3.6 WATER RESOURCES AND WATER QUALITY

3.6.1 Surface Water Resources

The study area lies entirely within the Roanoke River drainage basin. The Roanoke River originates west of Roanoke City and generally flows in a southeasterly direction for approximately 200 miles (322 kilometers) to the Buggs Island Lake. Here, it is joined by the Dan River, its main tributary. The Roanoke River crosses the state line into North Carolina roughly 16 miles (26 kilometers) below the John H. Kerr Reservoir. The study area is contained within the Upper Roanoke Subarea (U.S. Geological Survey Hydrologic Unit No. 03010101) and the Upper Dan Subarea (U.S. Geological Survey Hydrologic Unit No. 03010103) of the Roanoke River Basin. Major tributaries of the Roanoke River located in the study area are the Blackwater River and the Pigg River. The only major tributary to the Dan River located in the study area is the Smith River. Tributaries in the Valley and Ridge and Blue Ridge physiographic provinces exhibit moderate to steep gradients. The terrain in these two provinces is rugged and streams are generally confined to narrow, steep valleys. East of the Blue Ridge in the Western Piedmont physiographic province, the terrain is rolling and streams exhibit moderate to gentle gradients.

Public water supply service areas contained within the Upper Roanoke portion of the study area include the City of Roanoke, the City of Salem, Roanoke County/Vinton, the Hub Water Company (a private company supplying the I-81 Cloverdale interchange area in Botetourt County), the Bedford County Public Service Authority, the Town of Boones Mill, and the Town of Rocky Mount. Public water supply service areas contained within the Upper Dan portion of the study area include the Henry County Public Service Authority and the Town of Ridgeway. The Roanoke Valley contains the largest concentration of domestic/commercial/ institutional water uses in the study area. Surface water sources and water treatment plants (WTPs) for service areas within the study area are listed in Table 3.6-1.

The Virginia 303(d) priority list of impaired waters occurring within the study area is provided in Table 3.6-2. Waters requiring water quality-based effluent limits, as determined by the DEQ, are listed in Table 3.6-3. Other waters within the study area range from moderate to good. Waters ranging from moderate to good in water quality are resources for recreational activities involving secondary body contact (wading, boating, etc.).

Baseline water quality of water resources was determined for state- and federal-monitored streams through review of Virginia Ambient Water Quality Monitoring Reports (DEQ, 1997; DEQ, 1998, 2000) and U.S. Geological Survey (USGS) Water Resources Data (USGS, 1993). Water quality parameters, which can reasonably be expected to be impacted by new highway construction and highway operation, were identified through review of research findings published by FHWA (USDOT, 1996, 1998). Since 1996, the primary sources contributing to impairment of study area waters are (1) fecal coliform from urban non-point runoff and (2) fecal coliform from agricultural non-point runoff. Agricultural non-point runoff has also adversely affected the general standard for benthics in certain waterways. Copper, lead, and zinc are parameters contributing to the requirement for water quality-based effluent limits to Peters Creek. Although these metals are typically associated with highway runoff, no definitive cause has yet been documented. Baseline water quality along with recent trends in water quality (as derived from Virginia Ambient Water Quality Monitoring Reports) are provided in the Water Quality Technical Memorandum (VDOT, 2000).

Table 3.6-1
PUBLIC SURFACE WATER SUPPLIES WITHIN THE STUDY AREA

Demand Center	Facility		Source
Roanoke Valley	City of Roanoke	Carvins Cove WTP/ Carvins Cove Reservoir	Reservoir
		Catawba Creek Diversion	Stream
		Tinker Creek Diversion	Stream
		Falling Creek WTP/ Beaverdam and Falling Creek Reservoir	Reservoir
	Roanoke County	Spring Hollow Reservoir	Reservoir
	City of Salem	Glenvar WTP	Roanoke River
		Salem WTP	Roanoke River
Botetourt County (I-81 Cloverdale Interchange Area)	Hub Water Company	On-Site Treatment	Spring
Rocky Mount	Town of Rocky Mount	Blackwater WTP	Blackwater River
		Pigg River WTP	Pigg River
Henry County	Henry County Public Service Authority	Fieldcrest Mills WTP	Smith River
		Philpott WTP	Smith River
		Martinsville WTP	Beaver Creek Reservoir, Jones Creek, Little Beaver Creek
		Marrowbone Creek WTP	Marrowbone Creek

Source: Virginia State Water Control Board, 1988.

(This area left blank intentionally).

TABLE 3.6-2
STATE PRIORITY LIST OF IMPAIRED WATERS WITHIN THE STUDY AREA

Stream Name	Stream Segment mile – mile (km – km)	Parameter	Source of Impairment	City/County
Roanoke River	222.17-210.92 (357.54-339.43)	Aquatic life/benthics	Non-point source runoff - Urban	City of Salem
Roanoke River	210.92-199.20 (339.43-320.57)	Fecal coliform bacteria, Aquatic life/benthics	Non-point source runoff - Urban	City of Roanoke
Ore Branch	3.90-0.00 (6.28-0.00)	Fecal coliform bacteria	Non-point source runoff - Urban	City of Roanoke
Lick Run	3.50-0.00 (5.63-0.00)	Fecal coliform bacteria	Non-point source runoff - Urban	City of Roanoke
Tinker Creek	19.06-0.00 (30.76-0.00)	Fecal coliform bacteria	Non-point source runoff	Town of Vinton
Glade Creek	12.61-0.00 (20.29-0.00)	Fecal coliform bacteria	Non-point source runoff - Urban	Botetourt
North Fork Blackwater River	12.0-0.00 (19.31-0.00)	Aquatic life/benthics	Non-point source runoff - Agricultural	Franklin
Blackwater River	61.20-51.20 (98.49-82.40)	Fecal coliform bacteria, Aquatic life/benthics	Non-point source runoff - Agricultural	Franklin
South Fork Blackwater River	6.05-0.00 (9.74-0.00)	Fecal coliform bacteria, Aquatic life benthics	Non-point source runoff - Agricultural	Franklin
Blackwater River	51.20-35.80 (82.40-57.61)	Fecal coliform bacteria	Non-point source runoff - Agricultural	Franklin
Maggodee Creek	21.00-0.00 (33.80-0.00)	Fecal coliform bacteria	Non-point source runoff - Agricultural	Franklin
Blackwater River	35.80-15.80 (57.61-25.43)	Fecal coliform bacteria	Unknown	Franklin
Gills Creek	27.97-0.00 (45.01-0.00)	Fecal coliform bacteria	Unknown	Franklin
Pigg River	62.73-42.73 (100.95-68.77)	Fecal coliform bacteria	Non-point source runoff - Agricultural	Franklin
Storey Creek	11.66-0.00 (18.76-0.00)	Fecal coliform bacteria	Non-point source runoff - Agricultural	Franklin
Smith River	21.52-11.34 (34.63-18.25)	General Standard (Benthic)	Point source & non-point source (urban)	Henry

Source: DEQ, Water Division, 1996, 1998, 2000.

TABLE 3.6-3
WATERS REQUIRING WATER QUALITY-BASED EFFLUENT LIMITS

Stream Name	Stream Segment mi - mi (km - km)	Water Quality-Based Parameters	City/County
Peters Creek	0.26-MZ[1] (0.42-MZ[1])	Copper (Cu), Lead (Pb), Zinc (Zn), WET[2]	City of Roanoke
Roanoke River	201.81-MZ[1] (324.72-MZ[1])	Ammonia (NH_3) - Nitrogen (N)	City of Roanoke
Smith River	27.56 MZ[1] (44.34-MZ[1])	Cyanide	Henry County
Smith River	22.69-MZ[1] (36.51-MZ[1])	Methyl blue, sulfates, chlorides	Henry County
Camp Branch	0.70-MZ[1] (1.13-MZ[1])	Ammonia (NH_3) - Nitrogen (N)	Henry County

Source: DEQ, Water Division, 1996.
Notes: [1] MZ = mixing zone
[2] WET = weekly effluent temperature

TABLE 3.6-4
RECENT WATER QUALITY TRENDS - BIOLOGICALLY MONITORED STREAMS WITHIN THE I-73 STUDY CORRIDOR

Stream	Station	Degree of Impairment[1] (Source of Impairment)			
		1992	1994	1996	1998
Back Creek	4ABAA019.50	N/D	N/D	SI	N/D
Blackwater River	4ABWR045.80	NI	MI (dairy farm impacts)	MI	NI
	4ABWR061.20	MI (agricultural nps)	SI (dairy farm & nps impacts)	MI	MI
Maggodee Creek	4AMEE002.38	N/D	NI	MI	N/D
Little Creek	4ALLE005.22	N/D	SI (nps impacts)	N/D	N/D
Teels Creek	4ATEL001.02	N/D	NI	SI	N/D
Gills Creek	4AGIL023.22	N/D	MI (agricultural nps)	N/D	N/D
Pigg River	4APGG074.87	N/D	NI	N/D	N/D
Roanoke River	4AROA202.20	MI	VI (unidentified nps toxic & organics)	MI	MI
	4AROA206.03	N/D	N/D	N/D	MI
	4AROA206.95	N/D	N/D	N/D	MI
	4AROA212.17	MI	SI (multiple city inputs)	N/D	MI
	4AROA224.54	N/D	N/D	N/D	NI
Smith River	4ASRE019.00	NI	SI	CNC	MI
	4ASRE019.10	N/D	N/D	N/D	SI
	4ASRE022.30	N/D	N/D	N/D	SI
	4ASRE026.38	N/D	N/D	N/D	MI
	4ASRE031.00	N/D	N/D	N/D	CNC

Sources: Virginia Water Quality Board, 1992; DEQ, 1994, 1996, 1998, 1999, 2000, 2004.
[1] Notes: NI = Not Impaired
SI = Slightly Impaired
MI = Moderately Impaired
VI = Severely Impaired
N/D = No Data
nps = non-point source
CNC = Could Not Calculate

3.6.2 Groundwater Resources

Due to fracturing along the Bowens Creek fault and the nature of geologic structures in the area, a zone passing through the Bassett and Martinsville area is one of the most productive groundwater areas in the Virginia Piedmont. Ninety-four public water supply wells are located within this zone, with the bulk (62 wells) belonging to the Henry County Public Service Authority (Virginia State Water Control Board, 1988). Of the total 94 wells, 63 are located within the study area (Table 3.6-5).

The Roanoke Valley demand center obtains approximately 8.99 million gallons per day (mgd) (34.03 million liters per day [mld]) or 31 percent of its total demand from groundwater (Virginia State Water Control Board, 1988). With a reported water use of 0.153 mgd (0.58 mld), the Eastern Botetourt County demand center relies entirely on groundwater. With a reported water use of 0.041 mgd (0.155 mld), the Boones Mill demand center relies entirely on a spring fed by groundwater.

Springs are numerous throughout the Blue Ridge and Piedmont physiographic provinces, but they are less important than wells as a source of water. Spring yields are generally less than 5 gpm (19 lpm), and their use

has been largely restricted to domestic and farm uses (Virginia State Water Control Board, 1988). Springs are an important source of water supply in the Valley and Ridge physiographic province.

No sole source aquifers, as defined under Section 1424(e) of the Safe Drinking Water Act, have been designated in the study area or surrounding region (EPA, 1999, 2002). The Commonwealth of Virginia currently has no approved wellhead protection program (EPA, 1999, 2000).

No jurisdictions having local wellhead protection ordinances are located within the study area. Henry County, where the bulk of public water supply wells within the study area are located, relies upon those general performance standards set forth in Section 3.21 of the Virginia Waterworks Regulations (VR 355-18-000) for installation and maintenance of its water supply wells (Mr. Plant and Mr. Campbell, Henry County Public Service Authority, personal communication, 8 March, 1999). These performance standards require that public water supply wells be no less than 100 feet (30.48 meters) deep, that they be grouted to a depth of no less than 50 feet (15 meters) from the surface, and that they not be located within 100 feet (30.48 meters) of a potential surface source of contamination. Although currently non-regulatory, the 100-foot recommended performance standard set forth in the publication titled Implementing Wellhead Protection: Model Components for Local Governments in Virginia (Virginia Ground Water Protection Steering Committee, 1998) will be consulted for new well installation or development of wellhead protection zones (Mr. Plant and Mr. Campbell, Henry County Public Service Authority, personal communication, 8 March, 1999). Performance standards of the model ordinance set forth therein recommend a wellhead protection zone having a radius of no less than 1,000 feet (305 meters).

TABLE 3.6-5
PUBLIC GROUNDWATER SUPPLIES WITHIN THE STUDY AREA

Demand Center	Facility		Source
Roanoke Valley	Roanoke City	Crystal and Muse Springs	2 Springs
		New Hope and Southern Mills	2 Wells
	Roanoke County	Roanoke County Well Fields	76 Wells
	Salem City	Unnamed Well	1 Well
		Mowles Spring	1 Spring
	Town of Vinton	Unnamed Wells	6 Wells
Boones Mill	Town of Boones Mill	Boones Mill Spring	1 Spring
		Emergency Source	1 Well
Henry County	Henry County Public Service Authority	Carver Lane	2 Wells
		Collinsville	17 Wells
		Lee Acres	2 Wells
		Longview/Wall Street	3 Wells
		Pleasant Grove	1 Well
		Stanley Town	2 Wells
		Whitby Acres	1 Well
		Villa Heights	5 Wells
		Axton	1 Spring
		Chatmoss	7 Wells
		Laurel Park	4 Wells
		Meadow Gardens	2 Wells
		Carver Estates	3 Wells
		Carver Heights	3 Wells
		Greenbrier Creek	3 Wells
		Kings Village	2 Wells
		Lake Wood Forest	3 Wells
		Spencer Court	1 Well
		Lithia Springs	1 Well
	Town of Ridgeway	Unnamed Wells	5 Wells

Source: Virginia State Water Control Board, 1988

3.7 NATURAL RESOURCES

3.7.1 Terrestrial Ecology, Biodiversity, and Wildlife Habitat

Given the fact that large portions of the study area have been intermittently developed, farmed, or timbered since the late 1700s, major distinct terrestrial ecosystems have evolved largely as a result of past and present land uses. Major discrete terrestrial systems assessed as part of this study include deciduous forests (both hardwood bottomlands and oak/hickory forests), evergreen forests, mixed hardwood/pine forests, cropland and pastures, orchards and vineyards, and transitional lands (primarily old field).

Although agricultural activities and urbanization have resulted in a high degree of forest tract fragmentation throughout the region, several larger contiguous forest tracts exist throughout the study area. Larger contiguous forest tracts exist in western Roanoke County (in the Poor Mountain vicinity), along the Bedford/Roanoke/Franklin county lines (generally along the Blue Ridge Parkway), along Grassy Hill, along Fork Mountain, and along Turkeycock Mountain. These larger forest tracts provide an important contribution to regional biodiversity. The larger number of smaller fragmented forest tracts dispersed throughout the study area cumulatively contributes to regional biodiversity, particularly those connected by riparian corridors along major watercourses. The patchwork of forested and non-forested land coverage encountered across larger portions of the study area provide a certain degree of landscape diversity and edge habitat – a situation that also contributes to regional biodiversity. The wide diversity of wildlife habitat occurring in the study area provides for an abundance of terrestrial species. Due to the mobility of certain wildlife species, especially during periods of habitat stress, overlapping distributions may occur.

