout	*Salmo trutta*	✓
	Brook Trout	*Salvelinus fontinalis*	✓
	Creek Chub	*Semotilus atromaculatus*	
	Walleye	*Stizostedio vitreum vitreum*	✓

Source: NRVPDC Water Supply Plan

River segments that have recreational significance including state scenic river status- 9 VAC 25-780-90B.3

There are no streams with State Scenic River Status in the Towns of Blacksburg and Christiansburg. The point of withdrawal for the Blacksburg-Christiansburg-VPI Water Authority is located in a section of New River that has been designated as Qualified for Scenic River Status (Map ID-75, Name- New River, Location - Claytor Lake to Va. - W.V. state line, status- Qualified).

Va. DCR 2007 Virginia Outdoors Plan

Recreational uses at the point of withdrawal in the New River include fishing, canoeing, motor boating, kayaking, and swimming.

Sites of historic or archaeological significance- 9 VAC-25-780-90B.4

Town of Blacksburg

Historic Districts

Miller-Southside Historic District The Miller-Southside neighborhood was listed on the National Register of Historic Places in December 1990 and is a federal and state recognized historic district. This planned development, an early suburb of Blacksburg, contains more than 170 contributing structures, the majority which were with built between 1920 and 1930. The Town incorporated this suburb in a 1935 annexation from Montgomery County. It is bounded by Miller Street to the north, Main Street to the east, Airport Road to the south, and the rear property lines of the western parcels of Preston Avenue. The Miller-Southside Historic District is an intact residential area with a significant degree of homogeneity for the era and style of the structures. Building styles range from large brick foursquare dwellings to smaller bungalow and colonial revival style homes. Although the Miller- Southside Historic District is considered a Low Density Residential neighborhood, it is under pressure to change. The district lies within a few blocks of the downtown area and the Virginia Tech campus. Many properties along South Main Street have transitioned into professional office space, and some properties are transitioning from traditional owner-occupied residential dwellings to rental houses. These conversions in use threaten to undermine the residential integrity of the neighborhood. The Federal and State governments recognize this area as an historic district; however, a local zoning overlay does not protect this district. For this reason new construction and building alterations are not required to go through a design review process, and projects of incompatible design are allowed to be constructed within the district. Without the protection of a local zoning overlay, the character of this neighborhood may change over time.

Blacksburg Historic District The Blacksburg Historic District, the second area listed on the National Register in 1990, is also a federal and state recognized historic district. This area is

comprised of a portion of the original Town plat or "Sixteen Squares," most of the downtown, and the older residential areas surrounding the Sixteen Squares. This area was designated by a professional consultant specializing in historic landmarks as a historically significant area due to its composition of contributing structures. Each structure within the Blacksburg Historic District was surveyed, along with several outside its boundaries, to determine its historical significance. Structures deemed generally unaltered, true to their origins, or original in character, and therefore architecturally significant, were deemed contributing structures.

Additional significant historic places exist outside the historic district; some individual properties were placed on the National Register of Historic Places after the district was established in 1990. In addition, the sites of significant Blacksburg structures that have been lost or relocated are also worth noting. Below is a list of significant structures and sites in and around Blacksburg arranged in the following categories:

- The Sixteen Squares
- The Blacksburg Historic District
- Historic Structures and Sites on the Virginia Tech Campus
- Additional Historic Structures in Blacksburg
- Historic Sites and Waterways within Blacksburg
- Notable Historic Structures outside of Blacksburg

<u>The Sixteen Squares</u>

1. **Old Presbyterian Church** (ca. 1847, 117 South Main Street) The Presbyterians built a church on Main Street in 1847 for $1500. It is the oldest surviving building on the street today, and is one of the few surviving buildings in Blacksburg constructed before the Civil War. William Thomas, owner of the Thomas-Conner House (see #15) donated the lot, laid the cornerstone, and contributed "time and slaves" to the construction of the church. The building now houses a restaurant.

2. **Whisner Memorial Methodist Church** (circa 1906, north corner of Church and Lee Streets) Blacksburg was predominantly Methodist and Presbyterian at its founding, and a Methodist congregation was established in 1798. The Methodist Church was named for Reverend Peter H. Whisner, D.D., pastor and former President of the Preston and Olin Institute.

3. **First Church of God and Parsonage** (circa 1904, 115 Roanoke Street) Five beautiful Tiffany stained glass windows adorn this building. The windows closest to the ceiling can be seen during regular services. Built as a Presbyterian Church, the first services were held on June 26, 1904. Next to the church is a parsonage dating to 1907.

4. **Christ Episcopal Church** (circa 1879, east corner of Church and Jackson Streets) Designed by New York architect Emien Little, Christ Episcopal Church held its first service in March of 1879. An entry bell tower was added in 1934 as a memorial to William M. Brodie. The building's gothic design symbolizes Blacksburg's transition from a local market town to a community featuring the sophisticated architecture of the nineteenth century. The use of locally quarried limestone on this church, typically referred to as Hokie Stone and associated with Virginia Tech, predates its use on the campus.

5. **St. Paul A.M.E. Church of Blacksburg** (circa 1901, Penn Street between Jackson and Roanoke Streets) African Americans have lived in Blacksburg since its early years. Some of the surrounding plantations, such as Smithfield and Whitethorne, had slaves, and most of the early African American population in Town descended from these slaves. In the nineteenth century an African American community formed in the Penn Street area and the Blacksburg African Methodist Episcopal (A.M.E.) Church was completed in 1901 with services still held today.

6. **Croy-Dawson House** (ca. 1839, 307 Roanoke Street) The first occupants of this tiny log house were newlyweds William and Rosanna Croy Dawson who moved in on January 2, 1840. The couple received the home as a wedding gift. The Croy family owned several lots between Jackson and Lee Streets in the 1800s and created a Town within Town through their many self-sustaining businesses. In the late nineteenth century, Rosanna Croy Dawson kept a diary that provides today's researchers with important information about this period in Blacksburg. The boxwoods adorning the home's exterior are said to be transplanted from Mt. Vernon, former home of President George Washington.

7. **Andy Croy/Smith-Montgomery House** (ca. 1840s, 103 Penn Street) The Andy Croy House, also known as the Smith-Montgomery House, was originally built across Penn Street from where it currently stands. Andy Croy and his wife Betsy occupied the home, and Andy served as the bell-ringer and candlesnuffer at the Methodist Church. Dr. Phillips later bought the home and had it torn down. The numbered logs were then rolled across the street and reassembled with an L-shaped addition on it current site. The exact date of the relocation is not known.

8. **Log Houses** (circa 1850s, Jackson Street between Penn and Wharton Streets) The Andy Camper House, on the corner of Jackson and Penn Streets, and the Spencer-Johnson House, on the corner of Jackson and Wharton Streets, are the only remaining two-story log houses typical

of this time period. Built around 1850, each home would have been built for approximately $75. As with most log homes, the original logs of the Andy Camper and Spencer- Johnson houses have been covered with clapboard.

9. **Alexander Black House** (1897, 204 Draper Road, originally South Main Street) While the Alexander Black House currently stands just outside the boundaries of the Sixteen Squares, it was originally built on South Main Street. Constructed in 1897 by William Black's great-great-nephew, Alexander Black, the home served briefly as a boarding house after his death in 1935 before becoming a funeral home. The Queen Anne Victorian home originally included an open front porch and turret that were later removed and renovated to better serve its modern-day function. In 2002, the Town of Blacksburg purchased the Alexander Black House and moved it one block to Draper Road to accommodate the construction of Kent Square, a parking garage and retail center. The Alexander Black House will be restored and serve as a Town museum and cultural center.

10. **Spout Spring House** (circa 1840, 209 Wharton Street) Located near the site of the John Spickard House, Spout Spring can still be seen by the Spout Spring House. This spring provided the first source of water to Town buildings and was originally piped through hollow logs.

11. **Price House and Garden Park** (circa 1853, north corner of Wharton and Lee Streets) James C. Kent built this log and frame house, valued at $300 in the mid-nineteenth century. The original two-story log house was one of the first homes built outside the boundary of the original Town. Several features of the interior such as two-panel doors and an upstairs mantel, exhibit the Greek revival style. Thomas N. Conrad, one of the early presidents of Virginia Tech, lived in the house in the 1870s. When Nelson Price, a longtime resident of the home, passed away in 1985, it was donated to the Town of Blacksburg. The garden park has prize-winning irises that bloom each May.

12. **A.W. Luster House** (circa 1870, north corner of Wharton and Roanoke Streets) Beautiful white pillars frame the entrance of this two-story home. The second-tier porch was purportedly built as a retreat for a resident suffering from tuberculosis.

13. **Old Town Hall** (circa 1920, 141 Jackson Street) Old Town Hall is located on the site of William Black's log cabin which stood from the late 1780s to the late 1800s. The current building originally functioned as the Martin Logan Store, a general store, before becoming the Town Hall. While the current Town Hall stands on South Main Street, Old Town Hall currently serves as office space for some municipal employees.

14. **The Armory** (1936, 201 Draper Road) Built in 1936, the Armory is owned by the Town of

Blacksburg and leased to Virginia Tech to house the Armory Art Gallery. The structure was built on the former Blacksburg Public School campus and served as both an armory and an auditorium for Blacksburg High School. Until 1960, the building was used as a community center, the school cafeteria, a gymnasium, an arena for sporting events, and a place for public meetings and high school dances.

15. **Thomas-Conner House** (1878, 104 Draper Road) The Thomas-Conner House, built by William Howard Thomas in the late nineteenth century, features unique architectural details such as the semi-circular arches above the windows. The home is owned by the Town of Blacksburg and leased to Virginia Tech.

16. **Five Chimneys House** (1852, 203 Washington Street) The Queen Anne porch distinctive to the Five Chimneys House was built 30 to 50 years after the home's original construction in 1852. It underwent numerous renovations in the 1930s when A.G. Smith, a professor in the Virginia Tech Horticulture Department, reopened the fireplaces and enclosed the back porch. The Town of Blacksburg acquired the property in 1987 after Smith's death. It now serves as the Town's Community Relations Office.

<u>The Blacksburg Historic District</u>

17. **Lyric Theatre** (1930, 135 College Avenue) The Lyric Theatre opened on April 17, 1930, and underwent significant renovations in the 1950s including the installation of a cinemascope screen. The Kelsey family operated the theatre until 1989 when the construction of a multiplex movie theatre nearby forced the Lyric to shut its doors. It was briefly used by Virginia Tech for classroom space, but remained closed until 1996. In 1995, interested citizens created the Lyric Council to renovate and reopen the theater, and full-scale renovations were completed by October 1998. Today, the Lyric is one of downtown Blacksburg's most celebrated landmarks, showing films regularly and hosting numerous live musical events.

18. **Old Mill Building** (circa 1890, corner of College Avenue and Draper Road) Built around 1890, the old mill was home to the Blacksburg Milling and Supply Company by 1921. The company was engaged in large-scale merchant flour and corn milling as well as feed production. In the mid-twentieth century the building was renovated to serve as commercial space. Businesses that occupy the Old Mill Building and other historic commercial structures on College Avenue stand at the intersection of Town and University life, serving both the student population and long time Blacksburg residents.

19. **Bennett House and Wong Park** (circa 1912, 303 Wilson Avenue) The Bennett House was built in the early twentieth century in the bungalow style, an architectural style popular in the

1920s and 1930s. The nine acres of open land surrounding the Bennett House comprise Wong Park. In 2005, the Town of Blacksburg renovated and restored the home. It now houses the Housing and Neighborhood Services Office.

Historic Structures and Sites on the Virginia Tech Campus

20. **Smithfield Plantation** (circa 1773, off Duck Pond Drive) Colonel William Preston moved to Smithfield Plantation with his wife, Susanna Smith Preston, and their seven children in March 1774. Five more children were born at Smithfield, and, after William Preston's death in 1783, Susanna oversaw the home and the education of her children until her death in 1823. Smithfield was home to two Virginia governors, James Patton Preston and John Buchanan Floyd. William Ballard Preston, son of James Patton Preston, served in the General Assembly and was Secretary of the Navy under President Zachary Taylor. In 1959, Janie Preston Boulware Lamb, great-great-granddaughter of Colonel Preston, presented the Smithfield home to the Association for the Preservation of Virginia Antiquities (APVA) with the stipulation that it would restore, maintain, and open the house to the public. Smithfield remains a popular attraction in Blacksburg and highlights the Town's history as a frontier community. While Smithfield is accessible only by driving through the Virginia Tech campus, it is not owned by the University.

21. **Solitude** (1801, Virginia Tech Duck Pond) Solitude is the oldest building owned by Virginia Tech. The house, an example of Greek Revival style architecture, rests near the popular Duck Pond. It is believed to be near the site of the Drapers Meadow Massacre of 1755 during which a war party of Shawnee Indians attacked the settlement killing James Patton and kidnapping Mary Draper Ingles, who later escaped her captors. Originally constructed as a one room log house in 1801, it became known as Solitude in 1808, named by its owner Granville Smith. A large scale expansion of the house was completed in 1859; and it was purchased in 1872, along with 250 acres and several farm buildings surrounding the home, by the Board of Visitors of the Virginia Agricultural and Mechanical College (Virginia Tech). The home is now being restored and will house the Appalachian Studies Center.

22. **Henderson Hall** (circa 1876, off College Avenue) The oldest portion of Henderson Hall was originally the residence of the President of Virginia Tech. The fifth president, John McBryde, lived in this Victorian house during the early 1900s. When McBryde decided to build a new, larger home, "the Grove", Henderson Hall was enlarged and converted to an infirmary. Today, the hall functions as studio and office space for Virginia Tech's Art and Art History Department.

23. **The Grove** (1902, Grove Lane) The Grove, built around 1902, also known as the President's House on the Virginia Tech campus, serves as the residence for Virginia Tech presidents and their families. The Grove is a colonial revival structure and sits on a hill overlooking the Duck

Pond. It is also used as a reception facility and housing for visiting dignitaries.

24. **Lancaster House** (circa 1913, 403 Washington Street) This four-square style home was built by William Lancaster, a former mayor of Blacksburg, and his wife Lucy Lee Siebold Lane. William's daughter, Lucy Lee Lancaster, an influential volunteer leader for the YMCA at Virginia Tech, donated the home to the YMCA upon her death in 1989. Established in 1873, the YMCA at Virginia Tech, an independent non-profit organization, provides community services and educational programs to the University campus and the larger Blacksburg community.

25. **Drill Field** The Drill Field is the center of the Virginia Tech campus. Beneath the field flows Stroubles Creek which feeds into the University's Duck Pond. This water flow causes the field to form a slow sinking depression. Surrounding the Drill Field are many buildings exemplifying Virginia Tech's history and traditions including Burruss Hall and the War Memorial.

26. **Burruss Hall** (1936, Drill Field) Constructed in 1936, the hall was initially named the Teaching and Administration Building. In 1944, the Board of Visitors of Virginia Tech voted unanimously to name the building after President Julian A. Burruss during his 25th year in office. The building's construction was funded by federal Public Works Administration and Civil Works Administration grants secured, in large measure, through Burruss' efforts. During its long history, Burruss Hall has been home to commencement exercises, classrooms, concerts, theatrical productions, and administrative offices including the Office of the President.3

<u>Additional Historic Structures in Blacksburg</u>

27. **Keister House** (circa 1830, 607 Giles Road) The Keister House is situated on the northwest side of Giles Road northeast of the Sixteen Squares. This two-room plan house is an important and well-preserved dwelling representing a rare variation of the regionally popular hall-parlor form of the nineteenth century. Tax records indicate that John Keister, born in Blacksburg in 1787, owned the property in 1840. It remained in the Keister family until a 1935 foreclosure and remains a private residence today.4

28. **Amiss-Palmer House** (circa 1856, 300 Mountain View Drive) Colonel W.H. Palmer's father-in-law, Edwin Amiss, built this Greek Revival two-story brick house called "Mountain View." Of the eight original marble fireplaces, two remain. The bricks of the house were made on the property.

29. **Odd Fellows Hall** (1905, 203 Gilbert Street) In 1905 members of the Tadmore Light Lodge 6184 of the Grand United Order of the Odd Fellows formed a joint stock company with the Saint Francis Council of the Right and Worthy Grand Council of the Independent Order of Saint

Luke and built a lodge on Gilbert Street in New Town, an African-American community in Blacksburg. The simple, two-story structure included a lower level where members of the African-American community from throughout the New River Valley came to enjoy social events such as dances and bingo parties. The upper level was restricted to members of the Odd Fellows and St. Luke's, two benevolent organizations that provided support and services otherwise unavailable to African-Americans during segregation. In 2004, Montgomery County Court Judge Ray Grubbs appointed three trustees of the hall, who worked together with members of the Blacksburg Museum Advisory Committee to obtain historic designation. The Odd Fellows Hall was placed on the Virginia Landmarks Register and the National Register of Historic Places in 2005 and subsequently donated to the Town of Blacksburg. The hall will be restored and dedicated to collecting, preserving, and presenting the contributions of African-Americans to the Blacksburg community.

Historic Sites and Waterways within Blacksburg

30. **Spout Spring and Stroubles Creek** Among the three main springs existing in early Blacksburg, Spout Spring is the source of Stroubles Creek, which flows underneath much of downtown Blacksburg into the Virginia Tech Drill Field and Duck Pond. Stroubles Creek eventually connects to the New River, which in turn feeds into the Ohio River. Until the mid-1950s, the Town got its water from these local springs. At one time, water from Spout Spring was piped in hollowed-out logs to houses in Town, including Dr. Harvey Black's house, which stood on the corner of Washington Street and South Main Street. Eventually the logs were replaced with ceramic pipes, some of which were made by a local potter named Bodell.

31. **Town Spring** The parking lot of the Tech Bookstore on South Main Street is directly over the Town Spring. In 1890 the Town Spring was closed due to typhoid fever, but it was reopened in 1891 when the livery stable up the hill was removed. The spring declined significantly in the 1940s, becoming mostly a weed patch.

32. **Keister-Evans Spring** Located near Old Town Hall and the location of William Black's log home is the Keister-Evans Spring.

33. **T-Intersections** The Sixteen Squares, the original Town plat, remains largely intact today due to the existence of several T-intersections where the streets are enclosed at one or both ends and did not expand as the Town grew. The intersections provide a sense of the scale of the original Town. Church Street is enclosed at both ends by T-intersections with Old Town Hall standing at the northwest intersection with Jackson Street and the Old Blacksburg Middle School property sitting to the southeast at the intersection with Clay Street. Penn and Wharton Streets are similarly bounded on both ends by T-intersections. The remaining are at the

intersection of Washington and Wharton Streets, the intersection of Lee Street and Draper Road, and the intersection of Jackson Street and Draper Road near the Thomas Conner House.

34. **Lybrook's Row** (circa 1870, north corner of Roanoke and Church Streets) A row of cottages formed Blacksburg's first off-campus housing which Town residents often referred to as "Hell's Row." The outlines of these houses can be seen in the lawn that has since replaced Lybrook's Row. Archaeological investigations at the site have recovered evidence of a nineteenth century pottery and print shop

35. **Huckleberry Train Line** (1904, connecting Blacksburg and Christiansburg) The Virginia-Tennessee Railroad reached Cambria (now part of Christiansburg) in 1854. The Cambria-to Blacksburg stretch was built in 1904 due, in large part, to the need for a rail system for Montgomery County's thriving coal-mining industry. The Virginia Anthracite Coal and Railway Company (VAC & Ry. Co.), created in 1902, took over operations of the Merrimac Mines and work on a railway system in the early twentieth century. The line was later taken over by Norfolk & Western (N&W) in 1911. The Blacksburg depot was built where the Municipal Building now stands, and the railroad transported passengers until 1956 and freight until 1966, when air and automobile travel replaced the need for rail service. The railroad was dubbed the "Huckleberry" in the early twentieth century as lowbush blueberries, called huckleberries, flourished along the rail line to the Merrimac Mines. One tradition of the Huckleberry Train was carrying Virginia Tech cadets to VMI football games. Today, the path of the Huckleberry is marked with a walking trail linking downtown Blacksburg with the New River Valley Mall in Christiansburg.

<u>Notable Historic Structures Outside Blacksburg</u>

36. **Joseph McDonald Farm** (circa 1855, 3/5 mile northwest of the junction of Rt. 685 (Prices Fork Road) and Rt. 657 (Walnut Springs Road) at the end of Spur Road on the east side of Rt. 657. "The Joseph McDonald Farm is an early and well preserved agricultural complex. The main house is a two-story, log, hall-parlor house of unusually substantial dimensions. The survival of the log kitchen, springhouse, corncrib, cabin, and other later outbuildings make the property extremely valuable in illustrating the changing uses of domestic and agricultural space associated with the house during the period of significance."5

37. **Linkous-Kipps House** (circa 1820 and 1915, east side of Rt. 657 (Merrimac Road) near Merrimac) This house is "a very well preserved example of early to mid-nineteenth century Montgomery County domestic architecture and the way it can be altered to fit changing patterns and needs through the years. The house is one of a number of early to mid-nineteenth century log dwellings. It is one of the best preserved log dwellings from the period and exhibits

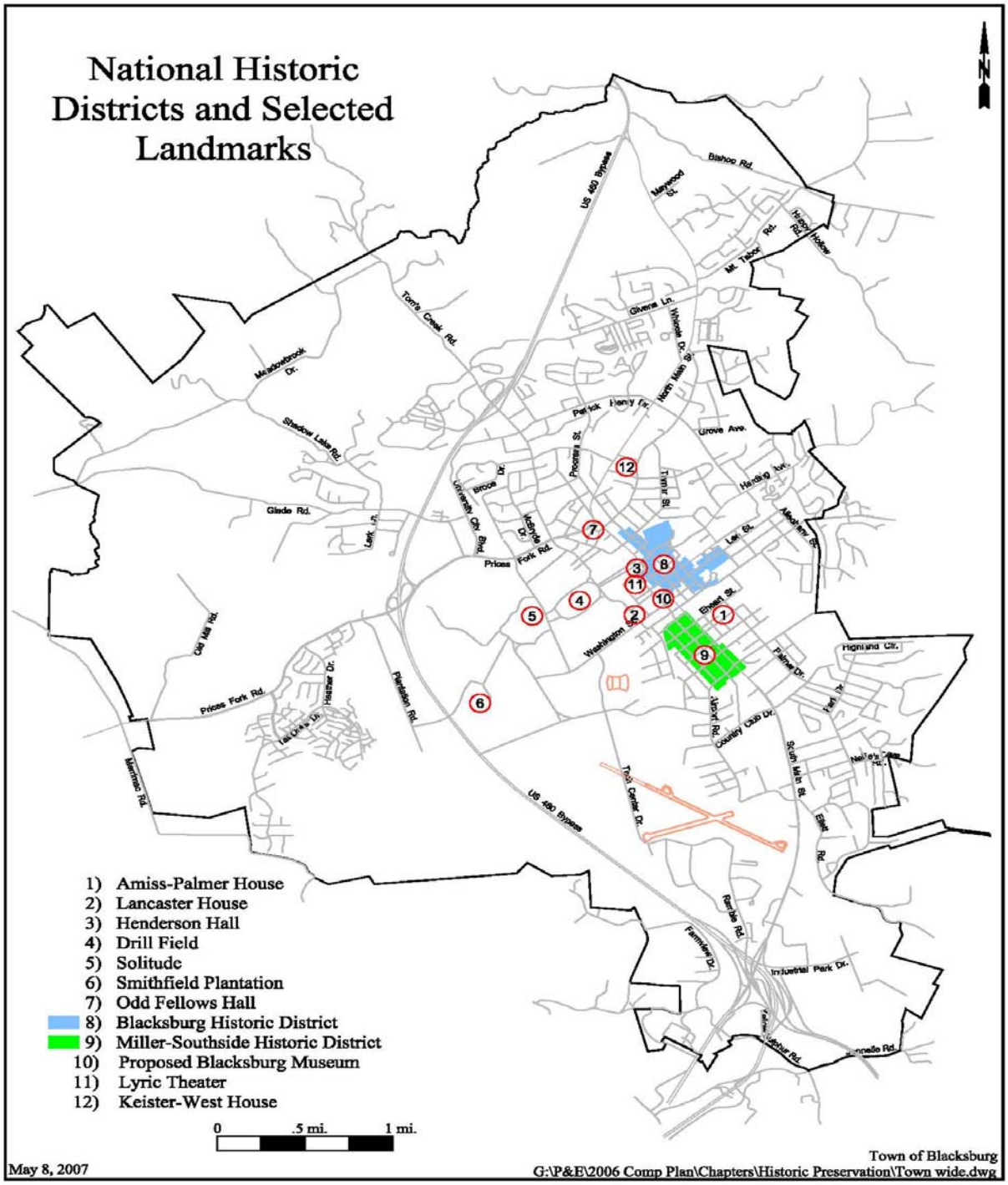
the types of house owned by substantial farm families.6

38. **Whitethorne** (circa 1855, end of drive, ¾ mile south of Rt. 685 (Prices Fork Road) one mile west of U.S. 460.) "Whitethorne is a very large brick house of advanced style and considerable elegance for its period…The property is significant as an important and unusual example of a substantial farmhouse built by a prominent farmer and lawyer, James Francis Preston. The house is well preserved and largely unaltered, and features unusually sophisticated architectural detailing and plan variations more characteristic of large farmhouses of eastern Virginia and Kentucky during the period."7

39. **Michael Kinzer House** (circa 1845, at end of drive, 1/5 mile south of Rt. 655 (Glade Road), one mile east of Rt. 624.) "The house is a very well preserved example of a regionally popular house form…The Form is characterized by a two-room plan with equal-sized rooms reached by a pair of doors in a four-bay façade. The property contains a locally important brick kiln site, the subject of extensive archaeological testing as part of the project for this property's nomination. The kiln contains information about the historic occupation of the Kinzer House and its construction, and about a common short term industrial production facility from the period of significance."8

40. **Kentland Farm** (circa 1835, off Whitethorne Road) In 1820 James Randall Kent acquired 1,630 acres of land along the New River. As he prospered in agriculture, Mr. Kent went on to build Kentland Manor in 1834-35, a two-story, five-bay, Flemish-bond brick home. Behind the manor house is a brick meat house with a wood-shingled pyramidal roof. These buildings, a mill, and other structures comprise the 350-acre Kentland Farm Historic and Archeological District officially recognized by the Virginia Board of Historic Resources and the National Register of Historic Places in 1991.9 Today, the farm is managed by the College of Agriculture and Life Sciences at Virginia Tech. The manor house will be restored as part of the Kentland Historic Revitalization Project; archaeological excavations in 2004 and 2005 revealed the location of a slave cemetery on the property.

Figure 4.3 Town of Blacksburg Historic Districts and Landmarks



Source: Town of Blacksburg 2006-2046 Comprehensive Plan

Town of Christiansburg

The Virginia Department of Historic Resources inventories historic resources for all Virginia localities. Sites that are inventoried and meet appropriate criteria may also be placed on the *Virginia Landmarks Register* and/or the *National Register of Historic Places.*

The *Virginia Landmarks Register*, currently containing over 1,800 entries, is established in state law; the Board of Historic Resources makes entries into this register, with the consent of the interested property owners. The National Register of Historic Places is established in federal law; the National Park Service, pursuant to nomination makes additions to this register from individual states. Both registers reflect sites prominently identified with the history and culture of the Commonwealth. All properties listed on the state register are nominated to the National Register. Formal recognition is voluntary and places no restrictions on the property owner's use of private funds. Sites indicated in the following table (and on the map on the next page, with districts indicated by shading and structures indicated in red) are recognized historic landmarks on the *Virginia Landmarks Register* and the *National Register of Historic Places*.

Table 4.5 Town of Christiansburg Historic Sites

DHR Inv. #	Site Description	Address	Original Construction	Original Use	Current Use
154-0001	East Main St. Historic District	--	--	--	--
154-0001-05	The Oaks/Major W.L. Pierce house	311 E. Main Street	1889	House	Bed & Breakfast
154-0003	Christiansburg Presbyterian Church	107 W. Main St.	1853	Church	Church
154-0007	Phlegar Bldg. (formerly T.F. Sullivan's Law office in 1880	4 S. Franklin St.	Early 19th c.	Offices	Montgomery County Magistrate Office
154-0010	South Franklin St. Historic District	--	--	--	--
154-0027	Christiansburg U.S. Post Office	2 E. Main St.	c. 1940	Post Office	Post Office
154-0043	Surface house	515 High St., NE	3rd qtr 19th c.?	House	House
154-0048	Cambria	--	--	--	--

	Historic District				
154-0048-01	(old) Christiansburg (Cambria) Depot	610, 630 Depot St., NE	1868-70	Depot	True Light Photography, offices, residences
154-5004	Hill School/(old) Christiansburg Industrial Institute/ Schaeffer Memorial Baptist Church	570 High Street, NE/ 580 High Street, NE	1883-85/ 1885 (church)	School/ church	Community Center/ Church
154-5008	Edgar A. Long Building (Christiansburg Industrial Institute-second site)	140 Scattergood Dr., NW	1927	School	Vacant (museum planned)

*Note: All entries are listed on both the Virginia Landmarks register and the National Register of Historic Places.
Source: Town of Christiansburg 2003 Comprehensive Plan

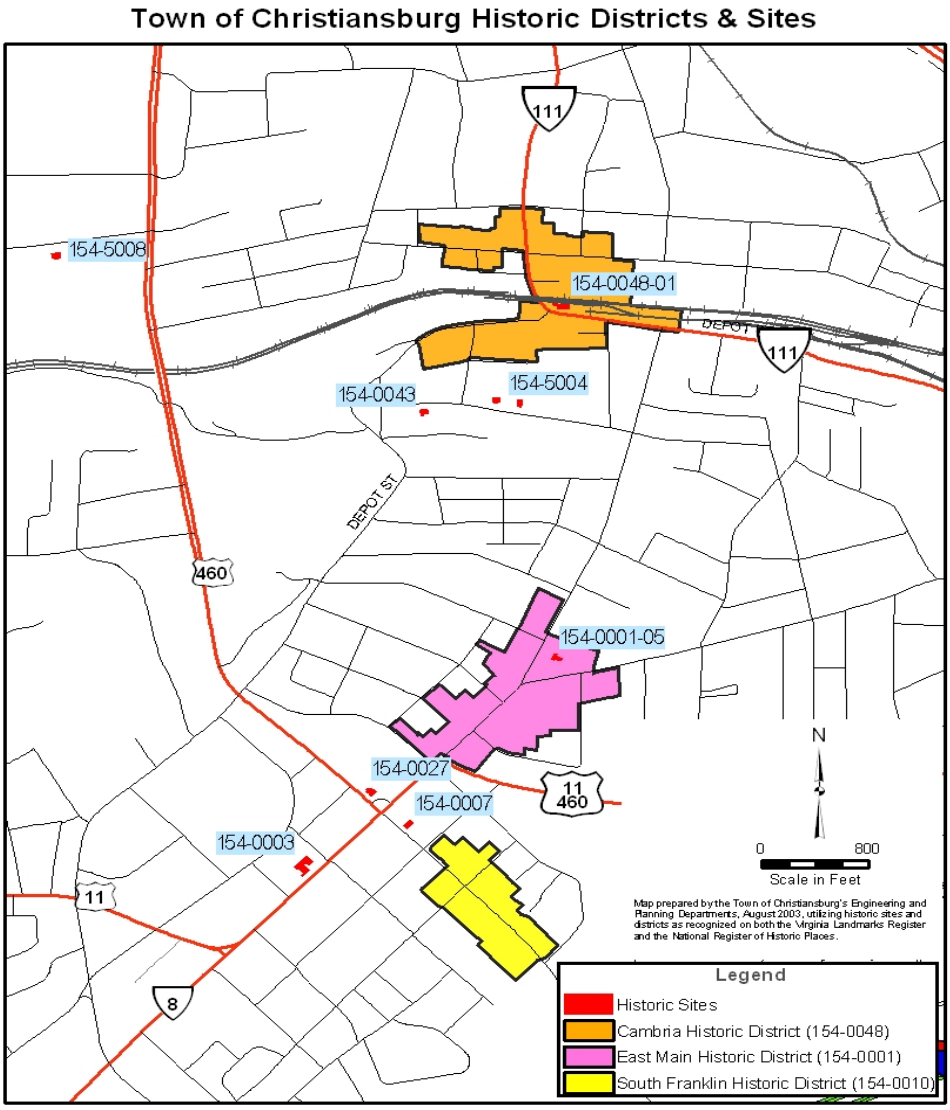
The Town of Christiansburg has three historic districts recognized by the *Virginia Landmarks Register* and the *National Register of Historic Places*. The East Main Street Historic District (VLR 06-20-1989, NRHP 01-10-1991) includes East Main Street from Roanoke Street and Pepper Street, NE to the old high school at 404 E. Main Street (presently the E. Main Street Apartments) and Park Street, NE from E. Main Street to Lester Street, NE. The South Franklin Street Historic District (VLR 06-20-1989, NRHP 01-10-1991) is located between 100 and 308 S. Franklin Street. The Cambria Historic District (VLR 06-20-1989, NRHP 01-10-1991) is comprised of 500 to 600 blocks of Depot Street, NE, the 500 – 600 blocks of Montgomery Street, NE, and the 900 -1000 blocks of Cambria Street, NE and the railroad depots.

The United States Post Office at 2 E. Main Street (VLR 06-20-1989, NRHP 02-01-1991) was one of approximately two dozen locations in Virginia to receive Mural American Artwork or Sculptures. These works were created during the Depression through Roosevelt's Works Project Administration. Christiansburg's mural is entitled Great Road and was done in 1939 by John DeGroot.

The Hill School, part of the (old) Christiansburg Industrial Institute, and Schaeffer Memorial Baptist Church are at 570 and 580 High Street, NE (VLR 05-16-1978, NRHP

04-06-1979). The construction of these buildings was financed by the Friends Freedmen's Association of Philadelphia in the 1880's in efforts to sponsor education for emancipated slaves.

Figure 4.4 Town of Christiansburg Historic Districts and Sites



The Christiansburg Institute, Inc. (CII) has received $300,000 in federal funds, which will support the renovation of the Edgar A. Long Building (VLR 12-06-2001, NRHP 03-05-2001), one of the last remaining buildings of the Christiansburg Institute campus. The program will incorporate the history of CII, 1866-1966: archives of the history of CII and of African American education, a museum and historical park to commemorate the excellence of the CII educational experience, a Community Learning Center which will offer educational opportunities for all citizens, and community building in order to engage citizens in exploring the histories of their communities.

Located at 140 Scattergood Drive, NW, the Edgar A. Long Building is a two-and-a-half story, brick structure that was built in 1927. Famed educator Booker T. Washington advised the Friends Freedmen's Association on the purchase of farmland for a campus.
The Edgar A. Long Building has statewide significance as the only pre-1950 building that stands on its original site at the campus, begun in the early 1900's as a regional center for secondary and higher education of African Americans.

Other sites on both the Virginia Landmarks Register and the National Register of Historic Places are the Oaks at 311 E. Main Street (VLR 04-20-1994, NRHP 07-15-1994) (currently a bed and breakfast); Christiansburg Presbyterian Church at 107 W. Main Street (VLR 06-21-1977, NRHP 01-30-1978), the Phlegar Building at 4 S. Franklin Street (VLR 06-20-1989, NRHP 11-13-1989) (currently Montgomery County offices), the Surface house at 515 High Street, NE (VLR 06-20-1989, NRHP 11-13-1989), and the old Christiansburg Depot at 630 Depot Street, NE (VLR 04-16-1985, NRHP 12-12-1985).

Unusual geologic formations, special soil types- 9 VAC 25-780-90B.5

Town of Blacksburg

Karst

Blacksburg's geologic features include karst terrain which may pose potential hazards for development. Karst areas are underlain by soluble carbonate rock, such as limestone or dolomite, which is susceptible to dissolution and can result in sinkholes, caves, and underground streams. Although most of the Town of Blacksburg overlies soluble carbonate bedrock, the degree of karst development is generally low. There are no sinking streams, and most sinkholes are broad, shallow, and stable. Eight identified karst areas have the most significant sinkhole development, and are probably the main areas of concern from a development perspective. Locations of individual sinkholes from a variety of data sources should be maintained and considered during development, but the majority of protection and monitoring efforts should concentrate on the eight sensitive karst areas. These features may pose ground-stability problems for construction and are potential avenues for groundwater contamination. Natural drainage patterns around sinkholes should be maintained to prevent increasing runoff or flooding. Blacksburg is also traversed by several inactive geologic faults, which may present another avenue for aquifer pollution.[1]

Minerals

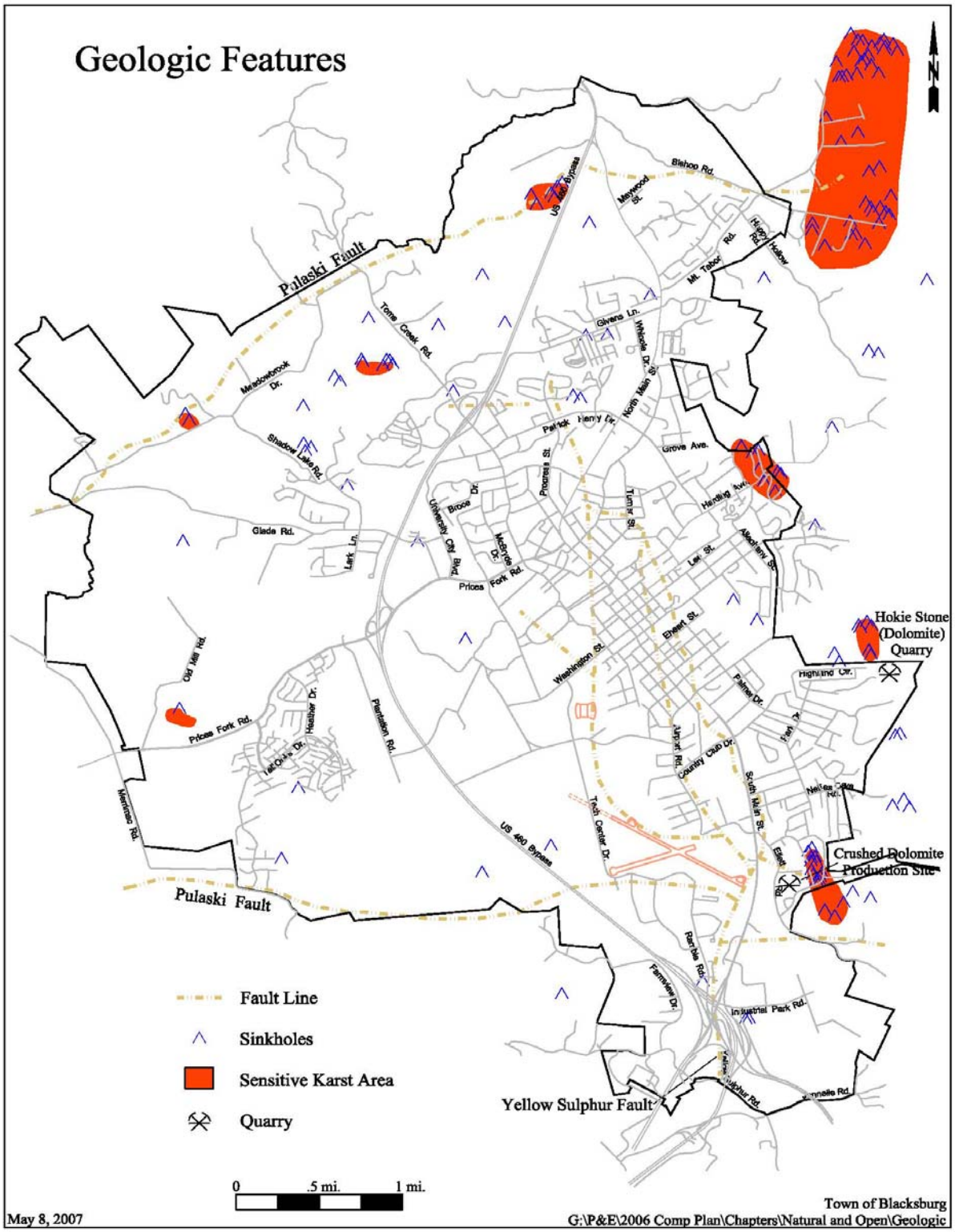
Mineral resources are mined and quarried in and around Blacksburg. The most prominent quarry lies at the corporate limits near Highland Park and provides the university with Hokie Stone. A former sandstone quarry lies east of Ellett Road just inside the Town's corporate limits.

Radon

Geologic conditions in the region produce radon at a higher than average rate for the state. Radon is a heavier than air, colorless, odorless gas that occurs naturally. It comes from the natural (radioactive) breakdown of uranium in soil, rock, and water. It can get into any type of building - homes, offices, and schools - and build up to dangerous levels. The Environmental Protection Agency (EPA) and the Surgeon General recommend testing all homes below the third floor for radon.

Natural Heritage Program, Virginia Department of Conservation and Recreation, 2001.

Figure 4.5 Town of Blacksburg Geologic Features



Town of Christiansburg

Due to ancient stresses in the earth, the bedrock underlying the Christiansburg area has been greatly deformed. Major and minor faults are common in the area and rock beds typically are inclined at fairly steep angles. Historical records do not indicate seismic activity in the immediate vicinity of Christiansburg; however, approximately 25 miles to the north, an active seismic area is found in Giles County. Most earthquakes are minor, but recent studies indicate a remote possibility of damaging earthquakes exists in the Giles County area.

According to the SCS Soil Survey for Montgomery County, there are two major soils groups in Christiansburg: the Groseclose-Poplimento-Duffield unit and the Caneyville-Opequon-Rock Outcrop unit. Soils of the Groseclose-Poplimento-Duffield unit cover the majority of the Town and are deep, well drained, and gently sloping to steep soils with clayey subsoil. Sinkholes are common in these soil areas, and slopes may be steeper in these instances. Urban uses are limited by these soils due to their clayey subsoil, slow permeability, low strength, and high potential for shrink-swell activity. The potential for erosion of these soils is severe in steep areas.

Soils of the Caneyville-Opequon-Rock Outcrop unit are found primarily in the eastern central portion of the Town, near the Route 460 By-Pass. Areas where these soils and Rock Outcrop exist are generally highly dissected upland areas with deep, winding and V-shaped hollows. These areas may be subject to sinkholes and subsurface drainage.
Soils of this group are moderately deep and shallow. They are generally well drained, with moderately steep to very steep slopes and a clayey subsoil. Urban uses on these soil and Rock Outcrop areas are limited by slope and rock outcrop as well as by a relatively shallow depth to bedrock and a high potential for erosion. In addition to restricting urban construction, the soils of these units generally prohibit the use of septic systems. This is due primarily to slow percolation rates, shallow depth to bedrock, and steep slopes.

Source: Town of Christiansburg Comprehensive Plan

Wetlands- 9 VAC 25-780-90B.6

The Town of Blacksburg and Town of Christiansburg manage and protect wetland areas by utilizing Town Code and working with State and Federal agencies. The Virginia Department of Environmental Quality (DEQ) and the U.S. Corps of Engineers (COE) administer the Va. Water Protection Permit Program and classify areas considered wetlands within town limits. The towns' stormwater regulations, erosion and sediment control programs, and zoning ordinances have sections dedicated to protecting wetland areas once they have been identified.