In September of 2002 (subsequent to distribution of the DEIS), DNH implemented changes in their environmental review services program and made available new Geographic Information System (GIS) data coverage. Unlike GIS data appropriately utilized in the DEIS (which made use of one-minute reporting blocks for natural heritage resource occurrences), the new coverage utilizes Conservation Sites for terrestrial occurrences and Stream Conservation Units (SCUs) for aquatic occurrences. Both Conservation Sites and SCUs represent key areas of the landscape that warrant further review for possible conservation action because of the natural heritage resources and habitat that they support. Based on the presence and number of natural heritage resources, DNH has assigned each Conservation Site or SCU a “conservation site biodiversity rank value “ (Brank) ranging from a value of “B1” for “outstanding significance” to “B5” for “of general biodiversity significance”. Conservation Sites within the I-73 study area to which DNH has assigned a Brank rating are described in Table 3.7-1. SCUs are discussed in section 3.7.2 (Aquatic Ecology, Biodiversity, and Wildlife Habitat).

Table 3.7-1
BIODIVERSITY RANKED CONSERVATION SITES

Site Name	Location	Biodiversity Ranking	Legal Status of Species Contained Within
Riverside	West of the City of Salem near the communities of Glenvar and Wabun in northwestern Roanoke County	B2 (Very High Significance)	Non-Listed
Dixie Cliff	Near Dixie Caverns east the community of Wabun in northwestern Roanoke County	B2 (Very High Significance)	Non-Listed
Poor Mountain	West of the City of Roanoke in western Roanoke County	B2 (Very High Significance)	State Listed
Grassy Hill	Immediately northwest of the Town of Rocky Mount	B2 (Very High Significance)	Federally Listed
Bald Knob – Rocky Mount	Immediately east of the Town of Rocky Mount	B2 (Very High Significance)	Non-Listed
Brier Mountain	Northwest of the community of Sydnorsville in Franklin County	B3 (High Significance)	Non-Listed
Smith River Rt. 682 Slopes	Near the community of Koehler in central Henry County	B4 (Moderate Significance)	Non-Listed

Source: DCR - DNH, November 2002.

The only managed/protected unique or limited terrestrial systems known to exist within the study area are the Poor Mountain Natural Area Preserve (NAP) in Roanoke County and the Grassy Hill NAP in Franklin County. These areas are considered important primarily because of the endangered plant species, which they support. These NAPs are contained within the Poor Mountain and Grassy Hill conservation sites listed in Table 3.7-1. More-detailed discussions of existing conditions and effects to these areas are provided in the Natural Resources Technical Memorandum (VDOT, 2000). The state-managed Havens Wildlife Management Area is located in northern Roanoke County, just to the north of the study area. The state-managed Turkeycock Mountain Wildlife Management Area is located in southeastern Franklin County, just to the east of the study area.

3.7.1.1 Forest Lands

Four main forest types are represented in the study area. These forest types are comprised of: 1) hardwood bottomland, 2) upland hardwood, 3) pine, and 4) mixed hardwood-pine. Characteristics of these forest types are provided in the Natural Resources Technical Report (VDOT, 2000).

3.7.1.1.1 Hardwood Bottomland Forests

The hardwood bottomland forests are found primarily along flat, low-lying areas adjacent to streams and rivers. Soils underlying these bottomland hardwood forests are generally alluvial in origin and are quite varied in nature, ranging from poorly drained to well drained. Because these areas are subject to varying degrees of flooding, the tree species comprising these hardwood bottomland forests are generally tolerant to flooding and poorly drained conditions. Tree species common to these hardwood bottomlands include red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), river birch (*Betula nigra*), sycamore (*Platanus occidentalis*), green ash (*Fraxinus pennsylvanica*), willow oak (*Quercus phellos*), swamp oak (*Quercus bicolor*), black willow (*Salix nigra*), American elm (*Ulmus americana*), slippery elm (*Ulmus rubra*), and ironwood (*Carpinus caroliniana*). Tree species common to the better-drained portions of these hardwood bottomlands include yellow poplar (*Liriodendron tulipifera*), Virginia pine (*Pinus virginiana*), and various oaks (*Quercus* spp.) and hickories (*Carya* spp.). Sapling and shrub species common to the hardwood bottomland forests of the study area include red-osier dogwood (*Cornus amomum*), spicebush (*Lindera benzoin*), and arrow-wood (*Viburnum dentatum*). It is estimated that approximately 3,927 acres (1,589 hectares) or less than one percent of the total forested area in the study area are comprised of hardwood bottomland forests. Past forestry management practices in hardwood bottomlands consisted of total harvesting when adjacent tracts of upland forests were harvested. The hardwood bottomlands were then left to regenerate naturally.

3.7.1.1.2 Upland Hardwood (Oak/Hickory) Forests

It is estimated that approximately 157,082 acres (63,571 hectares) or 40 percent of the total forested area in the study area are comprised of upland hardwood (oak/hickory) forests. This forest type is generally found on higher flats, slopes, and ridges away from stream courses. Mixed hardwood communities are the natural long-term forest types for upland areas and it is thought that all upland forests will tend toward this type if left undisturbed. Tree species common to mixed upland hardwood forests of the study area include northern red oak (*Quercus rubra*), scarlet oak (*Quercus coccinea*), black oak (*Quercus velutina)*, white oak (*Quercus alba*), post oak (*Quercus stellata*), chestnut oak (*Quercus prinus*), bitternut hickory (*Carya cordiformis*), pignut hickory (*Carya glabra*), black walnut (*Juglans nigra*), sugar maple (*Acer saccharum*), white ash (*Fraxinus americana*), pawpaw (*Asimina triloba*), eastern hemlock (*Tsuga canadensis*), American basswood (*Tilia americana*), American beech (*Fagus grandifolia*), black locust (*Robinia pseudo-acacia*), black cherry (*Prunus serotina*), yellow poplar (*Liriodendron tulipifera*), American holly (*Ilex opaca*), flowering dogwood (*Cornus florida*), redbud (*Circis canadensis*), eastern red cedar (*Juniperus virginiana*), witch hazel (*Hamamelis virginiana*), mountain laurel (*Kalmia latifolia*), smooth sumac (*Rhus glabra*), and sassafras (*Sassafras albidum*). These mixed upland hardwood forests often contain a smaller component of Virginia pine (*Pinus virginiana*), short needle pine (*Pinus echinata*), and eastern white pine (*Pinus strobus*). Because of relative ease of accessibility, many mixed upland hardwood forests have been harvested several times in the study area. Past forestry management practices for mixed upland hardwood forests consist of total to partial harvest. Most have been left to regenerate naturally into another stand of mixed hardwood, but some have been reforested with pine.

3.7.1.1.3 Pine Forests

Pine forests comprise approximately ten percent of the total timberland found in the study area. It is estimated that approximately 39,270 acres (15,893 hectares) in the study area are comprised of pine forests. These pine forests represent earlier successional stages of forest development in the region. The primary tree species found in this forest type is the eastern white pine (*Pinus strobus*) and loblolly pine (*Pinus taeda)* in southern Henry County, but large areas have been reforested with Virginia pine (*Pinus virginiana*). Short needle pine (*Pinus echinata*) is a less common natural species of these pine forests and is occasionally found scattered throughout. Past forestry management practices in pine forests consist of total harvesting followed by site preparation and reforestation with more pine. Some areas have been left to regenerate naturally with native pines and hardwood species that were already present in the understory.

3.7.1.1.4 Mixed Hardwood-Pine Forests

Mixed hardwood-pine forests comprise approximately 49 percent of the total timberland in the study area. It is estimated that approximately 192,425 acres (77,874 hectares) in the study area are comprised of mixed pine-hardwood forests. At 49 percent of the total forested land, mixed hardwood-pine forests comprise the largest forest type in the study area. This forest type is generally dominated by upland hardwood species with a lesser component of native pine. Mixed hardwood-pine forest types are thought to evolve as native pine die off, leaving room for more shade-tolerant hardwood species to take over. This forest type may also result following harvesting of native pine communities.

3.7.1.1.5 Wildlife Species (Including Migratory Birds) Associated with Forest Habitat

A wide array of wildlife species is present within the forest lands of the study area. Large game species include the white-tailed deer (*Odocoileus virginianus*), black bear (Ursus americanus), and eastern wild turkey (*Meleagris allopavo*). Small game species and fur-bearing species include the gray squirrel (*Sciurus carolinensis*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), gray fox (*Urocyon cinereoargenteus*), and red fox (*Vulpes fulva*). Small forest-dwelling mammals are also common. These small mammals include mice, moles, and shrews. Amphibians inhabiting the forest lands of the study area include the American toad (*Bufo americanus*), upland chorus frog (*Pseudacris triseriata*), gray treefrog (*Hyla versicolor*), Cope's gray treefrog (*Hyla chrysoscelis*), northern redback salamander (*Plethodon cinereus*), northern spring salamander (*Gyrinophilus porphyriticus*), southern two-lined salamander (*Eurycea bislineata cirrigera*), white-spotted slimy salamander (*Plethodon glutinosus*), northern dusky salamander (*Desmognathus fuscus fuscus*), northern red salamander (*Pseudotriton ruber*), spotted salamander (*Ambystoma maculatum*), and Wehrle's salamander (*Plethodon wehrlei*). Reptiles inhabiting the forest lands of the study area include eastern box turtle (*Terrapene carolina*), eastern fence lizard (*Sceloporus undulatus*), five-lined skink (*Eumeces fasciatus*), northern black racer (*Coluber constrictor*), corn snake (*Elaphe guttata*), eastern garter snake (*Thamnophis sirtalis*), eastern worm snake (*Carphophis amoenus*), rough green snake (*Opheodrys aestivus*), eastern hognose snake (*Heterodon platyrhinos*), black rat snake (*Elaphe obsoleta*), northern copperhead (*Agkistrodon contortrix*), mole kingsnake (*Lampropeltis sp.*), and northern ringneck snake (*Diodophis punctatus*).

Forest birds include a variety of wrens (Troglodytidae), warblers (Muscicapidae), thrushes (Turdinae), vireos (Virionidae), woodpeckers (Picidae), and flycatchers (Tyrannidae). Birds of prey inhabiting forest lands of the study area include red-tailed hawk (Buteo jamaicensis), Cooper's hawk (Accipiter cooperii), broad-winged hawk (Buteo platypterus), barred owl (Strix varia), and great horned owl (Bubo virginianus). Two hundred and eighty-three (283) migratory birds listed for protection under the Migratory Bird Treaty Act are reported to occur within the study area (see Appendix of Draft Environmental Impact Statement (VDOT, 2000). Of these 283 species, 181 are strictly terrestrial and are not dependent on aquatic habitat for any portion of their life cycle. Of the total 283 species reported for the study area, 29 have been identified as "Species of Management Concern" by FWS. Of the 29 "Species of Management Concern" within the study area, the "reason for concern" for 7 of the species is reported to be "dependence on vulnerable or restricted habitats". For the remaining 22 species the FWS-designated "reason for concern" is not directly linked to habitat loss. Forest birds include a variety of wrens (*Troglodytidae*), warblers (*Muscicapidae*), thrushes (*Turdinae*), vireos (*Virionidae*), woodpeckers (*Picidae*), and flycatchers (*Tyrannidae*). Birds of prey inhabiting forest lands of the

study area include red-tailed hawk (*Buteo jamaicensis*), Cooper's hawk (*Accipiter cooperii*), broad-winged hawk (*Buteo platypterus*), barred owl (*Strix varia*), and great horned owl (*Bubo virginianus*).

3.7.1.2 Agricultural Lands (Cropland, Pasture, Orchard, and Vineyard)

Using the USGS land use and land cover classification system (Anderson, et al, 1976), agricultural lands within the study area are combined into (1) cropland and pastureland and (2) orchards, groves, vineyards, nurseries, and ornamental. Characteristics of these agricultural lands are provided in the Natural Resources Technical Report (VDOT, 2000).

3.7.1.2.1 Plant Communities

Agricultural lands (cropland, pasture, orchard, and vineyard) comprise approximately 30 percent of the total study area. It is estimated that approximately 181,248 acres (73,351 hectares) in the study area are comprised of these various types of agricultural lands. Tobacco, corn, and hay are the most widespread crops grown throughout the study area. It is estimated that 50 percent of the agricultural lands found with the study area are comprised of cropland (for 90,624 acres or 36,676 hectares). Dairy and beef operations are an important part of the economy in Franklin County and Henry County, leading to large areas of pasture throughout the study area. It is estimated that 48 percent of the agricultural lands found with the study area are comprised of pasture (for 86,999 acres or 35,208 hectares). Apples and peaches comprise the most important orchard crops in the study area. Vineyards comprise a relatively small percentage of agricultural lands in the study area. Combined, it is estimated that orchards and vineyards make up less than two percent of the agricultural lands found within the study area (for 3,625 acres or 1,467 hectares).

3.7.1.2.2 Wildlife Associated With Agricultural Lands

Because they are typically monocultural plant communities, lack habitat diversity, and are disturbed on an on-going basis, agricultural lands generally provide poor habitat for wildlife. Utilization of agricultural lands by wildlife is largely a function of the type of crop being cultivated and the time of year. During growth stages, croplands provide refuge and foraging areas for a variety of small mammals, birds, and reptiles. Following harvest, grain crops are effective at attracting foraging white-tail deer (*Odocoileus virginianus*) and migrating waterfowl (particularly Canada geese [*Branta canadensis*]). Edge habitat between agricultural lands and adjacent forested tracts contribute to regional biodiversity.

3.7.1.3 Brush / Old Field

In accordance with the USGS land use and land cover classification system (Anderson, et al, 1976), clear-cut timbered areas, fallow farms fields, abandoned quarries, and other open and passive land covers are combined into transitional lands. Characteristics of these transitional lands are provided in the Natural Resources Technical Report (VDOT, 2000).

3.7.1.3.1 Plant Communities

Brush and old field communities are usually formed through the clearing of forested areas. These communities are vegetated with first-successional opportunistic plant species. Plant species common to brush communities include saplings of the once-present tree species, staghorn sumac (Rhus typhina), tree of heaven (Ailanthus altissima), black locust (Robina pseudo-acacia), blackberries (Rubus spp.), Japanese honeysuckle (Lonicera japonica), and greenbriers (Smilax spp.). Old field communities can also arise from agricultural lands that have lain fallow for a number of growing seasons. Old field communities are typically dominated by herbaceous plant species. Plant species common to these old field communities include broom-straw and beard grasses (Andropogon spp.), other assorted grasses (Poaceae), goldenrods (Solidago spp.), thistles (Carduus spp.), butterfly weed (Asclepias tuberosa), and red cedar (Juniperus virginiana).