Figure 4.6 Town of Blacksburg Wetlands (North)

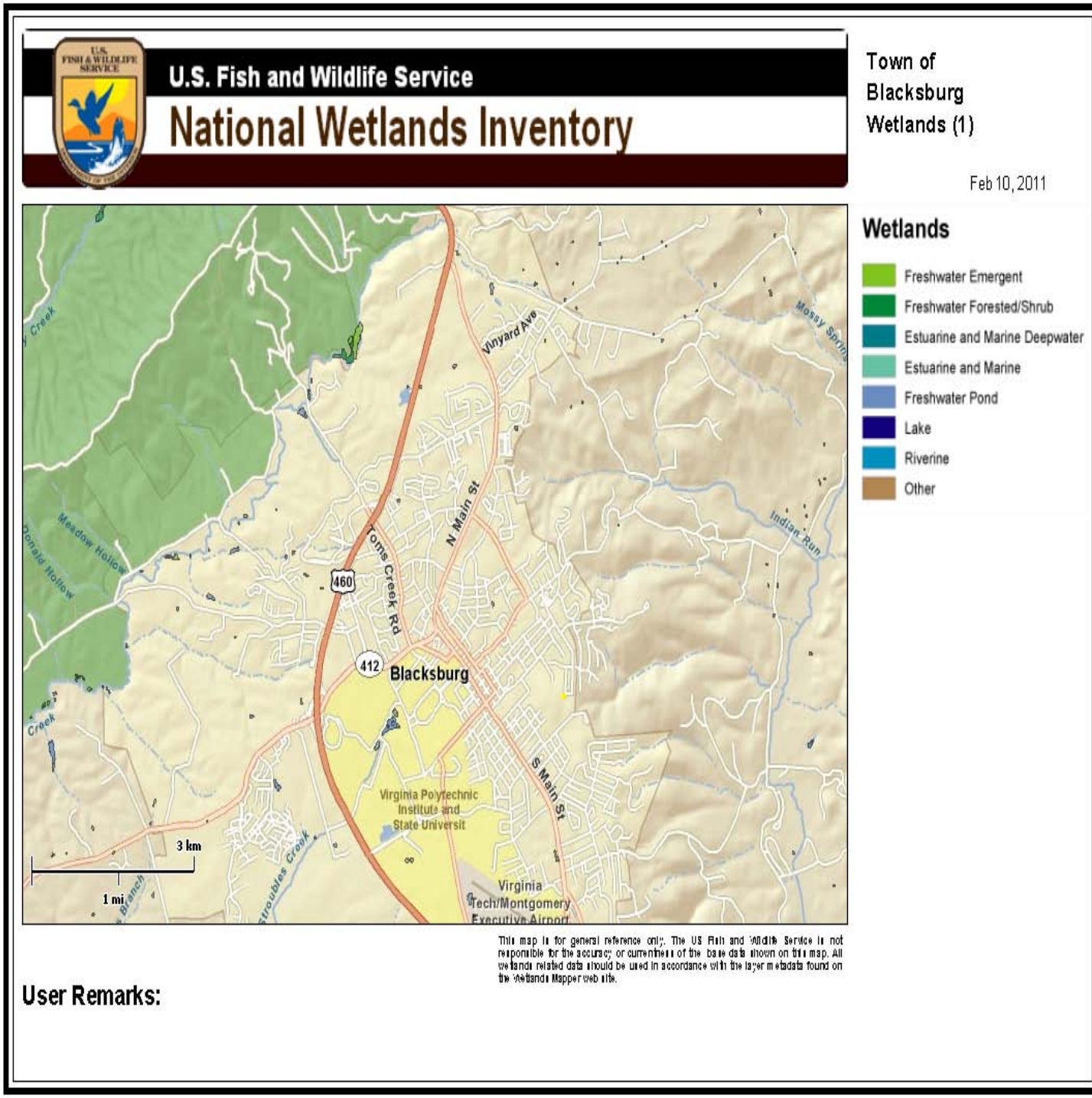


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Figure 4.7 Town of Blacksburg Wetlands (South)

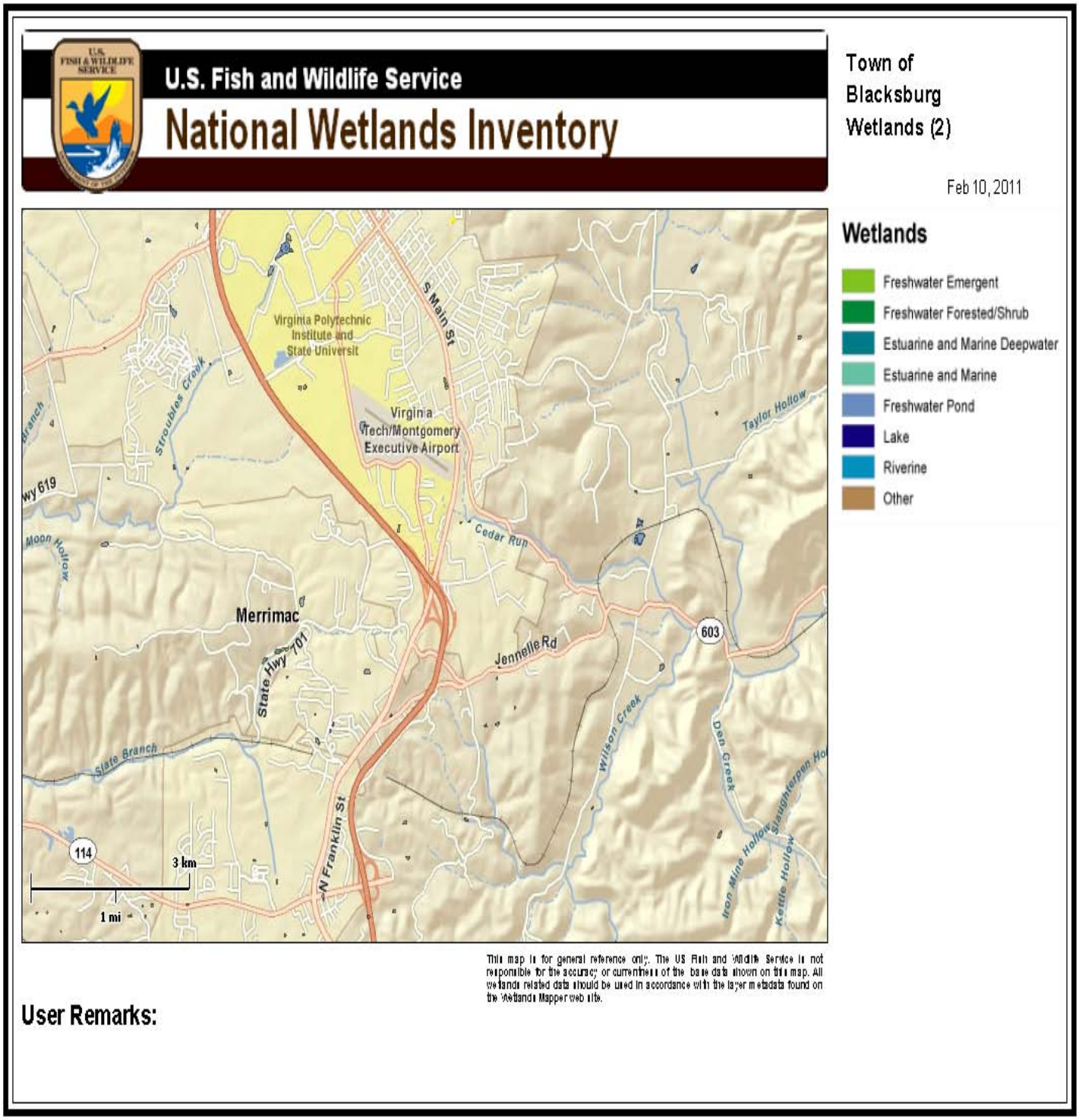

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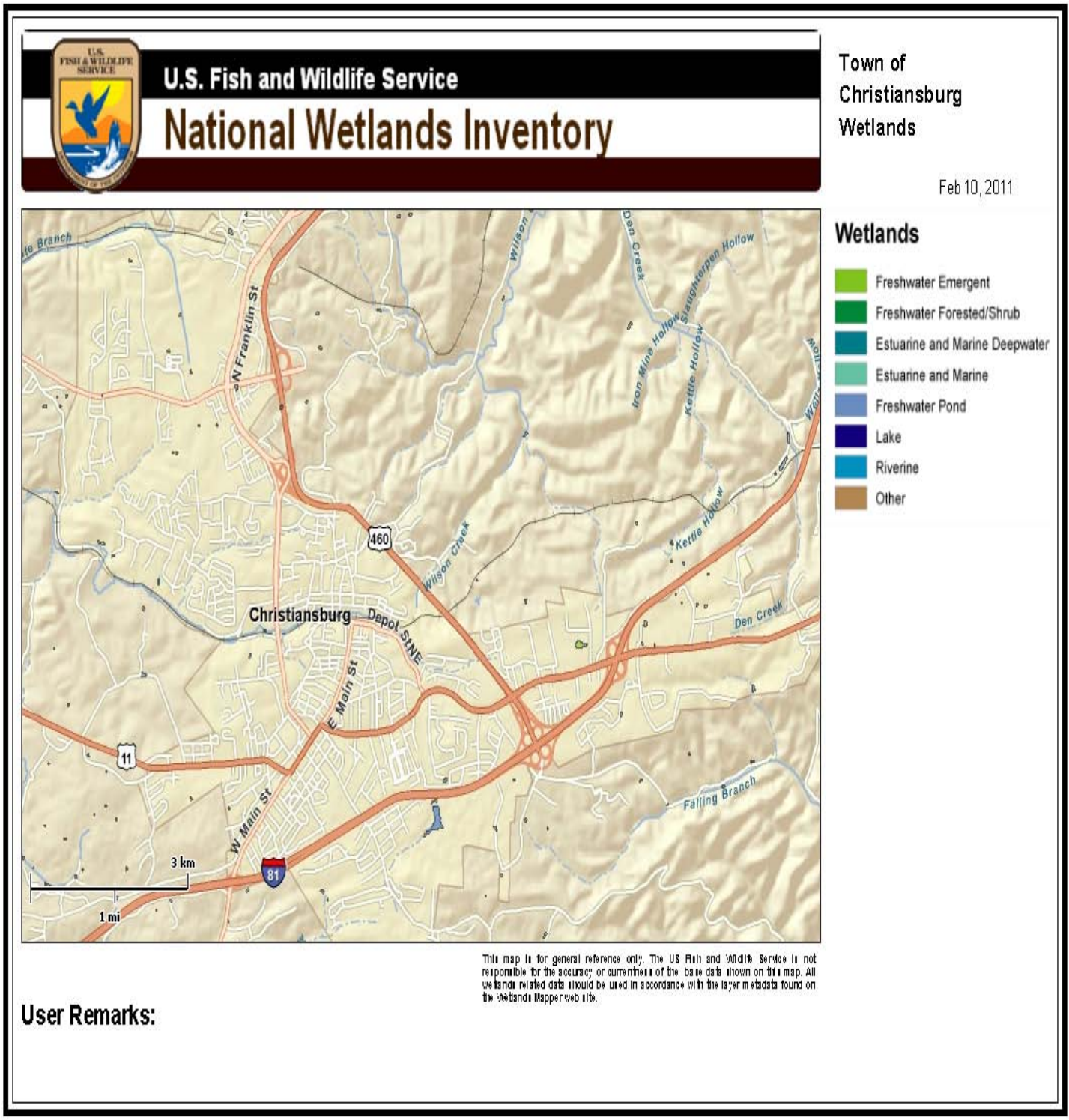
Figure 4.8 Town of Christiansburg Wetlands



Source: http://www.fws.gov/wetlands/Data/Mapper.html

Riparian Buffers and Conservation Easements- 9 VAC 25-780-90B.7

Town of Blacksburg

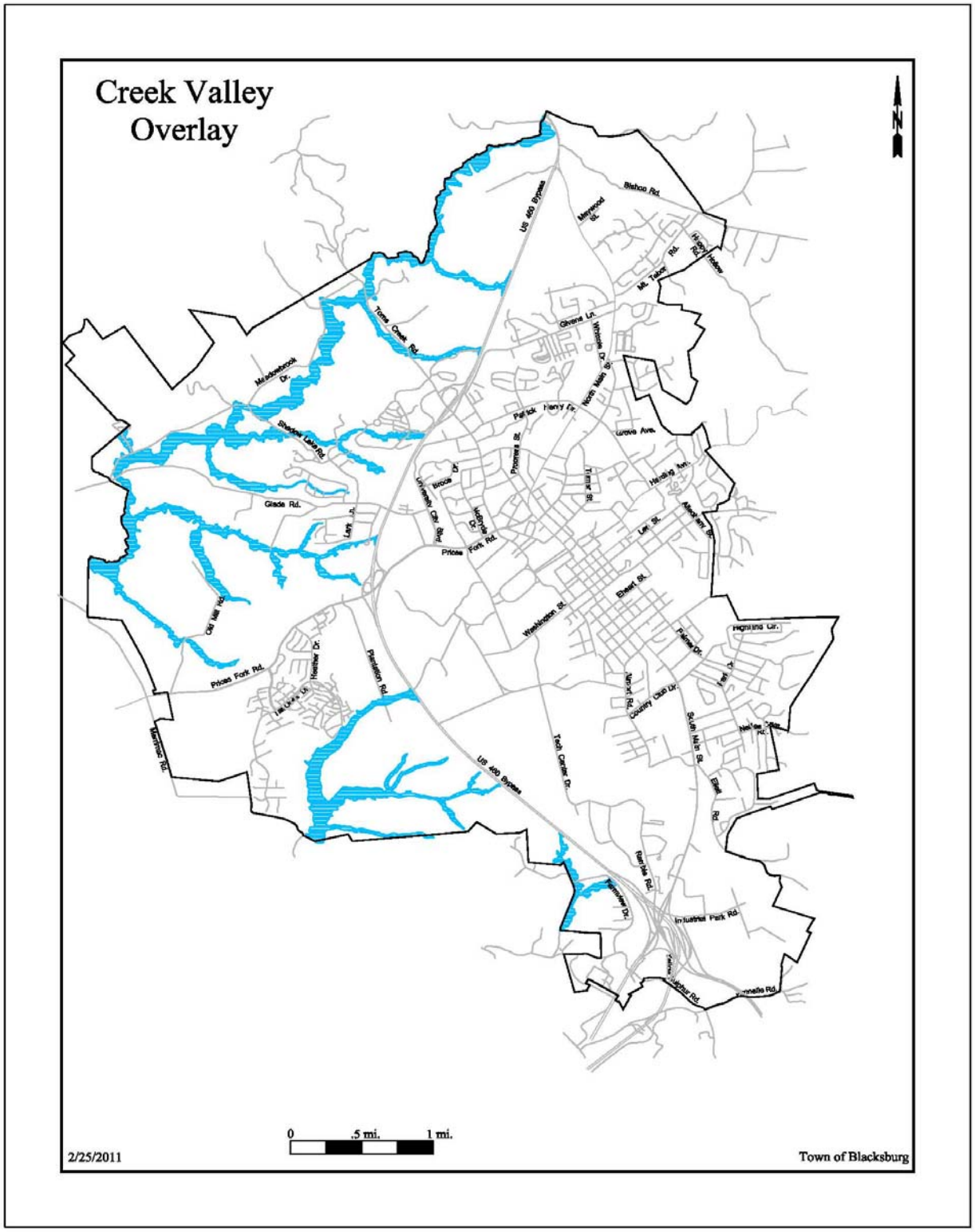
The Town of Blacksburg zoning ordinance includes sections that protect riparian zones within town. The Town's Creek Valley Overlay District attempts to protect the riparian corridors that are most susceptible to soil erosion and run-off in Toms Creek and sections of Stroubles Creek and Slate Branch located to the west of the 460 bypass. The Town's Flood Hazard Overlay Zoning Ordinance also protects riparian corridors by limiting development activities in areas of the Town that lie in drainage areas of 100 acres or more. The Town is also looking at other approaches to manage watershed assets: such as riparian easements for properties located outside the Creek Valley overlay District, public education and outreach, and collaboration with the Virginia Water Resources Center and other Virginia Tech organizations to investigate alternative management practices that produce measurable improvements to watershed quality.

Zoning Ordinance language for Creek Valley Overlay District:

Section 3230- Purpose

The purpose of the **Creek Valley** District is to regulate land use and development on lands adjacent to streams in such a manner as to: (1) ensure that development adjacent to creeks will not result in substantial damage to significant environmental resource areas; (2) ensure that **creek valley** development complements and enhances the protection of natural floodplains provided by the floodplain regulations of this district; (3) control the development that impacts wetlands, steep slopes, and vegetative buffer areas along creeks; (4) ensure that proper planning and design precedes land disturbing activities near creeks; (5) ensure that **creek valley** drainage and soil conditions are properly identified and incorporated into the planning process for subdivision and site plan review; (6) implement the intent of the Comprehensive Plan; (7) protect and enhance water quality and groundwater recharge processes by protecting the natural capacity of vegetation areas along creeks to filter and purify stormwater runoff; and (8) protect aquatic environments from the warming effects of solar radiation by preserving riparian tree canopy cover.

Figure 4.9 Town of Blacksburg Creek Valley Overlay District



Source: Town of Blacksburg Comprehensive Plan

The Town of Blacksburg has four properties under conservation easements within town limits.

1. Hidden Valley Conservation Easement (Tax map numbers 195-A1,165-A7,165-A10,166-A1)- The four parcels total approximately 144 acres

2. Hoge Conservation Easement (Parcel ID 030451)- approximately 32 acres

3. Simpkins Conservation Easement (Parcel ID's 017458, 017459)- Two parcels total approximately 53 acres

4. West Easement (Parcel ID 020643)- approximately 3.5 acres

Town of Christiansburg

The Town of Christiansburg zoning ordinance does not currently address riparian zone protection within town. The Christiansburg town Code does address flood plain districts which includes areas subject to the 100 year flood water inundation. The basis for the delineation is the most recent flood insurance studies within the corporate limits of town as prepared by the Federal Emergency Management Agency.

Currently, the Town of Christiansburg is in contract negotiations with a private contractor to restore approximately 2,180 linear feet of an unnamed perennial stream tributary to Crab Creek located on Town of Christiansburg property within the Diamond Hills development. The stream channel restoration activities will be based on natural stream channel design principals. The project involves the removal of a stormwater management basin impoundment which will reconnect the stream to its historic floodplain in Crab Creek. A stream buffer composed of native trees and shrubs and will be protected by a 100 foot wide conservation easement where ever possible.

Land Use, land cover, impervious cover, new development that may impact water quality- 9 VAC 25-780-90B.8

Town of Blacksburg

The Town of Blacksburg is divided into eight planning sectors plus the area immediately adjacent to the Town's boundaries in Montgomery County.

Downtown includes those areas historically zoned "Downtown Commercial" and "Central Residential" and is a vibrant place with retail shops and restaurants serving the needs of students and permanent residents. Downtown Blacksburg encompasses the original "Sixteen Squares" of historic Blacksburg. Pedestrian- oriented commercial and office uses prevail along

Main Street between Miller and Clay Streets to Prices Fork Road. Residential areas extend west towards the University, and east towards Wharton Street.

The Northwest sector is a rural area with development. There are currently two neighborhood-planning areas in this sector— Glade- Westover and Toms Creek. These neighborhoods vary greatly in that Glade-Westover is a mix of several typical suburban-style subdivisions and Toms Creek is very rural and contains larger parcels that are either pasture, land under other agricultural use, or very low-density or planned residential. There is a high rate of owner occupancy throughout the sector.

The North End sector is a rural area with a mix of development. There are currently six neighborhood planning areas in this sector: Main-Patrick Henry, Murphy, Northend, Northside Park, Shenandoah, and Woodbine-Wyatt Farm. These neighborhoods exemplify a progressive transition from the more developed residential areas closer to the core of Blacksburg to the rural open spaces found on the outskirts of Town. There is a high owner-occupancy rate for the properties throughout this sector.

The South End Sector is a diverse area filled with a variety of land uses. Also, this sector is the primary gateway to Blacksburg; visitors enter it via Main Street from either Route 460 Business or from the Bypass. To the west lies a quiet residential neighborhood adjacent to Montgomery Regional Hospital surrounded by open space and mature landscaping. It is close to the Huckleberry Trail and the Virginia Tech Corporate Research Center. The eastern portion of this sector includes the Blacksburg Industrial Park and the South Main Street commercial/office area. Several industries located in the park are high-tech and are attracted to the region because of the University's and the Town's emphasis on research and development. Residential uses are concentrated in the northeastern portion of the sector, and along Ramble Road, Farmview Drive, Ellett Road, and Jennelle Road. There are currently two neighborhood-planning areas in this sector. These neighborhoods vary greatly in housing style, owner vs. renter occupancy, and land use.

The Southwest sector contains one planned residential area, a multi-family development, and limited commercial, civic, and mixed-uses, and is surrounded by rural development. The dominant land use in the Southwest sector is agricultural or open-space; major landowners are Virginia Tech and the Virginia Tech Foundation. One neighborhood planning area, Hethwood,

contains at least seven subdivisions: Mission Hills, Pilgrims Point, Stroubles Mill, Haymarket Square, Fox Ridge, Oak Manor, and Brightwood Manor; Oak Manor and Brightwood Manor lie directly to the east of Hethwood along Prices Fork Road. The subdivisions within this planned area vary greatly in terms of median household income, home values, and owner vs. renter

occupancy.

The Virginia Tech campus of 2,600 acres includes more than 150 buildings close to the heart of Blacksburg. The core campus adjacent to the Downtown area is circled by open and agricultural lands stretching across the Route 460 Bypass towards Hethwood. To the south are the Virginia Tech Airport and the Corporate Research Center.

Table 4.6 Current Land Use Information

Land Use Category	# Units	Average # Units Per Acre	# Acres	% Acreage of Totaled Surveyed
Very Low Density Residential[1]	67	.04	1,782	14.1
Low Density Residential[2]	4,387	1.68	2,615	20.7
Medium Density Residential[3]	2,544	7.90	322	2.6
High Density[4]	7,329	15.59	470	3.7
Mobile Homes	380	5.76	66	0.5
Other Residential[5]	40	1.14	35	0.3
Total Residential	14,747	n/a	**5,290**	**42.0**
Civic			525	4.2
Public Assembly			*159*	*1.3*
Institutional Assembly			*366*	*2.9*
University			1,124	8.9
Low Impact			89	0.7

Commercial				
High Impact Commercial			149	1.2
Mixed Use[6]	520		51	0.4
Light Industrial/R&D			746	5.9
Light Industrial/R&D			*85*	*0.7*
VT Corporate Research Center			*420*	*3.3*
VT Montgomery Executive Airport			*241*	*1.9*
Industrial			215	1.7
Parkland/Open Space			757	6.0
Transportation (streets and ROW)			738	6.0
Utilities			54	0.4
Agriculture			1,934	15.3
Vacant			935	7.3
Total Non-Residential			**7,317**	**58**
Total Surveyed			**12,607**	**100**
Total Developed			**9,738**	**77.2**

Area[7]				
Total Undeveloped area[8]			**2,869**	**22.8**

Notes

[1]Residential/Agricultural or Very Low Density Residential Future Land Use Classification allows for small clusters of residential up to a net density of one dwelling unit per acre, with some low intensity agricultural uses, with 1 unit per acre used to calculate both low and high 2046 population projections.

[2]Low Density Residential Future Land Use Map classification allows up to four dwelling units per acre, with 2 units per acre for low and 4 units per acre for high used to calculate 2046 population projections.

[3]Medium Density Residential Future Land Use Map classification allows up to and including ten dwelling units per acre; or up to 20 bedrooms per acre, whichever is less with 5 dwelling units per acres for low and 10 dwelling units per acre used to calculate 2046 population projections.

[4]Multifamily or High Density Residential Future Land Use Map Classification allows more than ten dwelling units per acre: or more than 20 bedrooms per acre, with 15 units per acre used for low and 20 units per acre for high to calculate 2046 population projections.

[5]Other Residential Current Land Use Categories include hotels, motels, B&B, Assisted Living Facilities, and Greek Housing

[6]At time of adoption of the Comprehensive Plan in 2007, the Mixed Use Zoning District had just been created and no assumptions about population projections are being made at this time

[7]Total developed land includes all properties that are not considered in agricultural use or vacant. This classification includes land that may not be developed to its full potential per the zoning ordinance

[8]Total undeveloped area is equal to the land classified as undeveloped and agriculture.

[9]To calculate population projections, 2000 Census Average Household size in Blacksburg of 2.37 persons was used

Sources:

Town of Blacksburg Current Land Use Map as of 3-1-09

Town of Blacksburg Address File as of 3-1-09

Town of Blacksburg Comprehensive Plan

Figure 4.10 Town of Blacksburg Future Land Use

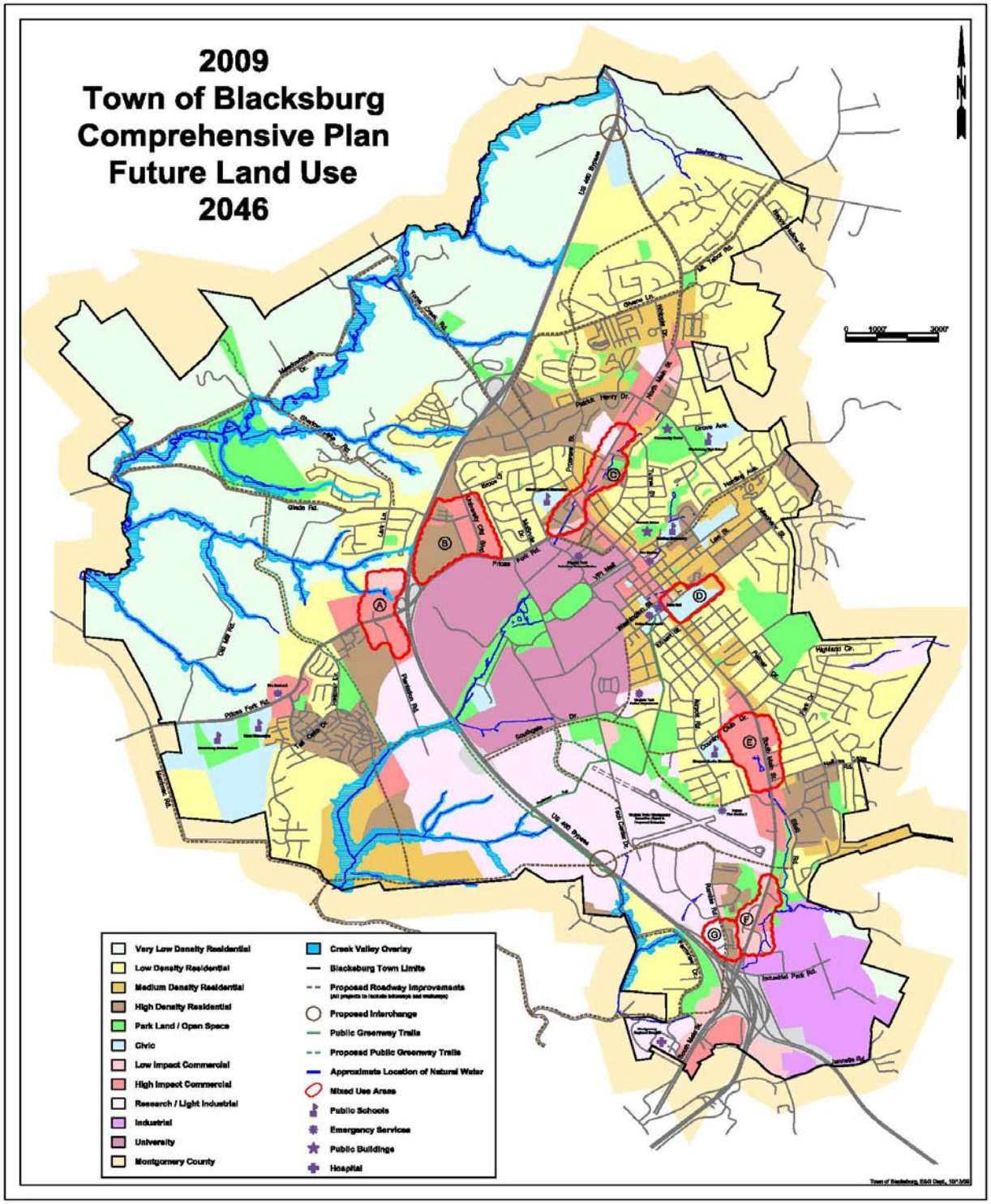
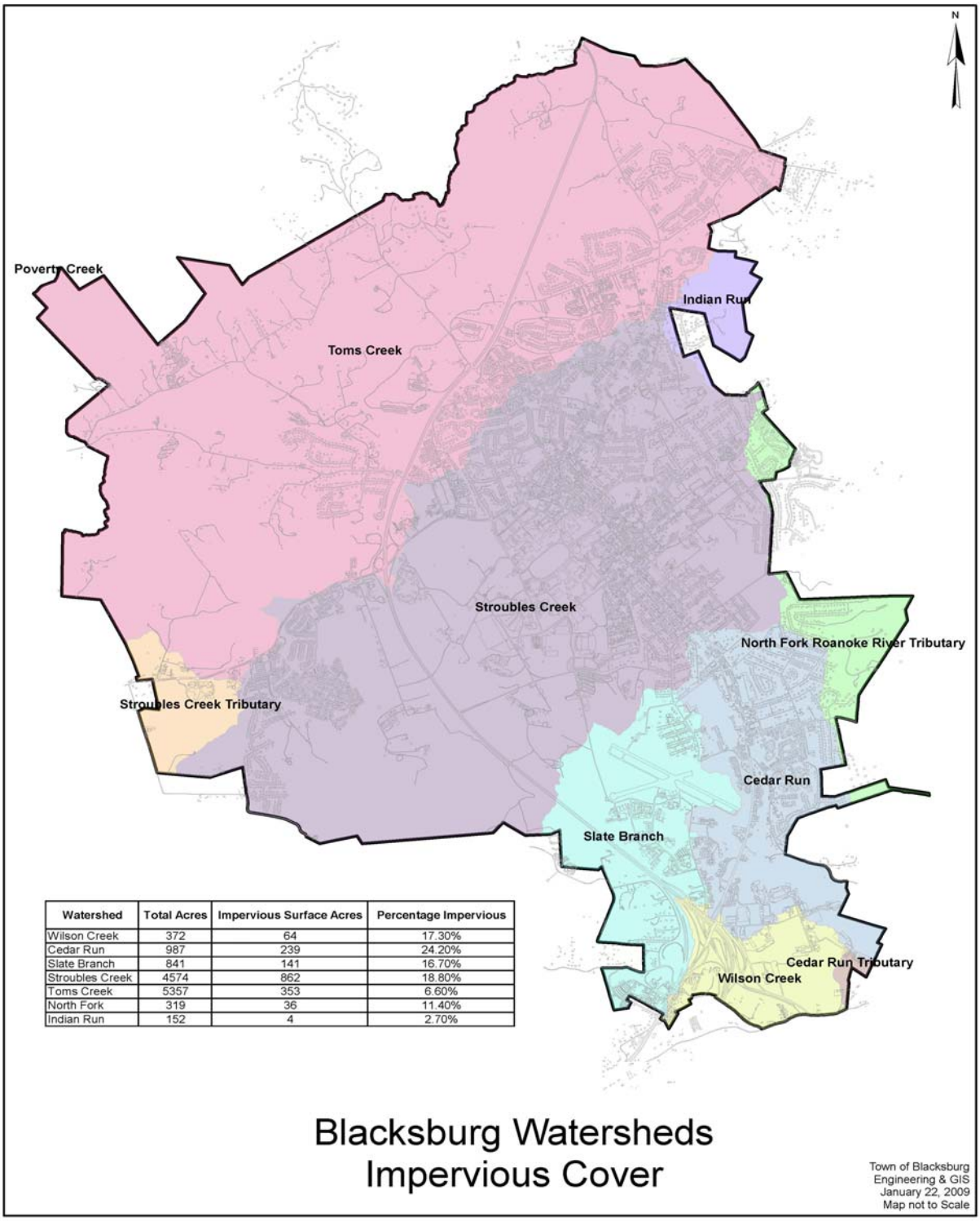


Figure 4.11 Town of Blacksburg Impervious Cover



Watershed	Total Acres	Impervious Surface Acres	Percentage Impervious
Wilson Creek	372	64	17.30%
Cedar Run	987	239	24.20%
Slate Branch	841	141	16.70%
Stroubles Creek	4574	862	18.80%
Toms Creek	5357	353	6.60%
North Fork	319	36	11.40%
Indian Run	152	4	2.70%

Town of Christiansburg

Of the 5,114 acres in the Town prior to annexation, 1,830 acres were undeveloped. Data indicates, however, that use of 482 acres, or 26%, of the available undeveloped land was precluded due to the potential for flooding or presence of slopes in excess of 20%. With the annexation of 3,525 acres of land in 1988, the Town of Christiansburg acquired over 1,900 additional acres of undeveloped land, much of it without physical restrictions to development.

This area has seen a large concentration of the Town's development in the time since annexation with much residential development occurring north and south of Peppers Ferry Road (Route 114). Commercial development occurred heavily in the N. Franklin Street corridor, particularly near the Peppers Ferry Road area. There are substantial undeveloped areas remaining in these areas, particularly in the areas north and south of Peppers Ferry Road (Route 114).

Floodplains, steep slopes of more than 15 percent, karst terrain and sinkholes, and wetlands are sensitive environmental features that may affect future development. Land in Christiansburg suitable for larger scale development is located predominantly in the vacant, agricultural, and wooded lands to the northwest, south, and east of the Town's center. A number of vacant parcels closer to the center of the Town are available for infill development. While steep slopes and floodplains may be undesirable for development, these areas present a number of opportunities for the Town. Through property acquisition and/or any number of preservation techniques, these recreational and scenic resources may be preserved for the enjoyment of citizens and visitors of the Town for years to come.
Source: Town of Christiansburg 2003 Comprehensive Plan

Table 4.7 Existing Land Use for Town of Christiansburg as of 12/2/03

District	Area	% of Town's Total Area	Estimated % Developed	Estimated Area Developed (acres)	Estimated % Undeveloped	Estimated Area Undeveloped (acres)
Agricultural	2,225.1	28.9%	5.0%	111.3	95.0%	2113.8
Rural Residential	247.2	3.2%	90.0%	222.5	10.0%	24.7
Single Family Residential	1663.0	21.6%	80.0%	1330.4	20.0%	332.6

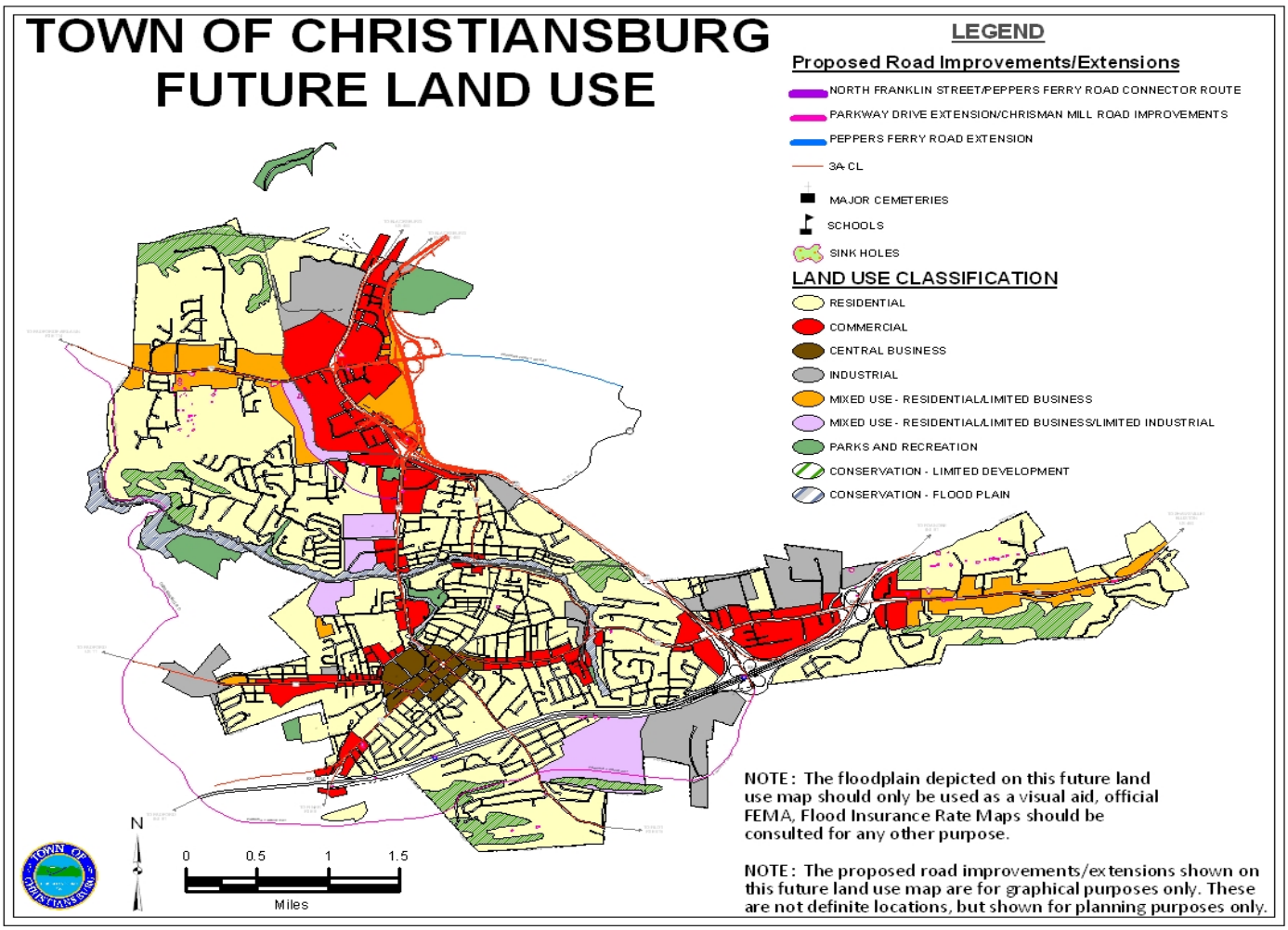
Two-Family Residential	716.3	9.3%	90.0%	644.7	10.0%	71.6
Multi-Family Residential	706.5	9.2%	75.0%	529.9	25.0%	176.6
Residential Manufactured Home Sub.	0.0	0.0%	--	--	--	--
Limited Business	36.9	0.5%	20.0%	7.4	80.0%	29.5
Central Business	65.7	0.9%	90.0%	59.1	10.0%	6.6
General Business	1232.0	16.0%	85.0%	1047.2	15.0%	184.8
Limited Industrial	57.3	0.7%	75.0%	43.0	25.0%	14.3
General Industrial	754.3	9.8%	65.0%	490.3	35.0%	264.0
Total of Residential Districts	**3,332.9**	**43.3%**	**81.8%**	**2,727.4**	**18.2%**	**605.6**
Total of Business Districts	**1,334.6**	**17.3%**	**83.4%**	**1,113.7**	**16.6%**	**220.9**
Total of Industrial Districts	**811.6**	**10.5%**	**65.7%**	**533.3**	**34.3%**	**278.3**
Total Area in all Zoning	**7,704.2**	**100.0%**	**58.2%**	**4,485.6**	**41.8%**	**3,218.6**

Districts						

Note: The total area would exclude areas of street rights-of-way

Source: Town of Christiansburg 2003 Comprehensive Plan

Figure 4.12 Town of Christiansburg Future Land Use

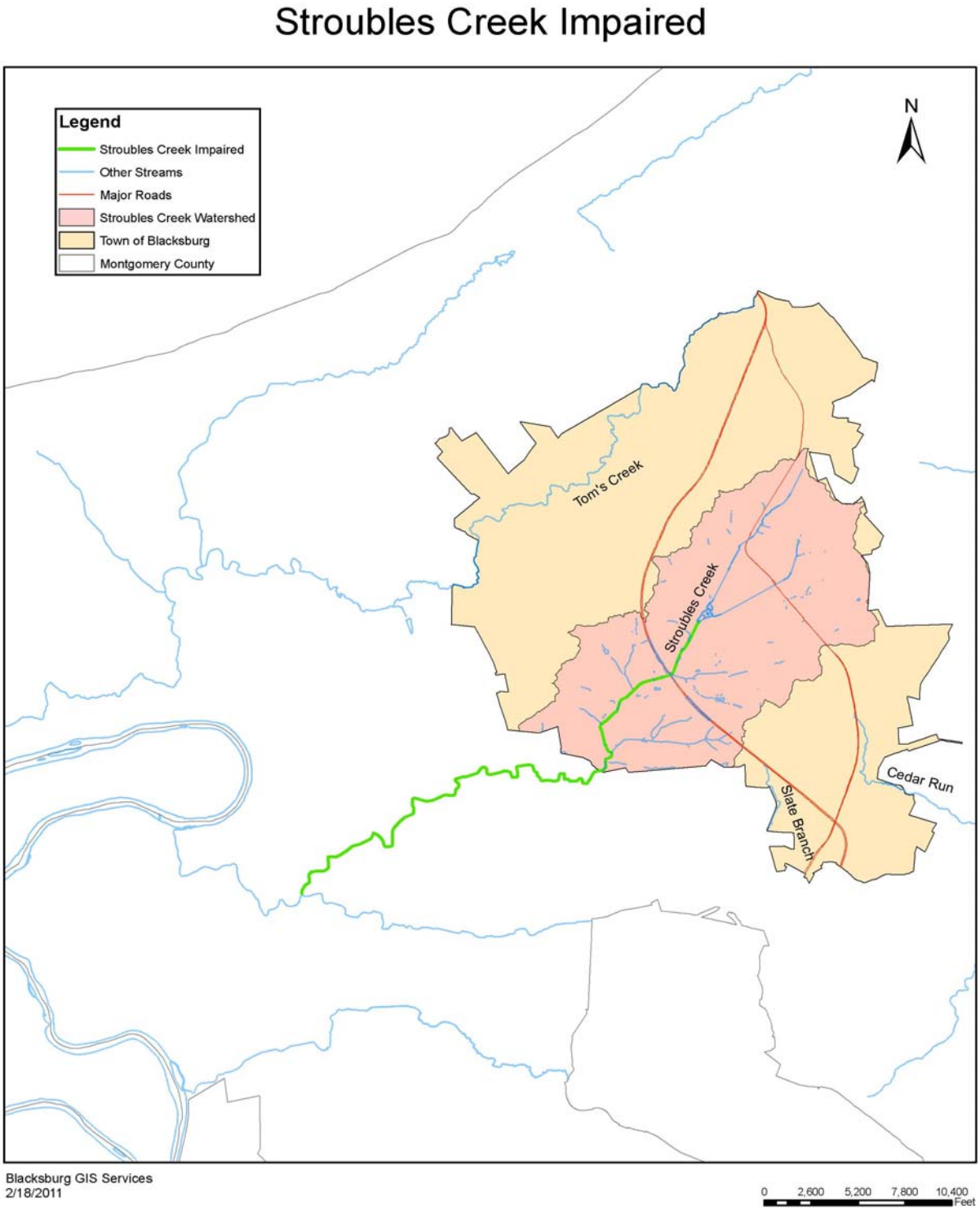


Impaired streams and type of impairment- 9 VAC 25-780-90B.9

Town of Blacksburg

In 2002 a section of the Stroubles Creek watershed located within Town limits was declared by the DEQ to have a benthic impairment (caused by sediment levels) and was placed on the State's Total Maximum Daily Loads (TMDL) list. In accordance with US EPA requirements, once a water body is on the TMDL list, then watershed stakeholders must attempt to restore water quality by developing and implementing a strategy that will limit the pollutant loadings. In 2005 the Town worked collaboratively with other watershed stakeholders to develop the Upper Stroubles Creek Watershed TMDL Implementation Plan (TMDL-IP). The TMDL-IP identifies several actions and management practices that the Town will implement through the year 2010 to comply with the TMDL-IP. It is estimated that the Town will spend $1.8 million dollars of the $7.8 million of identified costs in an attempt to address the water quality impairments associated with Stroubles Creek. The final TMDL-IP was approved by the DEQ on May 24, 2006, and can be found on the DEQ web site: http://www.deq.virginia.gov/tmdl/implans/stroubip.pdf.

Figure 4.13 Town of Blacksburg Impaired Stream



Town of Christiansburg

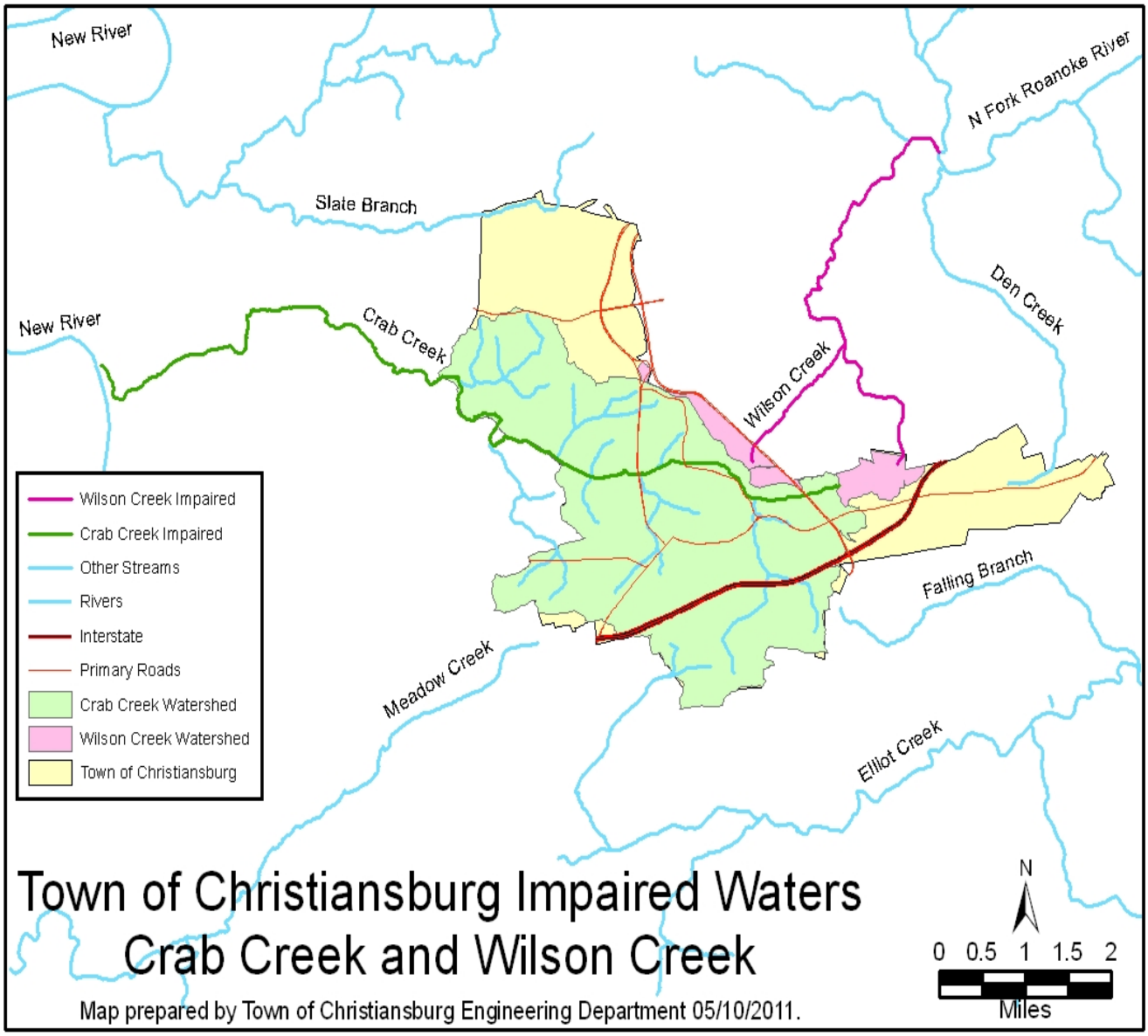
The Town of Christiansburg has two streams listed as impaired that have had a TMDL created: Crab Creek and Wilson Creek.

The Crab Creek watershed is part of the New River basin. Within Town, there are several unnamed tributaries and two named tributaries that feed into Crab Creek. Crab Creek discharges into the New River, which flows into the Ohio River, which flows into the Mississippi River and ultimately reaches the Gulf of Mexico. Crab Creek was placed on Virginia's TMDL Priority List due to violations of water quality standard for fecal coli form bacteria and sediment. Sediment reaches the Crab Creek watershed through surface runoff, natural erosive processes and streambank erosion.

Wilson Creek is a tributary to the North Fork Roanoke River. Approximately 23.09 river miles of Wilson Creek, Ore Branch and the Roanoke River were listed on Virginia's TMDL due to violations of water quality standard for fecal coli form bacteria.

Potential sources of fecal coli form in Crab Creek and Wilson Creek include failed and malfunctioning septic systems; sanitary sewer overflows; land application of biosolids; and wildlife, livestock and pet waste.

Figure 4.14 Town of Christiansburg Impaired Waters



Location of point source discharges- 9 VAC 25-780-90B.10

Table 4.8 Point Source Discharges permitted by EPA in Planning Area and near intake

Facility Name	Address	Issued	Expired	Description
Blacksburg Country Club	1064 Clubhouse Rd, Blacksburg, Va. 24060	9/8/08	9/11/13	Sewage System
Blacksburg, VPI, Sanitation Authority	5277 Prices Fork Rd., Blacksburg, Va. 24063	6/5/09	6/6/14	Sewage System
VPI and State University	112 Maintenance Complex, Blacksburg, Va. 24061	4/9/7	3/12/12	Water Supply
Federal Mogul Corporation	300 Industrial Park Rd., Blacksburg, Va. 24060	4/28/09	3/31/14	Motor Vehicle Parts and Accessories
Town of Christiansburg	2557 Crab Creek Rd., Christiansburg, Va. 24073	9/22/10	9/25/15	Sewage System
US Army Radford Army Ammunition	State Rt. 114 Radford, Va. 24141	6/8/10	6/9/15	Explosives
Claytor Lake Hydro	8355 Little River Dam Rd., Radford, Va. 24141	6/12/09	5/31/14	Electric Services
Intermet Radford Foundry	1605 First St., Radford, Va.	3/28/06	4/2/11	Gray and Ductile Iron Foundries

	24141			
Radford City Water Treatment Plant	**20 Forest St. Radford, Va. 24141**	**9/2/08**	**9/13/12**	**Water Supply**
Peppers Ferry Regional Wastewater Treatment Plant	**7797 Mason St. Radford, Va. 24143**	**10/21/09**	**09/30/14**	**Sewage System**

Source: www.epa.gov/enviro /facts/pcs/search.html January, 2011

Potential threats to existing water quality and quantity, other than those from above- 9 VAC 25-780-90B.11

The Source Water Assessment Plan referenced in prior sections provides information on potential threats to the existing water supply. The Va. Department of Health, Office of Drinking Water performs bi-annual inspections on the Towns water distribution systems to identify potential issues that could affect water quality and quantity. Potential issues could include security of water storage facilities, sanitary issues, natural disasters, backflow etc. The Towns work with the Va. Department of Heath to correct the identified issues and concerns.

Chapter 5 Projected Water Demand Information- 9-VAC 25-780-100 A, B

Town of Blacksburg

The Town of Blacksburg utilized the US Census Bureau, VEC, and Comprehensive Plan staff projections to determine future population for each decade through 2050. Water Demand projections are based on historic metered raw water data and population trend/per capita (average 2000 & 2010 data) consumption for 2020, 2030, 2040, and 2050. Also included is a water demand projection for 2045 based on the comprehensive plan future land use.

Self-supplied users (wells) were not included in calculations, because current numbers account for less than one percent of the population and should not increase due to restrictions in town code.

> **Section 24-122. - When service connection required.**
>
> **(a)**
>
> Except as specified herein, all occupied buildings located within two hundred (200) feet of a public water main shall be connected with the public water system. The owner or tenants occupying such buildings shall use the town owned system for water consumed or used in and about the premises on which such buildings are located. For any public water main constructed on or after October 1, 2000, the owner or tenant of a building within two hundred (200) feet of the public water main may elect to pay the fire protection fee set forth in section 24-602 in lieu of connection to the public water system. Once a building is connected to the public water system, it may not thereafter be disconnected.
>
> **(b)**
>
> If the pressure available to the occupied building is not adequate to meet minimum Department of Health requirements, then the requirements of subsection (a) shall be waived.
>
> **(c)**
>
> Whenever a new public water main is constructed, the owner of property described in subsection (a) must connect to the public water system or elect to pay the fire protection fee within twenty-four (24) months of the completion of the construction of the main.
>
> ***(Ord. No. 1274, § 11, 8-14-01)***

Town of Christiansburg

The Town of Christiansburg utilized the US Census Bureau, VEC, and Comprehensive Plan staff projections to determine future population for each decade through 2050. Water Demand projections are based on historic metered raw water data and population trend/per capita (average 2000 & 2010 data) consumption for 2020, 2030, 2040, and 2050.

Self-supplied users (wells) were not included in calculations, because current numbers account

for less than one percent of the population and should not increase due to availability and cost to connect to the CWS. New development must extend the CWS within the development and make the CWS system available to the property owner. By Town Code interpretation by the Town Manager, connection to the CWS is not required.

Sec. 29-63. Water and sewer main extensions to developments.

(a) When a proposed development within the corporate limits is located a distance greater than 250 feet from the water or sewer system and an extension to either system is required to serve the development, the Town may participate in the cost of the extension.

(b) The developer must install water and sewer mains within a development in accordance with the Subdivision and Zoning Ordinances of the Town.
(Code 1972, § 29-28)

Estimated Future Water Use Projected at Beginning of Each Decade- 9-VAC 25-780-100 C

Table 5.1 Estimated Future Water Use

Projected Water Use	**1990**	**2000**	**2010**	**2020**	**2030**	**2040**	**2045**	**2050**
Town of Blacksburg(MGD)	N/A	4.56	4.29	5.00	5.37	5.76	6.10*	6.18
Town of Christiansburg(MGD)	N/I	**N/I**	1.61	1.87	2.13	2.43	N/A	2.77
Total Water Demand (MGD)	**N/I**	**N/I**	**5.90**	**6.87**	**7.50**	**8.19**	**N/A**	**8.95**

Calculation based on 2046 Comprehensive Plan Land Use and Full Build-Out

Population Projections – 9-VAC 25-780-100 D1

Table 5.2 Population Projections for Town of Blacksburg and Town of Christiansburg

Locality	1990	2000	2010	2020	2030	2040	2050
Town of Blacksburg	34,590	39,573	42,620	46,300	49,700	53,350	57,267
Town of Christiansburg	15,004	16,947	21,041	24,371	27,701	31,486	35,788

Town of Blacksburg

Population projections to help determine future water demand are based on US Census Bureau (1990, 2000, 2010), VEC estimate (2020,2030) and staff projections based on VEC estimates (2040, 2050).

Table 5.3 Town of Blacksburg Growth Projections

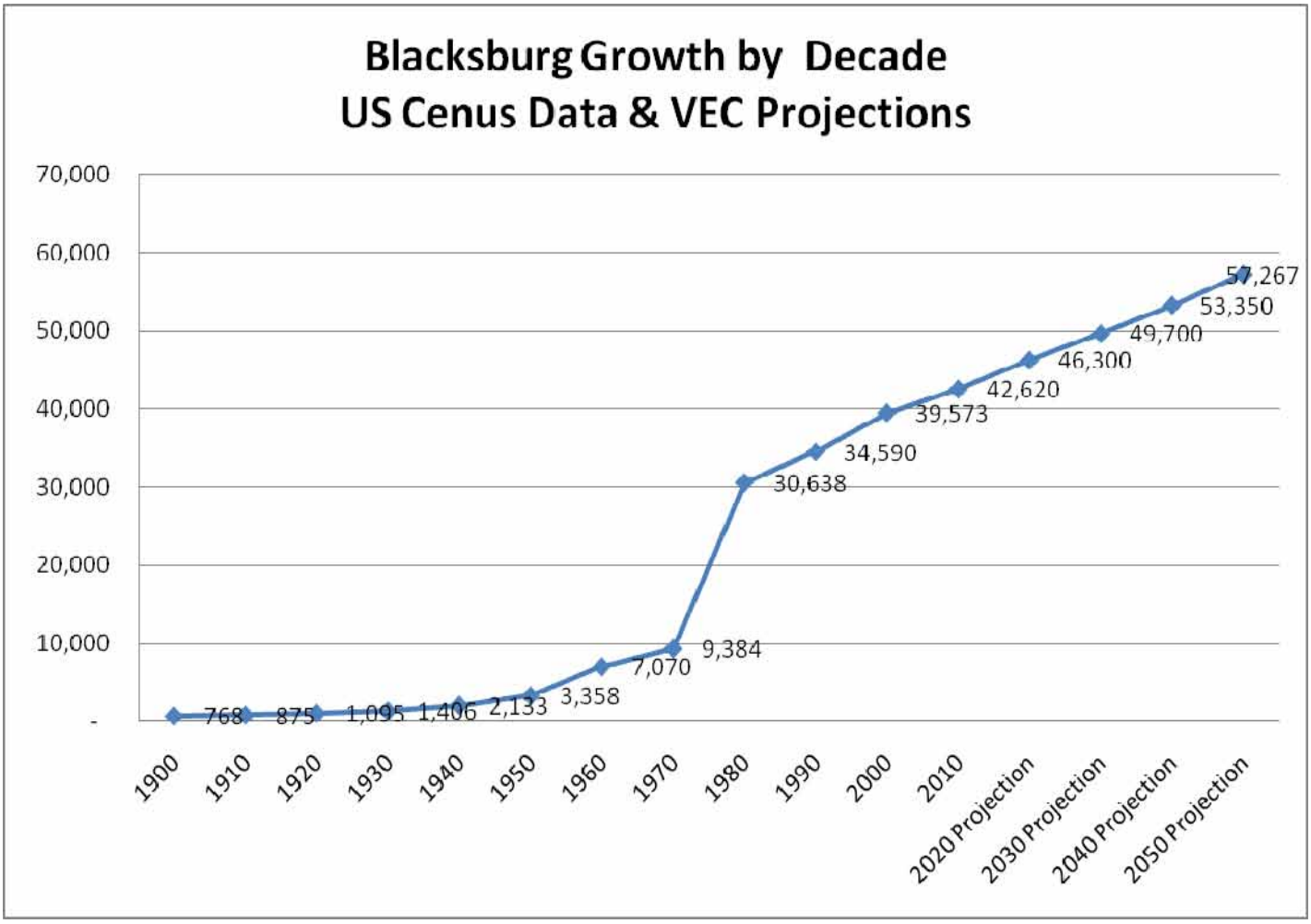
Blacksburg Growth by Decade

As of February, 2011

Decade	Population	Growth	% Growth	Source
1900	768			Census
1910	875	107	13.93%	Census
1920	1,095	220	25.14%	Census
1930	1,406	311	28.40%	Census
1940	2,133	727	51.71%	Census
1950	3,358	1,225	57.43%	Census
1960	7,070	3,712	110.54%	Census
1970	9,384	2,314	32.73%	Census
1980	30,638	21,254	226.49%	Census (Tech students included)
1990	34,590	3,952	12.90%	Census

2000	39,573	4,983	14.41%	Census
2010	42,620	3,047	7.70%	Census
2020 Projection	46,300	3,680	8.63%	VEC
2030 Projection	49,700	3,400	7.34%	VEC
2040 Projection	53,350	3,650	7.34%	Staff Projection derived from VEC
2050 Projection	57,267	3,918	7.34%	Staff Projection derived from VEC

Figure 5.1 Blacksburg Growth by Decade



Population projections for the Town of Christiansburg are based on US Census Bureau (1990, 2000, 2010), and Town of Christiansburg staff projections *(2020, 2030, 2040, 2050).

Table 5.4 Town of Christiansburg Growth Projections

Christiansburg Growth by Decade

As of May, 2011

Decade	Population	Growth	% Growth	Source
1900	659			Census
1910	1,568	909	137.94%	Census
1920	1,641	73	4.66%	Census
1930	1,970	329	20.05%	Census
1940	2,299	329	16.70%	Census
1950	2,967	668	29.06%	Census
1960	3,653	686	23.12%	Census
1970	7,857	4,204	115.08%	Census
1980	10,345	2,488	31.67%	Census
1990	15,004	4,659	45.04%	Census
2000	16,947	1,943	12.95%	Census
2010	21,041	4,094	24.16%	Census
2020 Projection	24,371	3,330	15.83%	Staff Projection
2030 Projection	27,701	3,330	13.66%	Staff Projection
2040 Projection	31,486	3,785	13.66%	Staff Projection
2050 Projection	35,788	4,302	13.66%	Staff Projection

Map depicting service areas for each CWS- 9 VAC 25-780-100 D2

Figure 5.2 Town of Blacksburg Water Distribution System

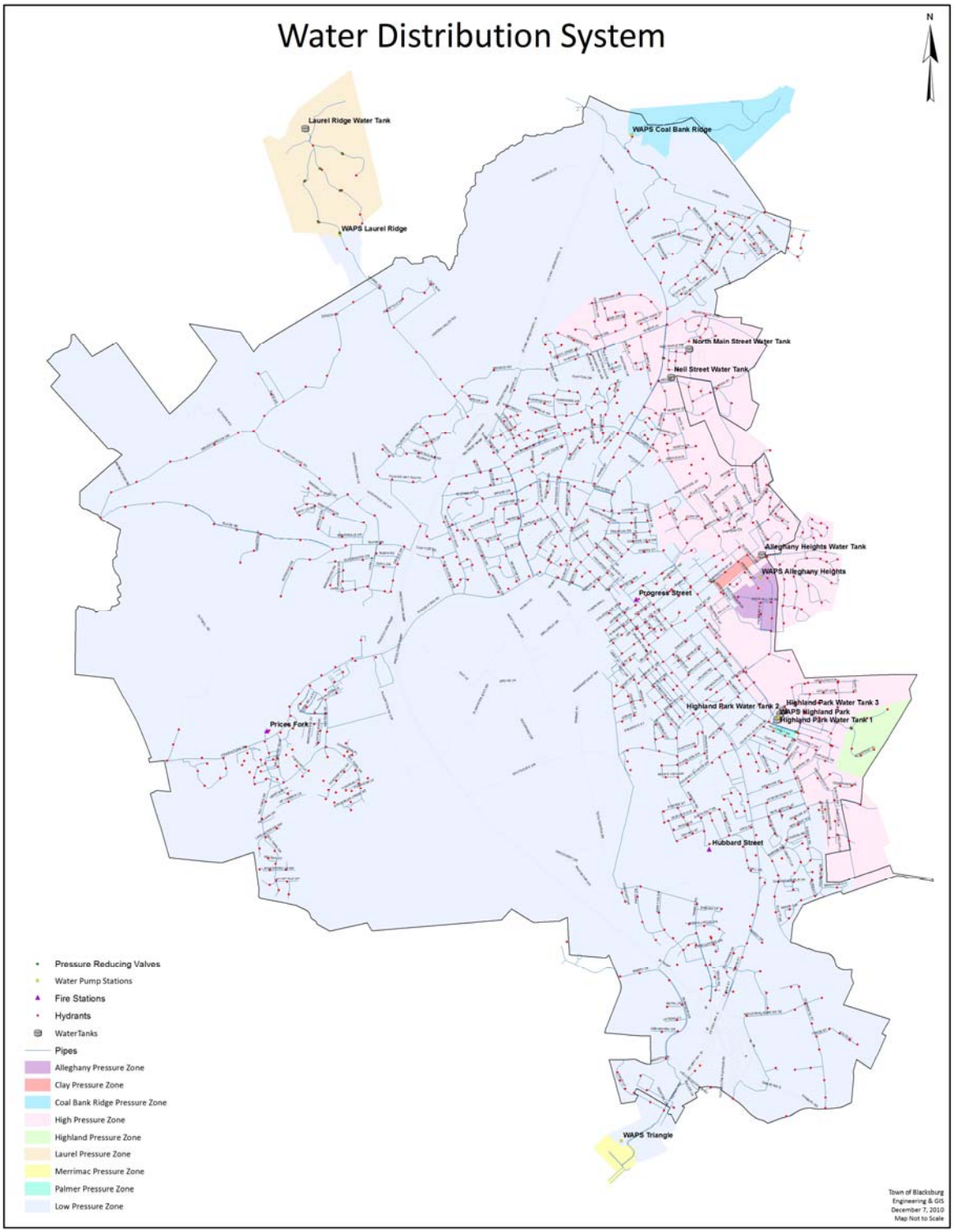
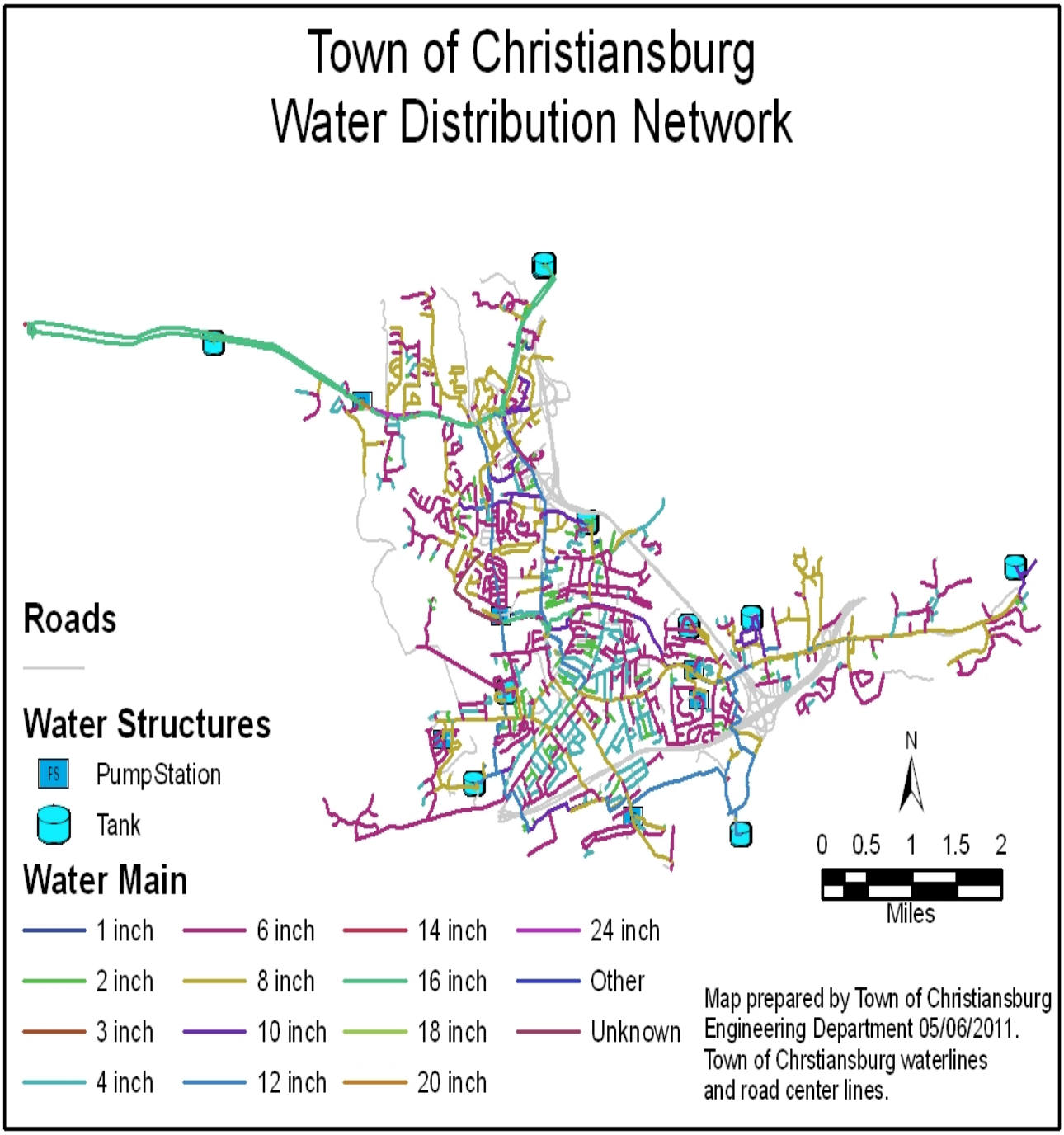


Figure 5.3 Town of Christiansburg Water Distribution Network



Estimated water demand for each existing CWS on an annual average and a peak monthly basis – 9 VAC 25-780-100 D3

Table 5.5 Average Monthly and Annual water demand projections for each CWS

CWS Water Demand	**2010**	**2020**	**2030**	**2040**	**2050**
Town of Blacksburg					
Average Monthly (MG)	130.50	152.10	163.35	175.22	188.00
Annual Average (MG)	1565.85	1825.00	1960.05	2102.40	2255.70
Self-Supplied					
Average Monthly (MG)	N/A	N/A	N/A	N/A	N/A
Annual Average (MG)	N/A	N/A	N/A	N/A	N/A
Town of Christiansburg					
Average Monthly (MG)	49.10	56.96	64.93	74.02	84.38
Annual Average (MG)	589.19	683.46	779.14	888.23	1012.58
Self-Supplied					
Average Monthly (MG)	N/A	N/A	N/A	N/A	N/A
Annual Average (MG)	N/A	N/A	N/A	N/A	N/A

Estimated Water Demand for Each Existing CWS Disaggregated into Categories of Use– 9 VAC 25-780-100 D4

The categories of use data for 2010 are observed numbers, while projections for 2020-2050 are based on percentages from 2010 data.

Table 5.6 Town of Blacksburg Demand Disaggregated into Categories of Use (GPD)

Town of Blacksburg	2000	2010	2020	2030	2040	2050
Residential	N/I	1,265,925	1,475,000	1,584,150	1,699,200	1,823,100
Commercial	N/I	1,125,779	1,310,000	1,406,940	1,509,120	1,619,160
Industrial	N/I	53,701	60,000	64,440	69,120	74,160
Va. Tech	N/I	1,243,192	1,445,000	1,551,930	1,664,640	1,786,020
Water Sales	N/I	165,270	190,000	204,060	218,880	234,840
Accounted Water Loss	N/I	12,688	15,000	16,110	17,280	18,540
Unaccounted Water Loss (14%)*	N/I	427,070	500,000	537,000	576,000	618,000
Total	N/I	4,293,625	4,995,000	5,364,630	5,754,240	6,173,820

Unaccounted Water Loss data excludes Va. Tech use

Table 5.7 Town of Christiansburg Demand Disaggregated into Categories of Use (GPD)

Town of Christiansburg	2000	2010	2020	2030	2040	2050
Residential	N/I	1,131,167	1,312,154	1,495,855	1,705,275	1,944,013
Commercial	N/I	388,162	450,268	513,305	585,168	667,092
Industrial	N/I	19,181	22,250	25,365	28,916	32,964
Water Sales	N/I	284,803	330,371	376,623	429,351	489,460
Accounted Water Loss	N/I	0*	0*	0*	0*	0*
Unaccounted Water Loss	N/I	76,000	83,600	91,960	101,156	111,272
Total	N/I	1,901,323	2,200,663	2,505,139	2,851,906	3,246,851

*** Unable to accurately report figure at this time due to Town of Christiansburg's water billing software limitations. All water loss reported as unaccounted at this time.**

Total Projected Water Demand for all Existing CWS disaggregated into above categories - 9 VAC 25-780-100 D5

Table 5.8 Total Water Demand for all CWS Disaggregated into above Categories (GPD)

Water Demand for all CWS's	2000	2010	2020	2030	2040	2050
Residential	N/I	2,397,092	2,787,154	3,080,005	3,404,475	3,767,113
Commercial	N/I	1,513,941	1,760,268	1,920,245	2,094,288	2,286,252
Industrial	N/I	72,882	82,250	89,805	98,036	107,124
Va. Tech	N/I	1,243,192	1,445,000	1,551,930	1,664,640	1,786,020
Water Sales	N/I	450,073	520,371	580,683	648,231	724,300
Accounted Water Loss	N/I	12,688	15,000	16,110	17,280	18,540
Unaccounted Water Loss	N/I	503,070	583,600	628,960	677,156	729,272
Total	N/I	6,194,948	7,195,663	7,869,769	8,606,146	9,420,671

Projection of Water Demand for Existing and Proposed Self-Supplied Nonagricultural Users >300,000 gallons per month - 9 VAC 25-780-100 E

The Town of Blacksburg has no existing or proposed self-supplied nonagricultural users (>300,000 gallons per month).

The Town of Christiansburg has no existing or proposed self-supplied nonagricultural users (>300,000 gallons per month).

Projection of Water Demand for Existing and Proposed Self-Supplied Agricultural Users >300,000 gallons per month - 9 VAC 25-780-100 F

The Town of Blacksburg has no existing or proposed self-supplied Agricultural users (>300,000 gallons per month).

The Town of Christiansburg has no existing or proposed self-supplied Agricultural users

(>300,000 gallons per month).

Projection of Water Demand for Existing and Proposed Self-Supplied Users <300,000 gallons per month - 9 VAC 25-780-100 G

Town of Blacksburg

The self-supplied users using less than 300,000 gallons per month are mainly residents utilizing wells. The existing residents on wells account for less than one percent of the population and should remain static because of Town code and regulations mentioned in section 9-VAC 25-780-100 A, B above.

Town of Christiansburg

The self-supplied users using less than 300,000 gallons per month are mainly residents utilizing wells. The existing residents on wells account for less than one percent of the population and it is anticipated this will remain static because of no known increase in well construction and the availability of the CWS.

Information Developed Pursuant to 9 VAC 25-780-140G- 9 VAC 25-780-100 H

At the time of preparation of this water supply plan, information on cumulative demand, use competition, or in-stream flow information developed pursuant to 9 VAC 25-780-140 G, is not available. The state-wide integrated Water Supply Plan has not been prepared by DEQ, from which analysis will be required to determine the above information.

Explanation of Projected Needs for Domestic, In-Stream Uses, and Economic Development- 9 VAC 25-780-100 I

The Towns of Blacksburg and Christiansburg water demand projections through 2050 indicate the Towns will not exceed permitted water production capacities. The majority of water demand within the Planning Area is supplied by distribution systems carrying water from the Water Authority with a permitted capacity of 12.4 MGD (exceeding the projected total demand of 9.4 MGD in 2050). A small percentage (< 1%)of the population within the planning area utilizes wells as a water supply, this percentage should remain static as discussed in previous sections.

Domestic consumption projections are based on population trends (provided by Census Bureau, VEC, and Planning Departments) in conjunction with historic raw water data and per capita use average (2000 and 2010). Commercial and Industrial use projections were based on ratio of demand in 2010 carried through 2050.

Chapter 6 Water Demand Management- 9 VAC 25-780-110

The Water Authority data indicates the overall use of water has declined over the past few years. Several factors have contributed to this decrease in water use including enforcement of Virginia Uniform Statewide Building Code, education on water conservation, improved distribution maintenance routines, water line replacement programs, leak detection programs, and water distribution accountability.

Information Describing More Efficient Water Use Practices- 9 VAC 25-780-110 A.1

The most significant impact to the reduction in water use is the enforcement of the building code. The required use of low flow fixtures in new and remodeled homes has a profound impact on water use.

The Town of Blacksburg has implemented new stormwater regulations that encourage citizens to capture stormwater for irrigation and groundwater recharge. Examples could include rain barrels, bioretention areas, etc.

Ordinances have been passed prohibiting private fire hydrants and prohibiting the use of public fire hydrants. Metered fill stations have been constructed for filling water trucks used by construction, chemical companies, etc.

Both towns have Cross Connection Control Programs that are necessary to protect the water supply system from backflow.

Information Describing Water through the Reduction of Use- 9 VAC 25-780-110 A.2

The Towns of Blacksburg and Christiansburg produce and distribute a Consumer Confidence Report annually. This report provides information on the source, disinfection process, distribution system, testing results, and vulnerability of the potable water they receive. The report is also utilized to educate citizens on conservation practices, lead and copper issues, and potential causes of backflow.

Information Describing Practices to Reduce Unaccounted for Water Loss- 9 VAC 25-780-110 A.3

<u>Town of Blacksburg</u>

The Town of Blacksburg monitors accounted and unaccounted water loss on a monthly basis. The town has reduced water loss approximately 5% over the past year by using leak detection methods and identifying illegal connections. The town has worked to educate maintenance

staff on the importance of accounting for water when flushing for new lines, repaired lines, fire hydrant flushing etc.

The town has installed master meters in areas that can be isolated; which helps determine when a leak is occurring. We have invested in leak detection equipment and trained staff in the use of this equipment.

A meter replacement and calibration program helps to ensure that water meters are accurate. The town also utilizes a water model and maintenance records to identify faulty water lines that are then placed in the water line replacement program each year.

The Town water storage facilities are inspected on a five year cycle as recommended by the Va. Health Department. This process helps us identify any health issues, safety issues, or leaks that may exist or evidence of problems that may arise in the future.

Town of Christiansburg

The Town of Christiansburg monitors accounted and unaccounted water loss on a monthly basis. Currently this procedure is limited due to modifications required of the water billing software. The Town has reduced water loss by the use of electronic leak detection methods, identifying illegal connections, and interdepartmental awareness. The Town also has made a centralized location for contractor water needs at the Public Works complex that allows supervised contractor water use.

The Town has invested in electronic leak detection equipment and training, along with tenured employees who are knowledgeable in water loss techniques. The Town has worked to educate maintenance staff on the importance of accounting for water losses particularly when flushing new water lines, repairing existing water lines, fire hydrant flushing, and wastewater line maintenance (jetting). An annual calibration program helps to ensure that master water meters are accurate and maintained as necessary.

The Town also utilizes a water model and maintenance records to identify water lines in need of replacement to aid with replacement scheduling. The Town's water storage facilities are inspected by staff annually and every 2 years by the Va. Health Department. This process helps us identify any health issues, safety issues, or leaks that may exist or evidence of problems that may arise in the future.

Table 6.1 Water Projects

Locality	Projected Completion Date	Project type	Project Description
Town of Blacksburg	6/2011	Water Storage	Water Tank Rehab
	9/2011	Water Lines	Approximately 1,200 feet water line replaced
	9/2011	Water Distribution System	New water lines installed to improve fire flow and water quality
Town of Christiansburg	8/2011	Water Storage	Water Tank Rehab
Town of Christiansburg	6/2012	Water Service Lines	Replace approximately 1,200 feet water service lines
Town of Christiansburg	6/2012	Water Distribution System	Replace approximately 5000 feet of water mains to improve fire flow, water quality, and dependability.

Current Conservation Practices, Techniques, and Technologies- 9 VAC 25-780-110 B

The Town of Blacksburg and Town of Christiansburg will continue to use available technologies to reduce unaccounted for water loss, to enforce building code, and educate citizens on water conservation. The projected water demand for both towns into the foreseeable future is well below the Water Authority's permitted output. Therefore no new projects for water conservation are planned.

Chapter 7 Drought Response Plan- 9 VAC 25-780-120

Purpose

The purpose of the Drought and Emergency Water Resource Plan is to conserve and protect the available water supply during declared emergency situations.

Introduction

A significant drought occurred in the Commonwealth of Virginia during the years of 1999-2002. In response to these conditions the State passed legislation requiring localities to develop a Water Supply Plan. A Drought Response and Contingency Plan is a required component of the Water Supply Plan, which identifies conditions for drought and water supply stage declarations, conservation measures for each stage, enforcement, variances, and public notice.

This plan was developed with elements from the State Drought Assessment and Response Plan and elements that are unique to the Town of Blacksburg and the Town of Christiansburg. The sole water source for the Town of Blacksburg and the Town of Christiansburg is the New River, therefore the two main indicators to evaluate drought severity is Precipitation Deficits and Streamflows.

Precipitation deficits will be monitored by comparing current precipitation amount with historical precipitation values as a percent of normal long-term average values. Comparisons will be made for each drought evaluation region using data compiled by the Office of the State Climatologist. Normal long-term average precipitation is defined as the mean precipitation for a thirty-year period of record for the area and time period being evaluated.

Precipitation amounts will be evaluated based on the water year (beginning October 1). Water years are a natural dividing point for water supply drought, as precipitation that falls in the first six months of a water year is analogous to putting money in the bank. Precipitation that occurs during this six month period has the potential to recharge ground water, which will sustain stream flows and support withdrawals from wells during the following six month period when moisture deficits naturally develop as evaporation and plant transpiration generally exceed precipitation. If a precipitation deficit outside of the normal range exists at the end of a water year, the precipitation records will carry forward until a normal condition is reached (i.e. if a precipitation deficit exists on October 1, precipitation records for the previous twelve months will be evaluated until the twelve month deficit is eliminated).

Because the significance of a precipitation deficit changes as the water year progresses, drought response stages will trigger at different percentages of normal depending upon the

date of evaluation as shown in table below.

7.1 ***Precipitation Deficits based on water year (beginning October 1)***

Months Analyzed	Normal (% of Normal Precipitation	Watch (% of Normal Precipitation	Warning (% of Normal Precipitation	Emergency (% of Normal Precipitation
October-December	>75.0	<75.0	<65.0	<55.0
October-January	>80.0	<80.0	<70.0	<60.0
October-February	>80.0	<80.0	<70.0	<60.0
October-March	>80.0	<80.0	<70.0	<60.0
October-April	>81.5	<81.5	<71.5	<61.5
October-May	>82.5	<82.5	<72.5	<62.5
October-June	>83.5	<83.5	<73.5	<63.5
October-July	>85.0	<85.0	<75.0	<65.0
October-August	>85.0	<85.0	<75.0	<65.0
October-September (and previous 12 months)	>85.0	<85.0	<75.0	<65.0

Streamflow data will be monitored at the closest USGS gauging station to the water intake, which is located in Radford, Virginia. In addition to these main indicators both towns will also utilize additional drought indication indexes, The National Weather Service Climate Prediction Center, Blacksburg Christiansburg VPI Water Authority, and any additional resources available.

The Virginia Drought Status Report produced each month summarizes the precipitation deficit, The NOAA Drought Index, U.S. Drought Monitor, Seasonal Drought Outlook, USGS Streamflow Conditions, etc. for all regions in the state of Virginia. The report is located at http://climate.virginia.edu .

I. Authority

The Town Manager, after notifying Town Council has authority to declare drought or emergency water supply conditions and impose voluntary and mandatory water conservation measures as set forth in this plan.

II. Water Supply and Drought Stages

The following section explains the indicators or triggers that the Town Manager may consider when implementing a specific stage and the actions that would be initiated for each stage.

Stage 1- Watch

The drought and water supply watch stage is intended to increase public awareness of climatic conditions that are likely to precede the occurrence of a significant drought event.

Indicators that may trigger a *watch* are as follows:

1. Monitoring and comparing water intake and treatment with water usage.
2. Precipitation deficits (% of normal precipitation) < 75.0-85.0% depending on time of year - determined using comparisons based on data compiled by the Office of the State Climatologist.
3. Representative daily stream flows for source water fall between the 10th and 25th percentile for return flow frequencies. Stream flows are monitored by utilizing the USGS gauging station (03171000) located at Radford, Va.
4. NOAA Drought Index D1, moderate drought.
5. Utilize additional drought indicators such as Standardized Precipitation Index, Palmer Drought Index, and NOAA monthly and seasonal precipitation outlooks.

When a drought watch declaration is warranted, the following actions may be initiated:

1. Public Outreach to inform customers of potential drought conditions and water conservation activities that may be utilized. (Websites, bill inserts, Blacksburg Alert, Town of Christiansburg Face Book and/or web pages, newspaper, etc.)
2. Monitor USGS data for in-stream flows daily
3. Limit non-essential government use
4. Notify major water users and Virginia. Tech of the drought condition
5. Increase resources to identify and correct water leaks
6. Encourage use of water recyclers (rain barrels, gray water, etc.) for non-potable uses
7. Refer to Appendix for additional water conservation tips

Stage 2- Warning (Voluntary)

The drought and water supply warning stage is declared when the onset of a significant drought event is imminent. Towns will request voluntary water conservation activities with a goal of reducing water use 5-10%.

Indicators that may trigger a *warning* are as follows:

1. Precipitation deficits (< 65.0-75.0% depending on time of year) - determined using comparisons based on data compiled by the Office of the State Climatologist.
2. Representative daily stream flows fall between the 5th and 10th percentile for return flow frequencies. Stream flows are monitored by utilizing the USGS gauging station (03171000) located at Radford, Va.
3. NOAA Drought Index D2, severe drought
4. Continue to monitor drought indicators listed above.
5. Continue to monitor and compare water intake and treatment with water usage.

When a drought warning declaration is warranted, the following actions may be initiated:

1. Continue measures from stage 1
2. Implement voluntary water use restrictions for all non-essential outdoor water use. (Examples- irrigation, washing car, washing sidewalks and driveways, etc.)
3. Limit water use for recreational activities (examples- swimming pools, golf courses, etc.)
4. The Town of Blacksburg will request Virginia Tech initiates voluntary water reduction measures.
5. Refer to Appendix for additional water conservation tips

Stage 3- Emergency (Mandatory)

The drought and water supply emergency stage is declared during the height of a significant drought event or loss of water supply due to emergency situations. Mandatory water conservation activities will be identified with a goal of reducing water use 10-15%.

Indicators that may trigger an *emergency* are as follows:

1. Emergency situation that significantly affects (or may affect) both town's water supply (which includes the water treatment plant, source water, or distribution system).

2. Precipitation deficits (< 55.0-65.0% depending on time of year) - determined using comparisons based on data compiled by the Office of the State Climatologist.
3. Representative daily stream flows below the 5th percentile for return flow frequencies. Stream flows are monitored by utilizing the USGS gauging station (03171000) located at Radford, Va.
4. NOAA Drought Index D3, extreme drought, or greater
5. Continue to monitor drought indicators listed above.

6. Water Authority notifies both towns that source water level is near or below water intake.
7. Water intake and treatment is less than historical water demand

When a drought or water supply emergency declaration is warranted the following actions may be initiated:

1. Continue measures from stages 1 and 2
2. Prohibit all non-essential outdoor water use including:
    a. washing vehicles
    b. irrigation for lawns, gardens, and plantings
    c. recreational uses, including refilling swimming pools
    d. Washing decks, sidewalks, and driveways
3. Require mandatory water use restrictions on major water users for non-essential functions.
4. Refer to Appendix for additional water conservation tips

Additional Measures

If measures outlined in section IV above are insufficient to reduce demand and preserve sufficient supplies of water for citizens, this section outlines additional measures that may be implemented during critical periods.

1. Limit new water mains and water taps.
2. Implement conservation water rate.

3. Implement a Water Restrictions Hotline.
4. Encourage use of non-potable water sources for construction activities and bulk water uses.

Violations and Penalties

The following summarizes those actions and penalties that will be imposed upon violators of the declared emergency stage of the drought and water supply management ordinance:

1. For the first offense, a violator shall receive a written warning delivered in person or posted by a town employee.
2. For the second offense, a violator shall be assessed a civil penalty of one hundred dollars, to be imposed on the violator's next water bill, or, in the case of violators not on the public water system, to be assessed by a written notice.
3. For the third offense, a violator shall be assessed a civil penalty of two hundred and fifty dollars for each offense, to be imposed on the violator's next water bill, or, in the case of violators not on the public water system, to be assessed by a written notice.
4. Each violation by a person shall be counted as a separate violation by that person, regardless of the location at which the violation occurs.

Appeals

Upon declaration of a drought emergency or water supply emergency, the town council shall establish an appeals review board to review applications for exemptions from required conservation measures and appeals of fines and to consider appeals of penalties assessed.

VI. Public Notice and Duration of Restrictions

Declaration of drought stages, a water supply emergency, or conservation measures by the Town Manager or the manager's designee shall become effective upon notification being printed in newspaper of general circulation within locality, through Blacksburg Alert, Town of Christiansburg Face Book and/or web pages, and/or broadcast upon radio or television station serving the locality. Any prohibitions or restrictions shall remain in effect until the town manager determines that a water emergency in the locality no longer exists.

Appendix

Water Conservation Tips

- Clothes washer and Dishwasher
  - Operate only full loads and/or use correct volume settings
  - Consider replacing washer – old washers use approximately 41 gallons per load, while new high-efficiency machines use 23 gallons on average
  - Consider replacing dishwasher – reduce by 30-50% water usage per load
- Faucet
  - Turn off the running water while brushing teeth, shaving, or washing
  - Catch "warm-up" water and use for plants
  - Consider installing low flow restrictors/aerators to faucets
- Irrigation systems
  - Lawns need only 1 inch of water per week, and they don't need to be watered daily
  - Water at night to reduce evapotranspiration
  - Upgrade your sprinkler clock
  - Install a rain shutoff device
  - Collect rainwater with a rain bucket or cistern system with drip lines
  - Convert turf to low water-use landscaping such as drought resistant grass, plants, shrubs and trees
- Showerhead
  - Take shorter showers (typical shower lasts 8 minutes and uses 17 gallons; an efficient shower lasts 3 or 4 minutes and uses 7.5 gallons)
- Leaks
  - Check for and repair toilet leaks – will waste from 30 to 500 gallons of water per day
  - Fix faucet leaks – a gradual dripping faucet can leak up to 5 gallons of water per day
  - Irrigation systems usually leak 20-40%
- Toilet
  - Offset older toilets with a plastic jug of pebbles and water to minimize flushing
  - Flush less frequently

Drought Response and Contingency Plans- 9 VAC 25-780-120.1, 2(a,b,c)

Ordinances will be submitted upon approval and adoption of the Water Supply Plan.

Chapter 8 Statement of Needs and Alternatives- 9 VAC 25-780-130

This section shall state the adequacy of existing water resources to meet current and projected demand based on the information from previous sections. Based on the determination of need alternative water resources and water demand management may be required.

Statement of Need- 9 VAC 25-780-130 A

The Town of Blacksburg and Town of Christiansburg have determined that the water resources available and treatment plant design capacity exceed current and future demand as outlined in this plan.

The Virginia Department of Health requires waterworks to plan for additional capacity when the waterworks production reaches eighty percent of the rated capacity (**12 VAC 5-590-520A)**. Projected demand based on population projections and current demand patterns is 72.2% of Water Authority design capacity in the year 2050.

Analysis of Alternatives if capacity does not meet future demand- 9 VAC 25-780-130B

The Community Water Systems represented in this water supply plan have adequate existing sources to meet projected demands during the planning period.

Potential Alternatives 9 VAC 25-780-130C

Water demand management alternatives that the towns and Va. Tech could institute include a more rigorous leak detection program, increased public outreach on water conservation, employee education on water conservation, encourage recycling gray water, etc.

Additional solutions to meet future demand include upgrade pump capacities, interconnections with surrounding localities, and increased storage capacity.

Appendix A - Upper New River Source Water Assessment Plan

UPPER NEW RIVER SOURCE WATER ASSESSMENT PLAN

Submitted to:

Virginia Department of Health
Office of Water Programs
1500 East Main Street, Room 109
Richmond, Virginia 23219

Prepared for:

Upper New River Source Water Assessment Group
3515 Peppers Ferry Road
Radford, Virginia 24141

January 7, 2002

Prepared By:

Draper Aden Associates
Engineering • Surveying • Environmental Services

DAA Project Number: B01127-01

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Virginia Department of Health Land Use Activity Rankings

1.0 Background Information

The U.S. Environmental Protection Agency (EPA), in accordance with the 1996 Amendments to the Safe Water Drinking Act, requires each state to develop a Source Water Assessment Program that will delineate boundaries of assessment areas, identify potential sources of contamination, and determine the susceptibilities of all public water supply systems (PWSS) in each state. The Virginia Department of Health (VDH) is responsible for the Source Water Assessment Program in Virginia.