3.7.1.3.2 Wildlife Associated with Brush / Old Field Communities

The edge habitat where brush and old field communities abut forests provides habitat diversity for a wide array of wildlife species. White-tailed deer utilize these communities for grazing and bedding. Small mammal

species inhabiting brush and old field communities include eastern cottontail rabbit (*Sylvilagus floridanus*), woodchuck (*Marmota monax*), and a variety of mice voles, moles, and shrews. Predators such as the red fox (*Urocyon cinereoargenteus*) and eastern gray fox (*Vulpes vulpes*) frequent these communities in search of small mammal prey. A number of bird species utilize brush and old field communities for nesting, foraging, and refuge. These birds include sparrows, eastern bluebird (*Sialia sialis*), American goldfinch (*Carduelis tristis*), blackbirds (*Euphagus* spp.), and brown-headed cowbird (*Molothrus ater*). Game species such as dove (*Zenaida macroura*) and quail (*Phasianidae*) also inhabit these communities. Several raptor species forage for small mammals in these communities. These raptor species include the red-tailed hawk, broad-winged hawk, Cooper's hawk, and American kestrel (*Falco sparverius)*.

3.7.2 Aquatic Ecology, Biodiversity, and Wildlife Habitat

Aquatic habitat addressed under this section includes certain waters of the U.S. (i.e., those other than wetlands) and deepwater habitat possibly affected by water body modifications. Wetlands have been addressed under separate sections as a specific category of waters of the U.S. Distinct aquatic habitat assessed as part of this study includes intermittent streams, perennial streams, isolated palustrine open water habitat (primarily farm ponds), and lacustrine waters (a narrow headwater arm of Smith Mountain Lake). The wide diversity of stream habitat occurring in the study area (from intermittent headwater streams to lower perennial streams) provides for an abundance of aquatic and water-dependent species. Riparian corridors dispersed throughout the study area cumulatively contribute to regional biodiversity. The biodiversity of aquatic ecosystems varies within the study area. The biodiversity of a large number of streams has been adversely affected by nonpoint pollution (increased sedimentation, nutrient loading, and fecal coliform counts) over a long history of agricultural practices – particularly those associated with livestock management. The biodiversity of streams in urbanized areas has been affected by channel modifications and by point and nonpoint pollution (Council on Environmental Quality, 1993). Due to the mobility of fish and waterfowl species, especially during periods of habitat stress, overlapping distributions may occur within stream reaches. SCUs represent key areas of the landscape that warrant further review for possible conservation action because of the natural heritage resources and habitat that they support. Based on the presence and number of natural heritage resources, DNH has assigned each SCU a Brank ranging from a value of "B1" for "outstanding significance" to "B5" for "of general biodiversity significance". SCUs within the I-73 study area to which DNH has assigned a Brank rating are described in Table 3.7-2.

TABLE 3.7-2
BIODIVERSITY RANKED STREAM CONSERVATION UNITS

Site Name	Location	Biodiversity Ranking	Legal Status of Species Contained Within
Roanoke River – Riverside SCU	East the community of Wabun in northwestern Roanoke County	B2 (Very High Significance)	Federally Listed
Roanoke River – Mill Race SCU	West of the City of Salem and east of the community of Glenvar in northwestern Roanoke County	B3 (High Significance)	State Listed
Pigg River – Furnace Creek SCU	Within the southern portion of the Town of Rocky Mount	B2 (Very High Significance)	Federally Listed
Big Chestnut Creek – Pigg River SCU	Southeastern Franklin County	B2 (Very High Significance)	Federally Listed
Smith River – Jordan Creek SCU	East of US 220 Bypass and west of the City of Martinsville in central Henry County	B4 (Moderate Significance)	Federally Listed

Source: Virginia Department of Conservation and Recreation, Division of Natural Heritage, November 2002.

3.7.2.1 Deepwater Habitat

Riverine deepwater habitat principally located along the larger streams and rivers (such as the Roanoke River, the Blackwater River, the Pigg River, and the Smith River). As classified under the FWS classification of wetlands and deepwater habitat, these riverine systems are subdivided into two subsystems: lower

perennial riverine deepwater habitats and upper perennial riverine deepwater habitats. Lower perennial riverine deepwater habitats are found within stream segments exhibiting low gradients and slow water velocity. Upper perennial wetlands are found within stream segments exhibiting high gradients and fast water velocity. It is estimated that 931 acres (377 hectares) of riverine deepwater habitat occurs within the 20 USGS 7.5-minute quadrangles encompassing the study area. Lacustrine limnetic deepwater habitats are also found within reservoirs in and adjoining the study area. Martinsville Reservoir, Marrowbone Reservoir, and the Leatherwood Creek Reservoirs (Numbers 2 through 6) are located within the study area. Smith Mountain Lake is located east of the study area, while Philpott Reservoir is located west of the study area. Deepwater palustrine habitats occur within a large number of farm ponds and other anthropogenic impoundments throughout the study area. It is estimated that 1,476 acres (597 hectares) of lacustrine deepwater (limnetic) wetlands occur within the 20 USGS 7.5-minute quadrangles encompassing the study area. See Chapter 4 for locations of potentially affected deepwater habitat. Characteristics of these deepwater habitat are provided in the Natural Resources Technical Report (VDOT, 2000).

3.7.2.2 Fish and Fish Habitat

Fish communities of study area perennial streams and lacustrine waters are primarily comprised of species common to freshwaters of the Atlantic slope of the eastern United States and are generally classified as warm freshwater fisheries. Natural Trout Waters and Stockable Trout Waters within the study area are shown in Table 3.7-3. Designated trout waters are listed in the Virginia Water Quality Standards (Virginia State Water Control Board, 1997) and are classified in accordance with DGIF stream class descriptions (Virginia State Water Control Board, 1997).

Intermittent streams studied do not support permanent populations of fish; however, they do provide temporary refuge and nursery for juveniles of many of the aforementioned fish species. Some farm ponds are stocked by landowners for private recreation with gamefish, such as crappie, bluegill, and small-mouth bass. Based on field surveys conducted by the DGIF (DGIF, 1998, 1999a, 1999b), the Roanoke River upstream of the city of Salem supports the greatest number of fish species (with 60 species confirmed). This is followed by the Blackwater River (with 58), the Pigg River (with 55), the Smith River upstream of the city of Martinsville (with 50), and the Smith River downstream of Martinsville and the Roanoke River downstream of the city of Roanoke (both with 46). Members of the darter family (*Percina* and *Etheostoma*), the shiner family (primarily *Luxilus, Cyprinella, and Notropis*), the redhorse family (*Moxostoma*), the dace family (*Rhinichthys, Phoxinus, and Clionostomus*), and the sunfish family (*Lepomis*) dominate most streams sampled. Populations of gamefish (such as largemouth bass or *Micropterus salmoides*, smallmouth bass or *Micropterus dolomieu*, brown trout or *Salmo trutta*, and rainbow trout or *Oncorhynchus mykiss*) are maintained through state-administered stocking of larger perennial streams and Smith Mountain Lake.

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TABLE 3.7-3
TROUT WATERS OF THE STUDY AREA

TYPE OF TROUT STREAM	STREAM SEGMENT	DGIF STREAM CLASS[1]
Natural Trout Waters (Wild Natural Trout Streams)	Smith River from DuPont Corporation's raw water intake upstream to the Philpott Dam	ii
	Glade Creek from its junction with Route 633 to the Bedford County line	iii
Stockable Trout Waters (Stockable Trout Streams)	Roanoke River from its junction with U.S. Routes 11 and Route 419 to the City of Salem's number 1 raw water intake	***
	Maggodee Creek from Boones Mill upstream to Route 862	vi
	Tinker Creek from its confluence with the Roanoke River north to U.S. Route 11 and U.S. Route 220	vii
	Roanoke River from the City of Salem's number 1 raw water intake to a point five miles upstream from the City of Salem's number 2 raw water intake	***
	Roanoke River from five miles above the City of Salem's number 2 raw water intake to the Montgomery County line	***

Source: Virginia State Water Control Board, 1997.

Class ii - Stream contains a good wild trout population or the potential for one but is lacking in aesthetic quality productivity, and/or in some structural characteristic. Stream maintains good water quality and temperature, maintains at least a fair summer flow, and adjacent land is not extensively developed. Stream would be considered a good wild trout stream and would represent a major portion of Virginia's wild trout waters.

Class iii - Stream which contains a fair population of wild trout with carrying capacity depressed by natural factors or more commonly man-related landuse practices. Land use activities may result in heavy siltation of the stream, destruction of banks and fish cover, water quality degradation, increased water temperature, etc. Most streams would be considered to be in the active state of degradation or recovery from degradation. Alteration in landuse practices would generally improve carrying capacity of the stream.

Class vi -Stream does not contain a significant number of trout nor a significant population of warmwater gamefish. Water quality is adequate and water temperature good for summer carryover of stocked trout. Summer flow remains fair and adjacent land is not extensively developed. All streams in this class would be considered good trout stocking water.

Class vii - Stream does not contain a significant number of trout nor a significant population of warmwater gamefish. Water quality and temperature are adequate for trout survival but productivity is marginal as are structural characteristics. Streams in this class could be included in a stocking program but they would be considered marginal and generally would not be recommended for stocking.

*** No DGIF classification.

3.7.2.3 Benthic Communities

An inventory of benthic invertebrates was assembled for selected streams within the study area (see Natural Resources Technical Memorandum (VDOT, 2000)). To assist in characterizing the general baseline water quality and health of streams within the study area, benthic populations were categorized according to whether the taxa comprising a population are pollution-tolerant or pollution-intolerant.

A wide variety of benthic faunas are found in the water bodies and waterways of the study area. Aquatic earthworms and tubificid worms (*Oligochaeta*) occur within most streams having muddy substrates throughout the study area but, being indicators of poorer water quality, are especially abundant within reaches of streams experiencing nutrient and organic loading (such as those reaches immediately downstream of pasturelands being grazed by cattle). Crayfish (*Cambaridae*) and freshwater clams (*Pelecypoda*) were sampled in a large number of streams, regardless of substrate type or apparent water quality. Air-breathing freshwater snails (*Physa spp.*) are found to be generally associated with gravelly/cobbly substrates exhibiting indicators of nutrient and organic loading (primarily a profusion of encrusting algae). Except within reaches of streams where poor water quality indicators and muddy substrates were observed, a diverse array of insect larvae and nymphs are represented. These include caddisflies (*Tricoptera*), mayflies (*Ephemeroptera*), stoneflies (*Plecoptera*), hellgrammites (*Megaloptera*), damselflies and dragonflies (*Odonata*), blackflies (*Diptera*), midges (*Chironomidae*), craneflies (*Tipulidae*), horseflies (*Diptera*), and other true flies (*Diptera*). Adult phases of invertebrates sampled include water penny (*Psephenidae*), aquatic beetles (*Coleoptera*), fingernail clams (*Sphaerium spp.*), gilled snails (*Viviparidae*), and leeches (*Hirudinae*).

No database or comprehensive inventory exists for the numerous isolated palustrine open water habitats (farm ponds) scattered throughout the study area; however somewhat heavy siltation rates and episodic nutrient loading from nearby residential and agricultural activities contribute to a relatively low diversity in species. Dominant benthic organisms include crayfish (Order *Decopoda*, Family *Cambaridae*), midge larva (Order *Diptera*, Family *Chironomidae*), and aquatic worms (Class *Oligochaeta*).

3.7.2.4 Waterfowl and Other Water-Dependent Migratory Birds

Reservoirs, river segments with open tree canopy, and larger farm ponds provide suitable habitat for a number of waterfowl. Waterfowl species reported or observed within the study area include mallard (*Anas platyrhynchos*), American black duck (*Anas rubripes*), gadwall (*Anas strepera*), Canada goose (*Branta canadensis*), wood duck (*Aix sponsa*), bufflehead (*Bucephala albeola*), common goldeneye (*Bucephala clangula*), pie-billed grebe (*Podilymbus podiceps*), hooded merganser (*Lophodytes cucullatus*), ruddy duck (*Oxyura jamacaicensis*), and lesser scaup (*Aythya affinis*). All of these waterfowl species are protected under the Migratory Bird Treaty Act.

Two hundred and eighty-three (283) migratory birds listed for protection under the Migratory Bird Treaty Act are reported to occur within the study area (see Appendix of Draft Environmental Impact Statement (VDOT, 2000)). Of these 283 species, 102 are dependent on aquatic habitat for at least a portion of their life cycle. Of the total 283 species reported for the study area, 29 have been identified as "Species of Management Concern" by FWS. Of the 29 "Species of Management Concern" within the study area, the "reason for concern" for 7 of the species is reported to be "dependence on vulnerable or restricted habitats". For the remaining 22 species the FWS-designated "reason for concern" is not directly linked to habitat loss.

3.7.2.5 Other Wildlife Species

Aquatic habitats of the study area (including wetlands) support a wide variety of water-dependent wildlife species. Amphibian species reported or observed within the study area include wood frog (*Rana sylvatica*), pickerel frog (*Rana palustris*), green frog (*Rana clamitans*), red-spotted newt (*Notopthalmus viridescens viridescens*), eastern mud salamander (*Pseudotritin montanus montanus),* southern two-lined salamander (*Eurycea bilineata cirrigera)*, northern dusky salamander (*Desmognathus fuscus fuscus*), spotted salamander (*Ambystoma maculatum*), spring peeper (*Hyla crucifer*), and bullfrog (*Rana catesheiana)*. Reptile species reported for and/or observed in aquatic habitats of the study area include queen snake (*Regina septemvittata*), eastern ribbon snake (*Thamnophis sauritus*), painted turtle (*Chrysemys picta*), mud turtle (*Kinosternon subrubrum*), slider (*Pseudemys scripta*), and snapping turtle (*Chelydra serpentina*).

3.7.3 Waters of the U.S., Including Wetlands

3.7.3.1 Navigable Waters of the U.S. (Section 10 Waters)

Activities affecting navigable waters of the U.S. are regulated by the COE under Section 10 of the Rivers and Harbors Act of 1899. As defined under COE regulations (33 CFR Part 329), navigable waters of the United States are defined as "those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce". The regulations go on to state that "a determination of navigability, once made, applies laterally over the entire surface of the water body, and is not extinguished by later actions or events which impede or destroy navigable capacity". Final determinations of navigability under Section 10 jurisdiction have been made by the Norfolk District COE for a number of waters throughout Virginia (Norfolk District COE, 1988). An additional number of rivers and streams throughout Virginia have been studied by the COE, but official determinations have not yet been made (Norfolk District COE, 1988). The Norfolk District Corps of Engineers has determined that the following waterways are navigable or, based on studies, assumed to be navigable:

- The Roanoke River from the Virginia state line upstream to the confluence of the North Fork and South Fork.
- Tinker Creek from its confluence with the Roanoke River upstream for approximately 1.8 miles (2.9 kilometers) to the U.S. Route 460 bridge.

- The Blackwater River from Smith Mountain Lake upstream to a point approximately 1.25 miles (2.01 kilometers) below the Norfolk and Southern railroad bridge (USGS Redwood 7.5-minute quadrangle).
- The Smith River from the Virginia State line upstream to and including Philpott Reservoir.

The Norfolk District COE has assumed that the Pigg River is non-navigable over its entire length.