This Source Water Assessment Plan (SWAP) is an assessment of land use activities and potential sources of contamination within the Virginia portion of the Upper New River watershed. The Upper New River SWAP encompasses portions of eight counties within the Commonwealth, as well as two cities (Galax and Radford) and numerous towns and communities. Twelve PWSS surface water intakes located within the Upper New River watershed are included in this SWAP. The eleven PWSS comprising these twelve intakes formed the Upper New River Source Water Assessment Group (The Group) to address these requirements. The Group includes the City of Galax, Town of Hillsville, Town of Fries, Austinville, Ivanhoe/Max Meadows, Town of Wytheville, Pulaski County PSA, Town of Pulaski, City of Radford, Blacksburg-Christiansburg-VPI Water Authority and the Radford Army Ammunition Plant (RAAP).

1.1 Source Water Protection Program in Virginia

Source water assessment planning is considered an initial phase in the eventual preparation and implementation of a source water protection plan. Preventing the contamination of and maintaining good quality drinking water supplies are the primary goals of source water protection efforts. Reducing or preventing chemical and microbiological contamination of source waters could allow PWSS to avoid more costly treatment or minimize monitoring requirements.

1.2 Source Water Assessment Program in Virginia

Section 1453 of the 1996 Amendments to the Safe Drinking Water Act (SDWA) requires each state to develop a Source Water Assessment Program that will:

- "delineate boundaries of the assessment areas in a state where one or more public water systems receive supplies of drinking water. The assessment should use all reasonably available hydrogeologic information on the sources of the supply of drinking water in the state and the water flow, recharge, and discharge and any other reliable information as the State deems necessary to adequately determine such areas; and

- identify contaminants regulated under this title for which monitoring is required under this title (or any regulated contaminants selected by the State, in its discretion, which the State, for the extent practical, the origins within each delineated area of such contaminants to determine the susceptibility of the public water systems in the delineated area to such contaminants."

In addition, "the State shall make the results of the source water assessments conducted under this section available to the public."

In the October 15, 1999 *Virginia Source Water Assessment Program* manual, VDH describes Virginia's strategic approach to conducting the assessment, which includes:

- Virginia's criteria for delineating the boundaries of the source water assessment areas,
- the significant potential sources of contamination to be inventoried in the delineated area, and
- the methodology for completing susceptibility determinations for each source.

1.3 SWAP Development Approach

In the October 15, 1999 *Virginia Source Water Assessment Program* manual, VDH referenced three goals regarding the SWAP Development Approach, which include:

1. Goals:
   a. Assessments will be conducted for the protection and benefit of waterworks thereby protecting the public's health and for the support of monitoring flexibility.
   b. Assessments will provide meaningful information to direct ongoing source water protection efforts and the overall drinking water program in the state.
   c. Assessments will be available to the waterworks owner who will be encouraged to proceed with source water protection programs.
   d. Assessments will be updated as new data becomes available.
   e. Assessments will use relevant data from existing state, federal, and other databases.
   f. Assessments of all sources will be completed within 42 months of US Environmental Protection Agency (EPA) of the SWAP.

2. Basis:
   a. In accordance with Section 1453 (a) (6) the program may make use of any of vulnerability assessments, sanitary surveys, and monitoring programs to avoid duplication and to encourage efficiency.
   b. Effort will be directed at maximizing the use of existing information, which may include:
   c. Data developed in completing the Groundwater Under Direct Influence of Surface Water (GUDIS) assessments,
   d. Data compiled to evaluate applications for waivers to Phase II/V monitoring, data from sanitary surveys of waterworks conducted by VDH personnel and consultants,
   e. Results from chemical and bacteriological monitoring programs, and
   f. Evaluation of a waterworks compliance with Virginia's comprehensive design and construction regulations.
   g. Geographic information systems (GIS) mapping of source water assessment areas will be provided.
   h. This assessment will be considered an initial assessment. As new data becomes available assessments may be modified.
   i. The delineation and land use activity (LUA) inventory included herein is considered minimum criteria to be utilized in the assessment.

3. Product deliverables will indicate where intensified site-specific source water assessment and/or protection will be needed and will include:
   a. Maps of source water assessment areas showing delineations and land use activities,
   b. Susceptibility determinations necessary for tailoring monitoring for chemical contaminants, and
   c. Information useful to future regulatory decisions (e.g., Ground Water Rule).

This Source Water Assessment Plan and report were completed in general accordance with the referenced manual and program, and meet the requirements of the VDH SWAP.

2.0 Physiography and Geology

The U.S. EPA defines the Upper New River watershed as the drainage basin of the New River from its source south of Boone, North Carolina downstream to the Giles County/Montgomery County line in Virginia. This SWAP addresses the Virginia portion of the watershed. Over 75% of the watershed is forested with the remainder being agricultural and urban.

The Upper New River watershed comprises approximately 2,937 square miles, of which approximately 2,203 square miles are in Virginia (Figure 1). The watershed is located in the Blue Ridge and Valley and Ridge physiographic provinces.

The southeastern portion of the watershed is located in the Blue Ridge physiographic province, including the PWSS for the City of Galax, Town of Fries and Town of Hillsville. This province includes the Blue Ridge proper, as well as smaller ridges and rounded hills. Bedrock consists of pre-Cambrian and Cambrian granites and gneisses which were folded and faulted while being thrust northwestward along a low-angle southeast-dipping fault.

The northwestern portion of the watershed is located in the Valley and Ridge physiographic province, including the remaining eight PWSS. This province in characterized by northeast-trending ridges and valleys of steeply folded and faulted bedrock. The ridges are generally underlain by sandstones, while the valleys are generally underlain by limestones and shales. Bedrock in this portion of the basin ranges in age from Cambrian to Mississippian. The limestone valleys are characterized by karst topography with associated springs, caves, and sinking streams.

3.0 Methodology

This Source Water Assessment Plan was prepared in accordance with the methodology outlined in VDH's, *Virginia Source Water Assessment Program* manual, issued October 15, 1999. The three components of the SWAP are delineation of the source water assessment areas, the inventory of land use activities of concern and potential sources of contamination within the assessment areas, and the determination of the susceptibility of each source water.

3.1 Delineation of Source Water Assessment Areas

The source water assessment areas were delineated in accordance with the procedures described in the VDH SWAP manual.

3.1.1 Surface Water Sources

The *Virginia Source Water Assessment Program Manual* indicates that a 5-mile fixed radius delineation approach for surface water sources is the approach of choice for Virginia. The advantages and disadvantages of time of travel versus fixed distance approaches were considered by VDH. The basis for Virginia's approach to delineation method is presented in the manual.

3.1.2 Zone 1 Delineation

The Zone 1 assessment area for non-tidal source intakes within surface water bodies is the watershed bounded by a 5-mile radius upgradient of the intake. The Zone 1 assessment area for impoundment source intakes within surface water bodies is the watershed bounded by a 5-mile radius of the intake. The Zone 1 assessment areas for the UNRSWAP are identified in Figure 2.

3.1.3 Zone 2 Delineation

The Zone 2 assessment area for non-tidal source intakes and impoundment intakes within surface water sources is the remainder of the watershed outside the 5-mile radius of Zone 1. The Zone 2 assessment areas for the UNRSWAP are identified on Figure 3.

3.1.4 Conjunctive Delineation

There are numerous hydrogeologic settings where there is a significant hydraulic connection between stream or reservoir and an underlying aquifer. Alluvial sand and gravel deposits within floodplains and terraces of streams and rivers typically function as high yield aquifers and are commonly used to produce municipal supplies. Groundwater in these deposits typically exhibits a strong degree of hydraulic connection with streams and may routinely move between the aquifer and surface water. Groundwater that occurs in fractured rocks in mountainous areas is also typically strongly connected to streams, since most flow in mountainous areas result from groundwater discharge. In order to establish the source water assessment area it is important to determine if the PWSS is providing water from both groundwater and surface water sources.

Conjunctive delineation of source water assessment areas is the integrated delineation of the zone of groundwater contribution and the area of surface water contribution to a public water supply. Based on the October 1999 *Virginia Source Water Assessment Program*, conjunctive delineation concerns are adequately addressed by the groundwater and surface water assessment strategies.

3.1.5 Mapping Method

The first step in delineating the source water assessment study area is to determine the geographic location of the source water intakes for the PWSS system. Initially, these points were supplied by VDH. However, the locations were field verified using a combination of topographic maps and hand-held global positioning system (GPS) receivers.

3.1.6 Geographic Data

It is well established that geographic information systems (GIS) provide a powerful analytical tool which can be used to create and link spatial and descriptive data for problem solving, spatial modeling, and to present the results in associative maps and/or tables. The mapped digital data presented herein was stored as logical thematic layers in a GIS. There are typically two types of data in a GIS thematic layer: spatial features and descriptive information. The spatial data is a geographic location for a physical feature such as a road, a well, or a potential source of contamination and is represented as X,Y coordinates. The descriptive information is attribute data, which describes the physical feature. These two types of data are stored in separate spatial and attribute files that are related by relational database techniques. Base maps and spatial data presented herein were constructed using ArcView 8.

3.1.7 Limiting Factors

Several assumptions were made regarding the accuracy of data provided by government agencies, which included geologic mapping and potential sources of contamination. Draper Aden Associates endeavored to affirm to the extent possible the accuracy of this data and provided amendments to government records information when it was discovered that a potential source of contamination as described by the sources was found absent from these records. However, in general Draper Aden Associates assumes no responsibility for the completeness and accuracy of government regulatory information.

3.2 Summary of Land Use Activity Inventory

Based upon the October 15, 1999 *Virginia Source Water Assessment Program* manual potential sources of contamination (PSC) sites are identified within both Zone 1 and Zone 2. The VDH SWAP defines PSC sites as those facilities available from State, Federal, and Local regulatory agency databases and other sources of information such as VPDES discharges, tire piles, landfills, Superfund sites, underground injection control permitted sites, industries, etc. The SWAP requires that an inventory of land use activities (LUAs) of concern and potential conduits to groundwater be completed for Zone 1. Additionally, the manual indicates that the inventory

shall include only items listed in Appendix F, Tables 1, 2, and 3 of the SWAP manual. A copy of this table is presented in Appendix C.

The LUA inventory identifies PSCs within Zone 1 and Zone 2 and LUAs in Zone 1. The purpose of the inventory is to identify an activity or land use that has the potential to contaminate the public drinking water supply, including regulated facilities in the delineated assessment area, as well as other agricultural, residential, commercial, municipal, and industrial activities. The SWAP manual outlined land use activities of concern are provided in Appendix C. It is important to note that the links between the potential contaminant sources and the primary contaminant types are not intended to be comprehensive, but only those most commonly associated with the potential contaminant source. Any potential source may have none, some or more types of contaminants associated with those listed in the SWAP manual. Each LUA has been ranked relative to its threat to water quality (high, medium, low), considering the type of drinking water source. The risk rankings are a combination of the perceived risk of a release of a contaminant from a land use area, chance of transport of the contaminant from the LUA to the source water, and the relative public health risk of the contaminant.

The first step is the broad PSC inventory based on existing regulated entities, GIS coverages, and a general land use evaluation. Databases evaluated include: Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), Resource Conservation and Recovery Act Information System (large and small quantity generators and disposals) (RCRIS), Virginia Pollution Discharge Elimination System sites (VPDES), Toxic Release Inventory sites (TRI). In addition, underground storage tanks, voluntary remediation sites, groundwater remediation not under CERCLIS and RCRIS, underground injection control - class five wells (automotive service station disposal wells, industrial process disposal wells, and other class five wells as warranted), landfills or dumps, spills and releases, industrial and municipal lagoons, and concentrated animal feeding operations. To the extent feasible, the locations of these sources were mapped. Additionally, information regarding LUAs and PSC for the individual intake zones is presented in Appendix A-1 through A-11. The regulatory database inventory is not an exhaustive survey, but its purpose is to make the PWSS aware of any known regulated facilities in the source water assessment area.

A more detailed PSC inventory was conducted to identify PSC that were not captured in the broad source inventory and to field verify the location of regulated potential contaminant sources. This inventory was completed by site visits and windshield surveys. Inventoried data is presented in Appendices A-1 through A-11, which include the corresponding figures for the individual intakes.

The inventory should be updated as needed to note changes in land use activities or potential contaminant sources, and the plan revised accordingly.

3.3 Susceptibility Determination

VDH has implemented a three-step process to determine the susceptibility of a water source to potential contamination. The first step is a sensitivity determination, which is an evaluation of the hydrogeological and physical characteristics of the source water and its assessment area. The

second step is an inventory of LUAs of concern and potential conduits to groundwater. The third step is assigning susceptibility using the criteria in Chart A below, which establishes one of four susceptibilities (very low, low, moderate, or high) for each water source.

Chart A

Type of Water Source	Sensitive Source	LUA present in assessment area	Susceptibility
Groundwater	No	No	Very Low
Groundwater	No	Yes	Low
Groundwater	Yes	No	Moderate
Groundwater	Yes	Yes	High
Surface water	Yes	No	Moderate
Surface water	Yes	Yes	High

Due to changing hydrologic, hydraulic and atmospheric conditions, surface water by nature is exposed to an inconsistent array of contaminants at varying concentrations. Additionally, since surface water sources are open to the atmosphere, VDH considers these sources sensitive, and therefore, to have a moderate or high susceptibility.

As previously mentioned, the second step of the three-step process in the susceptibility determination is an inventory of LUAs of concern and potential conduits to groundwater. Based on the SWAP manual, VDH requires that the inventory of LUAs in Zone 1 be used for the susceptibility determination for each surface water source. Additionally, VDH requires that LUAs in Zone 1 and major PCSs in Zone 2 be used for the susceptibility determination for each groundwater source.

The third step of the three-step process in the susceptibility determination is assigning a susceptibility to each water source. Based on the SWAP manual, VDH requires that Chart A (presented above) be used to determine the susceptibility of a source after the sensitivity determination and LUA inventory are completed. The susceptibility may be revised if additional data that becomes available in the future.

A brief description of the susceptibilities is provided below:

- **Very Low**: With this susceptibility a groundwater source is not sensitive to contamination and has no known LUAs of concern within the respective delineated assessment area(s).
- **Low:** With this susceptibility a groundwater source is not sensitive to contamination, however known LUAs of concern exist within the respective delineation assessment area(s). VDH requires that the LUAs are ranked relative to health risk.
- **Moderate:** With this susceptibility a groundwater source is determined to be sensitive and has no known LUAs of concern within the respective delineated assessment area(s). Furthermore with this susceptibility, a surface water source has no known LUAs of concern within the respective delineated assessment area(s).

- **High:** With this susceptibility a groundwater source is determined to be sensitive and has known LUAs of concern within the respective delineated assessment area(s). Furthermore with this susceptibility, a surface water source has known LUAs of concern within the respective delineated assessment area(s). VDH requires that the LUAs are ranked relative to health risk.

Characterizing the condition of a water source is largely based on available water quality data. The data evaluated during this source water assessment study are based on results from finished water and in some instances raw water. The US EPA August 1997, State Source Water Assessment and Protection Programs Guidance indicates that contaminants of concern should include, but not be limited to, water quality parameters regulated under the Safe Drinking Water Act. These contaminants include those with maximum contaminant levels (MCLs) for finished water, contaminants regulated under the Surface Water Treatment Rule, and the microorganism Cryptosporidium.

4.0 Source Water Assessment - City of Galax

The City of Galax's raw water intake is located on Chestnut Creek approximately 1 mile south (upstream) of where the creek flows under U.S. Route 58. The intake is located in the southern portion of the City of Galax.

4.1 Source Water Assessment Area

This Zone 1 source water assessment area is located within the Galax, Woodlawn, Cumberland Knob, and Lambsburg 7.5-minute USGS topographic quadrangles. Zone 2 is the area upstream from the limits of Zone 1 to the remainder of the Chestnut Creek watershed. The intake is located within an industrial and commercial section of the city. The assessment area for the City of Galax intake (Appendix A-1, Figures 1 and 2) was determined in accordance with the VDH SWAP manual.

4.2 Land Use Activity Inventory

The following land use activity inventory observations are based on information gathered during this source water assessment study, which includes site reconnaissance observations, government records review results, and third party regulatory database search results. A copy of the third party regulatory database search results are included in Appendix B on CD-ROM. The inventory reflects known land use activities and potential contaminant sources up to the date of our investigation of November 20, 2001.

4.2.1 Zone 1 Inventory

Based on information gathered during the inventory process, there are 41 LUA and PSCs identified within the Zone 1 assessment area. These sites area categorized in Appendix A-1, Tables 1 through 9. These sites include:

- 16 – Best Management Practices Sites (Table 1)
- 1 – Golf Course (Table 2)

- 1 – Hazardous and Solid Waste Site (Table 3)
- 3 – Industrial Sites (Table 4)
- 1 – Leaking Underground Storage Tank (Table 5)
- 1 – Tire Pile Site (Table 6)
- 5 – Toxic Release Inventory Sites (Table 7)
- 10 – Underground Storage Tanks (Table 8)
- 3 – Surface Water Source Wells and Springs (Table 9)

4.2.2 Zone 2 Inventory

The PSCs identified within Zone 2 for the City of Galax intake are categorized below. These sites can be viewed individually on the UNRSWAP website at www.daa.gis.com/unrswap or on the CD in Appendix B.

- 2 – Best Management Practices Sites
- 1 – DEQSWRO, Kings Trailer Park

4.3 Susceptibility Determination

Due to the presence of LUAs and PSCs within Zone 1, the water source is considered to have a high susceptibility according to the definitions presented in the Virginia SWAP manual. This designation does not mean that the source water has been impacted or that it will be impacted in the future. It does mean that if there is a release of pollutants in the source water assessment area, the source water could become impacted.

VDH required LUAs be ranked so that waterworks and the public have a basis for determining the highest health priority for providing source water protection activities within individual assessment areas. The rankings for the LUAs and PSCs identified within Zone 1 range from high to no ranking. Be advised that no ranking (designated by an "x" on the VDH table) does not mean that these PSCs pose no risk. VDH rankings are provided in Appendix C.

5.0 Source Water Assessment – Town of Hillsville

The raw water intake for the Town of Hillsville is located on Little Reed Island Creek approximately 0.14 miles south (upstream) of where the creek flows under U.S. Route 58. The intake is located in a rural portion of Carroll County.

5.1 Source Water Assessment Area

This Zone 1 source water assessment area is located within the Woodlawn, Hillsville, and Fancy Gap 7.5-minute USGS topographic quadrangles. The Zone 2 assessment area is the remainder of the Little Reed Island Creek watershed upstream from the limits of Zone 1. The watershed includes a combination of forested and agricultural areas. The assessment area for the Town of Hillsville intake (Appendix A-2, Figures 1 and 2) was determined in accordance with the VDH SWAP manual.

5.2 Land Use Activity Inventory

The following land use activity inventory observations are based on information gathered during this source water assessment study, which includes site reconnaissance observations, government records review results, and third party regulatory database search results. A copy of the third party regulatory database search results are included in Appendix B on CD-ROM. The inventory reflects known land use activities and potential contaminant sources up to the date of our investigation of November 20, 2001.

5.2.1 Zone 1 Activity Inventory

Based on information gathered during the inventory process, there are 4 LUA and PSCs identified within the Zone 1 assessment area. The sites are categorized in Appendix A-2, Tables 1 through 5. The sites identified include:

- 1 – Best Management Practices (Table 1)
- 1 – Discharge-No Discharge (Table 2)
- 1 – Industrial Facilities Discharge (Table 3)
- 1 – Underground Storage Tank (Table 4)

5.2.2 Zone 2 Inventory

Based on information gathered during the inventory process, there are 19 PSCs identified within the Zone 2 assessment area and are listed below. These sites can be viewed individually on the UNPSWAP website at www.daagis.com/unrswap or on the CD in Appendix B.

- 3 - Discharge-No discharge
- 5 – Storage Tank Releases
- 2 – Tire Piles
- 3 – Underground Storage Tanks
- 6 – Wells and Springs

5.3 Susceptibility Determination

Due to the presence of LUAs and PSCs within Zone 1, the water source is considered to have a high susceptibility according to the definitions presented in the Virginia SWAP manual. This designation does not mean that the source water has been impacted or that it will be impacted in the future. It does mean that if there is a release of pollutants in the source water assessment area, the source water could become impacted.

VDH required LUAs be ranked so that waterworks and the public have a basis for determining the highest health priority for providing source water protection activities within individual assessment areas. The rankings for the LUAs and PSCs identified within Zone 1 range from medium to no ranking. Be advised that no ranking (designated by an "x" on the VDH table) does not mean that these PSCs pose no risk. VDH rankings are provided in Appendix C.

6.0 Source Water Assessment – Town of Fries

The Town of Fries raw water intake is located on Eagle Bottom Creek, a tributary of the New River. The intake and treatment facility were formerly owned by Riegel Textile Company. The treatment facility was established in 1936-37. The town came into possession of the facility on January 1, 1989.

6.1 Source Water Assessment Area

This source water assessment area is located within the Galax, Brierpatch Mountain, Cripple Creek and Austinville 7.5-minute USGS topographic quadrangles. The Zone 1 and Zone 2 assessment areas encompass the Eagle Bottom Creek watershed, located northwest of the Town of Fries. The assessment area is approximately 3 miles by 1.75 miles so Zone 1 and Zone 2 are the same. The assessment area is mostly forested with some agricultural and residential areas located within the area. The source water assessment area for the Town of Fries intake (Appendix A-3, Figures 1 and 2) was determined in accordance with the VDH SWAP manual.

6.2 Land Use Activity Inventory

The following land use activity inventory observations are based on information gathered during this source water assessment study, which includes site reconnaissance observations, government records review results, and third party regulatory database search results. A copy of the third party regulatory database search results are included in Appendix B on CD-ROM. The inventory reflects known land use activities and potential contaminant sources from information gathered during the investigation conducted on July 17, 2001.

6.2.1 Zone 1 Inventory

Based on information gathered during the inventory process, there are no LUAs or PSCs identified within the Zone 1 assessment area.

6.2.2 Zone 2 Inventory

Based on information gathered during the inventory process, there are no PSCs identified within the Zone 2 assessment area.

6.3 Susceptibility Determination

Since no LUAs or PSCs are present within the assessment area, the water source is considered to be of moderate susceptibility according to the definitions presented in the Virginia SWAP manual. This designation does not mean that the source water has been impacted or that it will be impacted in the future. It does mean that if there is a release of pollutants in the source water assessment area, the source water could become impacted.

7.0 Source Water Assessment – Ivanhoe/Max Meadows

The intake for Ivanhoe/Max Meadows is located on Powder Mill Branch, a tributary to the New River, approximately 0.54 miles west of the community of Raketown.

7.1 Source Water Assessment Area

This source water assessment area is located within the Austinville and Cripple Creek 7.5-minute USGS topographic quadrangles. The assessment area is approximately 2.84 miles by 1.34 miles and encompasses the entire Powder Mill Branch watershed, so Zone 1 and Zone 2 are the same. The assessment area is completely forested. The source water assessment (Appendix A-4, Figures 1 and 2) area was determined in accordance with the VDH SWAP manual.

7.2 Land Use Activity Inventory

The following land use activity inventory observations are based on information gathered during this source water assessment study, which includes site reconnaissance observations, government records review results, and third party regulatory database search results. A copy of the third party regulatory database search results are included in Appendix B on CD-ROM. The inventory reflects known land use activities and potential contaminant sources from information gathered during the investigation conducted on July 11, 2001.

7.2.1 Zone 1 Inventory

Based on information gathered during the inventory process, there are no LUAs identified within the Zone 1 assessment area. Two PSCs, a leaking underground storage tank (LUST) and an underground storage tank (UST) were identified within the Zone 1 assessment area. A LUST at McCLoud's Grocery, State Route 601 East Invanhoe, and a UST identified belonging to Claude Blair, Ivanhoe Virginia. These sites are categorized in Appendix A-4, Tables 1 and 2 respectively.

7.2.2 Zone 2 PSC Inventory

Since Zone 2 is the same as Zone 1 for this intake, the PSCs are as described above.

7.3 Susceptibility Determination

Due to the presence of LUAs and PSCs within Zone 1, the water source is considered to have a high susceptibility according to the definitions presented in the Virginia SWAP manual. This designation does not mean that the source water has been impacted or that it will be impacted in the future. It does mean that if there is a release of pollutants in the source water assessment area, the source water could become impacted.

VDH requires LUAs be ranked so that waterworks and the public have a basis for determining the highest health priority for providing source water protection activities within individual assessment areas. There are no rankings for USTs or LUSTs in the VDH ranking tables.

However, this does not mean that these PSCs pose no risk. VDH rankings are provided in Appendix C.

8.0 Source Water Assessment – Austinville

The Austinville raw water intake is located on the New River. The water treatment plant for the intake is located on the former property of the Austinville Limestone Company. The public water plant was formerly operated by the limestone company until taken over by Wythe County.

8.1 Source Water Assessment Area

The Zone 1 source water assessment area is located within the Austinville, Sylvatus, Max Meadows, Cripple Creek, Galax, Brierpatch Mountain, 7.5-minute USGS topographic quadrangles. The Zone 2 assessment area incorporates the New River watershed from the limits of Zone 1 to the Virginia/North Carolina border. The intake is located in an industrial portion of the town. The Zone 1 assessment area is comprised of industrial, commercial, agricultural, and forested property. The source water assessment area for the Austinville intake (Appendix A-5, Figures 1 and 2) was determined in accordance with the VDH SWAP manual.

8.2 Land Use Activity Inventory

The following land use activity inventory observations are based on information gathered during this source water assessment study, which includes site reconnaissance observations, government records review results, and third party regulatory database search results. A copy of the third party regulatory database search results are included in Appendix B on CD-ROM. The inventory reflects known land use activities and potential contaminant sources on the date of the inspection, July 11, 2001.

8.2.1 Zone 1 Inventory

Based on information gathered during the inventory process, there are 28 LUAs and PSCs identified within the Zone 1 assessment area. For a list of the individual LUAs and PSCs identified in Zone 1 refer to Appendix A-5, Tables 1 through 12. The types of sites identified within Zone 1 include:

- 12 – Best Management Practices Sites (Table 1)
- 1 – Boat Ramps (Table 2)
- 2 – Discharge-No Discharge (Table 3)
- 2 – Industrial Facilities Discharge (Table 4)
- 1 – Industrial Site (Table 5)
- 1 – Landfill Facilities (Table 6)
- 1 – Permit Compliance System (Table 7)
- 3 – Storage Tank Release (Table 8)
- 1 – Tire Piles (Table 9)
- 2 – Underground Storage Tanks (Table 10)
- 1 – Voluntary Remediation Program (Table 11)

- 1 – Wells and Springs (Table 12)

8.2.2 Zone 2 Inventory

The 489 PSCs identified within Zone 2 for the Town of Austinville intake are categorized below. These sites can be viewed individually on the UNRSWAP website at www.daagis.com/unrswap of on the CD in Appendix B.

- 171 – Best Management Practices
- 8 – Boat Ramps
- 13 – Discharge-No Discharge
- 2 – Golf Courses
- 16 – Hazardous and Solid Waste Sites
- 1 – Hospital
- 13 – Industrial Facilities Discharge
- 53 Industrial Sites
- 5 – Underground Injection Wells
- 1 – Landfill
- 5 – Permit Compliance Systems
- 60 – Storage Tank Releases
- 6 – Tire Piles
- 14 – Toxic Release Inventory Sites
- 1 – Treatment, Storage, and Disposal Facilities
- 73 – Underground Storage Tanks
- 47 – Wells and Springs

8.3 Susceptibility Determination

Due to the presence of LUAs and PSCs within Zone 1, the water source is considered to have a high susceptibility according to the definitions presented in the Virginia SWAP manual. This designation does not mean that the source water has been impacted or that it will be impacted in the future. It does mean that if there is a release of pollutants in the source water assessment area, the source water could become impacted.

VDH requires LUAs be ranked so that waterworks and the public have a basis for determining the highest health priority for providing source water protection activities within individual assessment areas. The rankings for the LUAs and PSCs identified within Zone 1 for the Austinville intake range from high to no ranking. Be advised that no ranking (designated by an "x" on the VDH table) does not mean that these PSC pose no risk. VDH rankings are provided in Appendix C.

9.0 Source Water Assessment – Town of Wytheville

The raw water intake for the Town of Wytheville is located on Reed Creek directly west of U.S. Route 21 approximately 0.75 miles south of the Town of Wytheville. The intake has a potential of 4 million gallons per day (MGD) however is currently operating at 2 MGD.

9.1 Source Water Assessment Area

This Zone 1 source water assessment area is located within the Wytheville, Crockett, and Speedwell 7.5-minute USGS topographic quadrangles. This area is comprised of agricultural and forested land. Zone 2 encompasses the remainder of the New River watershed from the limits of Zone 1 to the Virginia/North Carolina border. The source water assessment area for the Town of Wytheville's intake (Appendix A-6, Figures 1 and 2) was determined in accordance with the VDH SWAP manual.

9.2 Land Use Activity Inventory

The following land use activity inventory observations are based on information gathered during this source water assessment study, which includes site reconnaissance observations, government records review results, and third party regulatory database search results. A copy of the third party regulatory database search results are included in Appendix B on CD-ROM. The inventory reflects known land use activities and potential contaminant sources up to the date of our investigation of June 20, 2001.

9.2.1 Zone 1 Inventory

Based on information gathered during the inventory process, 54 LUAs and PSCs were identified within the Zone 1 assessment area. These sites are described in Appendix A-6, Tables 1 through 12 and are categorized below:

- 4 – Best Management Practices (Table 1)
- 1 – Discharge-No Discharge (Table 2)
- 2 – Hazardous and Solid Waste Sites (Table 3)
- 1 – Industrial Facility Discharge (Table 4)
- 12 – Industrial Sites (Table 5)
- 6 – Leaking Underground Storage Tanks (LUST) (Table 6)
- 1 – Permit Compliance System (Table 7)
- 2 – Tire Piles (Table 8)
- 3 – Toxic Release Inventory (Table 9)
- 11 – Storage Tank Releases (Table 10)
- 6 – Underground Storage Tanks (Table 11)
- 5 – Voluntary Remediation Program (Table 12)

9.2.2 Zone 2 Inventory

The 52 PSCs identified within Zone 2 for the Town of Wytheville intake are categorized below. These sites can be viewed individually on the UNRSWAP website at www.daagis.com/unrswap or on the CD in Appendix B.

- 24 – Best Management Practices
- 1 – Boat Ramp
- 2 – Discharge-No Discharge

- 1 - Hazardous and Solid Waste Sites
- 1 – Industrial Facilities Discharge
- 6 – Industrial Sites
- 1 – Underground Injection Well
- 1 – Marinas
- 1 – Permit Compliance System
- 6 – Storage Tank Release
- 1 – Tire Piles
- 3 – Underground Storage Tank
- 4 – Wells and Springs

9.3 Susceptibility Determination

Due to the presence of LUAs and PSCs within Zone 1, the water source is considered to have a high susceptibility according to the definitions presented in the Virginia SWAP manual. This designation does not mean that the source water has been impacted or that it will be impacted in the future. It does mean that if there is a release of pollutants in the source water assessment area, the source water could become impacted.

VDH requires LUAs be ranked so that waterworks and the public have a basis for determining the highest health priority for providing source water protection activities within individual assessment areas. The rankings for the LUAs and PSC identified within Zone 1 for the Town of Wytheville intake range from high to no ranking. Be advised that no ranking (designated by an "x" on the VDH table) does not mean that these PSC pose no risk. VDH rankings are provided in Appendix C.

10.0 Source Water Assessment – Pulaski County PSA

The intake for the Pulaski County PSA is located on the New River approximately 1.9 miles east of the community of Draper.

10.1 Source Water Assessment Area

The Zone 1 source water assessment area for the Pulaski County PSA is located within the Dublin, Hiwassee, Foster Falls, and Pulaski 7.5-minute USGS topographic quadrangles. Zone 2 encompasses the remainder of the New River watershed from the limits of Zone 1 to the Virginia/North Carolina border. The intake is located in a rural portion of the county comprising of fields and wooded areas. The intake is located on the Claytor Lake portion of the river. The lake has high recreational use during portions of the year for fishing, swimming, and boating. The source water assessment area for the Pulaski County PSA intake (Appendix A-7, Figures 1 and 2) was determined in accordance with the VDH SWAP manual.

10.2 Land Use Activity Inventory

The following land use activity inventory observations are based on information gathered during this source water assessment study, which includes site reconnaissance observations, government records review results, and third party regulatory database search results. A copy of the third party regulatory database search results are included in Appendix B on CD-ROM. The inventory reflects known land use activities and potential contaminant sources up to the date of our investigation of June 14, 2001.

10.2.1 Zone 1 Inventory

Based on information gathered during the inventory process, there are 85 LUAs and PSCs identified within the Zone 1 assessment area. The individuals sites identified within the assessment area are listed in Tables1 through 14 in Appendix A-7. The sites are categorized below:

- 2 – Best Management Practices Sites (Table 1)
- 1 – Boat Ramp (Table 2)
- 3 – Discharge-No Discharge (Table 3)
- 10 – Hazardous and Solid Waste Sites (Table 4)
- 4 – Industrial Facilities Discharge (Table 5)
- 17 – Industrial Sites (Table 6)
- 2 – Landfills (Table 7)
- 4 – Marinas (Table 8)
- 11 – Storage Tanks Release (Table 9)
- 2 – Tire Piles (Table 10)
- 3 – Toxic Release Sites (Table 11)
- 22 – Underground Storage Tanks (Table 12)
- 1 – Voluntary Remediation Program (Table 13)
- 3 – Wells and Springs (Table 14)

10.2.2 Zone 2 Inventory

The 1,182 PSCs identified in Zone 2 for the Pulaski County intake are categorized below. These sites can be viewed individually on the UNRSWAP website at www.daagis.com/unrswap of on the CD in Appendix B.

- 1 – Airport
- 302 – Best Management Practices Sites
- 12 – Boat Ramps
- 37 – Discharge-No Discharge
- 4 – Golf Courses
- 54 – Hazardous and Solid Waste Sites
- 3 – Hospitals

- 27 – Industrial Facilities Discharge
- 158 – Industrial Sites
- 4 – Landfills
- 8 – Marinas
- 20 – Permit Compliance Systems
- 4 – Pollution Complaints
- 180 – Storage Tanks Release
- 31 – Tire Piles
- 31 – Toxic Release Sites
- 1 – Treatment Storage and Disposal Facility
- 10 – Underground Injection Wells
- 182 – Underground Storage Tanks
- 1 – Voluntary Remediation Program
- 112 – Wells and Springs

10.3 Susceptibility Determination

Due to the presence of LUAs and PSCs within Zone 1, the water source is considered to have a high susceptibility according to the definitions presented in the Virginia SWAP manual. This designation does not mean that the source water has been impacted or that it will be impacted in the future. It does mean that if there is a release of pollutants in the source water assessment area, the source water could become impacted.

VDH requires LUAs be ranked so that waterworks and the public have a basis for determining the highest health priority for providing source water protection activities within individual assessment areas. The rankings for the LUAs and PSCs identified within Zone 1 for the Pulaski County PSA intake range from high to no ranking. Be advised that no ranking (designated by an "x" on the VDH table) does not mean that these PSC pose no risk. VDH rankings are provided in Appendix C.

11.0 Source Water Assessment – Town of Pulaski

The Town of Pulaski's raw water intake is located on Hogan Branch approximately 0.6 miles west of the Town of Pulaski.

11.1 Source Water Assessment Area

The Zone 1 source water assessment area is located within the Pulaski, Foster Falls, Max Meadows, and Long Spur 7.5-minute USGS topographic quadrangles. The Zone 2 assessment area encompasses the remainder of the Hogan Branch and Peak Creek watershed. The assessment area is located in a forested portion of Pulaski County. The source water assessment area for the Town of Pulaski intake (Appendix A-8, Figures 1 and 2) was determined in accordance with the VDH SWAP manual.

11.2 Land Use Activity Inventory

The following land use activity inventory observations are based on information gathered during this source water assessment study, which includes site reconnaissance observations, government records review results, and third party regulatory database search results. A copy of the third party regulatory database search results are included in Appendix B on CD-ROM. The inventory reflects known land use activities and potential contaminant sources up to the date of our investigation of June 14, 2001.

11.2.1 Zone 1 Inventory

Based on information gathered during the inventory process, there are 3 LUAs and PSCs identified within the Zone 1 assessment area. The LUA, a tire pile, is located on VA State Route 610 (i.e. Caseknife Road) approximately 0.76 miles southwest of the intake. The sites are described in Appendix A-7, Tables 1 through 3 and are categorized below.

- 1 – Best Management Practices Sites (Table 1)
- 1 – Tire Piles (Table 2)
- 1 – Wells and Springs (Table 3)

11.2.2 Zone 2 Inventory

There are no PSCs identified in Zone 2 assessment area.

11.3 Susceptibility Determination

Due to the presence of LUAs and PSCs within Zone 1, the water source is considered to have a high susceptibility according to the definitions presented in the Virginia SWAP manual. This designation does not mean that the source water has been impacted or that it will be impacted in the future. It does mean that if there is a release of pollutants in the source water assessment area, the source water could become impacted.

VDH requires LUAs be ranked so that waterworks and the public have a basis for determining the highest health priority for providing source water protection activities within individual assessment areas. The tire pile is ranked as a medium risk to surface water. VDH rankings are provided in Appendix C.

12.0 Source Water Assessment – City of Radford

The intake for the City of Radford is located on the New River approximately 1.6 miles north (downstream) of where the river flows under Interstate Route 81 and 2.6 miles north of the Claytor Lake Dam.

12.1 Source Water Assessment Area

The Zone 1 source water assessment area is located within the Radford South and Dublin 7.5-minute USGS topographic quadrangles. The intake is located in an industrial, commercial and residential portion of the city. The Zone 2 source water assessment area includes the remainder of the New River watershed from the limits of Zone 1 to the Virginia/North Carolina border. The source water assessment area for the City of Radford intake (Appendix A-9, Figures 1 and 2) was determined in accordance with the VDH SWAP manual.

12.2 Land Use Activity Inventory

The following land use activity inventory observations are based on information gathered during this source water assessment study, which includes site reconnaissance observations, government records review results, and third party regulatory database search results. A copy of the third party regulatory database search results are included in Appendix B on CD-ROM. The inventory reflects known land use activities and potential contaminant sources up to the date of our investigation of May 31, 2001.

12.2.1 Zone 1 Land Use Activity Inventory

Based on information gathered during the inventory process, there are 50 LUAs and PSCs identified within the Zone 1 assessment area. These sites are categorized below and described in Tables 1 through 13 in Appendix A-9.

- 2 – Best Management Practices (Table 1)
- 2 – Boat Ramps (Table 2)
- 3 – Discharge-No Discharge (Table 3)
- 1 – Hazardous and Solid Waste Sites (Table 4)
- 1 – Industrial Facilities Discharge (Table 5)
- 9 – Industrial Sites (Table 6)
- 1 – Landfill (Table 7)
- 6 – Marinas (Table 8)
- 5 – Leaking Underground Storage Tanks (Table 9)
- 1 – Tire Pile (Table 10)
- 5 – Toxic Release Inventory Sites (Table 11)
- 5 – Underground Storage Tanks (Table 12)
- 9 – Wells and Springs (Table 13)

12.2.2 Zone 2 Inventory

The 1,355 PSC identified within Zone 2 for the City of Radford source water intake are are categorized below. These sites can be viewed individually on the UNRSWAP website at www.daagis.com/unrswap of on the CD in Appendix B.

- 1 – Airport
- 351 – Best Management practices

- 12 – Boat Ramps
- 44 – Discharge-No Discharge
- 5 – Golf Courses
- 64 – Hazardous and Solid Waste Sites
- 4 – Hospitals
- 32 - Industrial Facilities Discharge
- 185 – Industrial Sites
- 6 – Landfills
- 6 – Marinas
- 20 – Permit Compliance System
- 4 – Pollution Complaints
- 39 – Tire Piles
- 30 – Toxic Release Inventory
- 1 – Treatment, Storage and Disposal Facility
- 12 – Underground Injection Wells
- 207 – Underground Storage Tanks
- 197 – Underground Storage Tank Release
- 1 – Voluntary Remediation Program
- 134 – Wells and Springs

12.3 Susceptibility Determination

Due to the presence of LUAs and PSCs within Zone 1, the water source is considered to have a high susceptibility according to the definitions presented in the Virginia SWAP manual. This designation does not mean that the source water has been impacted or that it will be impacted in the future. It does mean that if there is a release of pollutants in the source water assessment area, the source water could become impacted.

VDH requires LUAs be ranked so that waterworks and the public have a basis for determining the highest health priority for providing source water protection activities within individual assessment areas. The rankings for the LUAs and PSCs identified within Zone 1 for the City of Radford intake range from high to no ranking. Be advised that no ranking (designated by an "x" on the VDH table) does not mean that these PSC pose no risk. VDH rankings are provided in Appendix L.

13.0 Source Water Assessment – Blacksburg–Christiansburg–VPI Water Authority

The Blacksburg-Christiansburg-VPI (BCVPI) Water Authority's raw water intake is located on the New River adjacent to the north side of the State Route 114 bridge approximately 1.5 miles from the community of Fairlawn, Virginia. The BCVPI Water Authority is a 12.4 MGD plant supplying drinking water to a population of approximately 50,000.

13.1 Source Water Assessment Area

This source water Zone 1 assessment area is located within the Blacksburg, Riner, Radford South, Radford North, Staffordsville and Dublin 7.5-minute USGS topographic quadrangles. The Zone 2 assessment area includes the New River watershed from the limits of Zone 1 upstream to the Virginia/North Caroline border. The source water assessment area for the BCVPI Water Authority intake (Appendix A-10 Figures 1 and 2) was determined in accordance with the VDH SWAP manual.

13.2 Land Use Activity Inventory

The following land use activity inventory observations are based on information gathered during this source water assessment study, which includes site reconnaissance observations, government records review results, and third party regulatory database search results. A copy of the third party regulatory database search results are included in Appendix B on CD-ROM. The inventory reflects known land use activities and potential contaminant sources up to the date of our investigation of May 31, 2001.

13.2.1 Zone 1 Land Use Activity Inventory

Based on information gathered during the inventory process, 157 LUAs and PSCs were identified within the Zone 1 assessment area. These sites are described in Tables 1 through 17 in Appendix A-10 and categorized below:

- 9 – Best Management Practices (Table 1)
- 7 – Drinking Water Supplies (Table 2)
- 1 – Golf Courses (Table 3)
- 17 – Hazardous Solid Waste Facilities (Table 4)
- 36 – Industrial Sites (Table 5)
- 1 – Boat Ramp (Table 6)
- 3 – Discharge-Nodischarge (Table 7)
- 2 – Hospitals (Table 8)
- 6 – Industrial Facilities Discharge (Table 9)
- 1 – Landfill (Table 10)
- 1 – Permit Compliance System (Table 11)
- 12 – Leaking Underground Storage Tanks (Table 12)
- 6 – Tire Piles (Table 13)
- 5 – Toxic Release Inventory (Table 14)
- 39 – Underground Storage Tanks (Table 15)

- 1 – Voluntary Remediation Program (Table 16)
- 11 – Surface Water Source Wells and Springs (Table 17)

13.2.2 Zone 2 Inventory

The 1,500 PSCs identified within Zone 2 for the BCVPI Water Authority intake are categorized below. These sites can be viewed individually on the UNRSWAP website at www.daagis.com/unrswap of on the CD in Appendix B.

- 20 – Permit Compliance Systems Sites
- 36 – Industrial Facilities Discharge Sites
- 35 – Toxic Release Inventory Sites
- 81 – Hazardous and Solid Waste Sites
- 1 – Airport
- 351 – Best Management Practices Sites
- 14 – Boat Ramps
- 217 – Storage Tank Releases
- 45 – Discharge-No Discharge Sites
- 4 – Hospitals
- 215 – Industrial Sites
- 8 – Landfills
- 11 – Marinas
- 40 – Tire Piles
- 13 – Underground Injection Wells
- 5 – Golf Courses
- 141 – Wells and Springs
- 4 – Pollution Complaint Sites
- 1 – Treatment, Storage, and Disposal Facility
- 257 – Underground Storage Tanks
- 1 – Voluntary Remediation Program

13.3 Susceptibility Determination

Due to the presence of LUAs and PSCs within Zone 1, the water source is considered to have a high susceptibility according to the definitions presented in the Virginia SWAP manual. This designation does not mean that the source water has been impacted or that it will be impacted in the future. It does mean that if there is a release of pollutants in the source water assessment area, the source water could become impacted.

VDH requires LUAs be ranked so that waterworks and the public have a basis for determining the highest health priority for providing source water protection activities within individual assessment areas. The rankings for the LUAs and PSCs identified within Zone 1 for the Blacksburg-Christiansburg-VPI Water Authority intake range from high to no ranking. Be advised that no ranking (designated by an "x" on the VDH table) does not mean that these PSCs pose no risk. VDH rankings are provided in Appendix C.

14.0 Source Water Assessment – Radford Army Ammunition Plant – 1 & 2

The RAAP – 1 raw water intake is located on the New River approximately 6 miles downstream from the Route 114 bridge in Montgomery County. The intake for the RAAP – 2 is located on the New River approximately 1.75 miles downstream from the Route 114 Bridge in Montgomery County.

14.1 Source Water Assessment Area

The Zone 1 source water assessment area for the RAAP intake 1 is located within the Blacksburg, Radford North, Radford South, and Staffordsville 7.5-minute USGS topographic quadrangles. The source water assessment area for the RAAP intake 2 is located within the Radford North, Staffordsville, 7.5-minute USGS topographic quadrangles. The source water assessment area for the RAAP 1 and 2 intakes (Appendix A-11, Figures1 and 2) was determined in accordance with the VDH SWAP manual.

14.2 Land Use Activity Inventory

The following land use activity inventory observations are based on information gathered during this source water assessment study, which includes site reconnaissance observations, government records review results, and third party regulatory database search results. A copy of the third party regulatory database search results are included in Appendix B on CD-ROM. The inventory reflects known land use activities and potential contaminant sources up to the date of our investigation of June 21, 2001.

14.2.1 Zone 1 Land Use Activity Inventory

Based on information gathered during the inventory process, there are 161 LUAs or PSCs identified within the Zone 1 assessment area for the RAAP intakes 1 and 2. These sites are categorized below and described in Tables 1 through 16 in Appendix A-11.

- 5 – Best Management Practices Sites (Table 1)
- 2 – Boat Ramps (Table 2)
- 5 – Discharge-No Discharge (Table 3)
- 18 – Hazardous Solid Waste Sites (Table 4)
- 2 – Hospitals (Table 5)
- 7 – Industrial Facilities Discharge Sites (Table 6)
- 33 – Industrial Sites (Table 7)
- 1 – Landfill (Table 8)
- 3 – Permit Compliance System (Table 9)
- 1 – RCRA Sites (Table 10)
- 21 – Tank Release Sites (Table 11)
- 4 – Tire Piles (Table 12)
- 7 – Toxic Release Inventory Sites (Table 13)
- 40 – Underground Storage Tanks (Table 14)
- 1 – Voluntary Remediation Program (Table 15)

- 11 – Wells and Springs (Table 16)

14.2.2 Zone 2 PSC Inventory

The 1,722 PSC identified within Zone 2 for the RAAP intakes 1and 2 are categorized below are categorized below. These sites can be viewed individually on the UNRSWAP website at www.daagis.com/unrswap of on the CD in Appendix B.

- 22 – Permit Compliance System Sites
- 45 – Industrial Facilities Discharge
- 39 – Toxic Release Inventory
- 100 – Hazardous and Solid Waste Sites
- 36 – Drinking Water Supply Sites
- 21 – Clean Water Needs Survey
- 2 – Airports
- 359 – Best Management Practices
- 14 – Boat Ramps
- 235 – Storage Tank Release
- 49 – Discharge-No Discharge
- 5 – Hospitals
- 254 – Industrial Sites
- 9- Landfills
- 12 – Marinas
- 45 – Tire Piles
- 13 – Underground Injection Wells
- 5 – Golf Courses
- 148 – Wells and Springs
- 1 – Comprehensive Environmental Response
- 4 – Pollution Complaints
- 1 – Treatment Storage and Disposal Facility
- 302 – Underground Storage Tanks
- 1 – Voluntary Remediation Program

14.3 Susceptibility Determination

Due to the presence of LUAs and PSCs within Zone 1, the water source is considered to have a high susceptibility according to the definitions presented in the Virginia SWAP manual. This designation does not mean that the source water has been impacted or that it will be impacted in the future. It does mean that if there is a release of pollutants in the source water assessment area, the source water could become impacted.

VDH requires LUAs be ranked so that waterworks and the public have a basis for determining the highest health priority for providing source water protection activities within individual assessment areas. The rankings for the LUAs and PSC identified within Zone 1 for the RAAP intakes 1 and 2 range from high to no ranking. Be advised that no ranking (designated by an "x"

on the VDH table) does not mean that these PSC pose no risk. VDH rankings are provided in Appendix C.

15.0 Making Assessments Available to the Public

15.1 Virginia Department of Health Responsibilities

Based upon the SWAP manual, VDH is responsible for the following:

- Provide the assessment report to the waterworks owner, the local health department and local libraries upon completion,
- Provide wide notification of the availability of the results and other information collected by use of the Internet, the Virginia Register, the Virginia Press Association members, press releases, and public service announcements on a monthly basis,
- Provide notification of the availability of the results and other information collected to the local health departments, extension agents, and local government administrators and request that they include the notice in newsletters and communications with the public,
- Provide copies of the source water assessment for a reasonable handling fee or provide individuals the opportunity to review the assessment information,
- Ensure the *Consumer Confidence Report* (CCR) includes the required SWAP information,
- Ensure that an announcement is sent to the local newspaper within 30 days of completion of the assessment.

15.2 Public Water Supply System Responsibilities

Based upon the SWAP manual, the PWS is required to include the following in the Annual *Consumer Confidence Report*:

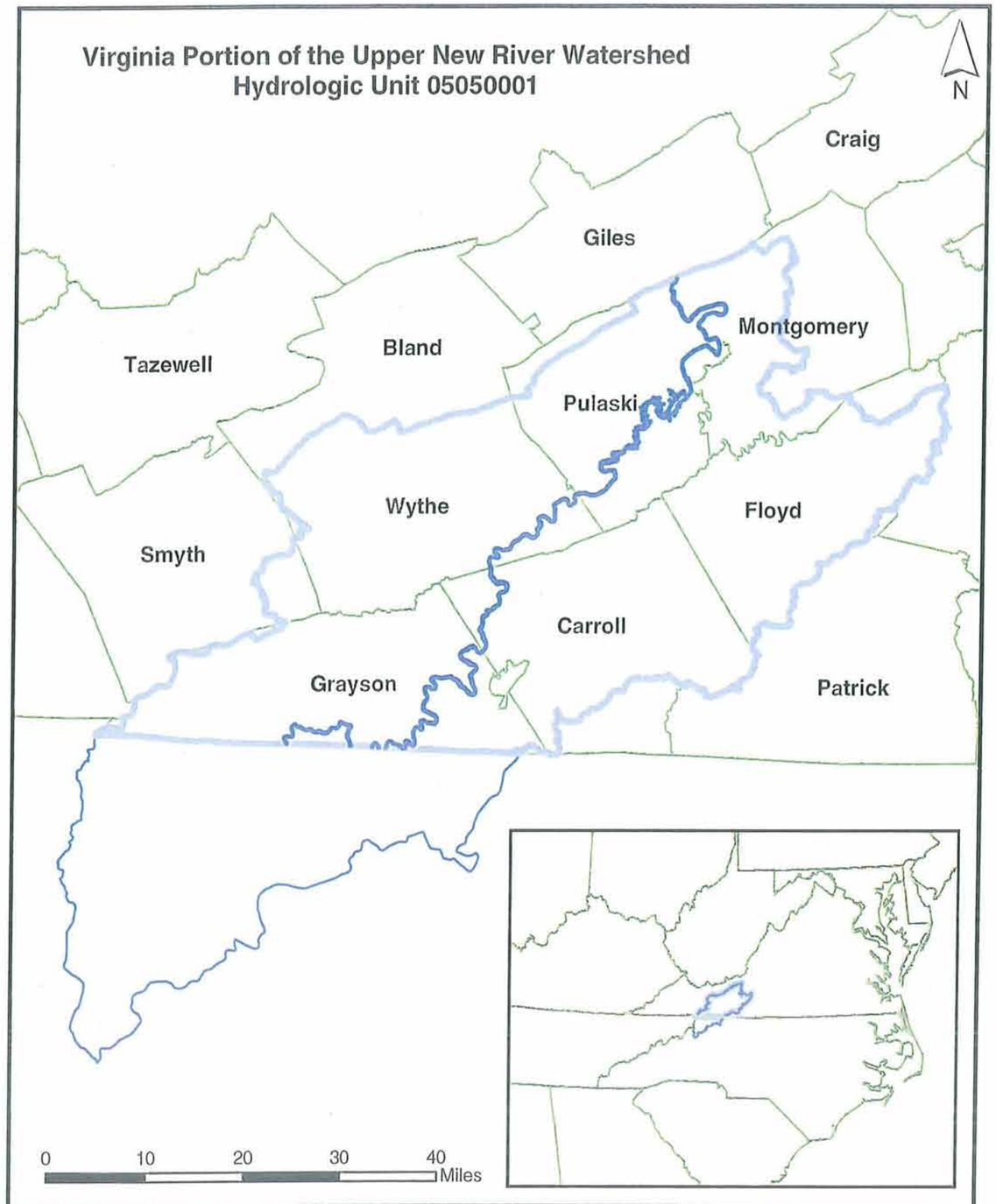
- A brief summary of the susceptibility to contamination of the drinking water source, based on the completed source water assessment,
- Information regarding how to obtain a copy of the source water assessment report.

Additionally, the PWS is to consider notifying customers of the availability of the completed source water assessment through billing notices or other means available. The PWS should also consider using public service announcement media or other appropriate local methods to expeditiously publicize information that will be contained in the next *Consumer Confidence Report* concerning the completed source water assessment report.

15.3 Subsequent Updates of Source Water Assessment Reports

VDH intends to provide a section in future sanitary survey forms for PWS operators to update land use activities within the Zone 1 source water assessment area.

Figures



Draper Aden Associates
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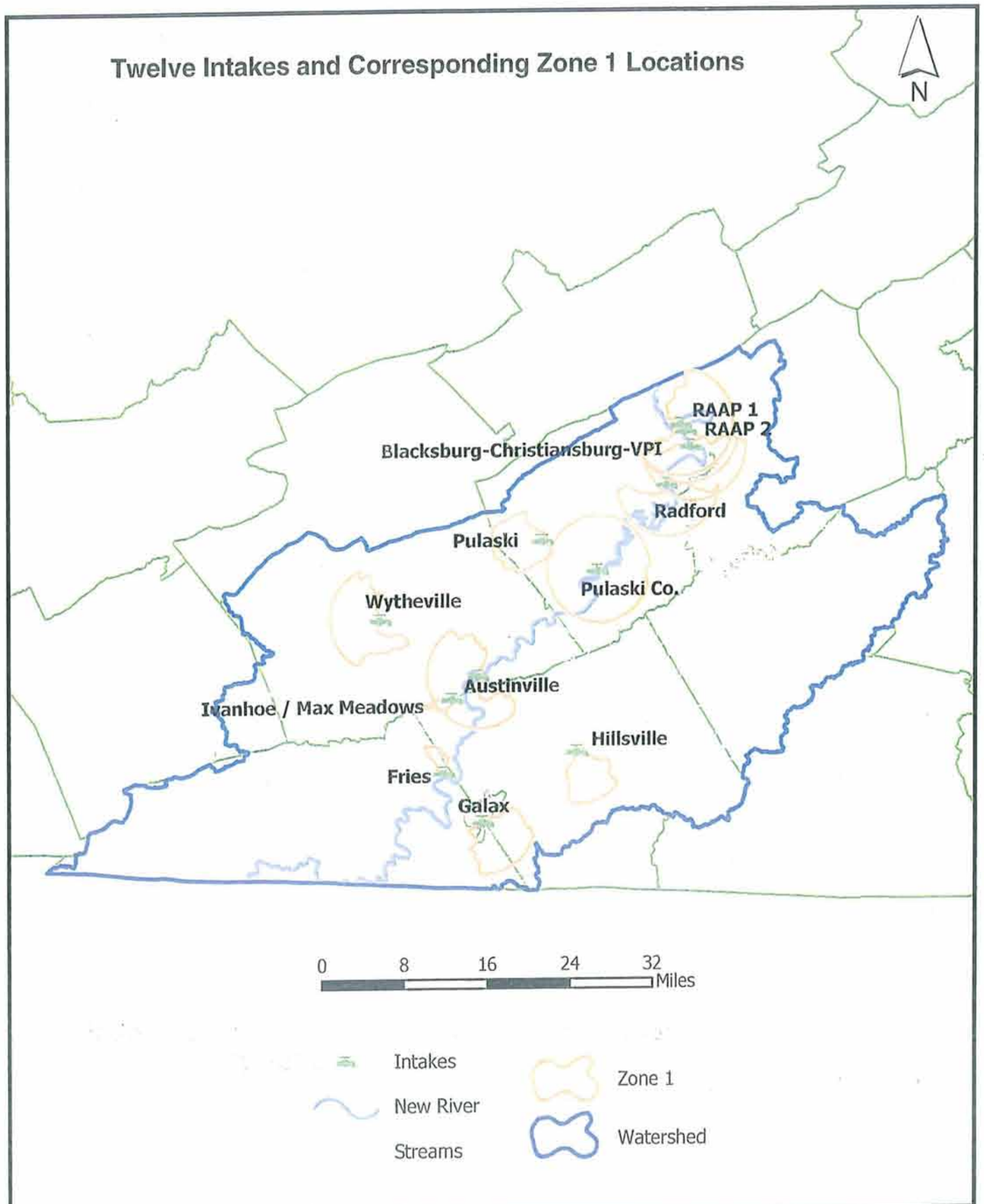
Upper New River Source Water Assessment Program	
Date: 12-31-01 Drawn by: MF Job#: B01127	Figure 1 **Study Area**



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Upper New River Source Water Assessment Program

Date: 12-31-01
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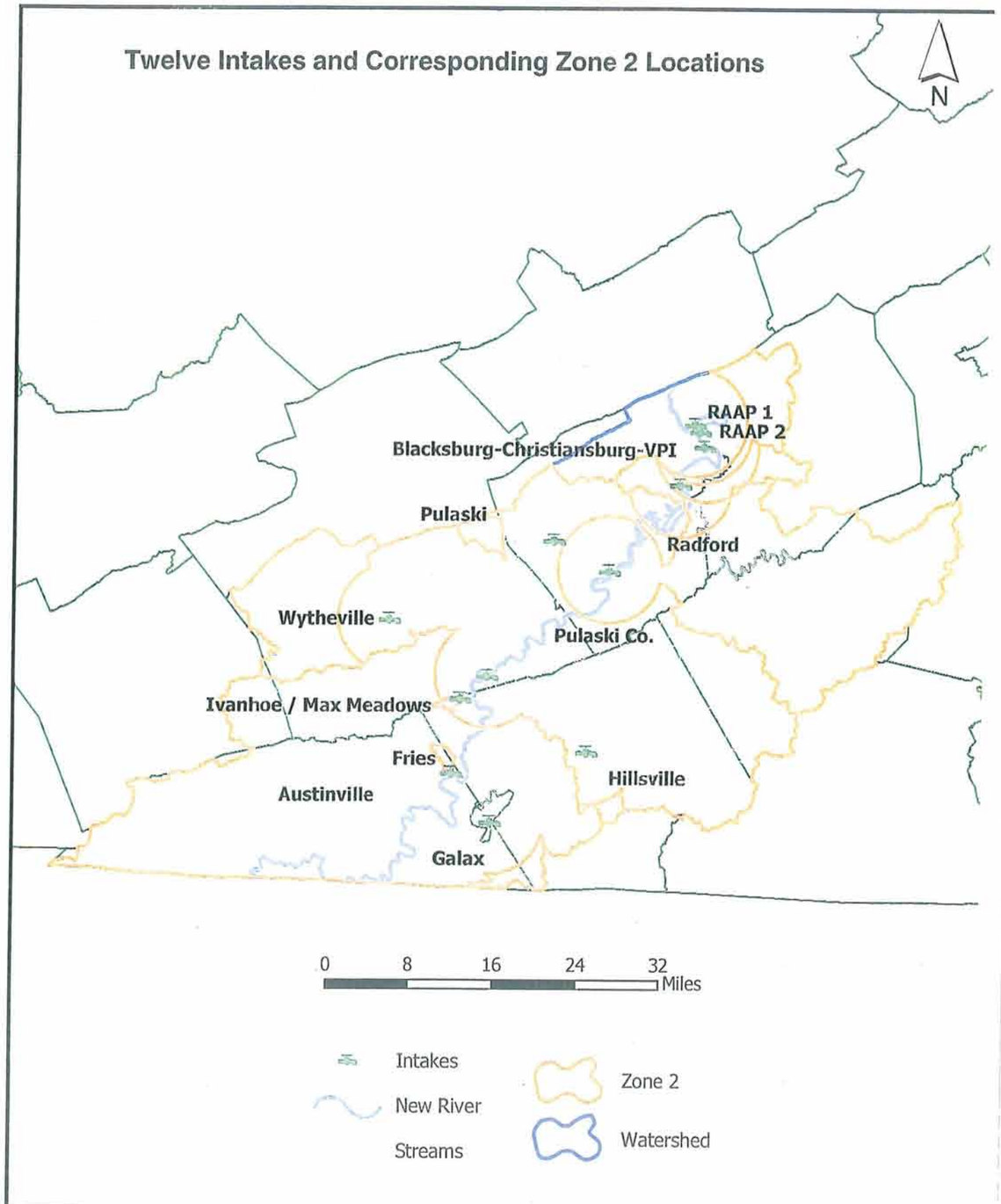
Job#: B01127

Figure 2
Zone 1 Source Water Assessment Areas



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Upper New River Source Water Assessment Program

Date: 12-31-01
Drawn by: MF
Job#: B01127

Figure 3
Zone 2 Source Water Assessment Areas

Appendices A-1 through A-11

Tables and Figures for Individual Intakes

Appendix A-1

City of Galax Intake Tables and Figures

TABLE 1
Best Management Practices (BMPs) - City of Galax Intake

VABMP	Topographic Quadrangle	BMP Description
9079	GALAX	Grazing Land Protection
9156	GALAX	Reforestation of Erodible Crop and Pastureland
9162	GALAX	Grazing Land Protection
9163	GALAX	Reforestation of Erodible Crop and Pastureland
9168	GALAX	Reforestation of Erodible Crop and Pastureland
9184	GALAX	Reforestation of Erodible Crop and Pastureland
9198	CUMBERLAND KNOB	Grazing Land Protection
9227	CUMBERLAND KNOB	Grazing Land Protection
9241	CUMBERLAND KNOB	Grazing Land Protection
9255	CUMBERLAND KNOB	Reforestation of Erodible Crop and Pastureland
9257	CUMBERLAND KNOB	Reforestation of Erodible Crop and Pastureland
9260	CUMBERLAND KNOB	Reforestation of Erodible Crop and Pastureland
9265	CUMBERLAND KNOB	Reforestation of Erodible Crop and Pastureland
9266	CUMBERLAND KNOB	Reforestation of Erodible Crop and Pastureland
9272	CUMBERLAND KNOB	Reforestation of Erodible Crop and Pastureland
9277	CUMBERLAND KNOB	Reforestation of Erodible Crop and Pastureland

TABLE 2
Golf Courses - City of Galax Intake

Golf Course	Groundwater Risk	Surface Water Risk
Blue Ridge GC	Medium	Low

TABLE 3
Hazardous and Solid Waste Sites - City of Galax Intake

Facility ID #	Facility Name	Facility Address
VA0001848142	Printed Circuit Solutions, MFG	115 Jack Guynn Drive, Galax

TABLE 8
Underground Storage Tanks - City of Galax Intake

Facility ID	Facility Name	Address
1-005742	E&L Diamond Electric	1000 S. Main Street, Galax
1-013015	Cockerham Tire and Auto #2	900 S. Main Street, Galax
1-013032	Hillcrest Service Center	1201 S. Main Strett, Galax.
1-006072	Fairview Elementary School	RT 2, Galax
1-012999	Oakland Elementary School	RT. 97, Galax
1-015275	Claude S. Brewe Well Drilling Company	RT 2, Box 12, Galax
1-013042	Lil Country Store	Route 97, Galax
	On the Way Citgo Station	806 South Main Street, Galax
	Pilot Service Station	812 South Main Street, Galax
	Cockerhams Chevron	900 South Main Street, Galax

TABLE 9
Wells and Springs - City of Galax Intake

Type	Location	Facility Name
Well	CARROLL	OAKLAND ELEM SCHOOL
Well	CARROLL	SUNRISE TRAILER PARK
Well	GRAYSON	BOBBY SIZEMORE-SUN VALLEY

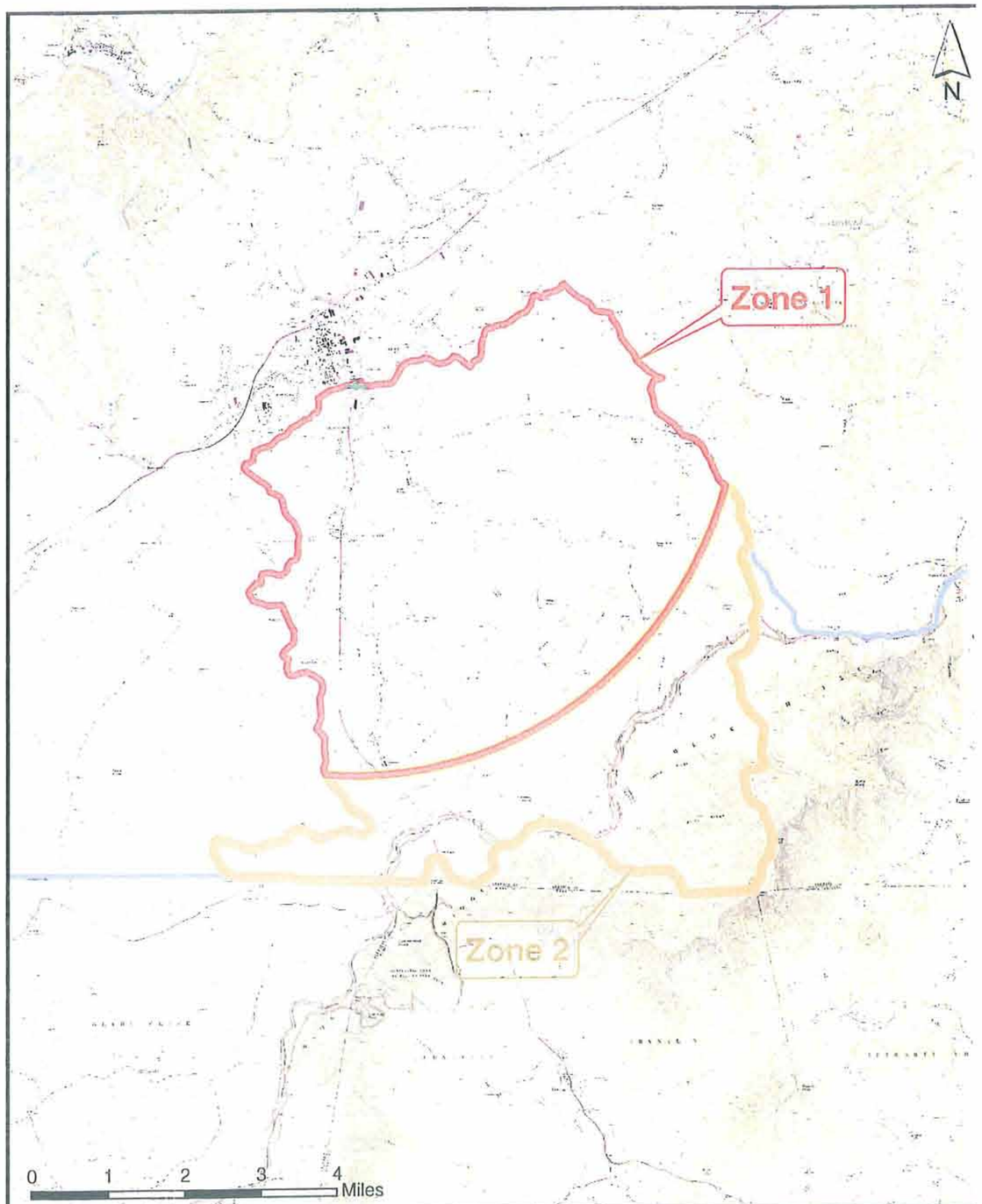

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Figure 1
City of Galax Source Water Assessment Area

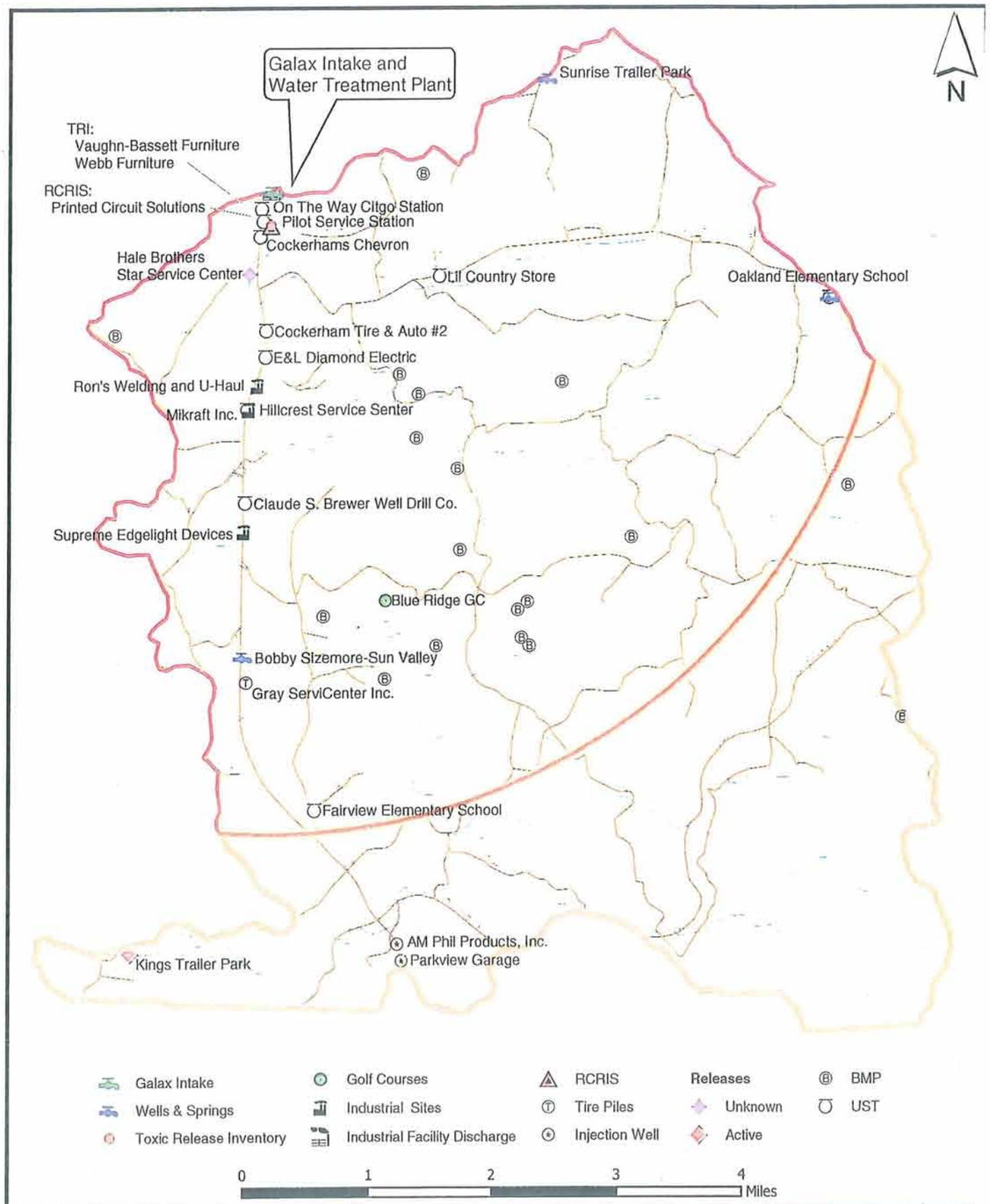

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Figure 2

City of Galax Zones 1 and 2

Appendix A-2

Town of Hillsville Intake Tables and Figures

TABLE 1
Best Management Practices - Town of Hillsville Intake

VABMP	Topographic Quadrangle	BMP Description
8911	WOODLAWN	Grazing Land Protection

TABLE 2
Discharge-No Discharge - Town of Hillsville Intake

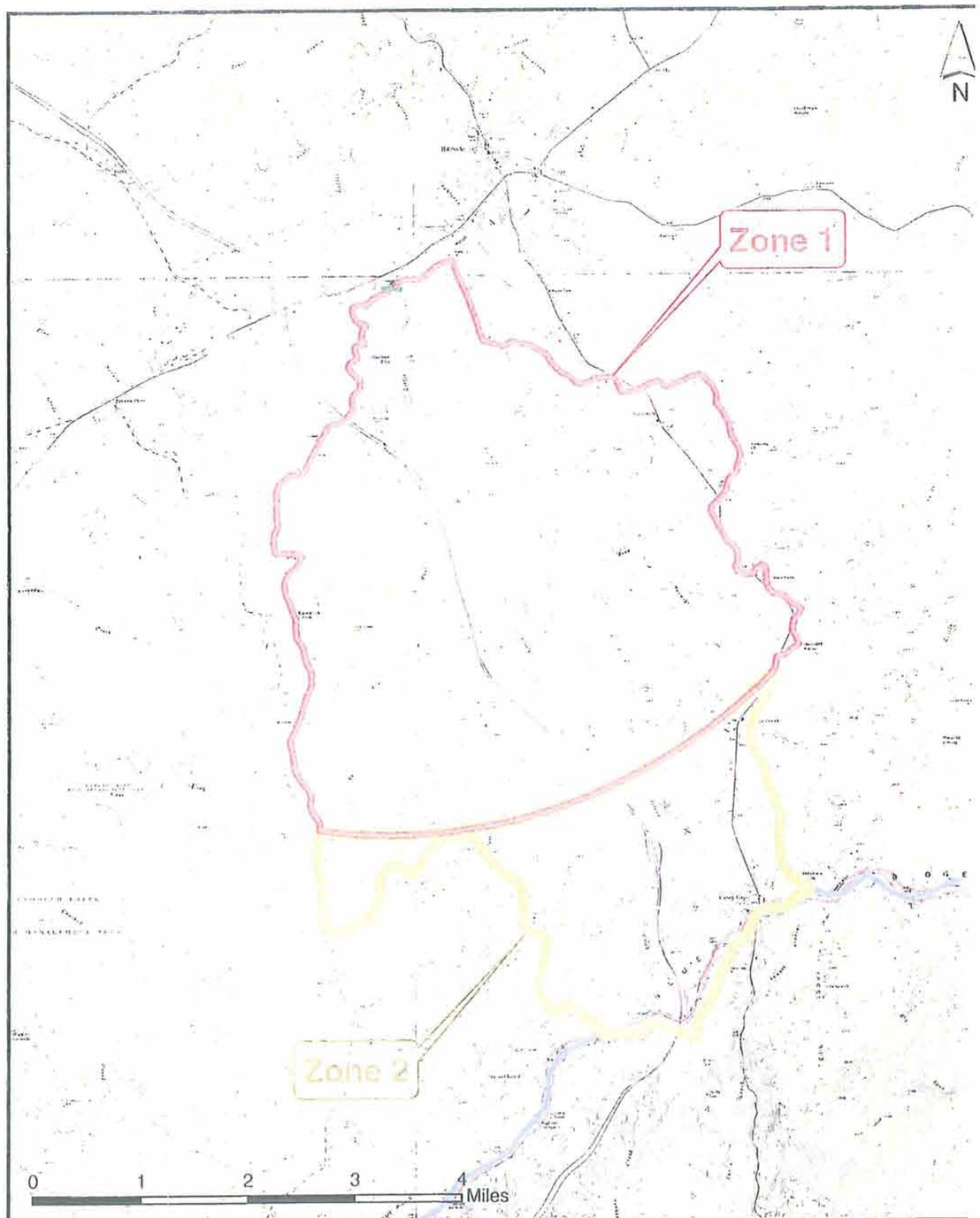
Permit #	Facility	Address	GW Risk	SW Risk
VA0074268	Hillsville Water Plant	Rt. 1 Box 32, Hillsville	Low	Medium

TABLE 3
Industrial Facilities Discharge - Town of Hillsville Intake

ID#	Facility Name	Location
VA0053031	Hillsville Water Treatment Plant	Hillsville

TABLE 4
Underground Storage Tanks (UST) - Town of Hillsville Intake

ID Number	Facility	Address
	MARATHON GAS STATION	



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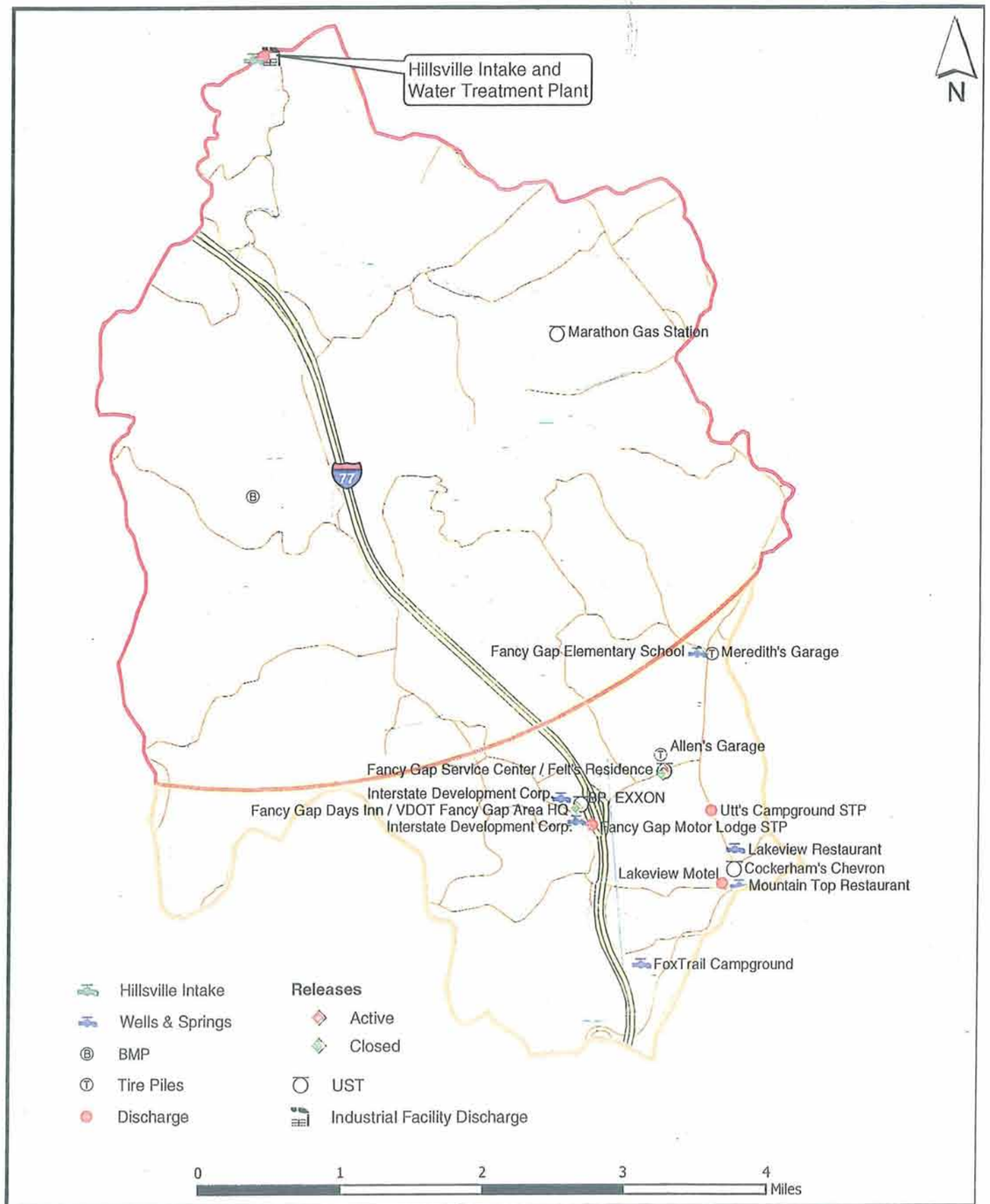
Upper New River Source Water Assessment Prograr

Date: 12-31-01
Drawn by: MF
Job#: B01127

Figure 1
Town of Hillsville Source Water Assessment Areas



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Date: 12-31-01
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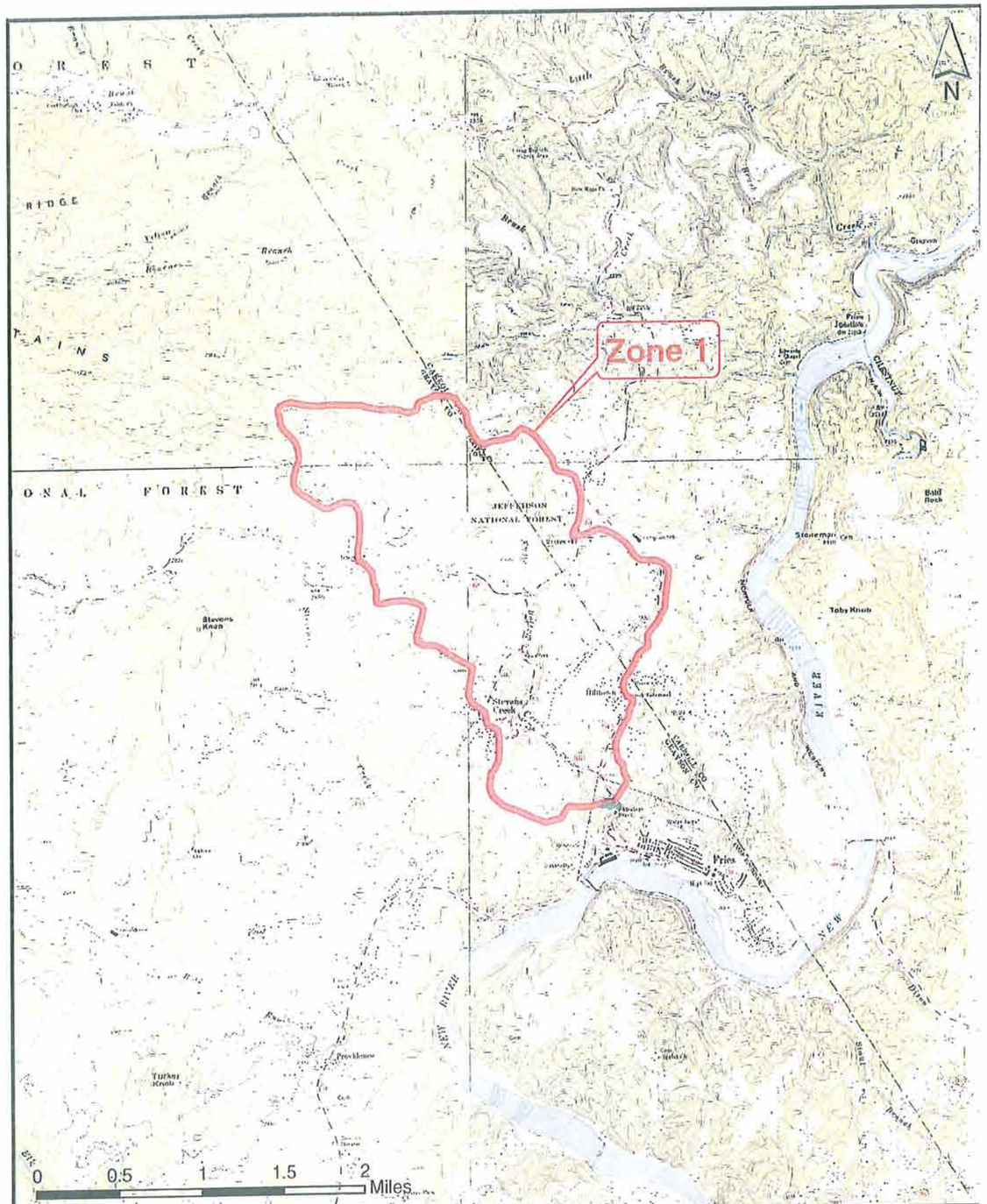
Job#: B01127

Figure 2
Town of Hillsville
Zones 1 and 2

Appendix A-3

Town of Fries Intake Tables and Figures



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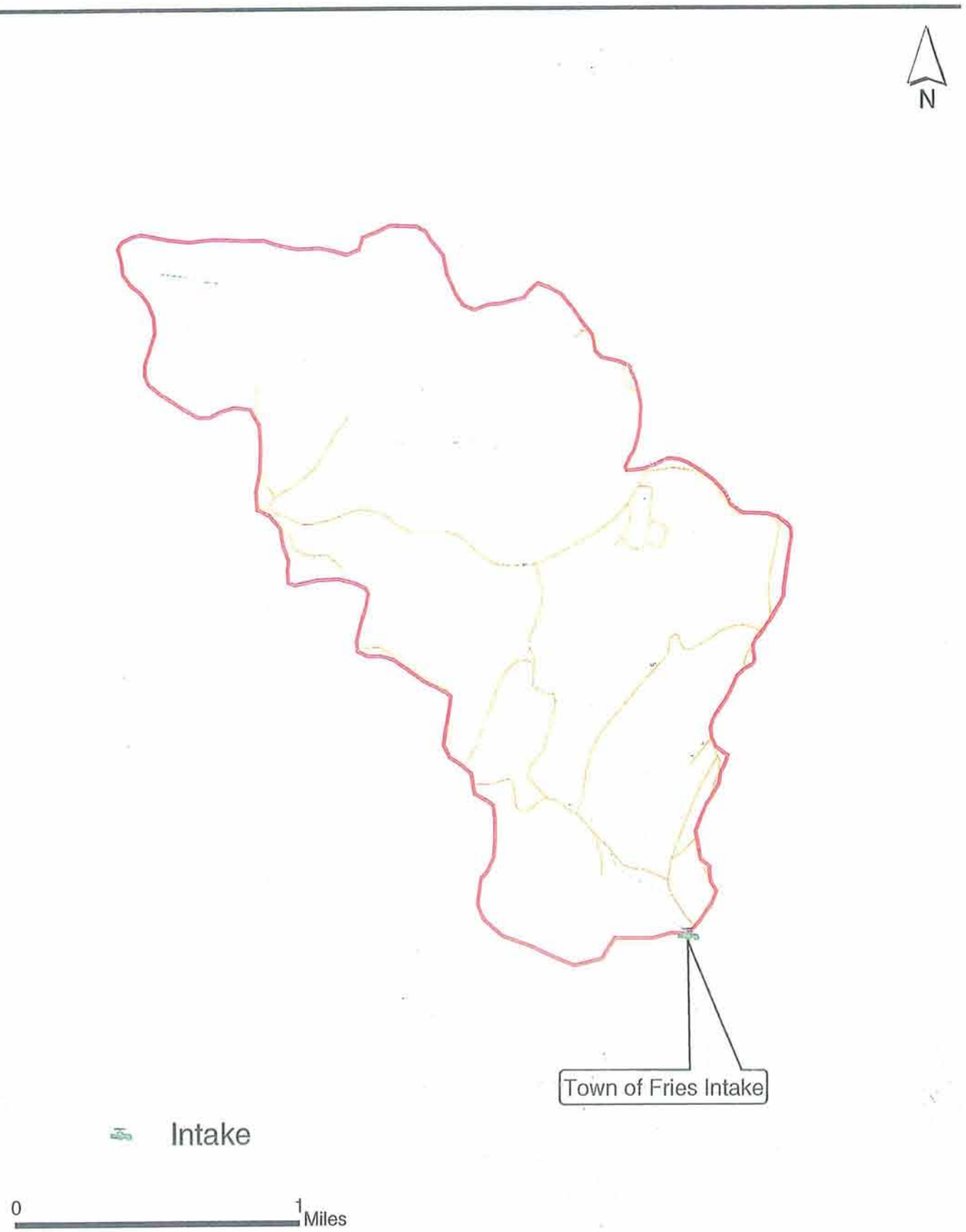
Upper New River Source Water Assessment Program

Date: 12-31-01
Drawn by: MF
Job#: B01127

Figure 1
Town of Fries Source Water Assessment Area



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Upper New River Source Water Assessment Program