3.7.3.2 Wetlands

Most wetland systems encountered throughout the study area are classified as palustrine, with a substantially lesser amount of lacustrine littoral wetlands occurring around the shallower shorelines of reservoirs. Several types of palustrine wetlands occur throughout the study area. A number of palustrine wetland communities throughout the study area have been produced by or influenced by beaver activities. It is estimated that 2,064 acres (835 hectares) of palustrine wetlands and 9.2 acres (3.7 hectares) of littoral lacustrine wetlands occur within the 20 USGS 7.5-minute quadrangles encompassing the study area. Field work conducted as part of this study confirms that a number of wetlands mapped under the National Wetlands Inventory (NWI) system are no longer present due to filling, clearing, and ditching (draining) that has occurred since initial NWI mapping. Field work also confirms that a number of wetland types mapped under the NWI system have evolved into different wetland types through natural succession since initial NWI mapping. These wetlands are indicated on the aforementioned figures using circles and/or italicized labels. See Chapter 4 for locations of potentially affected wetlands. Characteristics of these wetlands are provided in the Natural Resources Technical Report (VDOT, 2000).

3.7.3.2.1 Palustrine Forested Wetlands

Broad-leaved, deciduous, forested palustrine wetlands of varying hydrologic regimes are scattered throughout the study area due, in part, to the large amount of forest lands remaining in the region. Based on assessment of NWI mapping and field reconnaissance, it is estimated that 167 acres (68 hectares) of palustrine forested wetlands occur within the 20 USGS 7.5-minute quadrangles encompassing the study area.

3.7.3.2.2 Palustrine Scrub/Shrub Wetlands

Scrub-shrub wetlands occur primarily in association with wide meandering river floodplains, along shores of reservoirs, and immediately upstream of surface water impoundments (such as farm ponds). Based on assessment of NWI mapping and field reconnaissance, it is estimated that 192 acres (78 hectares) of palustrine scrub/shrub wetlands occur within the 20 USGS 7.5-minute quadrangles encompassing the study area.

3.7.3.2.3 Palustrine Emergent Wetlands

Emergent wetland systems are encountered along the shorelines of the many small ponds scattered throughout the study area and along the banks of most major streams. Based on assessment of NWI mapping and field reconnaissance, it is estimated that 213 acres (86 hectares) of palustrine emergent wetlands occur within the 20 USGS 7.5-minute quadrangles encompassing the study area.

3.7.3.2.4 Lacustrine Littoral Wetlands

Lacustrine littoral wetlands are encountered within the near-shore, shallow-water zones of reservoirs within the study area. Based on assessment of NWI mapping and field reconnaissance, it is estimated that 9.2 acres (3.7 hectares) of lacustrine littoral wetlands occur within the 20 USGS 7.5-minute quadrangles encompassing the study area.

3.7.4 100-Year Floodplains

Executive Order 11988 (Floodplain Management) defines a floodplain as “the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum,

that area subject to a one percent chance of flooding in any given year". The U.S. Water Resources Council's Floodplain Management Guidelines for Implementing Executive Order 11988 defines a regulatory floodway as "the area regulated by Federal, State or local requirements; the channel of a river or other watercourse and the adjacent land areas that must be reserved in an open manner, i.e., unconfined or unobstructed either horizontally or vertically, to provide for the discharge of the base flood so the cumulative increase in water surface elevation is no more than a designated amount (not to exceed one foot as set by the National Flood Insurance Program (NFIP)". See Chapter 4 for locations of potentially affected floodplains and floodways. More-detailed discussion of these floodplains and floodways is provided in the Natural Resources Technical Report (VDOT, 2000).

3.7.4.1 Northern Portion of the Study Area

Many low-lying portions of Roanoke County, western Botetourt County, and western Bedford County (the northern portion of the study area) bordering on perennial streams are subject to periodic flooding. The most severe flooding along the Roanoke River is most frequently due to heavy rains associated with tropical storms. Flooding along lesser creeks is most frequently due to local thunderstorms or frontal systems. Major floods in Roanoke County occurred in 1940, 1972, and 1985. During the 1940 event, discharge along the Roanoke River was recorded and 24,400 cubic feet (690 cubic meters) per second. With a discharge of 28,000 cubic feet (790 cubic meters) per second, the 1972 flood along the Roanoke River (caused by Hurricane Agnes) is considered to be the 50-year flood of record by the Federal Emergency Management Agency (FEMA). As indicated in the 1995 FEMA study, the November 1985 flood had an exceedence interval of approximately 100 years at the recording gage located at Roanoke. Major damage to buildings, roadways, bridges, and croplands were reported as a result of these storms. In the city of Roanoke, the most severe flooding occurs within the Roanoke River and Lick Run floodplains. In the city of Salem, the most severe flooding occurs within the Roanoke River floodplain. In the northern portion of the study area, flood-sensitive waterways include: the Roanoke River, Back Creek, Lick Run, Murray Branch, and Ore Branch. Waterways within the northern portion of the study area containing regulated floodways consist of the Roanoke River in Roanoke County and Bedford County; Back Creek, Lick Run, Murray Branch, and Ore Branch in Roanoke County. Figure 4.7-16 shows locations of potential stream crossings involving 100-year floodplains and floodways within the Roanoke City and Roanoke County portions of the study area.

3.7.4.2 Central Portion of the Study Area

As the largest tributaries of the Roanoke River, the Blackwater River and the Pigg River drain most of Franklin County (the central portion of the study area). Franklin County is sparsely populated and its floodplains are undeveloped for the most part. Nearly all floodplains within the county are occupied by forest, pasturelands, and croplands. A relatively small amount of commercial and residential development has taken place in the Maggodee Creek floodplain near the town of Boones Mill and within the floodplain of the South Fork of the Blackwater River near the community of Callaway. Flood-prone areas along major reservoirs (such as Smith Mountain Lake and Philpott Lake) are protected by flood easements and government or utility company ownership (FEMA, 1980). Low-lying portions of Franklin County are subject to periodic flooding from the Roanoke River, the Blackwater River, the Pigg River, and their larger tributaries. The most severe flooding along major rivers is due to heavy rains from tropical storms and major weather fronts. Flooding along tributaries and creeks is, most frequently, due to local thunderstorms. Major floods have occurred in Franklin County in 1928, 1939, 1940, 1944, 1972, and 1985. The August 1940 storm is the maximum flood of record for the Roanoke River, the Blackwater River, the Pigg River, and Snow Creek. The June 1972 storm (a result of Hurricane Agnes) approximated the 50-year storm along the Pigg River. Flood damage in the county is primarily to agricultural lands. Flood-sensitive waterways in the central portion of the study area include the Pigg River, the Blackwater River, Maggodee Creek, and Gills Creek. All of these waterways contain regulated floodways. Figure 4.7-17 shows the locations of potential stream crossings, which involve 100-year floodplains and floodways within the Franklin County portion of the study area.

A small dam is located on the Pigg River, approximately 400 feet (120 meters) upstream of Route 713. In its Flood Insurance Study for Franklin County, FEMA reports that this dam "…is subject to minor overtopping during high order floods. However, it is concluded that, while the short-term duration, shallow overflows might result in the erosion of abutments, rapid failure of the dam is unlikely." (FEMA, 1980). During recent

observations of the Pigg River dam site, the DCR's Dam Safety Office noted that the concrete gravity section of the dam appeared to be structurally sound with no visible cracks or misalignments, that concrete has deteriorated to a degree along the top and the downstream face of the dam, that the foundation along the base of the dam is for the most part on bedrock, that debris behind the dam is probably the greatest potential problem, and that the overtop spillway could clog to the point that flood flows would be higher than past events possibly causing breaching around the dam at the abutments (DCR; 23 November 1999 personal communication with Mr. Duncan McGregor, PE). Although the DCR Dam Safety Office states that the statement made in 1980 FEMA Flood Study remains valid, their communication notes that FEMA was not specific with reference to the length of time and degree of failure associated with FEMA's use of the term "rapid failure" nor to the probability of "rapid failure" associated with FEMA's use of the term "unlikely". Based on observations, the DCR Dam Safety Office offered the opinion that "the dam in its current state of operation and maintenance has the potential to impact downstream areas in ways not anticipated under normal major flood events". Information provided by the DCR Dam Safety Office is based on general observations and professional judgment alone. More-detailed conclusions regarding structural integrity of the dam will require a comprehensive dam safety inspection including in-situ materials testing, visual and tactile inspection, and possibly a structural and hydraulic analysis of the existing system.

3.7.4.3 Southern Portion of the Study Area

The southern portion of the study area lies largely within Henry County. The Smith River drains the central 75 percent of Henry County. The west-central and southwestern portions of Henry County are drained by the Mayo River. Tributaries of the Pigg River drain the northeastern portion of the county. The most severe flooding in Henry County occurs along the Smith River and its major tributaries. Severe flooding is most frequently due to heavy rains from tropical storms and some local thunderstorms. Major floods occurred along the Smith River in 1937, 1940, 1972, and 1985. The October 1937 event is reported to be the largest flood of record at the city of Martinsville and the community of Bassett. The stream gage at Bassett recorded a peak water elevation of 23 feet (7.0 meters) during this storm (with the normal overbank elevation being approximately eight feet [2.4 meters]). Along the Smith River, the 1972 flood was calculated to have a recurrence interval of 67 years (FEMA, 1980). The most common form of flood damage within Henry County is experienced within agricultural lands located within floodplains. The community of Bassett has historically experienced the most flood damage from the Smith River. During major flood events, highways and secondary roads within lower elevations of the Smith River watershed frequently become impassible. Philpott Lake has had a significant effect at reducing the peak flood stage of the Smith River. Marrowbone Reservoir and five flood control dams in the Leatherwood Creek watershed were constructed by the NRCS to help control flooding along the Smith River. In the southern portion of the study area, flood-sensitive waterways include: the Smith River, Leatherwood Creek, Marrowbone Creek, Grassy Creek, Jordan Creek, Beaver Creek, Reed Creek, and Little Reed Creek. All of these waterways contain regulated floodways. Figure 4.7-18 shows the location of potential stream crossings, which involve 100-year floodplains and floodways within the Henry County portion of the study area.

3.7.5 Threatened or Endangered Species

Based on information provided by FWS and the DNH during preparation of the DEIS, it was determined that one federal-listed endangered fish species (the Roanoke logperch or *Percina rex*) and one federal-listed endangered plant species (the smooth coneflower or *Echinacea laevigata*) are reported to occur within or in close proximity to the study area. Following preparation of the DEIS, the FWS determined that suitable habitat for a federal-listed freshwater mussel (the James spinymussel or *Pleurobema collina)* may also occur within or in close proximity to the study area. In addition to these federal-listed species, one state-listed threatened fish species (the orangefin madtom or *Notorus gilberti*) and one state-listed endangered plant species (piratebush or *Buckleya distichophylla*) are reported to occur within or in close proximity to the study area. Approximate locations of populations reported to exist in or near the study area are shown in Chapter 4.

3.7.5.1 Federal Listed Threatened or Endangered Species

Investigation of federal-listed threatened and endangered species within the study area was based on species listings supplied by the FWS (FWS; 10 February 1998 scoping letter), DNH (DCR, DNH; 24 February 1998

comment letter; 23 September 1998 comment letter), and the VDACS (VDACS; 8 April 1998 scoping letter). Wildlife species databases maintained by DGIF were also assessed (DGIF; 9 September 1998; 12 February 1999; 4 March 1999). Completeness and accuracy of lists provided was verified during interagency coordination meetings held between VDOT, its consultants, and the participating state and federal agencies.

3.7.5.1.1 Roanoke Logperch

The Roanoke logperch (*Percina rex*) is a freshwater fish species that is presently listed as endangered by both the U.S. Fish and Wildlife Service (FWS) and the Commonwealth of Virginia. The Roanoke logperch is endemic to the Roanoke River and Chowan River drainage basins, where it is encountered in relatively small numbers. Populations located to date are separated from one another by long segments of rivers or by large impoundments. The Roanoke logperch inhabits medium and large rivers with warm and moderately clear waters and moderate to relatively low gradients (Burkhead and Jenkins, 1991). A study recently conducted by Virginia Commonwealth University indicates that the Roanoke logperch is capable of inhabiting streams that are smaller than historically thought. It is reported that individuals of all life stages avoid moderately and heavily silted areas except during winter months of inactivity (Burkhead and Jenkins, 1991). Populations of the Roanoke logperch are threatened by instream channelization, impoundment, and dewatering activities, and by activities within the watershed that lead to pollution and increased siltation of receiving waters.

Populations of the Roanoke logperch are reported to occur in the upper Roanoke River and in the lower reaches of Mason Creek and Tinker Creek. The Roanoke logperch is also reported to occur in the Pigg River near its confluence with Big Chestnut Creek and in the extreme lower reach of Big Chestnut Creek. Roanoke logperch has been sampled in a segment of the Pigg River extending 820 feet (250 meters) upstream and 2,225 feet (800 meters) downstream of the U.S. Route 220 crossing (Angermeier, 1999). The Smith River upstream of the City of Martinsville is reported to support a small population of the logperch (Terwilliger and Tate, 1995).

3.7.5.1.2 James Spinymussel

The James spinymussel (*Pleurobema collina)* is a freshwater mussel that is endemic to Virginia. This species was listed as State Endangered by the Virginia Department of Game and Inland Fisheries in October of 1987. In July of 1988, it was listed as Federally Endangered by the U.S. Department of Interior (Federal Register #53:27693). The species is thought to be declining because of habitat degradation and reproductive isolation of subpopulations in the upper James drainage. Population declines are reported to be due to siltation, impoundment, and pollution. Potential threats to present populations are reported to include the upstream dispersal of the asiatic clam (*Corbicula fluminea*), a possible competitor; poor logging or road construction practices in the upper Craig Creek watershed, and sewage effluents from small communities (Terwilliger, 1995).

The James spinymussel is found in second and third order streams that are unpolluted, well oxygenated, and of moderate hardness. Streams range from 1 foot to 6.6 feet (0.3 to 2 meters) deep and 3.2 to 65.6 feet (1 to 20 meters) wide. Bottom sediments are typically sand and cobble - with or without boulders, pebbles, or silt. The mussels are usually buried in the substrate near stagnant riffle-run flows. This species is endemic to the James River drainage and is know to occur in the following streams: Craig, Johns, Dicks, Patterson, Catawba, and Potts creeks in Craig and Botetourt counties; the Mechums River, Rocky Run, and Licking Hole Creek in Albermarle County; and the Pedlar River in Amherst County (Terwilliger, 1995). As juveniles, the species is parasitic on fish. Dispersal of the species is during the larval stage only and is dependent on the movement of the host fish species.

Recent investigations have indicated that the James spinymussel may also occur within portions of the Dan River watershed in North Carolina. Because these recent investigations have indicated that the James spinymussel may occur outside its historically documented range, second and third order streams of the Dan River watershed within the study area were surveyed to determine whether the species is present. Results of these stream surveys confirm that the James spinymussel does not occur within the study area.

3.7.5.1.3 Smooth Coneflower

Smooth coneflower (*Echinacea laevigata*) is a perennial herb that is presently listed as endangered by the FWS. The smooth coneflower exhibits pink ray flowers and is the only native purple coneflower in Virginia. Throughout its range, the smooth coneflower is reported to occur in xeric woodlands, meadows, roadsides, and disturbed areas usually underlain by basic or circumneutral soils over basic bedrock. In Virginia, these basic rock types include limestone, diabase, and gabbro. Smooth coneflower requires relatively open areas created by natural disturbances, such as fires. The species is threatened by the loss of naturally-occurring open habitat and by over-collecting (Ludwig, 1991). In Virginia, smooth coneflower has been reported from the southern Piedmont and the Appalachian Valley (Valley and Ridge) provinces (Ludwig, 1991). In the study area, smooth coneflower has been reported to occur in the Grassy Hill area west of the town of Rocky Mount (DCR, Division of Natural Heritage, 1998). Due, in part, to the presence of smooth coneflower, the DCR Division of Natural Heritage has designated the Grassy Hill area as a NAP. Although the species has not reported in other portions of the study area, field surveys were conducted during mid-August of 2002 within areas exhibiting soils, rock types, and vegetation associations similar to those encountered on Grassy Hill.