Date: 12-31-01
Drawn by: SC
Job#: B01127

Figure 2

Town of Fries Zone 1 and 2

Appendix A-4

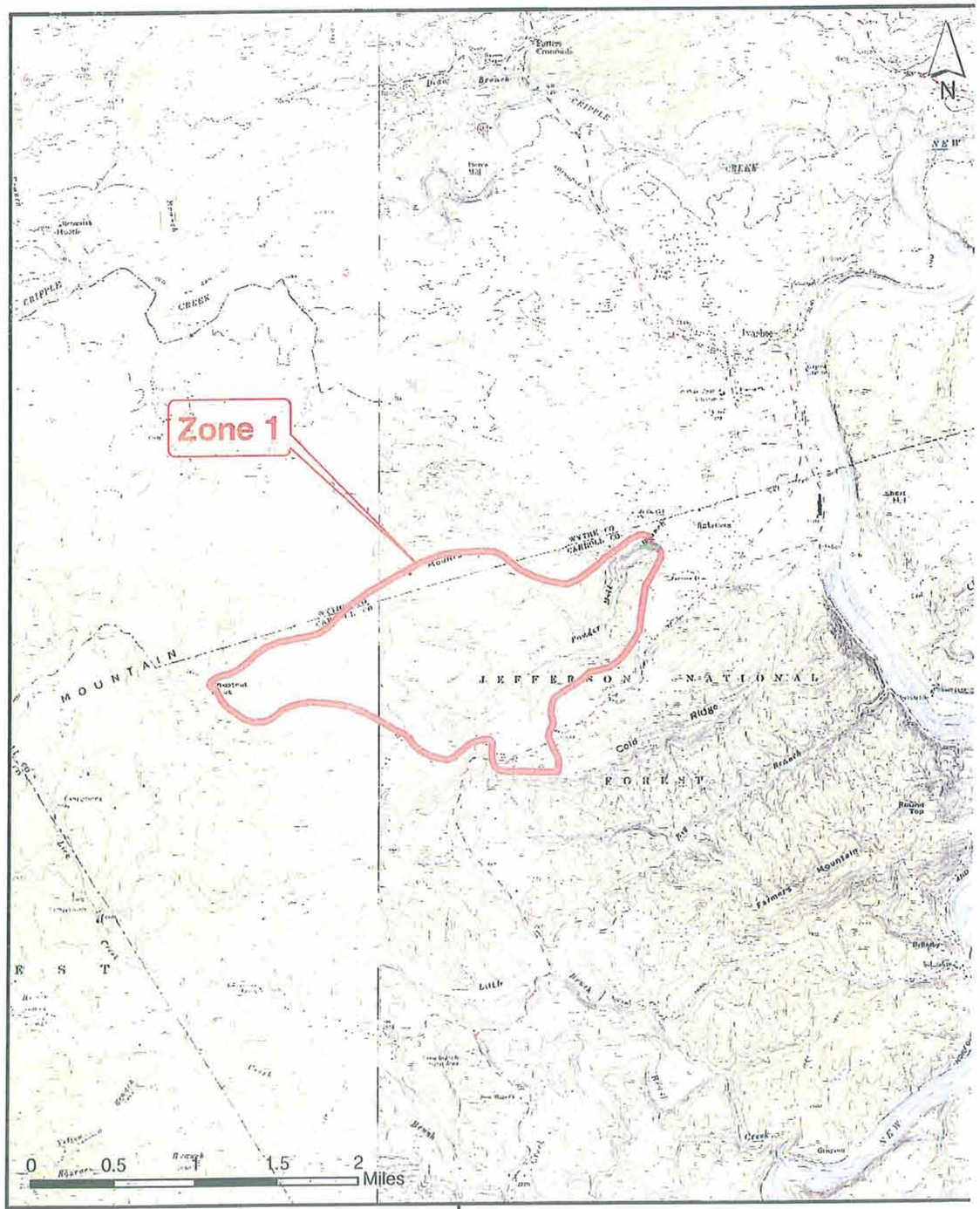
Ivanhoe/Max Meadows Intake Tables and Figures

TABLE 1
Tank Releases - Ivanhoe/Max Meadows Intake

PC #	Facility	Tank Type	Location	GW Risk	SW Risk
98-0330	McCloud's Grocery	UST	Ivanhoe, VA	Low	X

TABLE 2
Underground Storage Tanks (UST) - Ivanhoe/Max Meadows Intake

ID #	Name	Address
1-020037	BLAIR CLAUDE M	IVANHOE



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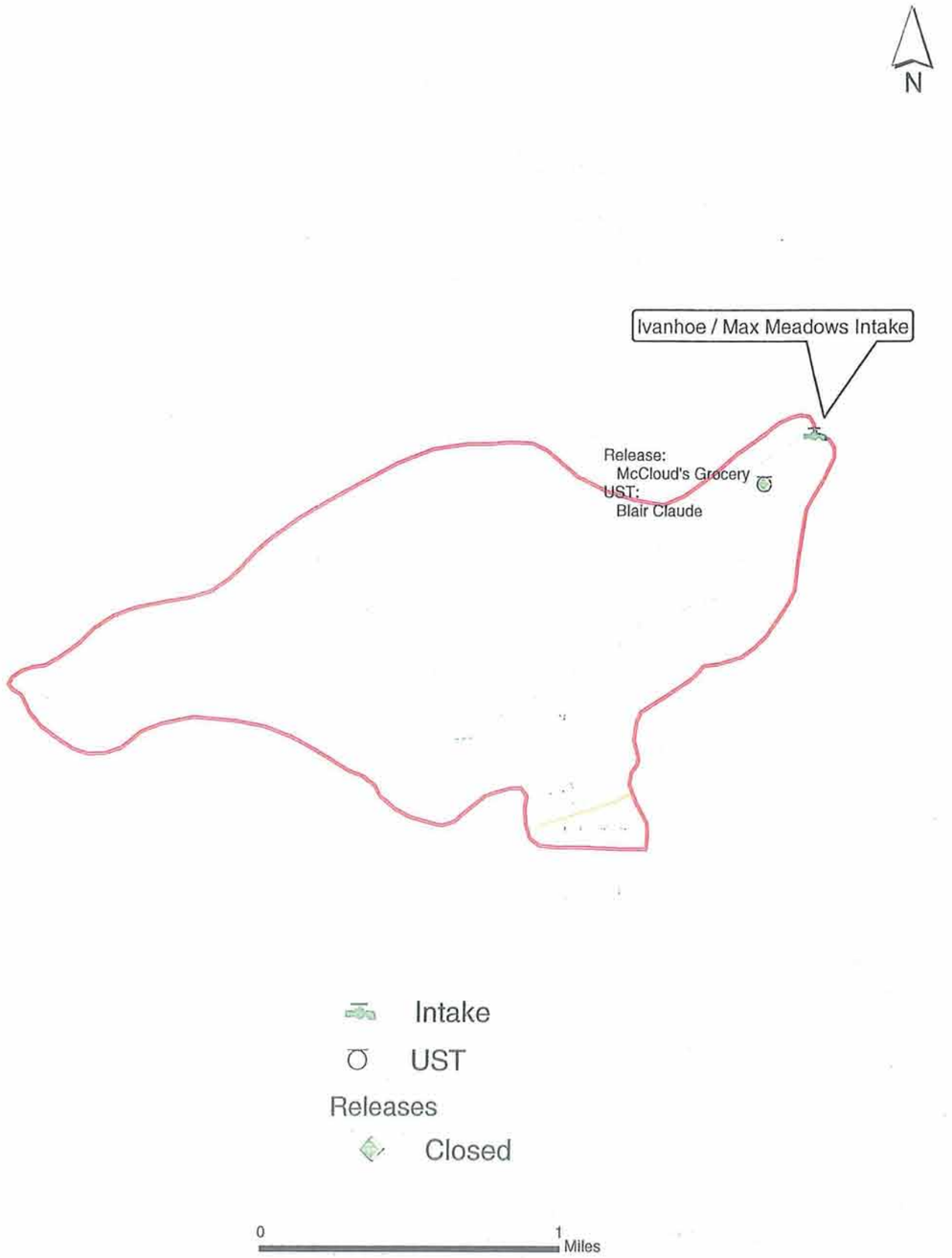
Upper New River Source Water Assessment Program

Date: 12-31-01
Drawn by: MF
Job#: B01127

Figure 1
Ivanhoe / Max Meadows Source Water Assessment Area



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Upper New River Source Water Assessment Program

Date: 12-31-01
Drawn by: SC
Job#: B01127

Figure 2
Ivanhoe / Max Meadows
Zone 1 and 2

Appendix A-5

Austinville Intake Tables and Figures

TABLE 1
Best Management Practices (BMPs) - Austinville Intake

VABMP Number	Topgraphic Quadrangle	BMP Description
8587	Max Meadows	Animal Waste Control Facility
8613	Wytheville	Grazing Land Protection
8643	Austinville	Grazing Land Protection
8656	Austinville	Permanent Vegatative Cover on Cropland
8666	Austinville	Permanent Vegatative Cover on Cropland
8683	Austinville	Permanent Vegatative Cover on Cropland
8697	Austinville	Grazing Land Protection
8698	Austinville	Grazing Land Protection
8728	Austinville	Reforestation of Erodible Crop and Pastureland
8763	Austinville	Reforestation of Erodible Crop and Pastureland
8798	Austinville	Grazing Land Protection
8808	Austinville	Grazing Land Protection

TABLE 2
Boat Ramp - Austinville Intake

Site Name	Water Body	GW Risk	SW Risk
Ivanhoe	New River	X	Medium

TABLE 3
Discharge-No Discharge - Austinville Intake

Permit Number	Facility	Address	Dischrage	GE Risk	SW Risk
VA0058424	Austinville Limestone Company	Box 568, Austinville	Y	Low	Medium
VA0084751	Byllesby and Buck Hydro Proj.	1 Riverside Plaza, Columbus	Y	Low	Medium

TABLE 4
Industrial Facilities Discharge - Austinville Intake

NPD	Facility	Address	Water Supply
VA0000272	New Jersey Zinc Company - Austinville	2200 First American Center, Nashville	NEW RIVER
VA0052361	Wythe-Bland Sewer Authority	Wytheville	DRY WELL

TABLE 5
Industrial Sites - Austinville Intake

Facility	Product Description	Address	GW Risk	SW Risk
Closed National Carbide Facility				

TABLE 6
Landfill Facilities - Austinville Intake

Facility	GW Risk	SW Risk
New Jersey Zinc (Closed)		

TABLE 7
Permit Compliance System - Austinville Intake

NPDES	Facility	City	Water Body
VA0084751	Appalachian Power Company Byllesby A	Ivanhoe	New River

TABLE 8
Storage Tank Releases - Austinville Intake

PC #	Facility	Tank Type	Location	GW Risk	SW Risk
91-1916	Sheffey Elementary School	UST	Wytheville, VA	Low	X
93-2134	Jonas Residence	NONPET	Grayson Hill, VA	Low	X
98-0330	McCloud's Grocery	UST	Ivanhoe, VA	Low	X

TABLE 9
Tire Piles - Austinville Intake

Facility	Owner	Address	GW Risk	SW Risk
B & B Auto Sales & Service	Luther C. Burnett	P.O. Box 635, RTE 631 Austinville, VA	High	High

TABLE 10
Underground Storage Tanks - Austinville Intake

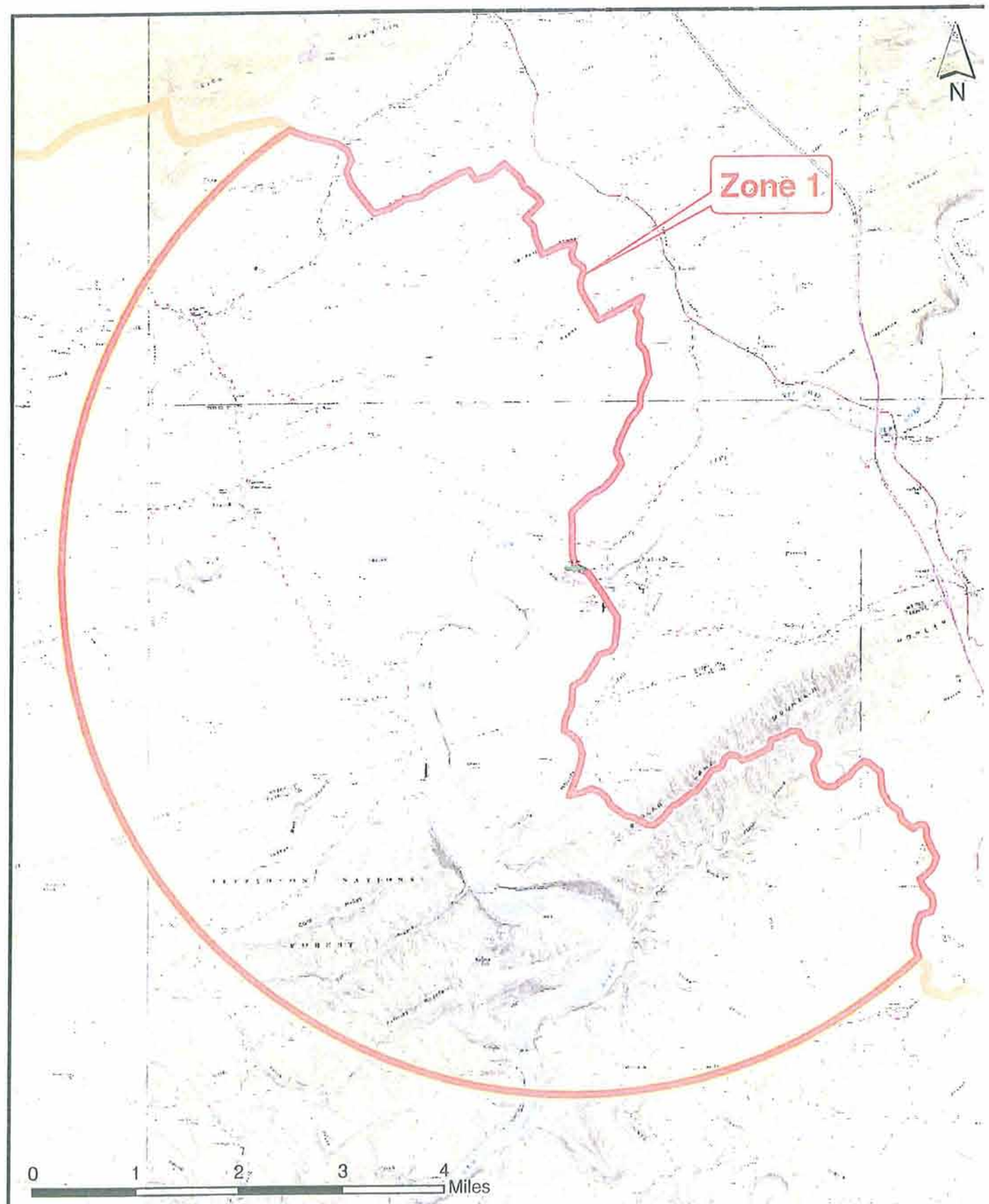
ID_NO	NAME	ADDRESS
1-009537	SHEFFEY ELEMENTARY SCHOOL	RT 3, BOX 468, Wytheville
1-020037	BLAIR CLAUDE M	IVANHOE

TABLE 11
Voluntary Remediation Program - Austinville Intake

ID Number	Facility	Address
VRP00033	OLD NATIONAL CARBIDE	

TABLE 12
Well and Springs - Austinville Intake

Type Code	County	Facility	Well Name
WL	CARROLL	NEW RIVER RECREATION AREA	WELL #1



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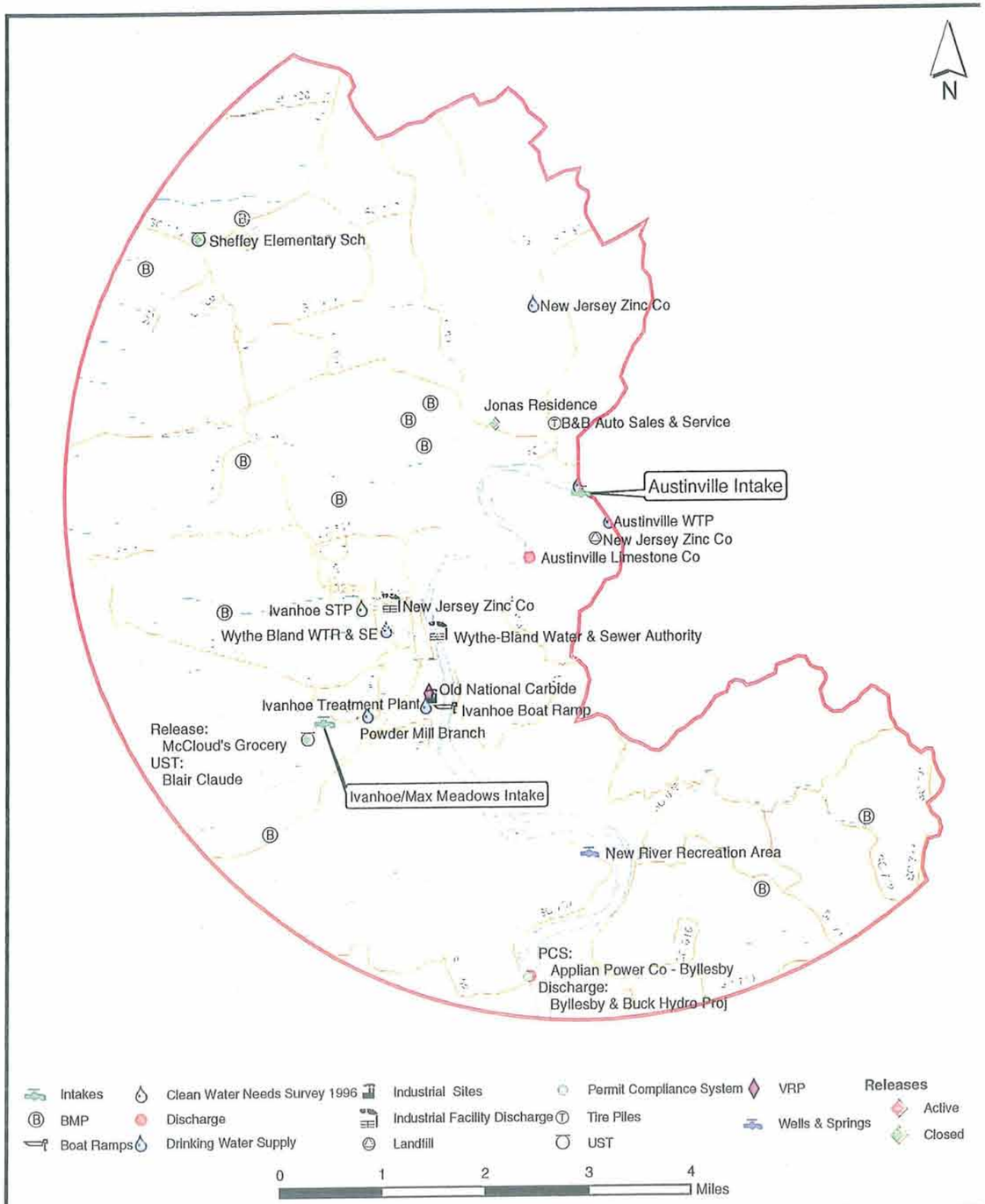
Date: 12-31-01
Drawn by: MF
Job#: B01127

Figure 1
Austinville Source Water Assessment Area



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Upper New River Source Water Assessment Program

Date: 12-31-01
Drawn by: SC
Job#: B01127

Figure 2
Austinville Zone 1

Appendix A-6

Town of Wytheville Intake Tables and Figures

TABLE 1
Best Management Practices - Town of Wytheville Intake

VABMP	Topographic Quadrangle	BMP Description
8441	CROCKETT	Grazing Land Protection
8498	W'VILLE	Grazing Land Protection
8654	CROCKETT	Reforestation of Erodible Crop and Pastureland
8655	CROCKETT	Reforestation of Erodible Crop and Pastureland

TABLE 2
Discharge-No Discharge - Town of Wytheville Intake

Permit	Facility	Address	Discharge	GW Risk	SW Risk
VA0000655	Wytheville Water Treatment Plant	P.O. Drawer 533, Wytheville	Y	Low	Medium

TABLE 3
Hazardous Solid Waste - Town of Wytheville Intake

ID #	Facility	Address
VAD008957185	PENDLETON CONSTRUCTION CORP	24TH ST & 11 ST, Wytheville
VAR000002881	USFS WYTHE DISTRICT	155 SHERWOOD FOREST RD, Wytheville

TABLE 4
Industrial Facilities Discharge - Town of Wytheville Intake

IFD ID #	NPD	Facility	City
59924	VA0000655	WYTHEVILLE WATER PLANT	WYTHEVILLE

TABLE 5
Industrial Sites - Town of Wytheville Intake

Facility	Product Description	Address	GW Risk	SW Risk
DSM Engineering Plastic Prdts	Stock plastic shapes		Medium	Low
Williams Manufacturing Corp	Machine shop: general, precision & contract machining; fastener tooling & mold rebuilding	585 Stafford Umberger Dr	Medium	Low
Buss America Windward Prdts	Segmented screw elements for compounding extruders	285 Stafford Umberger Dr	Medium	Low
Mount Rogers Industrial/Dvlpt	Sheltered workshop: parts assembly & packaging		Low	Low
Morton International Inc	Powdered electrostatic paint coatings		Medium	Low
Cross Creek Apparel Inc	Men's & ladies' knitted athletic & casual sportswear		Low	Low
National Seating Co	Truck seats		Medium	Low
Simply Country	Afghans, pillows, jackets & sweaters	255 George James Dr	Low	Low
Sheppard, R H Co Inc	Gray iron, iron & ductile castings; heavy duty power steering gears	1400 Stafford Umberger Dr	Medium	Low
Collections From Rural Retreat	Placemats, garment bags, tablecloths & pillows	255 George James Dr	Low	Low
Acrylife Inc	Elastomeric roofing systems & coating	1165 Stafford Umberger Dr	Medium	Low
Hosery Textile Plant				

TABLE 6
Leaking Underground Storage Tanks (LUST) - Town of Wytheville Intake

ID #	Facility	Address
90-0456	VDOT-WYTHEVILLE AREA HQ	RT. 11 W. OF WYTHEVILLE
90-1804	UMBARGER-WYTHEVILLE	US RT. 11 1 MI. S. OF WYTHEVILLE
93-0375	POLYMER CORPORATION	OLD BLUEFIELD HWY.
94-0219	VDOT-WYTHEVILLE RES. REL. #2	WYTHE CO.
96-0222	WILDERNESS ROAD TRUCKSTOP	EXIT 44 OFF OF I-77
92-1462	HOBACK RESIDENCE	WYTHE CO.

TABLE 7
Permit Compliance System Sites- Town of Wytheville Intake

NPDES	NAME	CITY
VA0076040	FACTORY MERCHANTS MALL STP	WYTHEVILLE

TABLE 8
Tire Piles - Town of Wytheville Intake

Facility Name	Owner Name	Address	GW Risk	SW Risk
Eversole Body Shop	Nard Eversole	1495 Chatman Road (Route 21), Wytheville	High	High
Smith's Lee Hi Auto Parts	Perry Smith	660 West Lee Hwy. (Rte. 11 W), Wytheville	High	High

No there — 30 miles 1

TABLE 9
Toxic Release Inventory - Town of Wytheville Intake

ID #	Facility	Address
VAD065385627	LONGWOOD ELASTOMERS INC.	655 FAIRVIEW RD., Wytheville
VAD065410540	POLYMER CORP.	2530 N. 4TH ST., Wytheville
VAD982579922	MORTON INTL. INC. WYTHEVILLE	2460 N. 4TH ST., Wytheville

TABLE 10
Tank Release - Town of Wytheville Intake

Facility	Tank Type	Location	GW Risk	SW Risk
Wytheville Area HQ	UST	On US 11, One Half Mile E of Intersection of US 11 and SR 656, Wytheville	Low	X
Umbarger Store	UST	Located on Route 11, 1 mile south of Wytheville	Low	X
Sults Used Cars	UST	On Rt. 21 S, Wytheville	Low	X
Hoback Residence	SHOAST	On Rt. 664, Wytheville	Low	X
Polymer Corporation Plant	UST	2530 North 4th Street, Wytheville	Low	X
Wytheville Area HQ	UST	On US 11, ~.5 mile E of its intersection with SR 656, Wytheville	Low	X
Longwood Elastimers Plant	NONPET	655 Fairview Road, Wytheville	Low	X
Longwood Elastimers Plant	UST	655 Fairview Road, Wytheville	Low	X
Duck's Grocery	UST	Located on 2100 West Lee Hwy, Wytheville	Low	X

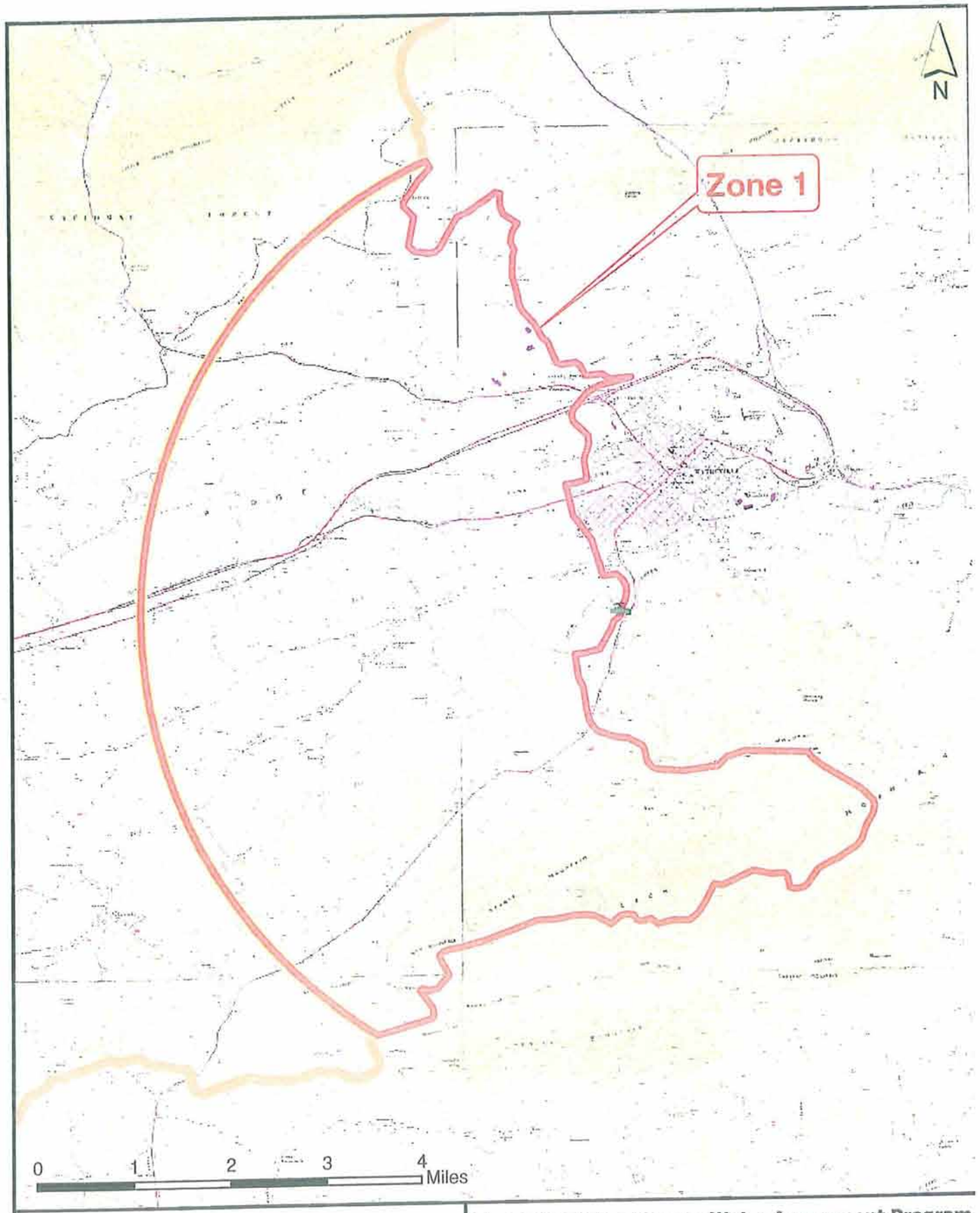
Wilderness Road Truckstop	UST	Located on Exit 44 off I-77, Wytheville	Low	X
Wytheville Travel Center	UST	At the Intersection of I-77 and I-81, Wytheville	Low	X

TABLE 11
Underground Storage Tanks (USTs) - Town of Wytheville Intake

ID #	Facility	Address
1-008187	NATIONAL SEATING COMPANY	1370 W. RIDGE ST., Wytheville
1-009504	USDA-FS-JNF - WYTHE RANGER DISTRICT	1625 WEST LEE HIGHWAY, Wytheville
1-009539	WYTHE COUNTY TECHNOLOGY CENTER	1500 WEST SPILLER STREET, Wytheville
1-010884	SPEED QUEEN LAUNDRY	1215 W. LEE HWY., Wytheville
1-019550	VDOT - WYTHEVILLE SHOP AREA HEADQUARTERS	US 11 - .5 MI E SR 656, Wytheville
1-024310	SULTS USED CARS	ROUTE 21 SOUTH, Wytheville

TABLE 12
Voluntary Remediation Program - Town of Wytheville Intake

ID Number	Facility	Address
VRP00033	OLD NATIONAL CARBIDE	
VRP00165	RADFORD UNIVERSITY CREOSOTE SITE	RADFORD UNIVERSITY, RADFORD
VRP00140	AMERICAN ANNUITY GROUP, INC.	WEST OF MILL STREET, HILLSVILLE
VRP00142	TENNECO NATURAL GAS	APPROXIMATELY 20 SITES IN SW VIRGINIA
VRP00070	ALLIED CHEMICAL CORP., PULASKI WORKS	1481 DORAN HWY, PULASKI



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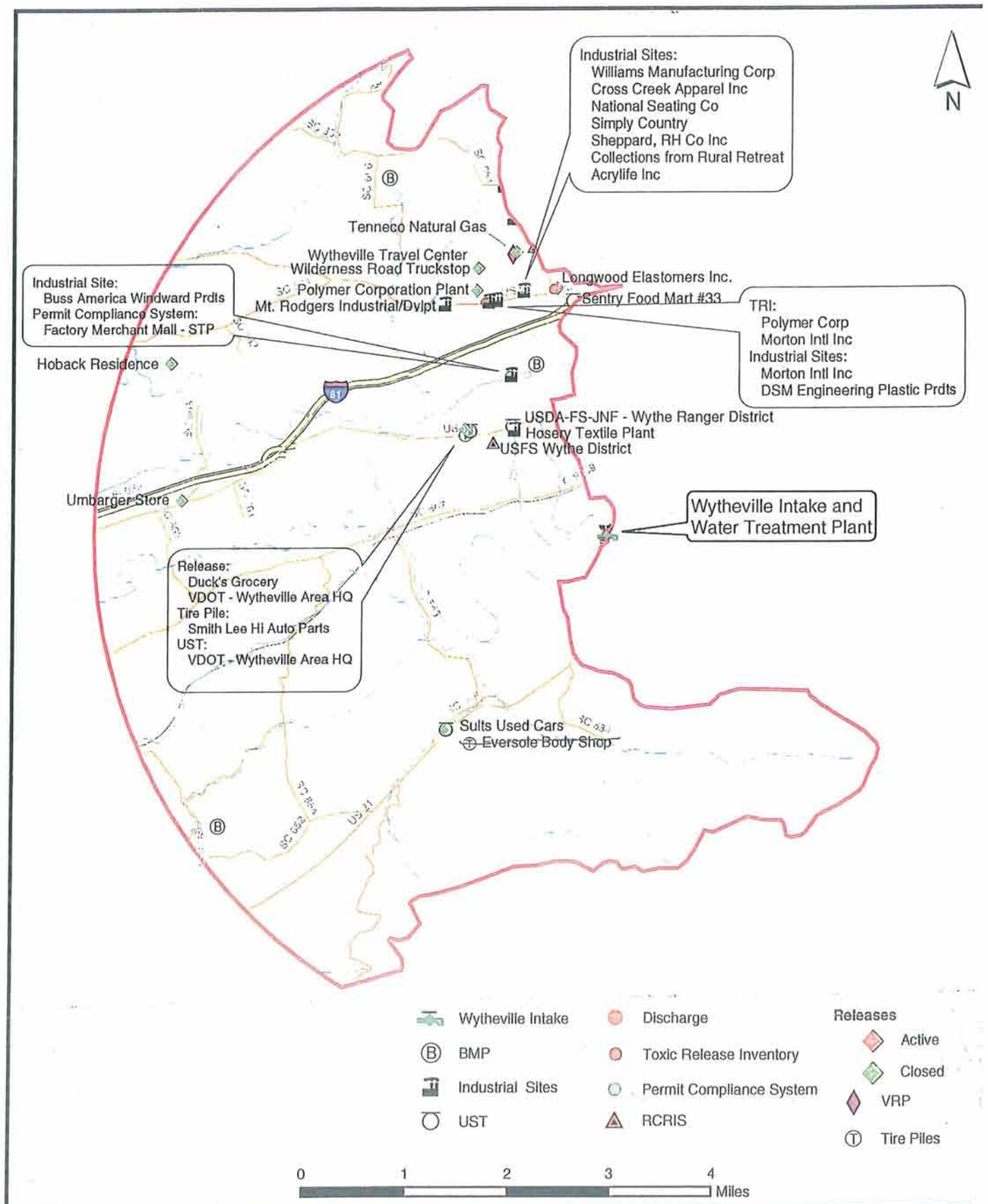
Upper New River Source Water Assessment Program

Date: 12-31-01
Drawn by: MF
Job#: B01127

Figure 1
Town of Wytheville Source Water Assessment Area



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Date: 12-31-01
Drawn by: SC
Job#: B01127

Figure 2
Town of Wytheville Zone 1

Appendix A-7

Pulaski County PSA Intake Tables and Figures

TABLE 1
Best Management Practices - Pulaski County Intake

VABMP	Topographic Quadrangle	BMP Description
8315	FOSTER FALLS	Reforestation of Erodible Crop and Pastureland
8353	FOSTERS FALLS	Grazing Land Protection

TABLE 2
Boat Ramps - Pulaski County Intake

Site Name	Water Body	Fund Type	GW Risk	SW Risk
Allisonia	Claytor Lake	P/LW	X	Medium

TABLE 3
Discharge-No Discharge - Pulaski County Intake

Permit Number	Facility	Address	Discharge	GW Risk	SW Risk
VA0051799	Pulaski County - WTP	143 Third Street, N.W., Pulaski	Y	Low	Medium
VA0060321	Red Carpet Inn & Restaurant	I-81 At Exit 92 (PO Box 1266), Pulaski	Y	Low	Medium
VPA02070	Pulaski County WTP	Rt. 651, Claytor Lake, Draper	N	Medium	Low

TABLE 4
Hazardous Solid Waste - Pulaski County Intake

ID Number	Facility	Address
VAD988207239	WARNER-LAMBERT CO TETRA	4769 Wurno Road, Pulaski
VAD988214755	NIPPER AUTOMOTIVE MACHINE SHOP	319 E Main Street, Pulaski
VA0000104711	EXPERT TIRE	1000 E Main Street, Pulaski
VAD000482414	LONG AIRDOX CO	4041 Wurno Road, Pulaski
VAD023884380	HERITAGE BUICK OLDS PONTIAC G M C	1601 Bobwhite Blvd, Pulaski
VAD023885023	STEGERS CLEANERS INC	324 E Main Street, Pulaski
VAD053182481	BOND COTE CORP	509 Burgis Ave., Pulaski
VAD054048046	HUDSON CHEVROLET CORP	1300 Bobwhite Blvd, Pulaski
VAD980720106	CHESAPEAKE & POTOMAC TELEPHONE CO	802 E Main Street, Pulaski
VAD988193041	7-ELEVEN #20615	W Main St. and Newbern St., Pulaski

TABLE 5
Industrial Facilities Discharge

IFD #	NPD #	Facility	Address	Water Body
59908	VA0000418	ALLIED CHEM IND DIV PULASKI	PO BOX 511, Pulaski	PEAK CREEK
60455	VA0025178	PULASKI,TOWN OF-STP	Pulaski	PEAK C
798	VA0051799	PULASKI CNTY P S AUTH WTP	Pulaski	TR TO CLAYTOR LK
61215	VA0062227	PULASKI, TOWN OF	Pulaski	CLAYTOR LK

TABLE 6
Industrial Sites - Pulaski County Intake

Facility	Product Description	Address	Gw Risk	Sw Risk
Pulaski Tinning Co	Tinning & sheet metal fabricating; commercial roofing	911 E Main St, Pulaski	Medium	Low
Akers Cabinet Shop	Wooden kitchen & gun cabinets, vanities, bookcases & counter tops		Medium	Low
Mc Cready Lumber Co	Tongue & groove flooring, industrial blocking, pressure treated lumber & hardwood cut stock		Medium	Low
Pulaski Furniture Corp	Gun cabinets, clocks, curios, hall trees, bedroom & dining room furniture	1 Pulaski Sq, Pulaski	Medium	Low
Reed Creek Inc	Pine furniture	2285 Julia Simpkins Rd, Pulaski	Medium	Low
Southern Welding Of Pulaski	Machine shop: general & CNC machining, ID grinding, welding, drilling, boring, cutting, custom fabricated steel products, mill & lathe work	120 Bell Ave, Pulaski	Medium	Low
Virginia Co	Medical equipment		Medium	Low
Virginia Wilbert Vault Co	Burial vaults	Hylton Village Loop, Pulaski	Medium	Low
BondCote Corp	Mesh, cotton, tarpaulin, single ply roofing & vinyl coated fabrics; canvas products	509 Burgis Ave, Pulaski	Medium	Low
Xaloy Inc	Plastic & food processing equipment screws, metal barrels & bimetallic cylinders		Medium	Low
Smythers, Daris O Sawmill	Rough lumber		Medium	Low
Caudell Signs Co	Metal, wooden & plastic signs & banners		Medium	Low
Warden Shackle Express Co	Chicken shackles	601 1st St NE, Pulaski	Medium	Low
Paragon P W C Inc	Poultry processing equipment	64 1st St, Pulaski	Medium	Low
RUS Uniform Co.				
Allied Chemical Corp.				
Pulaski Furniture				

TABLE 7
Landfills - Pulaski County Intake

Facility	GW Risk	SW Risk
Draper Landfill (Closed)		
Hoover Color Corp		

TABLE 8
Marinas - Pulaski County Intake

OWNER	GW Risk	SW Risk
Dean Jackson	X	Medium
Izaak Walton League	X	Medium
Jack Martin	X	Medium
Harold Chrisley	X	Medium

TABLE 9
Tank Release - Pulaski County Intake

PC Number	Site Name	Tank Type	Location	GW Risk	SW Risk
93-1830	Shop Rite Market	LUST	Pulaski, VA		
98-1045	Jay's Mobil Station	LUST	Pulaski , VA		
87-0235		LUST	Pulaski County, VA		
90-0193	Pepsi Cola Warehouse	LUST	Pulaski, VA		
93-1215	7-ELEVEN	LUST	Pulaski, VA		
98-1133	Wades First Auto Repair	LUST	Pulaski, VA		
97-1067	Ratcliff Mobil Station	LUST	Pulaski, VA		
97-1068	Jay's Mobil Station	LUST	Pulaski, VA		
98-1066	Huddy's	LUST	Dublin, VA		
91-0545	Pulaski Motor, Inc.	LUST	Pulaski, VA		
94-1795		LUST	Pulaski County, VA		

TABLE 10
Tire Piles - Pulaski County Intake

COMMONNAME	OWNERNAME	Address	GW_RISK	SW_RISK
Pulaski Mt. Wayside	V Dot	200 Industrial Rd., Rte 100 Pulaski Mt Wayside, Dublin	High	High
Dickerson Estate(Cole Mt. Rd.)	John W. & Robert Dickerson	P.O. Box 160, Cole Mt Rd. Route 692, Dublin	High	High

TABLE 11
Toxic Release Inventory - Pulaski County Intake

Facility ID	Facility Name	Address
VAD002155729	Hoover Color Corp.	State Hwys 693 & 777, Hiwassee
VAD053182481	Bondcote Corp.	509 Burgis Ave., Pulaski
VAD988181442	Xaloy, Inc.	101 Xaloy Way, Pulaski

TABLE 12
Underground Storage Tanks (UST) - Pulaski County Intake

ID Number	NAME	ADDRESS
2-003105	PEPSI-COLA GENERAL BOTTLERS - PULASKI	919 E. Main Street, Pulaski
2-004953	7-ELEVEN STORE 1055-20615	825 E. Main Street, Pulaski
2-005571	BELL ATLANTIC	802 Main Street, Pulaski
2-008440	FAST SHOP SUPERETTE, INC	128 South Washington Ave., Pulaski
2-013526	NORTHSIDE CHEVRON II	622 East Main Street, Pulaski
2-015917	DOWNTOWN EXXON	521 E. Main Street, Pulaski
2-018641	BOGLE TIRE CO INC	1002 E. Main Street, Pulaski
2-021898	JIM DANDY AUTO SERVICE INC	228 E. Main Street, Pulaski
2-026672	FORMER SHOP RITE MARKET	1000 Newbern Road, Pulaski
2-003313	EDENS DISTRIBUTING COMPANY, INC	2100 Monte Vista Ext., Pulaski
2-003781	BLUE RIDGE SUPPLY CO	92 E First Street, Pulaski
2-021417	H W HUFF ESTATE	304 Madison Ave., Pulaski
2-007162	XALOY	101 Xaloy Way, Pulaski
2-015029	WILCO FOOD MART	Rte 99 and Walnut Street, Pulaski
2-008721	EXPRESS STOP #5	RT 99 @ I-81, Pulaski
2-024085	PHILLIPS 66	Route 99, Pulaski
2-011232	PHILLIPS 66 #26001	I-81 & Route 100 East, Pulaski
2-013784	JAYS MOBIL STATION	Bobwhite Blvd & Newbern Road, Pulaski
2-010052	FORMER EXXON S/S #2-6609	I-81 EXIT 31, Pulaski
2-021352	FIRESTONE	1000 East Main St., Pulaski
2-019882	BONDCOTE CORPORATION	509 Burgis Ave., Pulaski
2-037047	HUDSON BUICK	1601 Bobwhite Blvd, Pulaski

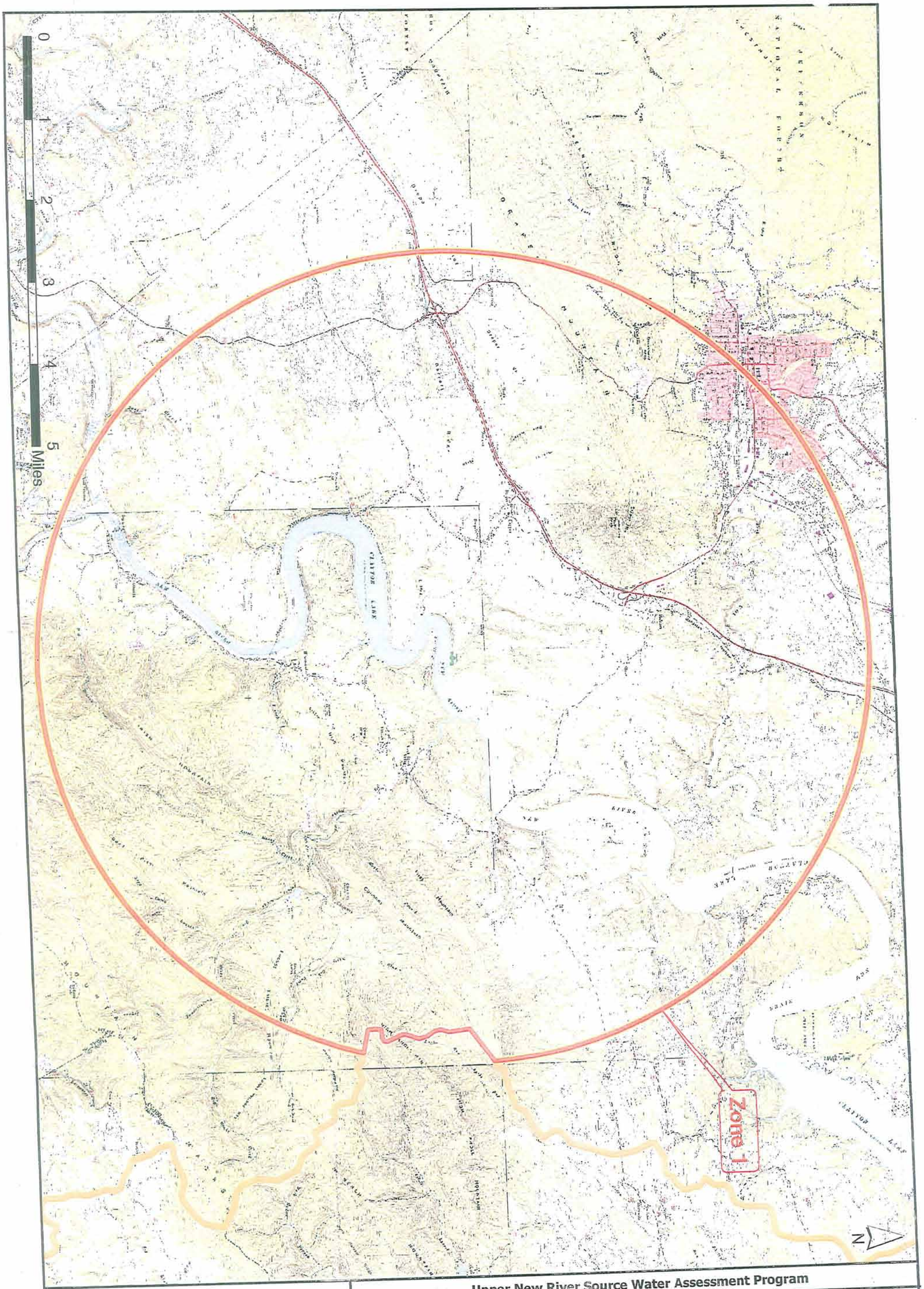
TABLE 13
Voluntary Remediation Program - Pulaski County Intake

ID Number	NAME	ADDRESS
VRP00070	Allied Chemical Corp., Pulaski Works	1481 Doran Highway, Pulaski

TABLE 14

Wells and Springs - Pulaski County Intake

Type Code	City	System Name	Facility Name
WL	PULASKI	CAMP POWATAN	DEEP WELL
WL	PULASKI	HOOVER COLOR CORPORATION	WELL
WL	PULASKI	LAKEWOOD ESTATES	WELL

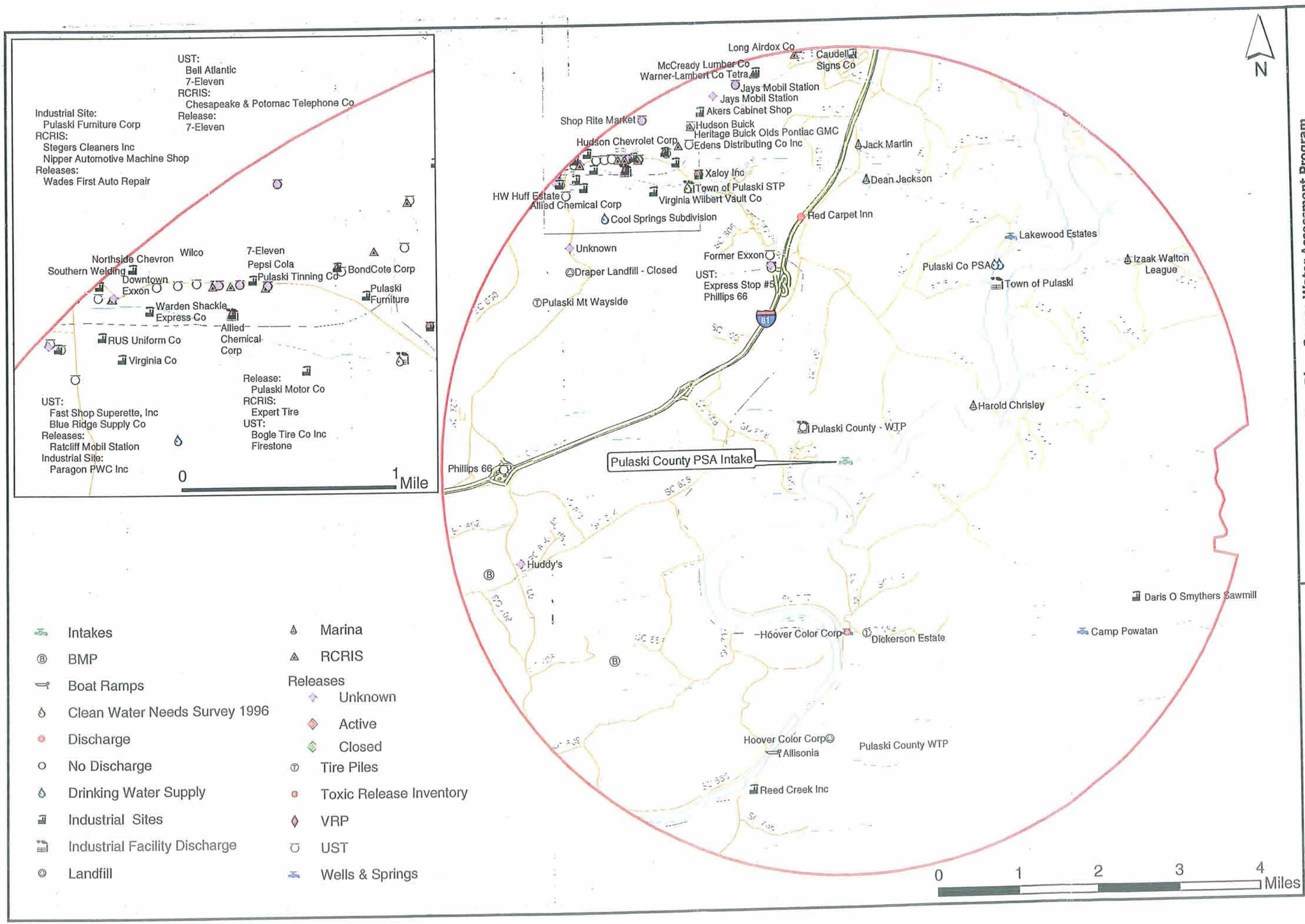


Upper New River Source Water Assessment Program

Draper Aden Associates
Engineering ◆ Surveying ◆ Environmental Services

Date: 12-31-01
Drawn by: MF
Job#: B01127

Figure 1
Pulaski County PSA Zone 1
Source Water Assessment Area



Upper New River Source Water Assessment Program

Figure 2

Pulaski County PSA Zone 1

Date: 01-02-02
Drawn by: SC
Job#: B01127

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Appendix A-8

Town of Pulaski Intake Tables and Figures

TABLE 1
Best Management Practices - Town of Pulaski Intake

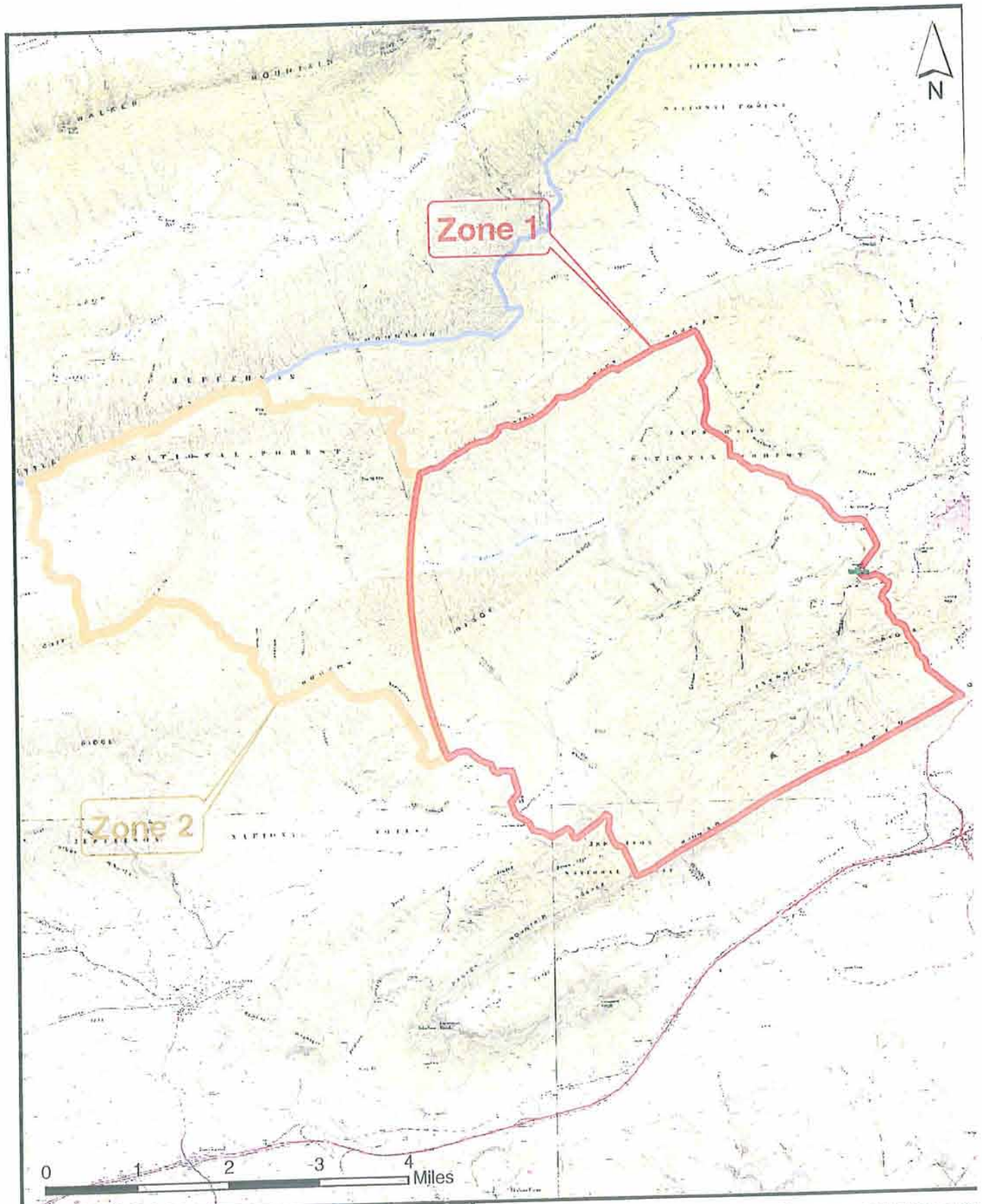
VABMP No.	TOPO	BMP Description
8240	PULASKI	Grazing Land Protection

TABLE 2
Tire Piles - Town of Pulaski Intake

COMMON NAME	OWNER NAME	ADDRESS	GW RISK	SW RISK
Somonas Property	Chester H. Semones	CaseKnife Ridge Rd. Rte. 610	High	High

TABLE 3
Wells and Springs - Town of Pulaski Intake

Type Code	Location	System Name	Facility name
WL	PULASKI	GATEWOOD CAMPGROUND TES	DRILLED WELLS



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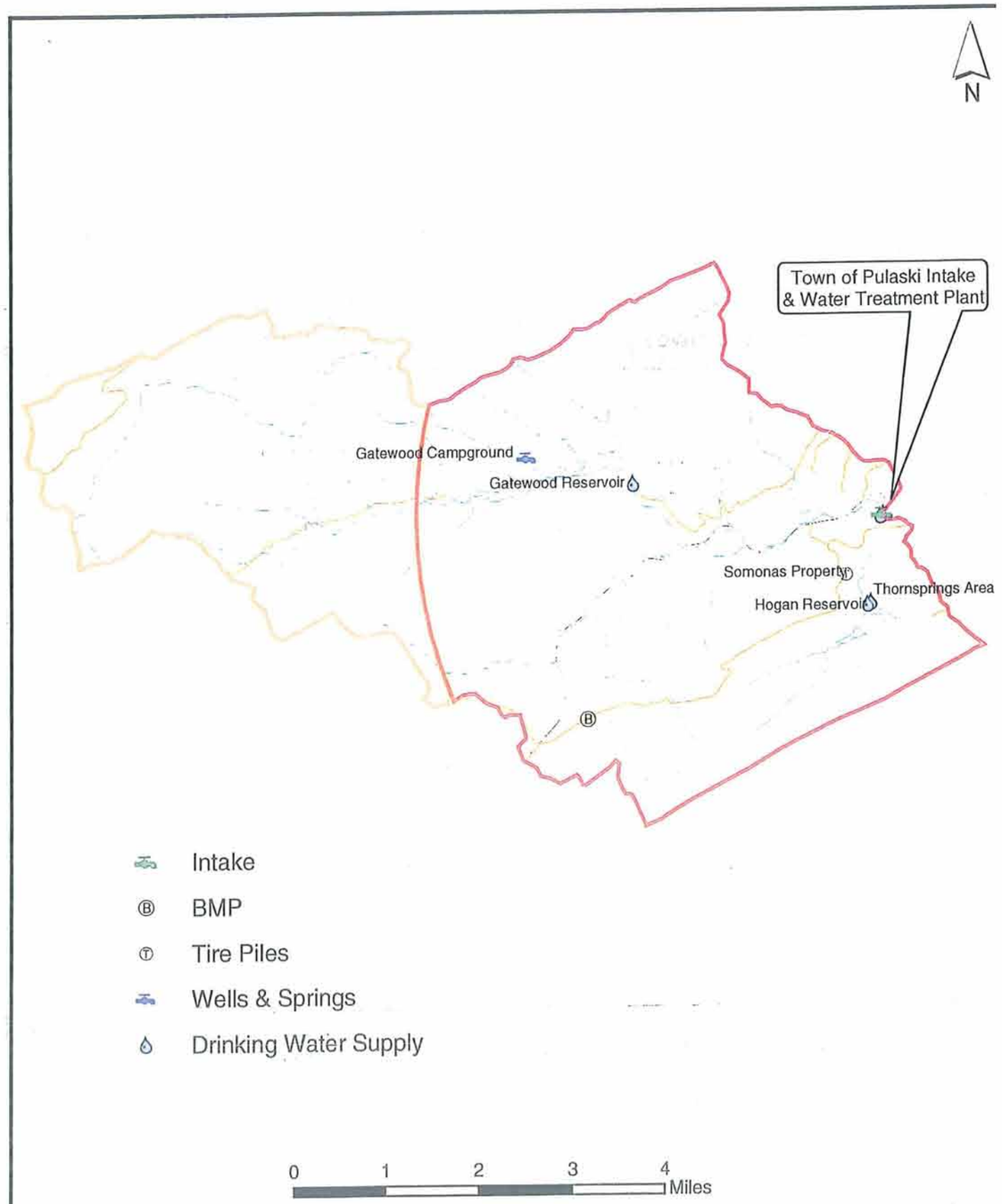
Upper New River Source Water Assessment Program

Date: 12-31-01
Drawn by: MF
Job#: B01127

Figure 1
Town of Pulaski Source Water Assessment Area



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Upper New River Source Water Assessment Program

Date: 12-31-01
Drawn by: SC
Job#: B01127

Figure 2
Town of Pulaski Zone 1 and 2

Appendix A-9

City of Radford Intake Tables and Figures

TABLE 1
Best Management Practices - City of Radford Intake

VABMP No.	Topographic Quadrangle	BMP Description
7908	RADFORD SOUTH	Grazing Land Protection
7909	RADFORD SOUTH	Grazing Land Protection

TABLE 2
Boat Ramps - City of Radford Intake

Site Name	Water Body	Fund Type	SW Risk
Claytor Dam	New River	P	Medium
Dublin	Claytor Lake	P/LW	Medium

TABLE 3
Discharge-No Discharge - City of Radford Intake

Permit #	Facility	Address	GW Risk	SW Risk
VA0054780	Radford, City of - WTP	619 Second Street	Low	Medium
VA0087084	AEP Claytor Lake	Rt. 1, Box 300A, Snowville Rd	Low	Medium
VPA02069	Radford, City of - WTP	20 Forest Avenue	Medium	Low

TABLE 4
Hazardous Solid Waste - City of Radford Intake

ID #	Facility	Address
VAD988204749	COCA-COLA BOTTLING CO	RT 100 BOX 547, Dublin
VAD988218301	BBA FRICTION INC OF NORTH AM	3994 PEPPERELL WAY (PULASKI IND PARK), Dublin

TABLE 5
Industrial Facilities Discharge - City of Radford Intake

IFD #	NPD	Facility	Address
61249	VA0063401	APPALACHIAN PWR CO CLAYTOR PLA	RT 1, Dublin

TABLE 6
Industrial Sites - City of Radford Intake

Facility	Product Description	Address	GW Risk	SW Risk
Holston River Quarry Inc	Crushed stone	State Route 61, Dublin	Low	Low
Marshall Concrete Products	Ready-mixed concrete & blocks		Medium	Low
Plymouth Inc	Notebooks, stationery & school paper supplies	10 Corporate D, Radford	Low	Low
HY-Tech Research Corp	Research & development laboratory: plasma science & laser diag		Low	Low
Mid Continent Nail Corp	Pallet nails		Medium	Low
Beach Manufacturing Co	Vehicle mirror, instrument panel & frame component assembly		Medium	Low
Mar-Bal Inc	Electrical molded thermoset polyester products		Medium	Low
Aspen Motion Technology				
APW Engineering Solutions				

TABLE 7
Landfill - City of Radford Intake

Facility	GW Risk	SW Risk
Ingles Mountain Landfill		

TABLE 8
Marinas - City of Radford Intake

OWNER	GW Risk	SW Risk
State of Va. Parks & Recreation	X	Medium
Earl S. Covey	X	Medium
Hidden Valley Family Campground, Inc.	X	Medium
Bruce & Clark Cunningham	X	Medium
Mr. Gerald Roseberry	X	Medium
Eddy Williams	X	Medium

TABLE 9
Tank Release - City of Radford Intake

PC #	Site name	Tank Type	Location	GW Risk	SW Risk
93-0738	CLAYTOR LAKE STATE PARK	LUST	DUBLIN, VA		
90-1632	CLAYTOR LAKE STATE PARK	LUST	DUBLIN, VA		
96-1102	CLAYTOR LAKE STATE PARK MARINA	LUST	DUBLIN, VA		
93-0530	PULASKI CO MAINTENANCE FACILITY	LUST	DUBLIN, VA		
98-1025N	PAUL A. LARUSO'S RESIDENCE	LUST	DUBLIN, VA		

TABLE 10
Tire Piles - City of Radford Intake

Facility Name	Owner's Name	Owner's Address	GW Risk	SW Risk
Ingles Mountain Landfill	Randell D. Bowling	201 Radford St., Christiansburg	High	High

TABLE 11
Toxic Release Inventory - City of Radford Intake

Caility ID	Facility Name	Address
VAD023716830	PULASKI FURNITURE CORP. PLANT #3	Rte. 100, DUBLIN
VAD043344472	ELECTROPLATE-RITE CORP.	U.S. RTE. 11 AT ST. RTE. 633 CEMETERY RD., DUBLIN
VAD066003161	VOLVO GM HEAVY TRUCK CORP.	HWY. 643, DUBLIN
VAD161580170	CONN-WELD IND. INC.	NEW BERN RD. ST. RTE. 682, DUBLIN
VAD988190195	NEWBERN FINISHING PLANT	VA. RTE. 682, DUBLIN

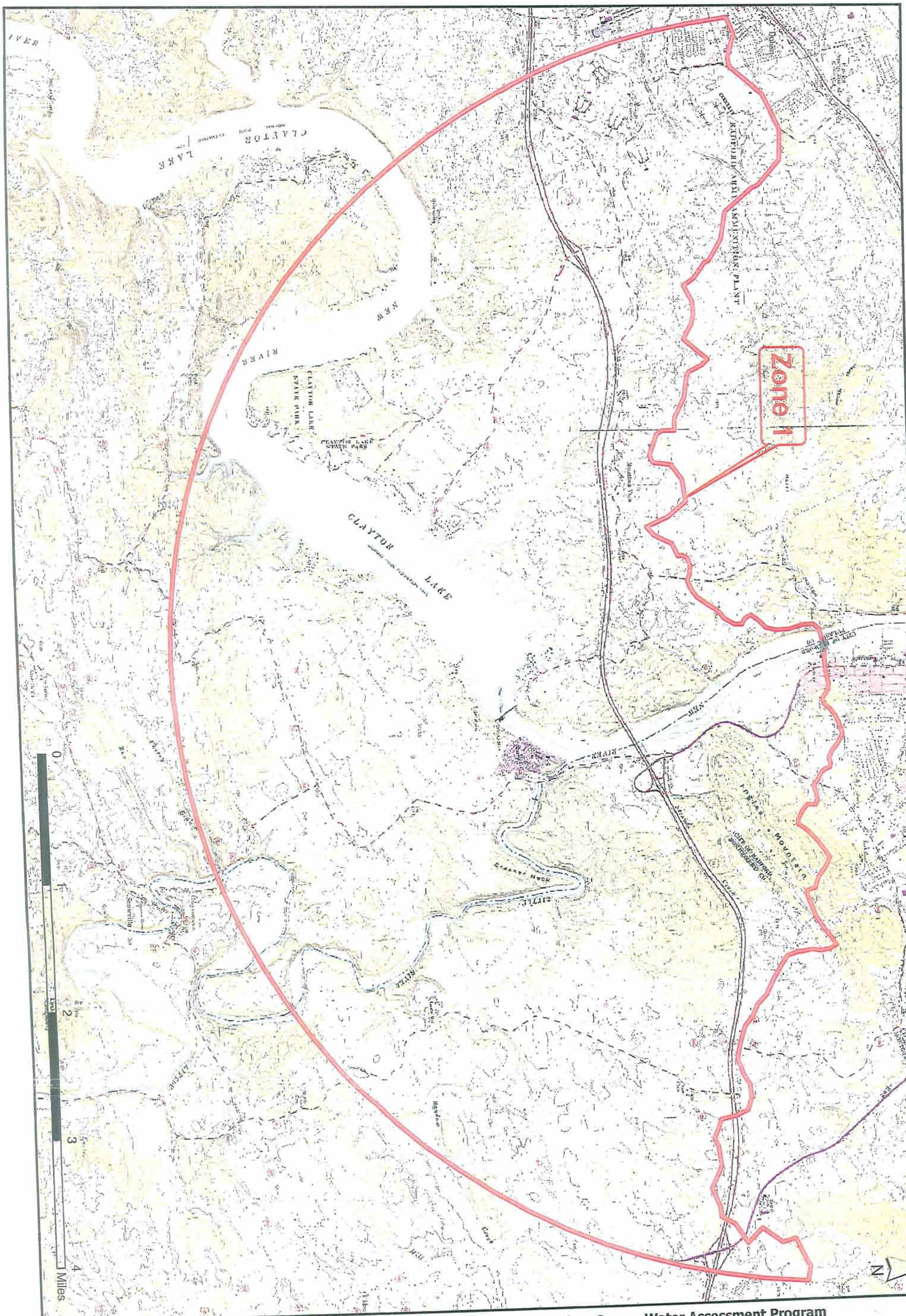
TABLE 12
Underground Storage Tanks (USTs) - City of Radford Intake

ID Number	Name	Address
2-025378		
2-016193	CLAYTOR LAKE STATE PARK	ROUTE 660, DUBLIN
2-016075	PULASKI COUNTY MAINTENANCE FACILITY	5572 UTILITY LANE - RT 1030, DUBLIN
* 2-017257	SOUTHGATE MARKET	RT 177, CHRISTIANBURG
* 2-027283	BETHAL ELEMENTARY	2306 TYLER ROAD, CHRISTIANSBURG

[illegible]

TABLE 13
Wells and Springs - City of Radford Intake

Type Code	County/City	System Name	Facility Name
WL	MONTGOMERY	BETHEL WOODS SUBDIVISION	WELL NO 1
WL	MONTGOMERY	SELU CONSERVANCY	WELL
WL	PULASKI	MCGUIRES FAMILY CAMPGROUND	DRILLED WELL
WL	PULASKI	CLAYTOR LAKE INN	DRILLED WELL
WL	PULASKI	BILL COPLEY	DRILLED WELL
WL	PULASKI	LAKEVIEW WATERWORKS	WELL NO. 1
WL	PULASKI	LAKEVIEW WATERWORKS	WELL NO. 2
WL	PULASKI	TINY TOWN MOBILE HOME PARK	WELL NO. 1
WL	PULASKI	TINY TOWN MOBILE HOME PARK	WELL NO. 2



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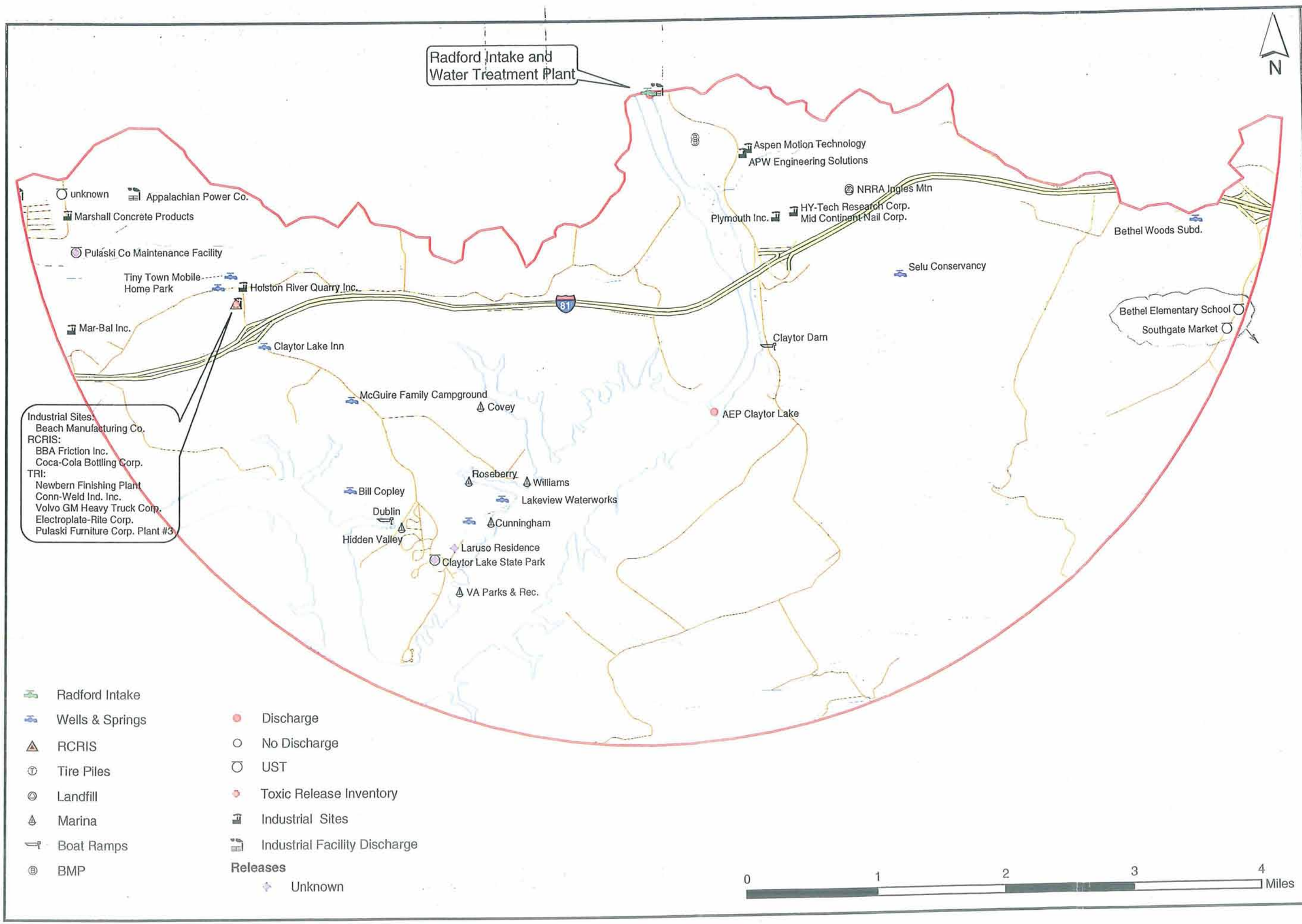
Upper New River Source Water Assessment Program

Date: 12-31-01
Drawn by: MF
Job#: B01127

Figure 1
City of Radford Zone 1
Source Water Assessment Area



Upper New River Source Water Assessment Program

Figure 2
City of Radford Zone 1

Date: 12-31-01
Drawn by: MF
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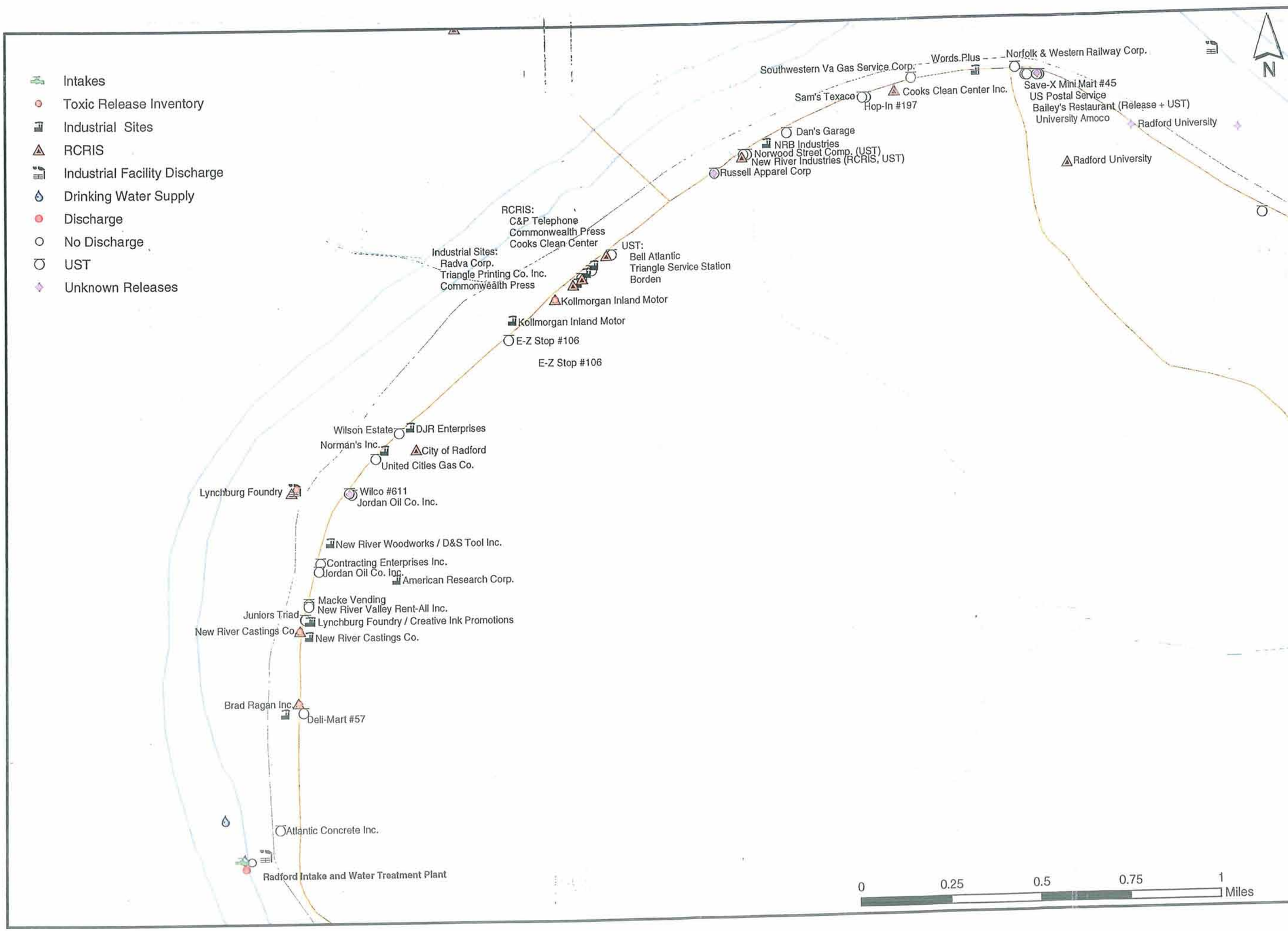

Upper New River Source Water Assessment Program

Figure 3
City of Radford Detail

Date: 12-31-01
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Appendix A-10

Blacksburg-Christiansburg-VPI Water Authority Intake Tables and Figures

TABLE 1
Best Management Practices - BCVPI Water Authority Intake

VABMP ID	Topographic Quadrangle	BMP Description
7756	BLACKSBURG	Grazing Land Protection
7758	RADFORD NORTH	Grazing Land Protection
7760	BLACKSBURG	Grazing Land Protection
7762	BLACKSBURG	Grazing Land Protection
7785	BLACKSBURG	Grazing Land Protection
7841	RADFORD NORTH	Reforestation of Erodible Crop and Pastureland
7845	RADFORD NORTH	Grazing Land Protection
7908	RADFORD SOUTH	Grazing Land Protection
7909	RADFORD SOUTH	Grazing Land Protection

TABLE 2
Drinking Water Supply - BCVPI Water Authority Intake

City	County	Facility Name	Owner
BLACKSBURG	MONTGOMERY	NEW RIVER	BLACKSBURG/VPI/CHRST
BLACKSBURG	MONTGOMERY	NEW RIVER	BLKBG-CHRTBG-VPI-WA
BLACKSBURG	MONTGOMERY	TREATMENT PLANT	BLKBG-CHRTBG-VPI-WA
RADFORD	MONTGOMERY	TREATMENT PLANT	RADFORD AMUNITION PL
RADFORD	MONTGOMERY	NEW RIVER	RADFORD AMUNITION PL
RADFORD	MONTGOMERY	TREATMENT PLANT	CITY OF RADFORD
RADFORD	MONTGOMERY	NEW RIVER	CITY OF RADFORD

TABLE 3
Golf Courses - BCVPI Water Authority Intake

Golf Course Name	Location	GW Risk	SW Risk
The River Course	Fairlawn		

GW=Groundwater
SW=Surfacewater

TABLE 4
Hazardous Solid Waste Sites - BCVPI Water Authority Intake

FACILITY NAME	LOCATION
THOMPSON CHRYLSER PLYMOUTH INC	3431 RADFORD ROAD, RADFORD
RADFORD CITY SCHOOLS	1612 WADSWORTH STREET, RADFORD
DICK PRICE FORD	6832 LEE HIGHWAY, RADFORD
INLAND MOTOR	501 FIRST ST, RADFORD
LYNCHBURG FOUNDRY CO	1605 FIRST ST, RADFORD
COOKS CLEAN CENTER INC	426 FIRST ST, RADFORD
HARVEY CHEVROLET CORP	1500 TYLER AVE, RADFORD
RAGAN BRAD INC RUBBER DIVISION	1905 FIRST, RADFORD
NEW RIVER INDUSTRIES INC	309 NORWOOD ST, RADFORD
RADFORD CITY OF	619 SECOND ST, RADFORD
CHESAPEAKE & POTOMAC TELEPHONE CO	202 FIRST ST, RADFORD
RADFORD COMMUNITY HOSPITAL	8TH & RANDOLPH ST, RADFORD
NEW RIVER CASTINGS CO	1701 FIRST ST, RADFORD
COOKS CLEAN CENTER INC	708 NORWOOD ST, RADFORD
RADFORD UNIV ALLEN HALL	NORWOOD ST B, RADFORD
RADFORD UNIV CURIE HALL	NORWOOD ST A, RADFORD
KMART #9084	RADFORD SHOP PLAZA, RADFORD

TABLE 5
Industrial Sites - BCVPI Water Authority Intake

INDUSTRY	PRODUCT DESCRIPTION	ADDRESS	GW_RISK	SW_RISK
Ragan, Brad Inc	Rubber compounds	1905 1st St, Radford	Medium	Medium
Commonwealth Press Inc	Commercial offset printing; computer typesetting; glue, perfect & saddle stitch binding	415 1st St, Radford	Medium	Low
Eleven West Inc	Magnetic & vinyl lettered signs; fabric screen printing & decals	6598 New River Rd, Pulaski County	Low	Low
Henley Tool Corp	Machine shop: tools, dies, jigs, fixtures, general machining, drilling, boring, cutting, honing, grinding, welding, lathe & mill work		Medium	Low
Kollmorgen Corp	Motors, drives, DC servo motors & amplifiers		Medium	Low
Kollmorgen Inland Motor	Custom torque, brushless, DC & servo motors; amplifiers; servo drives; electromechanical, rotary, linear, ball screw & air craft actuators		Medium	Low
Lynchburg Foundry/Radford Plt	Ductile & gray iron castings for automotive & fluid power industries	1605 1st St, Radford	Medium	Low
New River Castings Co	Ductile iron castings for automotive industry	1701 1st St, Radford	Medium	Low
NRB Industries Inc	Woven textiles	309 Norwood St, Radford	Low	Low
New River Valley Workshop Inc	Sheltered workshop: contract assembly, pallets, boxes & industrial aprons		Low	Low
Norman's Inc	Picture frames, wood products, kitchen & bathroom cabinets		Medium	Low
Old Colony Box Co Inc	Rigid set-up paper boxes	90 Robertson St, Radford	Low	Low
Pattern Services	Metal, wooden & plastic patterns		Medium	Low
Radva Corp	Polystyrene packaging	604 17th St, Radford	Medium	Low
Triangle Printing Co Inc	Commercial offset printing; staple, saddle stitch & spiral binding		Medium	Low
Motion Control Systems Inc	DC, servo & brushless motors & amplifiers	6701 Viscoe Rd, Radford	Medium	Low
Radva Corp	Polystyrene packaging	301 1st St, Radford	Medium	Low

Plymouth Inc	Notebooks, stationery & school paper supplies	10 Corporate Dr, Radford	Low	Low
Cassco Ice & Cold Storage Inc	Ice	608 17th St, Radford	Low	Low
HY-Tech Research Corp	Research & development laboratory: plasma science & laser diagnostics		Low	Low
American Research Corp Of VA	Research & development laboratory: physical & technological	1509 4th St, Radford	Low	Low
NRB Industries Inc	Woven textiles	6540 Viscoe Rd, Pulaski County	Low	Low
Baldwin Performance Machine	Automotive parts		Medium	Low
D J R Enterprises	Fabric screen printing & embroidering; advertising specialties	1012 1st St, Radford	Low	Low
Boitnott Machine Inc	Machine shop: general machining		Medium	Low
Creative Ink Promotions	Commercial offset & letterpress printing, computer typesetting & desktop publishing		Medium	Low
New River Woodworks	Wooden & laminated cabinets, furniture & counter tops		Medium	Low
Words Plus	Computer typesetting, desktop publishing & spiral plastic binding		Low	Low
Sign Systems Inc	Wooden, painted, plastic, metal, magnetic, neon, electrical, sandblasted & vinyl lettered signs		Medium	Low
Mid Continent Nail Corp	Pallet nails		Medium	Low
Absolute Tool & Die Inc	Machine shop: MIG welding, surface grinding, lathe & mill work, metal fabricating, tool & die		Medium	Low
D & S Tool Inc	Machine shop: general machining, lathe & mill work	1303 1st St, Radford	Medium	Low
ACT MicroDevices Inc	Fiber optic products & connectors; electronic product coating service		Low	Low
Aspen Motion Technology				
APW Engineering Solutions				
Concrete Plant				

TABLE 6
Boat Ramps - BCVPI Water Authority Intake

Boat Landing Name	Water Body Location	GW Risk	SW Risk
Pepper's Ferry Bridge	New River	X	Medium

GW=Groundwater
SW=Surfacewater

TABLE 7
Discharge-No Discharge - BCVPI Water Authority Intake

Permit Number	Facility Name	Address	Discharge	GW Risk	SW Risk
VA0054780	Radford, City of - WTP	619 Second Street, Radford	Y	Low	Medium
VA0061751	Christiansburg, Town of - STP	100 East Main Street, Christiansburg	Y	Low	Medium
VPA02069	Radford, City of - WTP	20 Forest Avenue, Radford	N	Medium	Low

GW=Groundwater
SW=Surfacewater

TABLE 8
Hospitals - BCVPI Water Authority Intake

Facility Name	GW Risk	SW Risk
Carilion Radford Community Hospital	Medium	Low
St. Albans Hospital		

GW=Groundwater
SW=Surfacewater

TABLE 9
Industrial Facility Discharge - BCVPI Water Authority Intake

Facility ID	Facility Name	Address	Water Body
VA0000213	LYNCHBURG FOUNDRY RADFORD	P O BOX 1012, Radford	NEW RIVER
VA0020559	Former Pulaski Co Sewer Authority	FAIRLAWN P O BLDG, Radford	NEW RIVER
VA0025526	Former Sewage Trt Plt	618 PULASKI ST, Radford	NEW R
VA0031143	BULLION HOLLOW COAL CO.#19 MIN	.....	L TOMS C
VA0054780	RADFORD WATER TREATMENT PLANT	90 MORTON ST, Radford	NEW R
VA0061751	TOWN OF CHRISTIANSBURG	Christiansburg	CRAB C

TABLE 10
Landfills - BCVPI Water Authority Intake

Facility Name	GW Risk	SW Risk
Hammond Landfill (Closed)		

GW=Groundwater
SW=Surfacewater

TABLE 11
Permit Compliance System- BCVPI Water Authority Intake

NPDES	Facility Name	City	Water Body
VA0061751	CHRISTIANSBURG TOWN OF	CHRISTIANSBURG	CRAB CREEK

TABLE 12
Leaking Underground Storage Tanks - BCVPI Water Authority Intake

PC #	Site Name	Tank Type	Location	GW Risk	SW Risk
91-1905	SCOTTISH MART	LUST	RADFORD, VA	high	x
94-1870	RADFORD UNIVERSITY	LUST	RADFORD, VA	high	x
98-1076	FORMER COASTAL MART	LUST	CHRISTIANSBURG, VA	high	x
92-0875	RADFORD UNIVERSITY	LUST	RADFORD, VA	high	x
97-1063N	SOWER'S RESIDENCE	LUST	CHRISTIANSBURG, VA	high	x
93-0648	JIFFY LUBE	LUST	ROANOKE, VA	high	x
00-2064	WILCO #611	LUST	RADFORD, VA	high	x
00-2065	RUSSEL APPAREL BUS	LUST	RADFORD, VA	high	x
00-2071N	FRED COVEY RESIDENCE	LUST	RADFORD, VA	high	x
92-0720	BAILEYS RESTAURANT	LUST	RADFORD, VA	high	x
00-2071	FRED COVEY RESIDENCE	LUST	RADFORD, VA	high	x
99-1042	THE PAUL STEELE RENTAL PROPERTY	LUST	RADFORD, VA	high	x

x=no designation
GW=Groundwater
SW=Surfacewater

TABLE 13
Tire Piles - BCVPI Water Authority Intake

COMMONNAME	JURISDCTN	OWNERNAME	ADDRESS1	GW_RISK	SW_RISK
Price Property (Quarry)	Pulaski	Richard P. Price	Route 11, Radford	High	High
Epergy Property	Montgomery	Eperhy	off Rte.663 on left side near	High	High
Farmland Equipment	Montgomery	George Canode	Route 11, Radford	High	High
Lynn Property	Montgomery	Clyde Lynn	Walton Road Rte 633, Radford	High	High
Brewer's Garage	Montgomery	Paul Edward Brewer	3941 Radford Rd, Radford	High	High
Ingles Mountain Landfill	Radford City	Randell D. Bowling	Ingles Mnt. Landfill	High	High

GW=Groundwater
SW=Surfacewater

TABLE 14
Toxic Release Inventory - BCVPI Water Authority Intake

Facility ID	Facility Name	Address
VAD000019364	KOLLMORGEN CORP. INLAND MOTOR DIV.	501 1ST. ST., Radford
VAD010063006	LYNCHBURG FNDY. CO. RADFORD SHELL PLANT	1605 1ST ST., Radford
VAD043552264	BRAD RAGAN INC.	1905 1ST & INGLES ST., Radford
VAD074752221	AT&T MICROELECTRONICS	RTE. 679 E. OF RTE. 114, Radford
VAD981730930	NEW RIVER CASTINGS CO.	1701 1ST ST., Radford