3.7.5.2 State Listed Threatened or Endangered Species

Investigation of state-listed threatened and endangered species within the study area was based on species listings supplied by the Virginia Division of Natural Heritage (Virginia Department of Conservation and Recreation, Division of Natural Heritage; 24 February 1998 comment letter; 23 September 1998 comment letter) and the Virginia Department of Agriculture and Consumer Services (Virginia Department of Agriculture and Consumer Services; 8 April 1998 scoping letter). Wildlife species databases maintained by the Virginia Department of Game and Inland Fisheries were also assessed. Completeness and accuracy of lists provided was verified during interagency coordination meetings held between VDOT, its consultants, and the participating state and federal agencies.

3.7.5.2.1 Orangefin Madtom

The orangefin madtom (*Notorus gilberti*) is a freshwater fish species of the catfish family that is presently listed as threatened by the Commonwealth of Virginia. The orangefin madtom is native to the upper Roanoke River drainage basin in Virginia and North Carolina. The species occupies a narrow range of habitat in medium-sized intermontane and upper Piedmont streams (moderate to strong riffles and runs having little or no silt and moderate gradients). The orangefin madtom is an intersticine species typically found in or near cavities formed by rubble and boulders. The largest populations occupy generally clear waters (Burkhead and Jenkins, 1991). Siltation and bait-seining are threats to remaining populations of the orangefin madtom. The species is short-lived and its apparently low reproductive potential renders the species especially vulnerable to disturbance. Only five isolated indigenous populations of the orangefin madtom are known to exist in the Roanoke River drainage basin.

In the study area, a population of the orangefin madtom is reported to inhabit the Roanoke River from the city of Salem upstream through the South Fork (DGIF, 1999). Within the study area, a second population is reported to inhabit the Pigg River near its confluence with Big Chestnut Creek, along with the lower reaches of Big Chestnut (Burkhead and Jenkins, 1991; DGIF, 1999).

3.7.5.2.2 Piratebush

Piratebush (*Buckleya distichophylla*) is a shrub species that is presently listed as endangered by the Virginia Department of Agriculture and Consumer Services. Piratebush is a dioecious shrub that grows up to 15 feet (4.6 meters) in height. It is a root parasite. Piratebush typically inhabits ridgetops and, shaly slopes that are often very steep. It is frequently found along streams with a westerly and southwesterly exposure. Major threats to piratebush populations in Virginia are road construction, browsing of young shoots (presumably by deer), and over-collecting. A large population of piratebush is reported to occur within the Poor Mountain/Long Ridge NAP located just west of the city of Salem. Under stewardship of the Nature Conservancy and the DCR's Division of Natural Heritage, the approximate 1,100 acres (445 hectares) comprising the NAP helps preserve a large population of the species. The presence of an additional

population of piratebush has been recently confirmed on the top and southwesterly exposures of a ridge located approximately 1,000 feet (305 meters) north of the 86-acre (35-hectare) parcel of the Poor Mountain/Long Ridge NAP. The exact extent of and number of individuals comprising this additional population of piratebush are not currently known, and the population is currently not reported under the DCR Natural Heritage database.

3.7.6 Wild and Scenic Rivers

No federally listed wild and scenic rivers are located within the study area or immediately downstream of the study area (U.S. Department of the Interior, 1981, 1998). Although some of the rivers that run through the study area have segments on the Nationwide Rivers Inventory, those segments lay outside the study area. No legislatively designated components of the Virginia Scenic Rivers Program are located within the study area or immediately downstream of the study area (DCR, 1996, 2002).

The segment of the Blackwater River extending from U.S. Route 220 downstream to Smith Mountain Lake is identified as a potential component worthy of future inclusion under the state program. This segment of the Blackwater River has recently been evaluated by the DCR and has been found to qualify for future inclusion. Attributes contributing to this determination include recreational boating opportunities, warmwater fisheries, and scenic qualities attributable to its rural setting. The segment of the Pigg River for its entire extent through Franklin County and Pittsylvania County is identified as a potential component worthy of future inclusion. This segment of the Pigg River has been nominated for inclusion but has not yet been evaluated (Richard Gibbons, DCR, personal communication, 30 September 1998).

3.7.7 Other Unique or Limited Natural Resources

3.7.7.1 Unique or Limited Geologic Features

The study area is located in the south-central portion of Virginia and covers approximately 604,160 acres (244,504 hectares) or 944 square miles (2,445 square kilometers). From north to south, the study area falls within three major physiographic provinces – the Valley and Ridge physiographic province, the Blue Ridge physiographic province, and the Western (or Inner) Piedmont physiographic province. The western flank of the Blue Ridge Mountains, which is the boundary between the Valley and Ridge physiographic province and the Blue Ridge physiographic province, traverses the study area from northeast to southwest just southeast of the city of Roanoke. The eastern flank of the Blue Ridge Mountains, which is the boundary between the Western Piedmont physiographic province and the Blue Ridge physiographic province, traverses the study area from northeast to southwest in the vicinity of the town of Boones Mill in Franklin County. Approximately 20 percent of the study area (i.e., the northern portion) lies within the Valley and Ridge physiographic province, approximately 10 percent of the study area (i.e., the north-central portion) lies within the Blue Ridge physiographic province, and approximately 70 percent of the study area (i.e., the south-central and southern portions) is located within the western Piedmont physiographic province. Elevations within the study area range from approximately 540 feet (165 meters) along the Smith River near the state line to approximately 3,093 feet (943 meters) atop Poor Mountain just east of the City of Salem.

3.7.7.1.1 Geologic Hazards

Fractured, sheared, and more heavily weathered rocks are associated with several aged and inactive fault zones within the study area. These fault zones include the Salem fault (roughly paralleling I-81 in the northernmost port of the study area), the Salem fault and Fries fault (roughly paralleling the Roanoke/Franklin county line), the Bowens Creek fault (trending northeast/southwest in southern Franklin County and northern Henry County), the Ridgeway fault (trending northeast/southwest in the vicinity of the community of Ridgeway in southern Henry County), and the Chatham fault (trending northeast/southwest in the southeastern-most portion of the study area). Due to brittle fracturing and weathering of rock types within these fault zones slopes are relatively less stable and relatively more erodible than similar slopes in other areas.

3.7.7.1.2 Mineral Resources

Mineral resources of economic importance in the Valley and Ridge portion of the study area include clay and shale for brick production, sand and gravel for aggregate, crushed stone for road construction and concrete, lime, building stone for local use, and dimension stone (Amato, 1974).

Mineral resources of economic importance within the Blue Ridge portion of the study area include crushed stone for road construction and concrete and dimension stone for building construction (Virginia Department of Mines, Minerals and Energy, Division of Mineral Resources, 1987).

Mineral resources of economic importance within the Piedmont portion of the study area include crushed stone for road construction and concrete, dimension stone for building construction, talc, soapstone, mica, magnetite and emery for abrasives, sillimanite, and kyanite for porcelain production (Conley and Henika, 1973).

3.7.7.1.1 Caves

Dixie Caverns and most of the sinkholes reported for the region occur within limestones and dolomites of the Elbrook Formation. Maps published by the Virginia Division of Mineral Resources indicate that the Elbrook Formation occurs largely north of the Roanoke River and Interstate 81 within the study area. The Virginia Cave Board states that one small cave has been documented within the project study area (DCR, 20 March 2002 correspondence).

3.7.7.1.2 Prime Farmland Soils

Because of its major importance in meeting the nation's short-term and long-term needs for food and fiber, prime farmland is considered one of several important types of important farmland. Prime farmland is land that is best suited to food, feed, forage, fiber, and oilseed crops. Prime farmland produces the highest crop yields with minimal expenditure of energy and economic resources, thus, farming it results in the least damage to the environment according to the USDA, Natural Resources Conservation Service (NRCS). Recent trends in land use have meant the loss of prime farmlands to industrial and urban uses. Soils underlying prime farmlands are, thus, considered a unique and limited natural resource. For a detailed discussion of prime farmlands from the perspective of land uses within the study area, see Section 3.2. Prime farmland soils occurring in the study area are listed in Table 3.7-4.

3.7.7.1.3 Other Unique or Limited Soil Types

The NRCS has mapped several hydric soils in association with floodplains and wetlands throughout the study area. These hydric soils consist of Alderflats silt loam (zero to four percent slopes), Clubcaf silt loam (zero to two percent slopes), and Purdy silt loam (zero to four percent) in Roanoke County; Purdy silty clay loam (zero to four percent slopes) in Botetourt County; Chenneby loam (zero to four percent slopes) and Kinkora loam (zero to three percent slopes) in Franklin County, and Leaksville silt loam (zero to four percent slopes) in Henry County. Hydric soil inclusions and hydric soil units too small to be mapped by NRCS underlay all wetlands encountered in the study area (see Section 3.7.4.2). Hydric soils are treated both as a unique or limited soil type and as an intrinsic component of wetlands in this report.

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TABLE 3.7-4
PRIME FARMLAND SOILS IN THE STUDY AREA

Roanoke, Botetourt, and Bedford Counties	Franklin County	Henry County
Altavista fine sandy loam (2-7% slopes)	Cecil sandy loam (2-7% slopes)	Buckhall sandy loam (2-7% slopes)
Alleghany loam (2-7% slopes)	Chenneby loam (0-2% slopes, occasionally flooded)	Clifford sandy loam (2-7% slopes),
Braddock fine sandy loam (2-7% slopes)	Clifford fine sandy loam (2-7% slopes)	Delanco loam (0-4% slopes),
Chewacla loam (0-2% slopes)	Delcano fine sandy loam (2-7% slopes, rarely flooded)	Dyke loam (2-7% slopes),
Combs loam (0-2% slopes, occasionally flooded)	Edneyville fine sandy loam (2-7% slopes)	Elsinboro fine sandy loam (0-4% slopes, rarely flooded),
Frederick silt loam (2-7% slopes, occasionally flooded)	Elsinboro fine sandy loam (2-7% slopes, rarely flooded)	Mayodan fine sandy loam (2-7% slopes),
Gladehill fine sandy loam (0-3% slopes, occasionally flooded)	Hiwassee loam (2-7% slopes)	Minnieville loam (2-7% slopes),
Hayesville fine sandy loam (2-7% slopes, occasionally flooded)	Minnieville loam (2-7% slopes)	Stoneville loam (2-7% slopes),
Lindside silt loam (0-2% slopes, occasionally flooded)	Orenda loam (2-7% slopes)	Woolville-Clifford complex (2-7% slopes).
Minnieville loam (2-7% slopes)	Pacolet fine sandy loam (2-7% slopes)	
Sinodion loam (0-2% slopes, occasionally flooded)	Tatum gravelly loam (2-7% slopes)	
Speedwell loam (0-2% slopes, occasionally flooded)	Thurmont fine sandy loam (2-7% slopes)	
Thurmont sandy loam (2-7%slopes)	Wintergreen loam (2-7% slopes)	
Toccoa sandy loam		
Wintergreen loam (2-7% slopes, rarely flooded)		
Zoar silt loam (2-7% slopes)		

Source: USDA, Soil Conservation Service, 1989, 1994; USDA, NRCS, 1997.

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3.8 HAZARDOUS MATERIALS

3.8.1 Existing Data Review and Regulatory Database Search

The hazardous materials analysis for the I-73 Location Study Environmental Impact Statement identifies potential contaminant sources within or near the proposed project area. A search of federal and state databases for the study area was conducted by Environmental Data Resources, Inc. in July 1996. An updated database search was conducted for the FEIS in June 2004. To avoid unnecessary investigation, searches of standard government databases were limited to areas within which hazardous conditions could be reasonably expected to effect project construction and/or operation (i.e., a one-mile-wide corridor along each alternative under consideration). . The initial environmental database search report was augmented with a field investigation (windshield survey) to verify the report findings and to locate sites that were not mapped in the database search report due to inadequate address information. These sites along with a complete listing of occurrences found in the database are provided in the *I-73 Location Study Technical Memorandum – Hazardous Materials*. The updated database search was compared to the original to determine which sites were new and which sites had been de-listed or removed from the database. The following databases were used to identify "problem" hazardous materials situations:

Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS): This database contains data on potentially hazardous waste sites reported to the EPA by states, municipalities, private companies, etc., pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act. The CERCLIS contains sites either proposed for or on the National Priority List (NPL) or are in the screening and assessment phase for possible inclusion to the NPL (see below).

National Priority List (NPL): Also known as Superfund. This EPA-supplied list is a subset of CERCLIS and identifies sites for priority cleanup under the Superfund Program.

Delisted NPL: The EPA has deleted these sites from the NPL. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) established the criteria used by the EPA for deletion.

Records of Decision (RODs): Mandating a permanent remedy for NPL sites, these documents provide technical and health information to aid the cleanup of these sites.

CERCLIS - No Further Remedial Action Planned (NFRAP): This database contains sites that have been removed from CERCLIS. These may be sites where, after an initial investigation, no contamination was found, contamination was removed quickly, or the degree of contamination was not serious enough to be placed on the NPL.

Resource Conservation and Recovery Information System (RCRIS): This system includes selective information on sites that generate, transport, store, treat, and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). These are divided into small-quantity generators (SQGs), large-quantity generators (LQGs), and operators of treatment, storage, and disposal facilities (TSDs).

RCRA Administrative Action Tracking System (RAATS): This system contains records, based on enforcement actions issued under RCRA, pertaining to major violators. It includes administrative and civil actions brought by the EPA.

Emergency Response Notification System (ERNS): This system records and stores information on reported releases of oil and hazardous substances.

Hazardous Materials Information Reporting System (HMIRS): This database contains information on hazardous material spill incidents reported to the Virginia Department of Transportation.

Solid Waste Management Facilities/Landfill Sites (SWF/LF): This database contains data from the DEQ's Permitted Facilities List, containing solid waste disposal facilities or landfills.

Underground Storage Tank – registered (UST): USTs are regulated under Subtitle I of RCRA, and must be registered with the DEQ, the state department responsible for administering the UST program.

Leaking Underground Storage Tank (LUST): Regulated by the DEQ, this database contains records of LUSTs and the status of any repair or remediation. Many LUSTs identified by the database search are closed cases where the tank has either been sealed or removed.

Aboveground Storage Tank – registered (AST): This database contains a list of ASTs for the DEQ's AST Data Notification Information.

Voluntary Remediation Program (VRP): This program encourages owners of selected contaminated sites to conduct voluntary cleanups. The sites are usually open dumps or unpermitted solid waste disposal facilities and cannot be included on the NPL or contain RCRA hazardous wastes.

Polychlorinated Biphenyl (PCB) Activity Database (PADs): Generators, transporters, commercial storers, and/or brokers or disposers of PCBs are identified, as reported to the EPA.

Facility Index System (FINDS): These records contain both facility information and "pointers" to other sources that contain more detail.

Material Licensing Tracking System (MLTS): The Nuclear Regulatory Commission (NRC) maintains this system. It contains lists of sites that possess or use radioactive material and are subject to NRC licensing requirements.

Toxic Chemical Release Inventory System (TRIS): This database identifies facilities that release toxic chemicals to the air, water, and land in reportable quantities under the Superfund Amendments and Reauthorization Act (SARA) Title III Section 313.

Comprehensive Environmental Database System (CEDS): This database includes Virginia Water Protection Permits, Virginia Pollution Discharge Elimination System (point discharge) Permit, and Virginia Pollution Abatement (non-point discharge) Permit.

Former Manufactured Gas (Coal Gas) Sites: This list identifies the existence and location of coal gas sites.

Leaking Tanks Database (LTANKS): This database is maintained by DEQ and contains current leaking petroleum tanks

Mines Master Index File (MINES): Regulated by the Department of Labor, Mine Safety and Health Administration, this database identifies the existence and location of mine sites.

Spills (VA SPILLS): This database is compiled form the Pollution Complaint Database developed by DEQ.

Sites identified as potential contaminant sources may not necessarily affect the study area. These sites are simply listed within the searched databases as registered and regulated businesses or agencies. Information gathered about the possibility of contamination within this search can only be positively verified through sampling and laboratory analysis. The conclusions of this report are based entirely on an environmental database search and a field investigation, and this report identifies possible impacts on the study area.

3.8.2 Sites Identified within the Study Area

Through the aforementioned means, a total of 927 hazardous material sites were identified by the database search within the project study area. This list of hazardous material sites consists of sites within the 600-foot-

wide (180-meter-wide) corridor boundaries and sites near these boundaries. The potential impacts of the sites lessen with greater distance from the segment. Table 3.8-1 lists the summary of occurrences by database source. Of these 927 occurrences, 184 are located within the 600-foot-wide (180-meter-wide) corridor boundary.

TABLE 3.8-1
SUMMARY OF IDENTIFIED SITES

Hazardous Materials Site Database Source	Occurrences Identified in Hazardous Materials Study Area	Occurrences Within 600-foot-wide Alternative Corridor
CERCLIS	2	1
NPL	0	0
Delisted NPL	1	1
RODs	1	1
CERCLIS-NFRAP	3	1
RCRIS – SQGs	108	20
RCRIS – LQGs	2	0
RCRIS – TSDs	4	0
RAATS	0	0
ERNS	7	1
HMIRS	3	0
SWF/LF	3	0
UST	272	57
LUST	167	39
AST	24	4
VRP	8	0
PADs	3	1
FINDS	136	25
MLTS	3	0
TRIS	3	0
CEDS	11	1
Coal Gas	1	0
LTANKS	148	29
MINES	4	0
VA SPILLS	13	3
Total	927	184

Note: Based on the Area Corridor Study, I-73 Location Study, Roanoke City, VA., Environmental Data Resources, Inc., June 2004

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3.9 HISTORIC AND ARCHAEOLOGICAL RESOURCES

Section 106 of the National Historic Preservation Act of 1966 (NHPA) as amended (36 CFR 800), requires that federal agencies consider the effects of their actions on significant historic properties included in or eligible for the National Register of Historic Places (NRHP). To satisfy this requirement, it is necessary to consult with the State Historic Preservation Officer (SHPO) when identifying and determining the potential effects to historic resources. In the State of Virginia, the Director of the Virginia Department of Historic Resources (DHR) serves as the SHPO. For the I-73 project, historic resources that are eligible or potentially eligible for the NRHP were identified in accordance with the provisions of Section 106 of the NHPA. Archaeological resources were identified and evaluated in accordance with revised regulations of the NHPA, which allow a phased approach where multiple corridors or large land areas are under consideration.

3.9.1 Architectural Resources

3.9.1.1 Architectural Setting

The study area, located adjacent to U.S. Route 220 in Roanoke, Franklin, and Henry counties, has a long agricultural history. The earliest settlers relied on subsistence farming and, although times have changed significantly, farming is still a way of life for many in the area. Developments such as the construction of the railway system introduced new businesses, lifestyles, products, and methods to area residents. This evolution is well represented by the historic architecture in the region. The agricultural lifestyle is reflected in the houses, barns, outbuildings, pastures, and fields that have survived and been adapted to changing times. The development of crossroads, towns, businesses, and factories in the late nineteenth and early twentieth centuries is also well represented. In many areas, large farmsteads have been subdivided and historic crossroad communities have been developed beyond any resemblance to the original historic settlement. For the most part, the study area retains a high degree of historic integrity.

3.9.1.2 Methodology

To identify resources in the study area that are eligible or potentially eligible for the NRHP, three general methods were used:

1) Background research was conducted to document previously identified resources in the study area. Architectural site files were examined at DHR, and additional research was conducted at the Virginia Historical Society and the Library of Virginia in Richmond, the Roanoke Regional Preservation Office, the Blue Ridge Institute and Museum at Ferrum College, the Museum of the Roanoke Valley Historical Society, and the Virginia Museum of Transportation.

2) An architectural identification survey was conducted for the TSM and Build Alternatives. The Area of Potential Effect (APE) for the architectural survey was considered to be the entire length of all of the corridors, and to include a 1000-foot wide band along each corridor except along the existing route of I-581, primarily Segment 374. In that segment, the intention would be to widen the existing roadway, so only the area of direct impact was surveyed. Resources adjacent to or visible from the corridors also were included. All buildings and structures constructed prior to 1950 were photographed and recorded. The purpose of the study was twofold: 1) to provide specific information concerning the location, nature, history, and significance of buildings in the APE that are 50 years old or older; and 2) to identify buildings that are potentially eligible for the NRHP.

3) Following the identification survey and based on guidance from DHR, Phase II architectural evaluations were conducted to evaluate the eligibility of eight properties.

3.9.1.3 Resources Identified

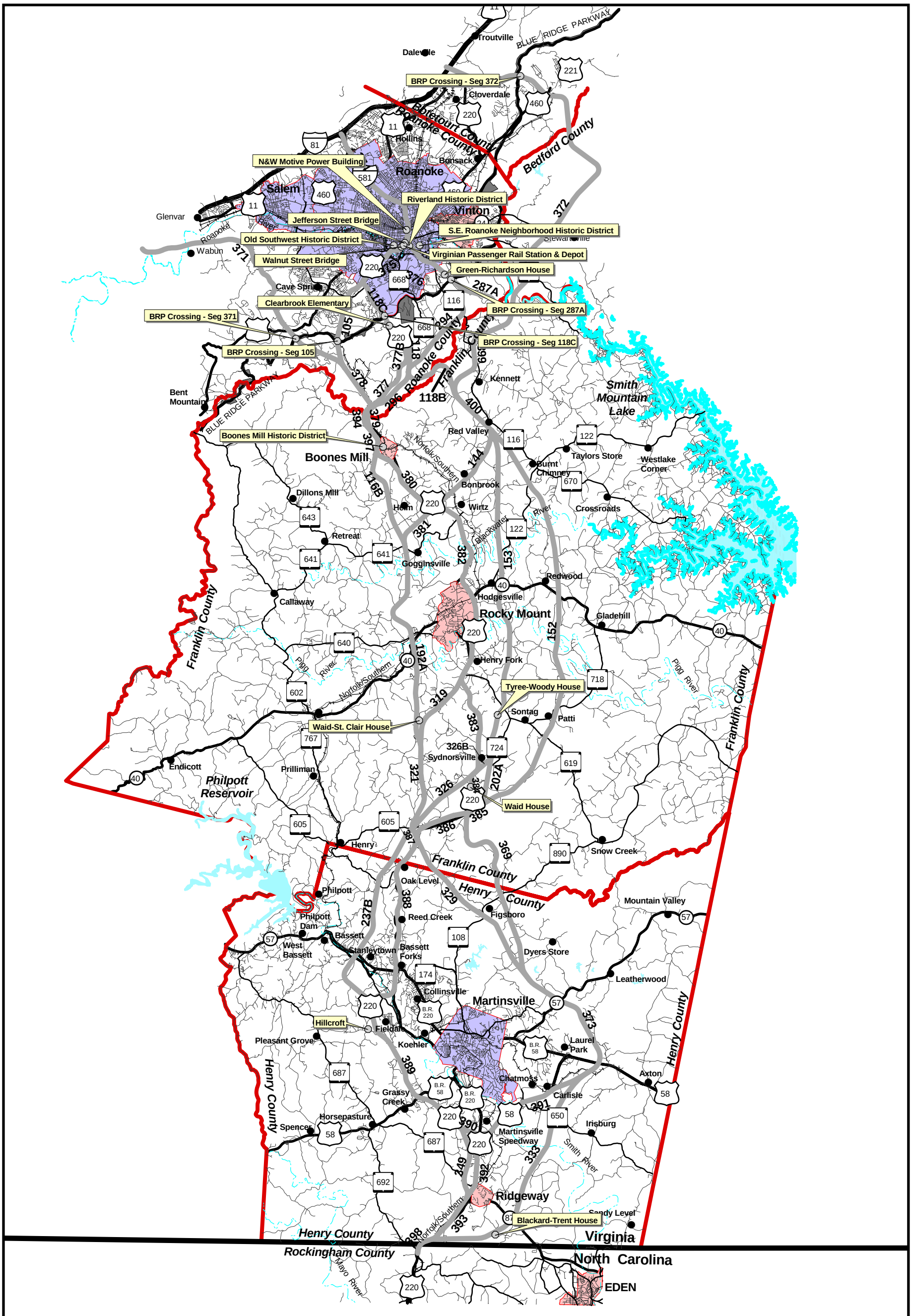
A total of 576 properties were surveyed or revisited for the study area. The majority of the surveyed structures date to the late 19th and early 20th centuries. There were also five resources that date from the mid-late 18th and early 19th centuries. The surveyed structures include a combination of homes commercial and industrial buildings, schools, agricultural facilities, bridges and rail facilities. Also included were three eligible historic districts and the Blue Ridge Parkway. Properties identified during the DEIS process are listed and described in the I-73 Archaeological Resources Technical Memorandum and Addendum, *I-73 Location Study, Identification and Evaluation of Historic Properties: Buildings, Districts, Structures, and Objects.*

A total of 16 resources located in the APE were determined eligible for the NRHP. Five of these resources were determined eligible for the NRHP prior to this study. These include Hillcroft [044-0007]; the Old Southwest Historic District [128-0049]; the Walnut Street Bridge [#1815]; the Jefferson Street Bridge [#8003]; and the Blue Ridge Parkway. Based on the architectural identification survey, DHR determined that five additional resources located in the APE are eligible for the NRHP. These include the Boones Mill Historic District [033-5162], the Waid House [033-0014], the Waid-St. Clair House [033-0116], the Blackard-Trent House [044-5055], the Riverland Historic District [128-5476], and the Green Richardson Farmstead [080-0033]. Finally, of the nine properties that were further evaluated in Phase II architectural studies, three were determined eligible for the NRHP. These include the Clearbrook Elementary School [080-0605], the Norfolk & Western (N&W) Motive Power Building [128-5471], and the Virginian Rail Passenger Station and Depot [128-5461], and the Tyree/Woody House [033-5153]. The Southeast Neighborhood [128-5865] was determined eligible by the Keeper of the National Register. These resources are listed in Table 3.9-1 and their general locations are shown on Figure 3.9-1. A brief description of each resource follows Figure 3.9-1. Detailed figures depicting each resource are included in Chapter 4.9.

TABLE 3.9-1
NRHP ELIGIBLE RESOURCES LOCATED IN THE I-73 APE

Resource Name	DHR #	National Register Listing Criterion
Roanoke City		
N&W Motive Power Building	128-5471	A
Riverland Historic District	128-5476	A / C
Virginia Passenger Rail Station & Depot	128-5461	A / C
Walnut Street Bridge	1815	C
Jefferson Street Bridge	8003	C
Old Southwest Historic District	128-0049	A / C
Southeast Roanoke Neighborhood	128-5865	A
Botetourt and Roanoke Counties		
Blue Ridge Parkway		A / C
Roanoke County		
Green-Richardson House	080-0033	A / C
Clearbrook Elementary School	080-0605	A / C
Franklin County		
Boones Mill Historic District	033-5162	A
Waid-St. Clair House	033-0116	C
Waid House	033-0014	C
Tyree-Woody House	033-5153	C/D
Henry County		
Hillcroft	044-0007	A / C
Blackard-Trent House	044-5055	C / D

Notes: Historic resources can be listed on the NRHP under the following criterion:
- A. are associated with events that have made a significant contribution to the broad patterns of our history;
- B. are associated with the lives of persons significant in our past;
- C. embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction;
- D. have yielded, or may be likely to yield, information important in prehistory or history (Federal Register 1981).



FUTURE 73

I-73 Location Study

FIGURE 3.9-1
ARCHITECTURAL RESOURCES

3.9.1.3.1 N&W Motive Power Building

Located along Segment 374 adjacent to I-581 in Roanoke City, the Building at 209 Shenandoah Avenue [128-5471] was constructed in 1911 by Norfolk & Western as the Motive Power Office Building, and is currently referred to as the Mechanical Building. It is an elaborate four-and-one-half-story, 20-bay, gable-on-hip-roofed brick structure. Located behind the building are a circa-1960s dispatch center and a 1911 coach shed and repair shop. Also, in 1949, a 63-foot-long addition was made to the east side of the building and matches the original 96-foot section in size and appearance. The N&W Motive Power Building has been determined to be eligible for the National Register of Historic Places under Criterion A because it is an integral historic component of the greater N&W Railway property in Roanoke. The National Register boundaries for the property are approximately 4.81 acres (1.95 hectares). This building is owned by N&W, which is now a subsidiary of the Norfolk Southern Corporation.

3.9.1.3.2 Riverland Historic District

The Riverland Historic District [128-5476] is a residential neighborhood located to the south of Segment 376 in the City of Roanoke. The district is generally bounded by the Roanoke River to the north and west, Walnut Avenue to the south, and Primrose Street to the east. It is primarily residential and has no schools or large-scale commercial development. There is one church and a few small commercial establishments. The residential development in the district resulted from the City's industrial boom in the late 19th and early 20th centuries and the need to provide worker housing. Most dwellings in the district date from 1915 to 1925. Most of the residences are examples of the American Foursquare and bungalows style, many with Craftsman-influenced details. The Riverland Historic District meets National Register Criteria A and C as a collection of residences that embody the distinctive characteristics of early twentieth century American architectural styles and that possesses a direct association to the industrial development of the City of Roanoke. The Riverland District has 319 architectural resources with only 45 considered to be non-contributing.

3.9.1.3.3 Virginia Passenger Rail Station & Depot

The Virginia Passenger Station and Depot is located at 1412 Jefferson Street in Roanoke City, adjacent to U.S. Route 220 and Segment 375. This one-story, ten-bay, hip-roofed train depot [128-5461] dates to circa 1920 and was apparently constructed for the Virginian Railroad, a competitor of the N&W and the C&O. The Virginian merged with the N&W in the late 1950s. The Virginian Railway played an important role in the early economic development of Roanoke and was the focus of Roanoke's early transportation system. Although not of any particular architectural style, it uses elements from popular styles of the period, particularly the terra-cotta tile roof typical of the Mission and Italian Renaissance Revival styles. The building has been determined eligible for the National Register of Historic Places under Criterion A and C. The boundary for the Passenger Station includes the building and the 1.1 acres (0.45 hectares) that surround the building. Although the building suffered fire damage in 2001, it has been determined eligible for the NRHP and was listed on the Virginia Landmarks Register in 2003.