TABLE 15
Underground Storage Tanks (UST) - BCVPI Water Authority Intake

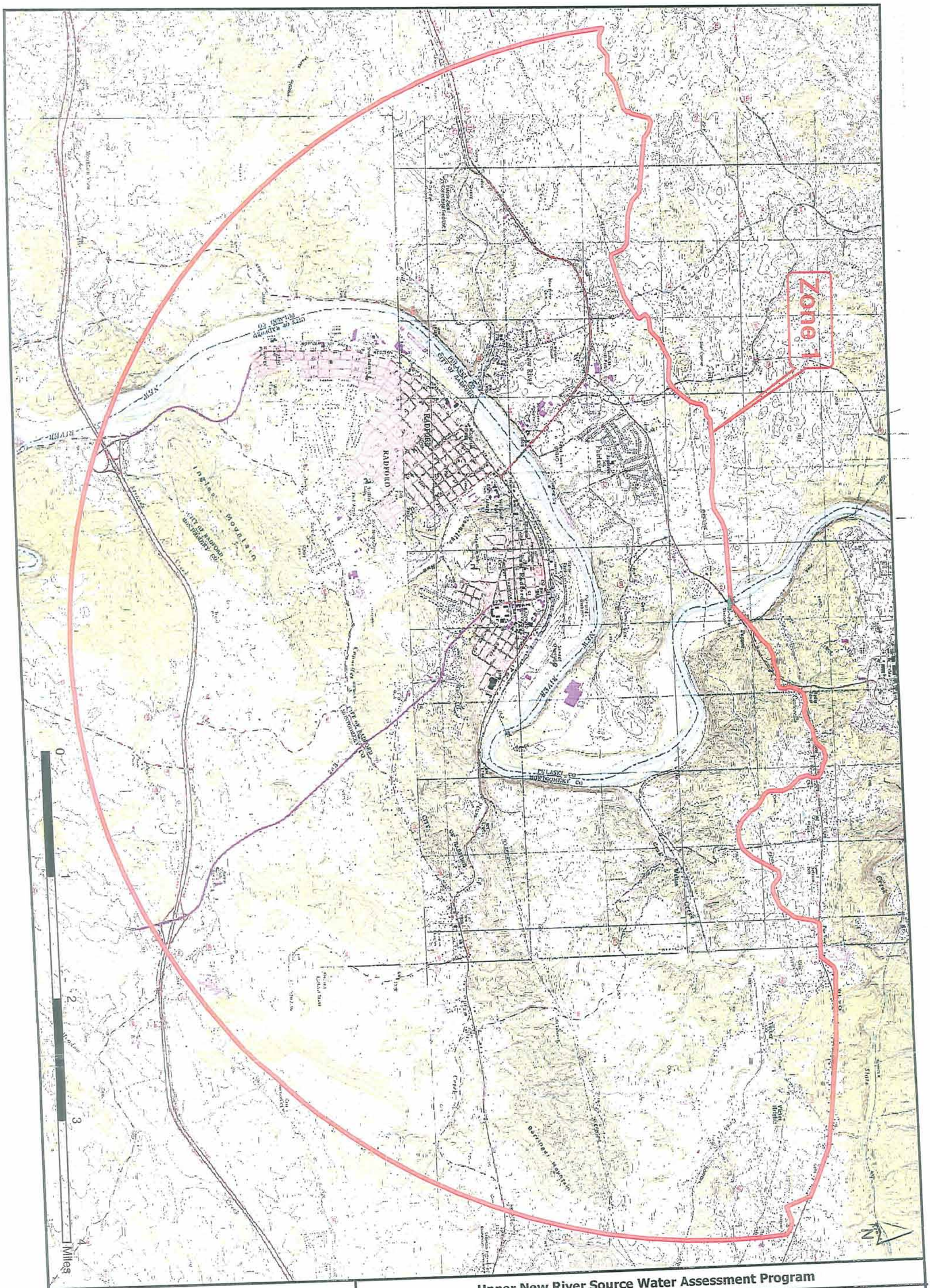
ID_NO	NAME	ADDRESS
2-000804	River Bend Plant	6540 Viscoe Rd, Fairlawn
2-002291	Hop-in #97	612 E. Norwood Street, Radford
2-002520	Harvey Chevrolet	1500 Tyler Avenue, Radford
2-003245	Contracting Enterprises Inc.	1403 First Street, Radford
2-004454	WILCO #611	1102 First Street, Radford
2-005572	Bell Atlantic	202 First Street, Radford
2-006352	Southwestern Virginia Gas Service Center	111 Harrison Street, Radford
2-006933	Lynchburg Foundry - Radford Plant	1605 First Street, Radford
2-010038	University AMOCO	1034 Norwood Street, Radford
2-013566	Dans Garage	401 Norwood Street, Radford
2-014957	Atlantic Concrete, Inc.	10 Forest Ave, Radford
2-015360	New River Industries, Inc.	309 Norwood Street, Radford
2-015378	Triangle Service Center	330 First St. Radford
2-015881	Sams Texaco	602 Norwood Street, Radford
2-015916	E-Z STOP #106	701 First Street, Radford
2-017253	Macke Vending	1520 First Street, Radford
2-017871	New River Valley Rental, Inc.	1530 First Street, Radford
2-018311	Cassco Ice and Cold Storage Inc.	608 17th Street, Radford
2-018485	Russell Apparel Corp.	219 Norwood Street, Radford
2-019047	United Cities Gas Co.	1013 First Street, Radford
2-020984	New River Valley	103 Duncan Lane, Radford
2-021029	Arlie G. Wilson Estate/Wilson Park Beach	921 First Street, Radford
2-021395	DELI MART #57	2307 First Street, Radford
2-021840	Pak N Sak Food Store #2	1800 Norwood Street, Radford
2-022858	Save-X Mini Mart #45	1001 Norwood Street, Radford
2-023015	Norwood Street Company	300 Norwood Street, Radford
2-023721	Old Colony Box Company Inc.	90 Robertson Street, Radford
2-024506	Baileys Restaurant	1031-1033 Norwood Street, Radford
2-025796	Frank and Dorothy Martin	1620 Norwood Street, Radford
2-026215	Borden	409 West First Street, Radford
2-027047	US Postal Service	1007 Norwood Street, Radford
2-020280	Inland Motor Division	609 Rock Road, Radford
2-018000	Norfolk And Western Railway Corporation	Norwood Street, Radford
2-011282	Scottish Mart	123D Norwood Street, Radford
2-030882	Jordan Oil Company, Inc.	1101 First Street, Radford
2-030883	Jordan Oil Company, Inc.	1420 First Street, Radford
2-020132	Juniors Triad	1600 First Street, Radford
2-023223	Jiffy Lube	2006 Orange Ave. Roanoke
2-025779	Hutchinson Motor Company	RT 114, Christiansburg

TABLE 16
Voluntary Remediation Program - BCVPI Water Authority Intake

ID Number	Facility Name	Address
Vrp00165	Radford university creosote site	Radford university

TABLE 17
Wells and Springs - BCVPI Water Authority Intake

Type	County	System Name	Identification
WL	Montgomery	Bethel woods Subdivision	Well No. 1
WL	Montgomery	Dry Valley Subdivision	Well No. 1
WL	Montgomery	Selu Conservancy	Well
WL	Montgomery	Vicker Heights	Well
WL	Montgomery	Walton Farms Subdivision	Well No. 1
WL	Pulaski	Riverbend Trailer Park	Well No. 1
WL	Pulaski	Riverbend Trailer Park	Well No. 2
WL	Pulaski	Earl Covey	Drilled Well
WL	Pulaski	Polyester Trailer Park	Well No. 1
WL	Pulaski	Polyester Trailer Park	Well No. 2
WL	Pulaski	Riverbend Trailer Park	Well



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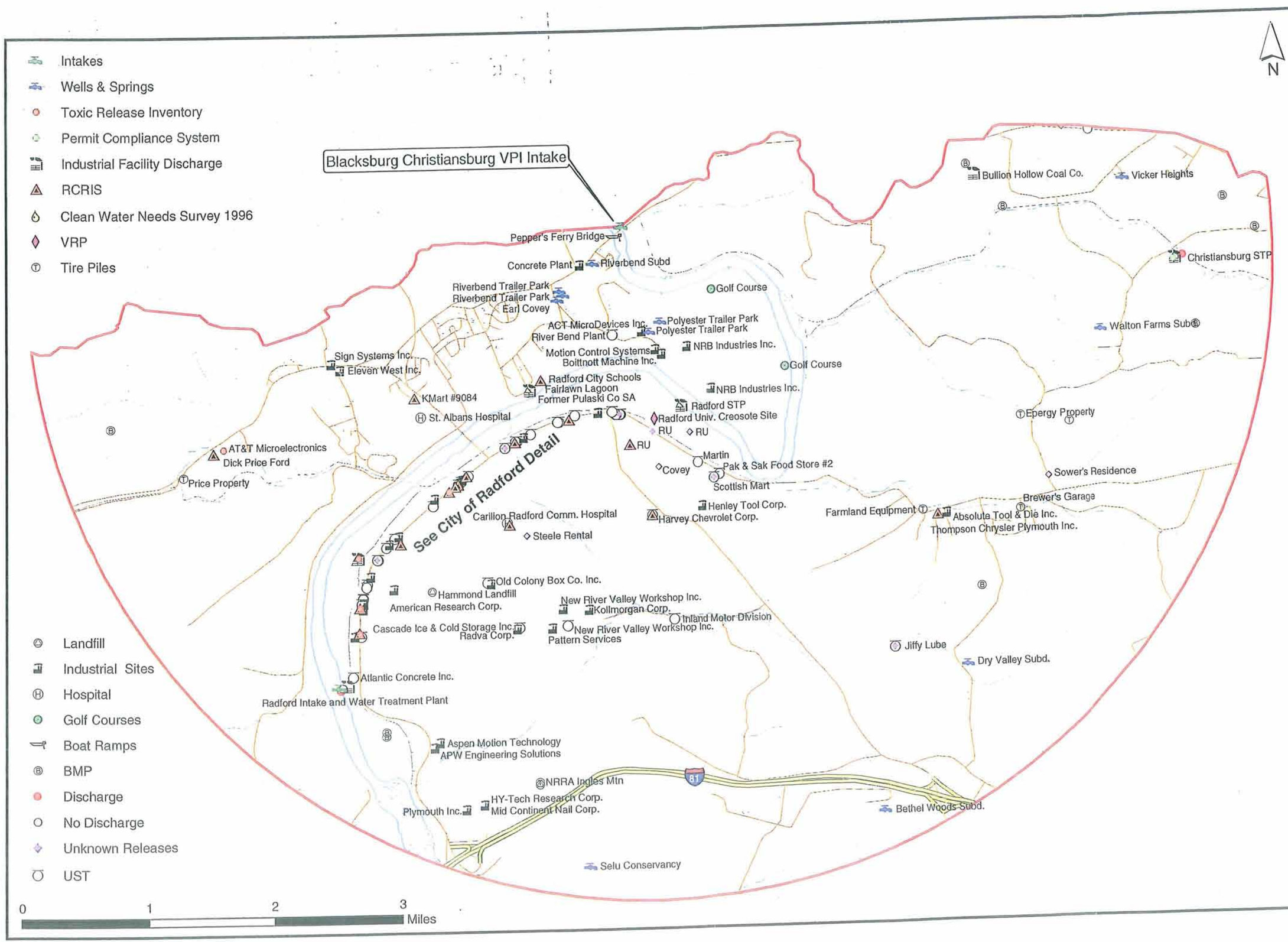
Job#: B01127

Upper New River Source Water Assessment Program

Figure 1
Blacksburg Christiansburg VPI Zone 1 Source Water Assessment Area



Upper New River Source Water Assessment Program

Figure 2

Blacksburg Christiansburg VPI WA Zone 1

Date: 12-31-01
Drawn by: MF
Job#: B01127

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Appendix A-11

RAAP Intakes 1 & 2 Tables and Figures

TABLE 1
Best Management Practices - RAAP Intakes

VABMP	Topographic Quadrangle	BMP Description
7758	Radford North	Grazing Land Protection
7762	Blacksburg	Grazing Land Protection
7792	Radford North	Grazing Land Protection
7800	Radford North	Grazing Land Protection
7841	Radford North	Reforestation of Erodible Crop and Pastureland

TABLE 2
Boat Ramps - RAAP Intakes

Site Name	Water Body	Type Fund	GW Risk	SW Risk
Pepper's Ferry Bridge	New River	P	X	Medium
Whitethorne	New River	P	X	Medium

GW=Groundwater
SW=Surfacewater

TABLE 3
Discharge-No Discharge - RAAP Intakes

Permit Number	Facility	Address	Discharge	GW Risk	SW Risk
VA0000248	Radford Army Ammunition Plant	P.O. Box 1, Radford	Y	Low	Medium
VA0052850	Blacksburg-Christiansburg-VPI WTP	P. O. Box 10006, Blacksburg	Y	Low	Medium
VA0060844	Lower Stroubles Creek - STP	P. O. Box 52, Blacksburg	Y	Low	Medium
VA0062685	Peppers Ferry Regional WWTP	P. O. Box 2950, Radford	Y	Low	Medium
VPA02012	Environmntl Land Waste-Mgt Svc	6993 Morgan Farm Road, Radford	N	Medium	Low

TABLE 4
Hazardous Solid Waste - RAAP Intakes

ID	Facility	Address
VAR000009712	Commonwealth Press Inc.	415 1ST St, Radford
VAD988215901	Thompson Chrysler Plymounth Inc.	3431 Radford Rd, Radford
VAD988222287	Radford City Schools	1612 Wadsworth St, Radford
VAR000000059	Dick Price Ford	6832 Lee Hwy, Radford
VAD000019364	Inland Motors	501 First St, Radford
VAD010063006	Lynchburg Foundary Inc.	1605 First St, Radford
VAD023886526	Cooks Clean Center, Inc.	426 First St, Radford
VAD023886807	Harvey Cheverolet	1500 Tyler Ave, Radford
VAD043552264	Ragan Brand Inc. Rubber Division	1905 First, Radford
VAD074418823	New River Indutries Inc.	309 Norwood St, Radford
VAD081762312	City of Radford	619 Second St, Radford

VAD096698949	Chesapeake & Potomac Telephone Co.	202 First St, Radford
VAD074753302	Radford Community Hospital	8TH & Randolph St, Radford
VAD981730930	New River Castings Inc.	1701 First St, Radford
VAD981935141	Cooks Clean Center, Inc.	708 Norwood St, Radford
VAD988186904	Radford University Allen Hall	Norwood St B, Radford
VAD988186912	Radford Unversity Currie Hall	Norwood St A, Radford
VAD988188751	KMart #9084	Radford Shop Plaza, Radford

TABLE 5
Hospitals - RAAP Intakes

Facility	GW Risk	SW Risk
Carilion Radford Community Hospital	Medium	Low
St. Albans Hospital		

TABLE 6
Industrial Facilities Discharge - RAAP Intakes

IFD ID #	NPD	Facility	Address	Waterbody
59892	VA0000213	Lynchburg Foundry Radford	P O Box 1012, Radford	New River
59894	VA0000248	RAAP	Radford	New River
60311	VA0020559	Former Pulaski Co Sewer Authority	Fairlawn P O Bldg, Radford	New River
60485	VA0025526	Former Sewage Trt Plt	618 Pulaski St, Radford	New River
60679	VA0031143	Bullion Hollow Coal Co. #19 Mine	.....	L Tom's Creek
61162	VA0060844	BLACKSBURG-VPI SA-Stroubles Creek	.....	New River
61236	VA0062685	Peppers Ferry Regional Wastewater Treatment Plant	143 First Street, NW, Pulaski	New River

TABLE 7
Industrial Sites - RAAP Intakes

Facility	Product Description	Address	GW Risk	SW Risk
Ragan, Brad Inc	Rubber compounds	1905 1st St, Radford	Medium	Medium
Commonwealth Press Inc	Commercial offset printing; computer typesetting; glue, perfect & saddle stitch binding	415 1st St, Radford	Medium	Low
Eleven West Inc	Magnetic & vinyl lettered signs; fabric screen printing & decals	6598 New River Rd, Pulaski County	Low	Low
Henley Tool Corp	Machine shop: tools, dies, jigs, fixtures, general machining, drilling, boring, cutting, honing, grinding, welding, lathe & mill work		Medium	Low
Alliant Techsystems Inc	Military propellants, explosives, nitric & sulfuric acids	State Route 114, Montgomery	Low	Low

		County		
Kollmorgen Corp	Motors, drives, DC servo motors & amplifiers		Medium	Low
Kollmorgen Inland Motor	Custom torque, brushless, DC & servo motors; amplifiers; servo drives; electromechanical, rotary, linear, ball screw & air craft actuators		Medium	Low
Lynchburg Foundry/Radford Plt	Ductile & gray iron castings for automotive & fluid power industries	1605 1st St, Radford	Medium	Low
New River Castings Co	Ductile iron castings for automotive industry	1701 1st St, Radford	Medium	Low
NRB Industries Inc	Woven textiles	309 Norwood St, Radford	Low	Low
New River Valley Workshop Inc	Sheltered workshop: contract assembly, pallets, boxes & industrial aprons		Low	Low
Norman's Inc	Picture frames, wood products, kitchen & bathroom cabinets		Medium	Low
Old Colony Box Co Inc	Rigid set-up paper boxes	90 Robertson St, Radford	Low	Low
Pattern Services	Metal, wooden & plastic patterns		Medium	Low
Radva Corp	Polystyrene packaging	604 17th St, Radford	Medium	Low
Triangle Printing Co Inc	Commercial offset printing; staple, saddle stitch & spiral binding		Medium	Low
Motion Control Systems Inc	DC, servo & brushless motors & amplifiers	6701 Viscoe Rd, Radford	Medium	Low
Radva Corp	Polystyrene packaging	301 1st St, Radford	Medium	Low
Cassco Ice & Cold Storage Inc	Ice	608 17th St, Radford	Low	Low
New River Energetics	Gunpowder	State Route 114, Montgomery County	Low	Low
American Research Corp Of VA	Research & development laboratory: physical & technological	1509 4th St, Radford	Low	Low
NRB Industries Inc	Woven textiles	6540 Viscoe Rd, Pulaski County	Low	Low
Baldwin Performance Machine	Automotive parts		Medium	Low
D J R Enterprises	Fabric screen printing & embroidering; advertising specialties	1012 1st St, Radford	Low	Low
Boitnott Machine Inc	Machine shop: general machining		Medium	Low
Creative Ink Promotions	Commercial offset & letterpress printing, computer typesetting & desktop publishing		Medium	Low
New River Woodworks	Wooden & laminated cabinets, furniture & counter tops		Medium	Low

Words Plus	Computer typesetting, desktop publishing & spiral plastic binding		Low	Low
Sign Systems Inc	Wooden, painted, plastic, metal, magnetic, neon, electrical, sandblasted & vinyl lettered signs		Medium	Low
Absolute Tool & Die Inc	Machine shop: MIG welding, surface grinding, lathe & mill work, metal fabricating, tool & die		Medium	Low
D & S Tool Inc	Machine shop: general machining, lathe & mill work	1303 1st St, Radford	Medium	Low
ACT MicroDevices Inc	Fiber optic products & connectors; electronic product coating service		Low	Low
Concrete Plant				

TABLE 8
Landfills - RAAP Intakes

Facility	GW Risk	SW Risk
Hammond Landfill (Closed)		

TABLE 9
Permit Compliance System - RAAP Intakes

NPDES	Facility	Address	Waterbody
VA0000248	RADFORD ARMY AMMUNITION PLANT	MONTGOMERY COUNTY PS	NEW RIVER
VA0060844	BLACKBURG-VPI SANITATION AUTHO	MONTGOMERY COUNTY PS	NEW RIVER
VA0062685	PEPPER'S FERRY RGNL WSTWTR TMT	PULASKI	NEW RIVER

TABLE 10
RCRA Sites - RAAP Intakes

EPA ID #	Facility	Location	Status	GW Risk	SW Risk
VA1210020730	RADFORD ARMY AMMO PLT	Montgomery County	LI S	High	High

TABLE 11
Tank Release Sites - RAAP Intakes

PC #	Facility	Tank Type	Address	GW Risk	SW Risk
87-0580		LUST	MONTGOMERY CO., VA		
88-0831		LUST	MONTGOMERY CO., VA		
91-1905	SCOTTISH MART	LUST	RADFORD, VA		
94-1870	RADFORD UNIVERSITY	LUST	RADFORD, VA		

95-1086	RAAP - UST NO. 503	LUST	RADFORD, VA
95-1098	RAAP	LUST	RADFORD, VA
95-1099	RAAP	LUST	RADFORD, VA
96-1092	RAAP	LUST	RADFORD, VA
97-1089	RAAP	LUST	RADFORD, VA
98-1076	FORMER COASTAL MART	LUST	CHRISTIANSBURG, VA
91-1354	RADFORD ARSENAL	LUST	RADFORD, VA
91-1777	RAAP SHIPPING & RECEIVING	LUST	RADFORD, VA
94-0645	RAAP	LUST	RADFORD, VA
94-4520	RAAP	LUST	RADFORD, VA
92-0875	RADFORD UNIVERSITY	LUST	RADFORD, VA
00-2064	WILCO #611	LUST	RADFORD, VA
00-2065	RUSSEL APPAREL BUS	LUST	RADFORD, VA
00-2071N	FRED COVEY RESIDENCE	LUST	RADFORD, VA
92-0720	BAILEYS RESTAURANT	LUST	RADFORD, VA
00-2071	FRED COVEY RESIDENCE	LUST	RADFORD, VA
99-1042	THE PAUL STEELE RENTAL PROPERTY	LUST	RADFORD, VA

TABLE 12
Tire Piles - RAAP Intakes

Common Name	Owner Name	Address	GW Risk	SW Risk
Price Property (Quarry)	Richard P. Price	P.O. Box 3567, Off Route 11, Radford	High	High
Epergy Property	Eperhy	Off Rte 663 on left side	High	High
McCoy Garage	McCoy	P.O. Box 334, 5860 Centennial Rd., Rte 625, McCoy	High	High
Farmland Equipment	George Canode	P.O. Box 2384, Rte 11, Radford	High	High

TABLE 13
Toxic Release Inventory - RAAP Intakes

Facility ID	Facility	Address
VA0001902063	U.S. ARMY RADFORD ARMY AMMUNITION PLANT	State Rte 114, Radford
VA1213820730	HERCULES INC. RADFORD ARMY AMMUNITION PLANT	State Rte 114, Radford
VAD000019364	KOLLMORGEN CORP. INLAND MOTOR DIV.	501 1ST. ST., Radford
VAD010063006	LYNCHBURG FNDY. CO. RADFORD SHELL PLANT	1605 1ST ST., Radford
VAD043552264	BRAD RAGAN INC.	1905 1ST & Ingles St., Radford
VAD074752221	AT&T MICROELECTRONICS	Rte. 679 E. off Rte114, Radford
VAD981730930	NEW RIVER CASTINGS CO.	1701 1ST ST., Radford

TABLE 14
Underground Storage Tanks (UST) - RAAP Intakes

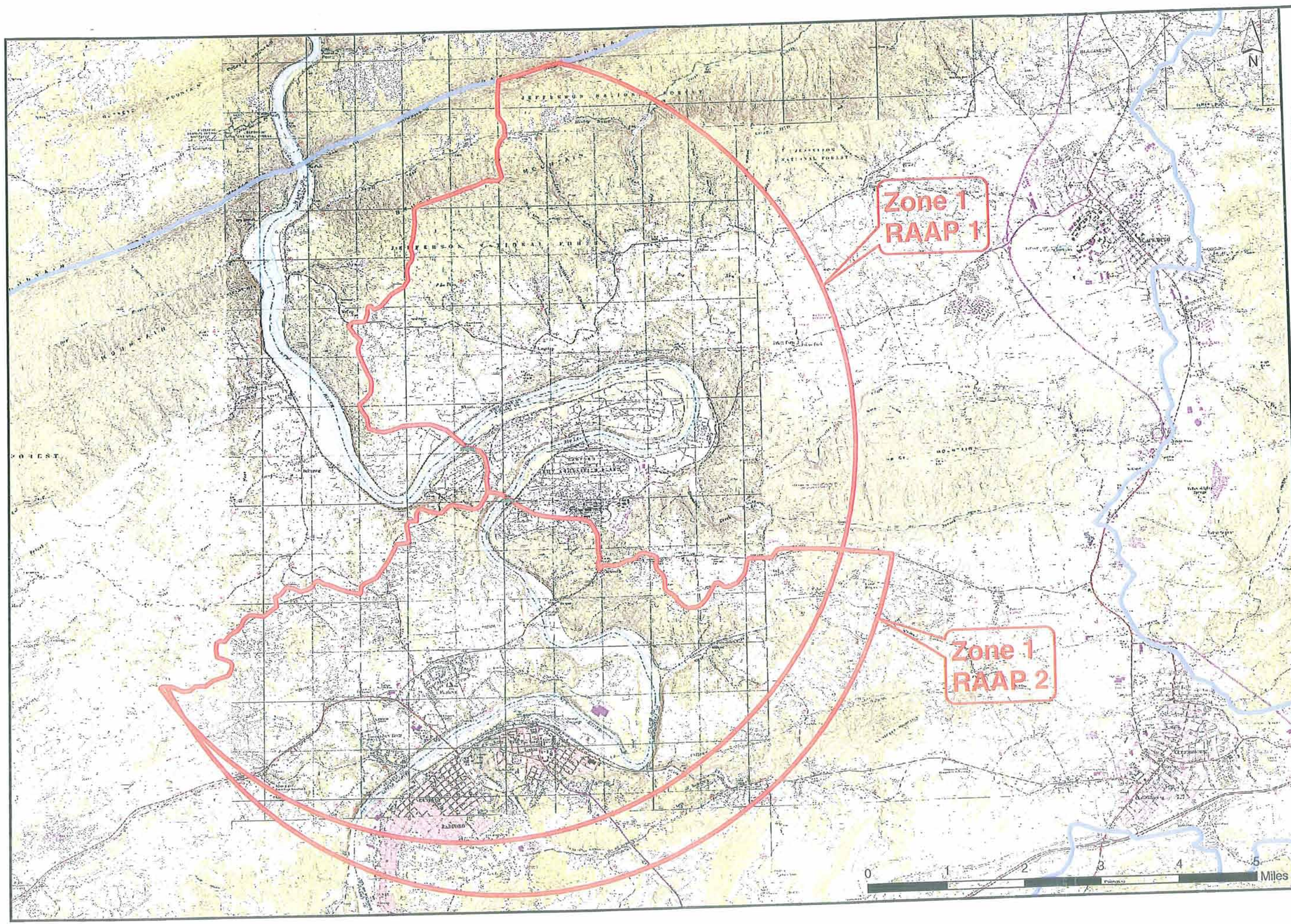
Facility	Address
RIVER BEND PLANT	6540 VISCOE ROAD, FAIRLAWN
HOP-IN #197	612 EAST NORWOOD ST., RADFORD
HARVEY CHEVROLET CORPORATION	1500 TYLER AVENUE, RADFORD
CONTRACTING ENTERPRISES INC	1403 FIRST STREET, RADFORD
WILCO #611	1102 FIRST STREET, RADFORD
BELL ATLANTIC	202 FIRST ST., RADFORD
SOUTHWESTERN VA GAS SERV CORP	111 HARRISON ST., RADFORD
LYNCHBURG FOUNDRY - RADFORD PLANT	1605 FIRST STREET, RADFORD
UNIVERSITY AMOCO	1034 NORWOOD STREET, RADFORD
DANS GARAGE	401 NORWOOD ST., RADFORD
NEW RIVER INDUSTRIES; INC	309 NORWOOD STREET, RADFORD
TRIANGLE SERVICE STATION	330 FIRST STREET, RADFORD
SAMS TEXACO	602 NORWOOD STREET, RADFORD
E-Z STOP #106	701 FIRST STREET, RADFORD
MACKE VENDING	1520 FIRST ST., RADFORD
NEW RIVER VALLEY RENT-ALL INC	1530 FIRST ST., RADFORD
CASSCO ICE & COLD STORAGE INC	608 17TH STREET, RADFORD
RUSSELL APPAREL CORP	219 NORWOOD ST., RADFORD
UNITED CITIES GAS COMPANY	1013 FIRST STREET; W, RADFORD
NEW RIVER VALLEY WORKSHOP INC	103 DUNCAN LANE, RADFORD
ARLIE G. WILSON ESTATE/WILSON PARK BEACH	921 FIRST STREET, RADFORD
DELI MART #57	2307 FIRST ST., RADFORD
PAK & SAK FOOD STORE #2	1800 NORWOOD STREET, RADFORD
SAVE-X MINI MART #45	1001 NORWOOD STREET, RADFORD
NORWOOD STREET COMP	300 NORWOOD STREET, RADFORD
OLD COLONY BOX CO INC	90 ROBERTSON ST, RADFORD
BAILEYS RESTAURANT	1031-1033 NORWOOD ST, RADFORD
FRANK & DOROTHY MARTIN	1620 NORWOOD ST., RADFORD
BORDEN	409 WEST FIRST STREET, RADFORD
U S POSTAL SERVICE	1007 NORWOOD STREET, RADFORD
INLAND MOTOR DIVISION	609 ROCK ROAD, RADFORD
RADFORD ARMY AMMUNITION PLANT	RT 114, RADFORD
NORFOLK & WESTERN RAILWAY COMPANY	NORWOOD STREET, RADFORD
SCOTTISH MART	123D NORWOOD STREET, RADFORD
JORDAN OIL COMPANY INC.	1101 FIRST STREET, RADFORD
JORDAN OIL COMPANY INC.	1420 FIRST STREET, RADFORD
JUNIORS TRIAD	1600 FIRST STREET, RADFORD
RIVERWAY GROCERY	4338 PRICES FORK ROAD, BLACKSBURG
A&J QUICK SHOP #2	RT 2, BOX 450, BLACKSBURG
HUTCHISON MOTOR COMPANY	RT 114, CHRISTIANSBURG

TABLE 15
Voluntary Remediation Program - RAAP Intakes

ID Number	Facility	Address
VRP00165	Radford University Creosote Site	Radford University, Radford

TABLE 16
Wells and Springs - RAAP Intakes

Type Code	Location	System Name	Facility name
WL	MONTGOMERY	PRICES FORK	WELL NO. 1
WL	MONTGOMERY	PRICES FORK	WELL NO. 2
WL	MONTGOMERY	VICKER HEIGHTS	WELL
WL	MONTGOMERY	WALTON FARMS SUBDIVISION	WELL NO 1
WL	PULASKI	RIVERBEND TRAILER PARK	WELL NO. 1
WL	PULASKI	RIVERBEND TRAILER PARK	WELL NO. 2
WL	PULASKI	EARL COVEY	DRILLED WELL
WL	PULASKI	EAGLEVIEW MOBILE HOME PARK	WELL NO. 2
WL	PULASKI	POLYESTER TRAILER PARK	WELL NO. 1
WL	PULASKI	POLYESTER TRAILER PARK	WELL NO. 2
WL	PULASKI	RIVERBEND SUBDIVISION	WELL



Upper New River Source Water Assessment Program

Figure 1
RAAP Zone 1
Source Water Assessment Area

Date: 12-31-01
Drawn by: MF
Job#: B01127

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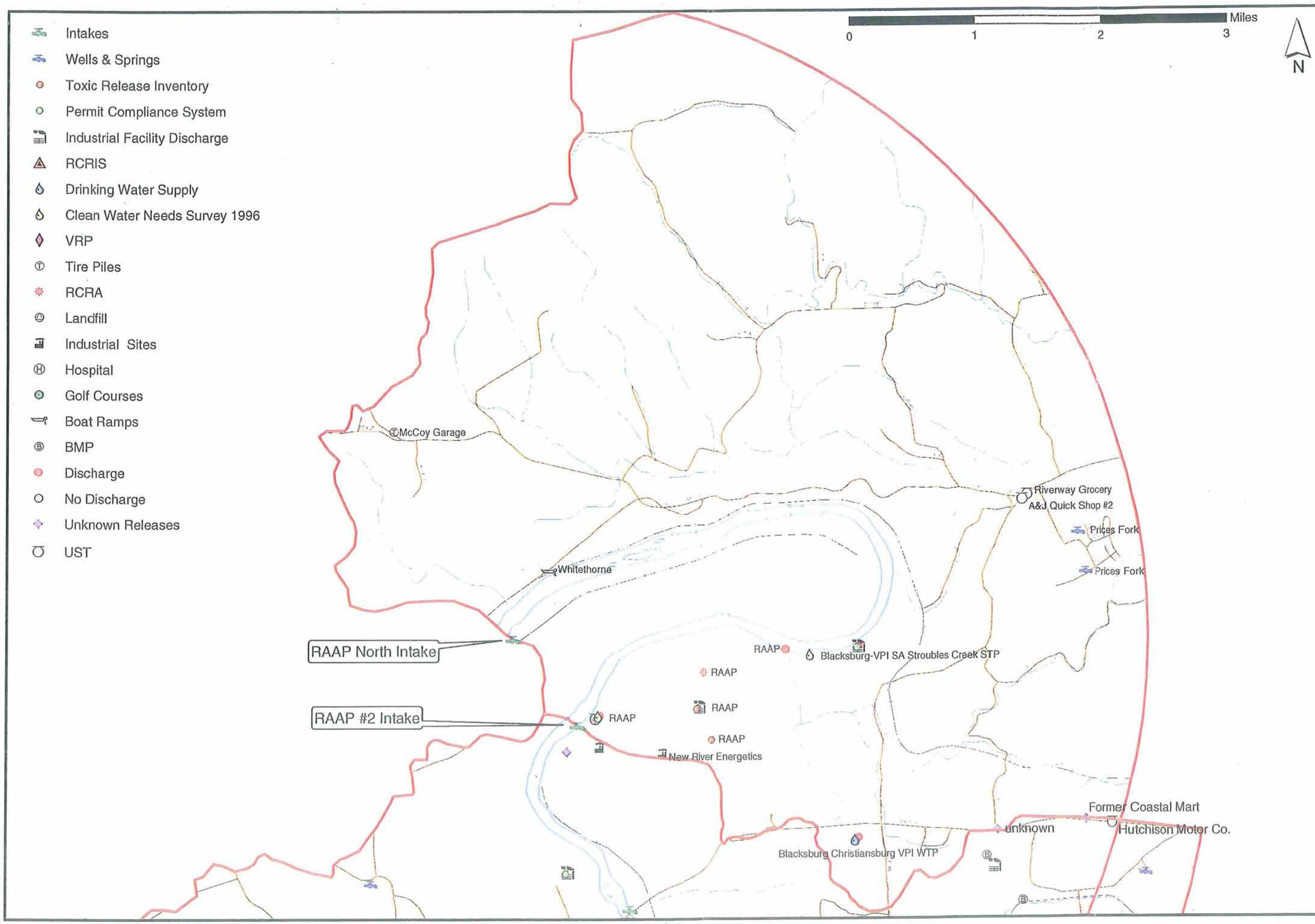

Upper New River Source Water Assessment Program

Figure 2
RAAP Zone 1 - North Portion

Date: 12-31-01
Drawn by: MF
Job#: B01127

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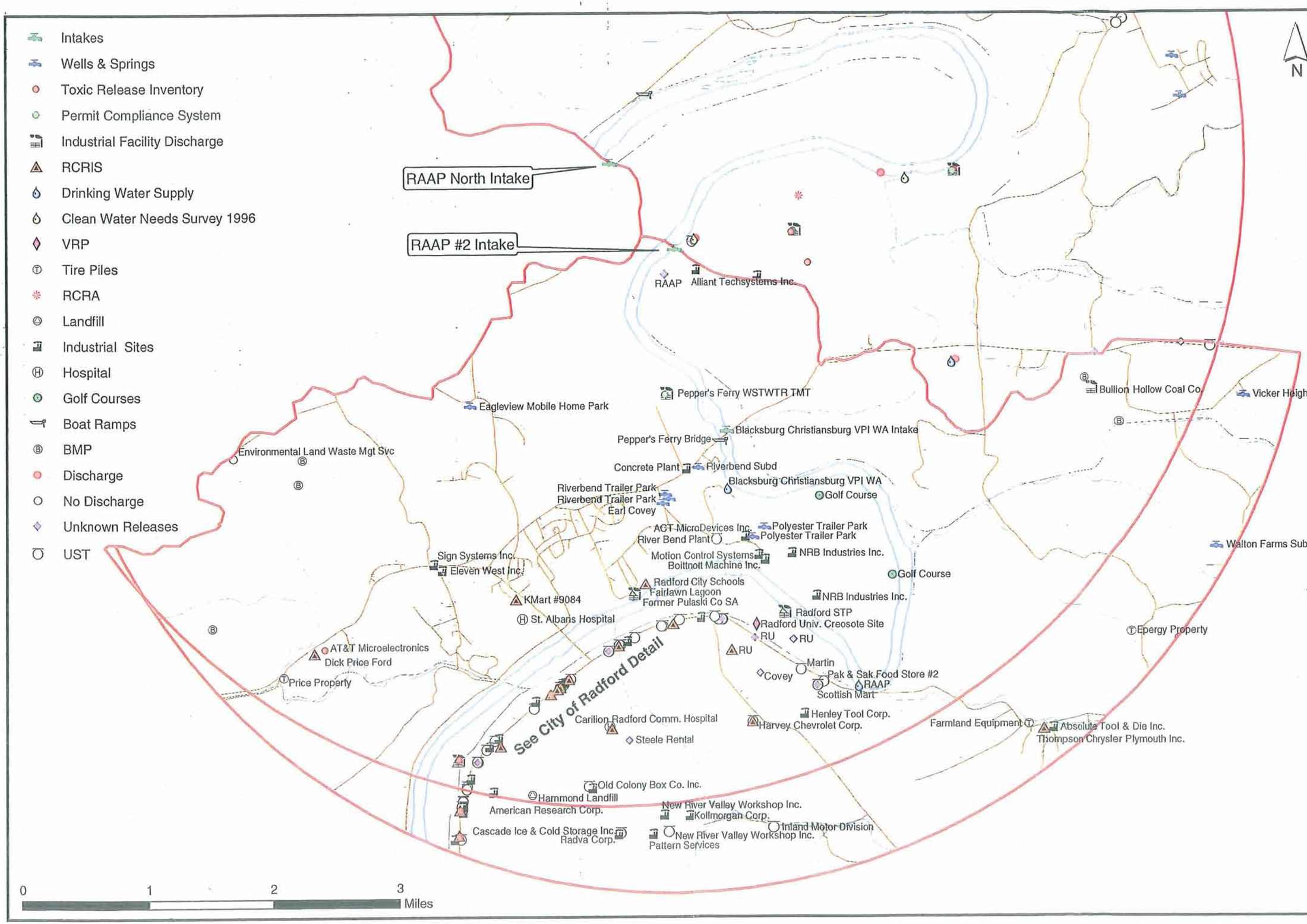

Upper New River Source Water Assessment Program

Figure 3

RAAP Zone 1 - South Portion

Date: 12-31-01
Drawn by: MF
Job#: B01127

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Appendix B

CD Containing Regulatory Database Report and Zone 2 Potential Sources of Contamination and Land Use Activities

Appendix C

Virginia Department of Health Land Use Activities Rankings

Table 1
LAND USE ACTIVITY INVENTORY
(Community and Nontransient Noncommunity Waterworks)

CLASSIFICATION	CONTAMINANT	SURFACE WATER RISK	GROUND WATER RISK	NAICS CODE
Residential/Commercial				
Fuel Storage Systems [ground water only]	V	X	medium	814110
On-site sewage system [ground water only]	M, N	X	medium	814110
Agriculture				
Chemical/fuel storage areas	V, S, N	low	medium	111, 112
Crop and fodder production	S, N	low	medium	111
Specialty crop production/nursery (e.g. horticulture, citrus, nuts, fruits)	S, N	low	medium	112
Livestock/poultry				112
Pasture (grazing)	M, N	medium	low	112
Intensive animal feeding operations				112
Confined animal feeding operations (permitted)	M, N	high	high	112
Confined animal feeding operations (non-permitted)	M, N	high	high	112
Aquaculture	M, N	low	medium	11251
Animal burial areas	M, N	low	medium	112
Manure holding or spreading	M, N	medium	medium	112
Other				
Industrial/Commercial [Dry and Discharging]				
Above ground storage tank (> 660 gallons) excluding potable water and petroleum	V, S, N	medium	medium	
Animal Slaughtering or Processing	M, N	low	medium	311
Asphalt Plants	V, S, N	low	medium	32412
Car Wash	V	low	low	811192
Cemetery [ground water only]	M, N, S	X	low	812220
Coal Gasification Facility	V	low	medium	324199
Dry Cleaning Establishment	V	low	medium	812320
Electrical and Electronic Product Manufacturing	I, V	low	medium	335310, 334410
Electroplating/Metal Finishing	I, V	low	medium	332813
Fertilizer/Manufacturer/Distributor/Storage	N, S	medium	medium	325, 422
Fire Training Facilities	V	low	medium	922160
Food Processing	M, N	low	low	311
Funeral Home/Mortuary	M, V	low	low	812210
Furniture/Boat Refinish (Boat Yards)	V, S, N	medium	medium	811420, 336612
Gasoline Station/Service Center	V, S, N	low	medium	447100
Golf Course	N, S	low	medium	713910
Hazardous Waste RecoveryFacility	V, S, R, M	high	high	562211
Hazardous Waste Transfer, Storage or Disposal	V, S, R, M	high	high	562
Hospital	V, S, R, M	low	medium	622110
Laboratories	V, S, R, M	low	medium	541380, 621510
Machine Shops	V	low	medium	332710
Marina [Surface Only]	M, V, S	medium	X	713930
Military Base	V, S, R, M	high	high	928110
Oil & Gas Production (Refining)/Storage/Pipelines	V	medium	medium	324110, 422710, 486910
Paint Shop	V	low	medium	811121
Pesticide/Herbicide Manufacturer/Distributor/Storage	S	medium	medium	325320, 422690,422910,
Photo Processor/Printer	I	low	medium	812290
Pipeline / Powerline Right of Way	S	low	low	486910, 221120
Plastic Manufacturer	V, S	low	medium	326100, 325211
Power Generation Station	S	medium	low	221110
Scrap and Junk Yards	V, I	low	medium	421930
Solid Waste Collection/Transfer Site	V, S, M, I	low	low	562111
Superfund Site	V, S, R, M, I	high	high	562211
Underground Injection Well [groundwater only]	V, S, R, M, I	X	high	562
Underground Storage Tanks [excluding potable water][groundwater only]	V	X	medium	
Underground Storage Tanks [leaking][regulated][groundwater]	V	X	high	
Wood Preservative Manufacturer/Wood Preserver	S	low	medium	321114
Other				
Wastewater Facilities				
Combined Sewer Overflow/Discharge	M, N, V, S	high	low	22132
Septage Lagoon	M, N	medium	medium	22132

VIRGINIA SOURCE WATER ASSESSMENT PROGRAM
Table 2
LAND USE ACTIVITY INVENTORY
(Transient Noncommunity Waterworks)

CLASSIFICATION	CONTAMINANT	SURFACE WATER RISK	GROUND WATER RISK	NAICS CODE
Residential				
On-site sewage system [ground water only]	M, N	X	medium	814110
Agriculture				
Chemical/fuel storage areas	V, S, N	low	medium	111, 112
Crop and fodder production	S, N	low	medium	111
Specialty crop production/nursery (e.g. horticulture, citrus, nuts, fruits)	S, N	low	medium	111
Livestock/poultry				112
Pasture (grazing)	M, N	medium	low	112
Intensive animal feeding operations				112
Confined animal feeding operations (permitted)	M, N	high	high	112
Confined animal feeding operations (unpermitted)	M, N	high	high	112
Aquaculture	M, N	low	medium	11251
Animal burial areas	M, N	low	medium	112
Manure holding or spreading	M, N	medium	medium	112
Other				
Industrial/Commercial [Dry and Discharging]				
Above ground storage tank (> 660 gallons) excluding potable water and petroleum	V, S, N	medium	medium	
Animal Slaughtering or Processing	M, N	low	medium	311
Fertilizer/Manufacturer/Distributor/Storage	N, S	medium	medium	325310
Hospital	V, S, R, M	low	medium	622110
Laboratories	V, S, R, M	low	medium	541380, 621510
Marina [Surface Only]	M, V, S	medium	X	713930
Solid Waste Collection/Transfer Site	V, S, M, I	low	low	562111
Underground Injection Well [groundwater only]	V, S, R, M, I	X	high	562
Other				
Wastewater Facilities				
Combined Sewer Overflow/Discharge	M, N, V, S	high	low	22132
Septage Lagoon	M, N	medium	medium	22132
Sewer Lines (Surface-crossing and adjscant lines only) [surface water only]	M, N	high	X	22132
Storm Sewer Discharges and Stormwater infiltration ponds	V, N, S	medium	low	22132
Untreated Piped Discharge [straight pipe]	M, N	High	low	22132
Wastewater Pump Station	M, N, V	High	low	22132
Wastewater Treatment Factility [point source discharge]	M, N, V	Medium	low	22132
Wastewater Treatment Nondischarging lagoon/mass drainfield	M, N, V	Low	medium	22132
Land Disposal				
Biosolids	M, N, I	Low	low	111, 112
Industrial Sludge	M, N, I, S, V	Low	low	562
Landfill (Lined)	M, N, V, S	Low	medium	562212
Landfill (Unlined)	M, N, V, S	Low	high	562212
Open Dump	M, N, V, S	Low	high	5622
Septage	M, N	Medium	medium	111, 112 562
Wastewater	M, N	Medium	medium	22132
Other				
Special Cases (specifically identified as a significant source of contaminants)				
Barge and Vessel Traffic for surface sources		High	X	483211
Caves/Sinkholes for surface sources			X	

"x" – does not mean no risk

M = microbiological
N = nitrate/nitrite
V = volatile organic chemicals
S = synthetic organic chemicals
I = inorganic chemicals
R = radiological contaminants

(NOT all inclusive)

Appendix B - Glossary

COE- United States Corps of Engineers

CWS- community water system; a system that serves at least 15 residential connections or at least 25 residential customers

DEQ- Department of Environmental Quality

Design capacity- capacity at which the system is engineered to operate

FEMA- Federal Emergency Management Agency

gpd- gallons per day

gpm- gallons per minute

GW- ground water

MGD- million gallons per day

N/A- not applicable

N/I- no information

PSA- public service authority

RFAAP- Radford Army Ammunition Plant

SW- surface water

SWAP- Source Water Assessment Plan

TMDL- total maximum daily load

TMDL-IP- total maximum daily load implementation plan

USGS- United States Geological Survey

VEC- Virginia Employment Commission

VPI- Virginia Polytechnic Institute; also referred to as Virginia Tech