3.9.1.3.4 Walnut Street Bridge

The Walnut Street Bridge [structure #1815] is located adjacent to U.S. Route 220 in Roanoke City. Built in 1927, the Walnut Street Bridge was a joint effort between the City of Roanoke and the N & W Railway. The bridge carries Walnut Street vehicular traffic over the railroad. The structure is a five span, 655-foot long, open spandrel rib-arch concrete bridge. The bridge is recommended eligible for the National Register under Criterion C for its engineering significance as an example of a rib-arch concrete bridge, a type that is not common in Virginia. The bridge possesses regional significance and is a visually prominent landmark, has original features such as it decorative railing and light posts and retains its integrity of structure and location. The general surroundings have not been substantially altered from their historic appearance.

3.9.1.3.5 Jefferson Street Bridge

The Jefferson Street Bridge [structure #8003] is located adjacent to U.S. Route 220 in Roanoke City. Built in 1928, the Jefferson Street Bridge was a joint effort between the City of Roanoke and the Virginian Railway. The bridge, which carries Jefferson Street vehicular traffic over the railroad, is a three-span, 375-foot long closed spandrel concrete arch. The bridge is recommended eligible for the National Register under Criterion C for its engineering significance as an uncommon example of a bridge built on a skew and for its rarity of design elements (light posts and original concrete bridge rail). The structure retains a high degree of integrity and its setting has been reasonably unaltered from its 1928 appearance.

3.9.1.3.6 Old Southwest Historic District

Located in the City of Roanoke, the Old Southwest Historic District [128-0049] was listed in the National Register in 1985. The district is a large urban residential neighborhood that developed primarily between the years of 1882 and 1930. Containing 105 city blocks, the district is generally bounded by Jefferson Street to the west, the Norfolk and Southern Railway to the north of the Roanoke River to the south and west. Thought to be the most architecturally cohesive residential neighborhood in the urban area of Roanoke, the district reflects the prosperity that overtook Roanoke after the merger of the Shenandoah Valley and N&W railways in 1882, and the intensive industrial and commercial development that followed. The housing extant in the neighborhood today was built to accommodate the influx of workers as well as the officials of the N&W Railway. The district is one of Virginia's largest historic districts in both area and number of buildings (1,658) and contains good examples of late 19th and early 20th-century residential architectural styles such as Queen Anne, Shingle Style, Colonial Revival, Bungalow, American Foursquare and Tudor Revival and several notable churches and schools. The district is listed in the National Register under criterion C for its local architectural significance and under criterion A for its significance in transportation and community planning.

3.9.1.3.7 Southeast Roanoke Neighborhood Historic District

The Southeast Roanoke Neighborhood [128-5865] developed as a result of the construction of the American Viscose Plant on the bottomland below Morningside Park along the Roanoke River. The American Viscose Plant was constructed in 1917 on 236 acres in a bend of the river. The district consists of dwellings of modest dimensions commonly associated with working class housing. Eligibility is based on Criterion A, for the development of the neighborhood in response to the establishment of the American Viscose Plant.

3.9.1.3.8 Blue Ridge Parkway

The Blue Ridge Parkway is a 469-mile (755-kilometer) linear park that connects the Shenandoah National Park in Virginia with the Great Smoky Mountains National Park in North Carolina. It crosses 12 counties in Virginia and 17 counties in North Carolina and covers approximately 85,000 acres (34,398.31 hectares). The Blue Ridge Parkway is owned and administered by the U.S. Department of the Interior, NPS. Construction of the Blue Ridge Parkway began in the 1930s and it is eligible for the National Register for its significance in the areas of engineering, landscape design, bridge architecture (Criterion C), and recreation (Criterion A). Although the primary park activity is recreation and sightseeing, the Blue Ridge Parkway provides a multitude of other activities. These activities include naturalist walks and interpretive talks, self-guided nature walks, roadside exhibitions, picnicking and camping. The Parkway plays a major role in interpreting regional scenery and culture and is a major tourist attraction in the Blue Ridge region of Virginia and North Carolina.

3.9.1.3.9 Green-Richardson House

The vernacular Federal style Green-Richardson House [080-0033], located on Segment 376, is a brick hall and parlor plan house with 14 inch thick walls, a Flemish bond façade and four-course American bond side and rear elevations. Although there have been alterations to the house including relocating the interior stair, the addition of a partially enclosed front porch, and rear ell, the house retains integrity. Located behind the house are a kitchen and log barn that date to the period of the house. A chicken coop, garage, and barn date to the 1920s. Although located on one acre, the house and outbuildings are surrounded by 25 acres (10.12 hectares) of the original tract of land that remains in the family. This land is undeveloped and retains its rural

appearance. The house, kitchen, and log barn are some of the few buildings remaining from the period before the establishment of Roanoke County in 1838. The Green-Richardson House meets the criteria for National Register eligibility under Criterion C for its architectural significance.

3.9.1.3.10 Clearbrook Elementary School

The Clearbrook Elementary School [080-0605] is located just west of Segment 118C adjacent to U.S. Route 220 in Roanoke County. This Colonial Revival-style school has a central auditorium with classroom wings and one classroom on the front. The building features a dentiled cornice, a broken pediment over the front door, quoins, arched decorative brickwork with a keystone on the protruding end sections, a keystone over each first-story window, pilasters by the front recessed entrance, and a square cupola. Although there have been additions to the two-story brick building over the years, the original section of the school has remained intact with few physical changes and remains an elementary school. Clearbrook School is eligible for the National Register under Criterion C for its architectural significance. In addition, Clearbrook School is eligible under Criterion A for its significance in the educational development of Roanoke County. Begun in 1938, and built as a Public Works Administration Project, the school was finished in 1939 and to this day educates students of the Clearbrook and Boones Mill areas. The boundary for the Clearbrook School includes the school building and surrounding 6 acres (2.43 hectares).

3.9.1.3.11 Boones Mill Historic District

The Boones Mill Historic District [033-5162] encompasses the core of the early settlement and the commercial center of the Town of Boones Mill, a historic Franklin County milling community. Located on both sides of U.S. Route 220, the district contains resources that represent its residential, commercial and religious history from the late 18th century to its era of greatest commercial success in the early 20th century. The district contains 57 resources, 38 of which are considered contributing. Of these, there are 28 residences, one church, one cemetery one former jail, a railroad depot and six commercial structures. The town was created in 1782 with a milling operation on Maggodee Creek. By the second quarter of the 19th century, the Carolina Road, which was the main north-south road for settlers traveling between Pennsylvania and North Carolina, passed through the heart of the town. In 1838, a turnpike (present-day U.S. Route 220) was opened along the same route. The 19th century saw the development of the town's commercial center as it became a significant stop along the turnpike and as the railroad came to the town, providing both passenger and freight service. The Boones Mill Historic District is eligible for the NRHP under Criterion A for its association with the development of the Town of Boones Mill, a historic crossroads for travelers through the region. The resources in the district depict the town's growth from an 18th century milling community to a 20th century commercial center and are a significant collection of structures that illustrate its historical development.

3.9.1.3.12 Waid-St. Clair House

The Waid-St. Clair House [033-0116] is located adjacent to Route 762 in rural Franklin County. Built between 1846 and 1856, the house is considered eligible for the National Register under Criterion C as a good example of vernacular Greek Revival architecture in Franklin County and retains a high degree of integrity. The resource also may be eligible under Criterion D for its archaeological potential. The property encompasses16.85 acres (6.82 hectares) and contains the Greek Revival style residence, a ca. 1846-56 log barn, a modern shed and stable, and two purported slave cemeteries. The two-story brick house has a rear ell and exterior brick end chimneys and features six-over-six sash windows and a gabled roof sheathed in standing seam metal. A one-bay, one-story porch on the front elevation is modern. The interior features Greek Revival mantels and original woodwork such as flooring, stair rails, baseboards and chair rails. The yard has a number of mature evergreen trees that block the view of the house from the road and large boxwoods line the front walkway. A horse pasture is found behind the house.

3.9.1.3.13 Waid House

The Waid House [033-0014] is the centerpiece of a farmstead on Route 718 in rural Franklin County. Built between 1847 and 1857, the Waid House is considered eligible for the National Register under Criterion C for

its local architectural significance. The house is an excellent example of vernacular Greek Revival architecture in Franklin County and retains a high degree of integrity. The two-story house is of brick construction with a gabled roof and features nine-over-six sash windows, brick end chimneys and a one-bay flat-roofed portico with pilasters and Tuscan columns. The interior possesses many Greek Revival characteristics in the mantels, window and door trim and chair rail. The well-landscaped yard has mature boxwoods and pine, oak and magnolia trees. Besides the house, there is an extant log slave cabin on the 21-acre (8.8 hectares) property, a cemetery with 12 marked graves and an adjacent burial ground through to be a slave cemetery, and a modern shed and garage.

3.9.1.3.14 Tyree-Woody House

Tyree-Woody House [033-5163[is located east of 220 along Segment 153 near the community of Sontag. This abandoned dwelling is composed of two separate sections: a heavy timber frame 1 ½-story unit and a log 1 ½-story unit. The interior Federal-style finishes of the frame section indicate a construction date of around 1825. The Greek Revival-style elements of the log section indicate that it was constructed in the second quarter of the nineteenth century, probably around 1840. This building, while in somewhat deteriorated condition, survives with limited modernization. It retains the ability to yield information on construction and decorative styles of the early nineteenth century and was determined eligible for the NRHP under Criteria C and D.

3.9.1.3.15 Hillcroft

Hillcroft [044-0007] is located in the community of Rangeley near the intersection of the proposed I-73 and Route 609 on Segment 389. It is thought to be the oldest surviving building in Henry County. Built along the Great Wagon Road, the house was used as a stop for travelers during the eighteenth century. This vernacular Federal style house was built in four sections. The circa 1740 section of the house was built by Colonel Henry Lyne. This section is one-and one-half stories and has a massive Flemish bond laid brick exterior end chimney. Around 1815, the Reverend John Cousins Traylor added a frame two-story section. The elaborate door surrounded with a six-light transom that provides entrance to this section is a circa 1940 replacement. In 1841 the Rangeley family, for whom the community of Rangeley is named, bought the property. The section of Hillcroft built by the Rangeley family has a Flemish bond facade and five-course American bond side and rear elevations. In 1940 there was a brick addition attached to, but set back from, the circa 1740 section and in 1967 a rear addition was built. Hillcroft was determined eligible for the National Register of Historic Places in 1997 under Criterion A and C.

3.9.1.3.16 Blackard-Trent House

The Blackard-Trent House [044-5055] was built between 1845 and 1852 and is a fine example of vernacular Greek Revival architecture in Henry County. Features of the frame two-story, L-shaped house include original 6/6-sash windows, weatherboard siding, an entry porch with prominent vernacular square Doric columns supporting a simple entablature and square wood balustrade and handrail, and double leaf one-panel doors topped by a three light transom and flanked by four light sidelights. The interior is basically unaltered and features Greek Revival mantels and door and window trim. Located behind the house are a number of original agricultural support buildings. A two-story frame tobacco-packing house, one-story icehouse with 18-inch walls insulated with sand, log smoke house, and log shed all date to the 1850s. A corncrib, chicken coop, and large frame barn date to the 1920s. The concrete pavilion covering the well was reconstructed in 1980. Log slave cabins stood north of the house until 1991 when they were destroyed by fire. The house and outbuildings are surrounded by 30 acres (12.14 hectares) that retain their rural agricultural character. The house itself is virtually unaltered and retains a high degree of architectural integrity. The Blackard-Trent House is eligible under Criterion C for architectural significance as one of the earlier substantial farmhouse and outbuilding complexes in Henry County and Criterion D for archaeological potential.

3.9.2 Archaeological Resources

For the I-73 project, the archaeological assessment was conducted using a phased approach that is consistent with the revised regulations of the NHPA (36 CFR Part 800.4(b)(2)). This approach was outlined by VDHR in a letter to VDOT dated September 1, 1998. The letter is included in the Comments and Coordination Section of the I-73 DEIS and is described in the following paragraph.

> *Investigations to identify significant archaeological sites will be conducted on the selected alternative (determined by the draft EIS) and concluded before the final EIS. Data on known archaeological resources within the proposed alternatives will be included in the DEIS as will a discussion of the potential for additional historic and prehistoric resources that are likely to be within the proposed alternatives. This discussion should be based on previous work in the project area, widely accepted settlement models, environmental data, and the presence of known resources in the region. This approach must also be endorsed by the Federal Highway Administration.*

Since a build alternative was selected, a Phase I archaeological survey was conducted for this alternative. The Phase I archaeological survey involved systematic shovel testing of the selected alternative in accordance with the practices of DHR. The results of this survey are included in Section 4.9 of this document. If alignment modifications are made during the design phase, additional Phase I archaeological surveys may be required prior to construction.

More than 60 archaeological sites have been previously recorded within the segments making up the proposed corridor options. These are listed in the Table 3.9-2 by county. These sites have not been depicted on a study area map to protect them from vandalism and relic hunters.

Table 3.9-2
PREVIOUSLY RECORDED ARCHAEOLOGICAL SITES WITHIN THE CORRIDOR OPTIONS

Site Number	Component	Previous Recommendations
Henry County		
44HR9	Late Woodland	Monitor
44HR55	Early Archaic	Monitor
44HR112	Woodland	None
44HR129	Postcontact	No Further Work
44HR130	Middle Archaic	No Further Work
44HR131	Precontact	No Further Work
44HR132	Middle Archaic	No Further Work
44HR133	Precontact	No Further Work
44HR134	Postcontact	No Further Work
44HR135	19th C.	No Further Work
44HR12	Late Woodland	None
44HR42	Archaic / Woodland	Further Work
44HR61	Late Woodland	None
44HR62, 44-25	Late 18th C. Fort	None
Franklin County		
44FR84	Fish Dam	Further Work
44FR188	Precontact	None
44FR189	Precontact	None
44FR190	Woodland	None
44FR43	Archaic	Monitor
44FR44	Archaic	No Further Work
44FR64	Postcontact	Preservation
44FR65	Woodland	Further Work
44FR230	Paleoindian	Further Work
44FR244	Late Archaic	Further Work

Site Number	Component	Previous Recommendations
44FR87	Woodland	None
44FR124	Postcontact Cemetery	None
Roanoke County		
44RN289	Late Woodland	Further Work
44RN305	Late Archaic	None
44RN306	Precontact	None
44RN307	Late Archaic / Early Woodland	None
44RN321	Early Archaic, Late Archaic, Woodland	None
44RN20	No information available	No information available
44RN59	Archaic	None
44RN61	Archaic	None
44RN90	Archaic	Monitor
44RN94	1850 Cabin	None
44RN122	Late Archaic / Early Woodland	None
44RN139	Late 19th, Early 20th C. Domestic	None
44RN140	Precontact	None
44RN141	18th, 19th C. Domestic	None
44RN147	Precontact	No Further Work
Roanoke County		
44RN148	Precontact	Further Work
44RN197	Precontact	Further Work
44RN263	19th, 20th C. Cemetery	Preserve
44RN278	Woodland	No Further Work
44RN279	Late Woodland	Further Work
44RN5	Precontact	No Further Work
44RN17	Precontact	None
44RN18	Archaic	None
44RN20	Archaic	None
44RN44	18th to 20th C. Domestic	Site Destroyed
44RN75	Archaic	Monitor
44RN76	Archaic / Woodland	Further Work
44RN77	Woodland	No Further Work
44RN219	Woodland	Further Work
44RN220	Precontact	Further Work
44RN261	Postcontact Dam and Sluice	Further Work
44RN314	Late Archaic	Site Destroyed
44RN315	Postcontact	No Further Work
44RN316	Late Woodland	No Further Work
44RN317	Postcontact	Further Work
44RN318	Postcontact	None
44RN198	Middle Archaic – Late Woodland	Further Work
Bedford County		
44BE185	Early – Late Woodland	Further Work

These sites are located in settings ranging from floodplains to ridge tops and date from the Paleoindian period through the twentieth century. Previous archaeological research in the vicinity of the project area has revealed that there is generally a high probability of prehistoric occupation in areas that are relatively level. Precontact sites have been recorded in upland hollows, on ridges, saddles, benches, terraces, floodplains, and in rockshelters. The probability of encountering large precontact village sites is especially high within the portions of the proposed corridors crossing broad floodplains such as those along the Smith and Roanoke Rivers. The potential is high for the presence of camps and upland habitations throughout most of the project area. Rockshelters in the project area have a high probability of containing sites, and these sites have a good probability of being significant if they have not been too extensively disturbed by looters. Although many of the sites located in the current project area are apt to consist of lithic scatters, the potential for significant sites is high on larger upland landforms such as ridge tops and saddles, on broad floodplains, and in rockshelters.

None of the topographic maps encompassing the project area have been updated in the last 15 years. Residential and commercial development, especially in the vicinity of the City of Roanoke, has increased in recent years and exceeds that depicted on the topographic maps. This development will undoubtedly have had an effect on the preservation of archaeological sites within the project area. Site preservation is not expected in areas with extensive grading, underground utilities, or foundation excavation. However, intact sites could be encountered in areas such as minimally landscaped green spaces or under some types of parking lots. Along broad floodplains, even in developed areas, the potential for intact sites is generally higher since they may be sealed in place by alluvial deposits.

There are a number of variables that affect the preservation of archaeological sites in areas that are currently farmed. In fields that have been deeply plowed over long periods of time, sites may be encountered but would not normally retain intact deposits or features. This would be especially true in areas with slope and/or naturally eroded soils. The probability for site preservation is higher in more recently cultivated areas that have had shallow plowing or where no-till cultivation methods have been employed. Sites may also be preserved beneath cultivated fields that are located on broad floodplains. Without reference to specific areas and types of cultivation practices, it is impossible to assign a probability for site preservation in currently farmed areas.

Tribal coordination in Virginia with federally recognized tribes that attach religious or cultural significance to any land within the study area has been an evolving issue over the development of the EIS. Initially, FHWA contacted the State Historic Preservation Officer and based on their recommendation, contacted the Virginia Council on Indians (VCI). Based on that effort, the Eastern Band of the Cherokee was the only federally recognized tribe that was identified that might have ties to Virginia. In July of 2004, FHWA sent a letter to the Eastern Band of the Cherokee requesting that they identify any land or property in Virginia, which they might attach religious or cultural significance, but FHWA did not receive a response. FHWA also searched several databases helpful in identifying Tribes with an interest in an area including the Native American Consultation Database, the website “MAPS: GIS Windows on Native Lands, Current Places, and History”, the website “Indian Land Cessions in the United States”, and the map entitled “Indian Land Areas Judicially Established 1978” on the National Park Service’s Native American Graves Protection and Repatriation Act (NAGPRA) website. However, none of these sources identified any land or property in Virginia to which religious or cultural significance has been attached by federally recognized tribes nor did they identify any federally recognized tribes that attached religious or cultural significance to lands or property in Virginia at the time that they were reviewed. More recent discussions with the SHPO identified the Catawba and Tuscarora Nation as potential federally recognized tribes that might attach religious or cultural significance to land within Virginia. Notwithstanding the current lack of information in this area related to Virginia, no National Register-eligible prehistoric or historic Native American archeological sites that would be impacted by the project have been identified. In any event, the Programmatic Agreement that has been executed for this project commits FHWA and VDOT to involve Native American tribes in any future identification, evaluation, and treatment efforts that would need to be undertaken due to post-review discoveries or design changes that could effect the area of potential effect. Likewise, the Programmatic Agreement stipulates that any post-review discoveries of Native American burials will be addressed in accordance with the NAGPRA as well as Virginia law and in consultation with the appropriate tribal leaders and the VCI. Accordingly, FHWA and VDOT will continue to work to identify federally recognized tribes that may attach religious or cultural significance to lands within the study area and coordinate with them accordingly should any Native American archeological sites or burials be discovered.

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3.10 PARKLANDS AND RECREATIONAL RESOURCES

Parklands and recreational resources located within one mile (1.61 kilometers) of the TSM and Build Alternative Options were identified for this analysis. The following general types of parklands and recreational resources were identified:

- Federal and State Parklands
- Regional and Local Parks
- Wildlife Management Areas (where recreational opportunities exist)

Recreational resources located in the Build Alternative corridors are listed in Table 3.10-1 and are shown in Figures 4.10-1 thru 4.10-4 These resources are also described in the Parks and Recreation Areas Technical Memorandum (VDOT, 2000). Two special areas of concern, the Blue Ridge Parkway and the Appliacian Trail and described below.

TABLE 3.10-1
STUDY AREA RECREATIONAL RESOURCES

Location/Resource	Location/Resource
Salem City • Mowles Spring Park • Roanoke River (David Smith Trail) Greenway Roanoke City/ Salem City • (Proposed) Roanoke River Greenway (remaining portion) Roanoke City • Mill Mountain Park • Washington Park • Entranceway Park • Mill Mountain Greenway • Lick Run Greenway (Phase I) • (Proposed) Lick Run Greenway (Phases II, III) • Piedmont Park • Roanoke River (Wiley Drive) Greenway • Harkrader Park • River's Edge Sports Complex • Mill Mountain Star Trail (Greenway) Roanoke City/ Vinton City • Tinker Creek Greenway	Salem City/ Roanoke County • Hanging Rock Greenway Botetourt County • Appalachian Trail • Blue Ridge Boxley Fields Roanoke County / Botetourt County • Blue Ridge Parkway Roanoke County • Explore Park, Roanoke River Parkway • Darrell Shell Park • Southwest District Park • (Proposed) Raceway Tract • Green Valley School and Park • Murray Run Greenway • Garst Mill Greenway • Wolf Creek Greenway Franklin County • Waid Recreation Area • Franklin County Recreation Park • LARC Ballfield

3.10.1.1 Appalachian Trail

The Appalachian Trail National Scenic Trail is a unit of the National Park System, and our nation's premier national long-distance hiking trail. It is a continuous, marked, 75-year-old, 2,167-mile (3,487-kilometer) footpath that traverses the Appalachian Mountain chain through 14 states from central Maine to northern Georgia. It is also a treasure of scenic wonders, as evidenced by the actions taken by the United States Congress and the Commonwealth of Virginia to designate the Appalachian Trail.

In 1968, Congress passed the National Trails System Act, which designated the Appalachian Trail as the nation's first national scenic trail and authorized federal land acquisition to establish a permanent route and protective corridor surrounding the footpath. In 1973, Virginia passed the Virginia Appalachian Trail Act "to provide for the ever-increasing outdoor recreation needs of an expanded population and in order to promote public access to, travel within, and enjoyment and appreciation of the open-air, outdoor areas of the state" and to encourage protection of the Trail as part of the National Scenic Trails System".

Today, virtually all of the Appalachian Trail is in public ownership, and millions visit the Trail each year for hikes of various lengths and to enjoy the scenic, natural, and culturally significant resources of the Trail's surrounding environment. The Trail is administered by the NPS in cooperation with the USDA Forest Service, numerous state agencies, and the Appalachian Trail Conference and its 31 affiliated trail clubs.

The section of the Appalachian Trail from Tinker Mountain to Blackhorse Gap (which encompasses the vicinity of the proposed project) is maintained by the Roanoke Appalachian Trail Club and is one of the more popular day-hike sections of the Appalachian Trail in Virginia.

3.10.1.2 Blue Ridge Parkway

The Blue Ridge Parkway is a 469-mile (755-kilometer) linear park owned and administered by the U.S. Department of the Interior, NPS as part of the National Park System. The Blue Ridge Parkway connects the Shenandoah National Park in Virginia with the Great Smoky Mountains National Park in North Carolina.

Access to the Blue Ridge Parkway in the study area is provided at U.S. Route 460, Route 24, Explore Park, Mill Mountain, and U.S. Route 220. However, since the NPS prohibits direct connection of an interstate highway to the Blue Ridge Parkway, access to the Blue Ridge Parkway from U.S. Route 220 will be eliminated to comply with the conditions of their updated Master Plan.

The primary activities on the Blue Ridge Parkway are recreation and sightseeing. Specifically, recreational opportunities include naturalist walks and interpretive talks, self-guided nature walks, roadside exhibitions, picnicking, and camping. The Blue Ridge Parkway plays a major role in interpreting regional scenery and culture and is a major tourist attraction in the Blue Ridge region of Virginia and North Carolina. The Blue Ridge Parkway is also a nationally significant resource that is currently eligible for the National Register of Historic Places.

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3.11 INDIRECT AND CUMULATIVE IMPACTS

Introduction

Indirect and cumulative impacts was established in the Council of Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR §§ 1500-1508). These regulations require federal agencies to address and consider direct, indirect, and cumulative impacts of their proposed actions. The CEQ defines these impacts as:

Direct effects are caused by the action and occur at the same time and place. (40 CFR § 1508.8)

Indirect effects are caused by the action and are later in time and farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. (40 CFR § 1508.8)

Cumulative impact is the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. (40 CFR § 1508.7)

It should be noted that the terms "effect" and "impact" are used synonymously in the CEQ regulations.

3.11.1 Methodology

Direct effects consider the permanent and temporary impacts associated with the construction of the proposed roadway. The methodologies and the types of impacts for both the natural and man-made environment are discussed in detail in the Affected Environment and Environmental Consequences chapters of this document, respectively.

Once the proposed roadway is constructed, indirect effects may result that otherwise might not have occurred if the roadway had not been constructed. These effects may impact both the natural and man-made environment and are usually the result of land use, employment, and population changes that have resulted from the proposed action. However, the cause-and-effect of this relationship is often difficult to quantify. Other factors can influence this relationship such as the economy, availability of utilities, zoning, comprehensive land use plans, and property owner decisions. Roadways are, at best, an inefficient means for inducing or encouraging development in the absence of these other factors (Hartgen 2003a). Ultimately, it is the responsibility of local governments to determine the magnitude of future growth. Roadways only help to "accommodate, rather than spur growth" (Hartgen 2003b).

The determination of indirect effects resulting from the construction of the proposed project was based on the identification of those areas likely to develop and assess the impacts resulting from this future development. The following methodology allowed for a comparison of the proposed CBA's including the No-Build Alternative. This methodology was developed in consultation with EPA.

- A zone of potential influence having a one-mile radius around each proposed interchange will be used to estimate the amount of undeveloped land that could be developed for highway use.
- Compare the existing and proposed future land use to determine the development potential surrounding each proposed interchange.
- Quantify the amount of undeveloped land that can be converted to residential, commercial, or industrial land use.
- Assess the positive and negative impacts resulting from the potential future development.

Cumulative impacts include the total of all impacts to a particular resource or resources that have occurred, are occurring, and will likely occur as a result of the proposed project when taken cumulatively with the impacts from past present, and reasonably foreseeable future projects. Both indirect and direct impacts are a subset of cumulative impacts. The following methodology will be used to determine the cumulative impacts of the proposed project.

- Determine the area that will be affected by the proposed project. This area will be defined as the project impact zone.
- List those resources within the impact zone that could be affected by the proposed project.
- Establish the geographic area associated with the resources identified for the analysis.
- Establish the time frame for the analysis.
- Identify other actions effecting the resources, ecosystems, and human communities of concern.
- Qualify the effects resulting from these cumulative impacts

3.11.2 Cumulative Effects of Past actions

In order to determine the cumulative effects associated with a proposed action, an understanding of past cumulative effects is needed to asses the incremental effects of the proposed action. The following is a discussion of past development that has occurred within the study area and will serve as a base-line for the determination of cumulative effects associated with present and foreseeable future actions.

3.11.3 Pre-Contact

Human occupation of the study area dates back as far as the Paleoindian period, which began about 10,000 B.C. However, it wasn't until the Late Woodland period (from 900 A.D. to 1600 A.D.) that settlement patterns became more sedentary and populations began to dramatically grow. Many of these settlements were increasingly associated with major streams located throughout the region. This growth was due, in part, to increased horticultural activities practiced by the Native Americans; however hunting and gathering were still important to their survival.

During this period, the natural environment was dominated by forest of oak, hickory, and southern pine including American chestnut, hickories, and maples. These forests were often interspersed with large expanse of prairies, fields, or meadows. According to paleoecologists, this type of forest and open space was the result of land management practices of the Native Americans. Fire was the chief land management tool employed by these people. Fire was used to clear land for settlements as well as to provide a buffer for defense. It was also used to clear land for farming and to create wildlife habitat for hunting. These cleared areas provided forage for a variety of animals such as deer, turkey, and other small mammals. These animals provided the Native Americans with the necessities of their daily lives.

3.11.4 1607 to 1800 – Early Settlement

European settlement of the project area began in the early eighteenth century, at which time it appears that the Native Americans were no longer living in the region (Barber and Barfield 1992). Many of the early settlers of German, Swiss, and Scotch-Irish ancestry arrived in the project area from Pennsylvania by way of the Great Wagon Road (Stevens 1930; Virginia Writers' Project 1942; Kagey 1988). Other settlers were English pioneers from the Tidewater and Piedmont regions of Virginia who brought their slaves with them.

Although there is no evidence of Native American groups living in the current project area at the time of the earliest white settlements, raids were a real threat. As a result of the French and Indian War, several massacres occurred along the Virginia frontier, and settlement of the area slowed significantly (White 1982; Salmon and Salmon 1993). Numerous forts were built along the route of the Great Wagon Road between 1755 and 1760 to protect travelers and settlers from the threat of attack by Native Americans. Settlement of the Virginia frontier resumed its rapid pace with the end of the war (Salmon and Salmon 1993).

Residents of the project area relied on agriculture as their primary source of income. Crops included hemp, corn, barley, flax, hay, beans, and root crops. Tobacco was becoming an increasingly important crop in Henry and Franklin counties. Most livestock, such as pigs, horses, cattle, and sheep, were raised for local use, although some cattle and horses were exported. Most of the mills at this time were small, and provided service to only a small number of people (White 1982; Pedigo and Pedigo 1977).

While towns were still scarce during this time, Big Lick (Roanoke) was becoming an important crossroads settlement due to its location near the intersection of the Great Wagon Road and the Wilderness Road. However, Salem was still the main settlement in the area during this period. By 1753, there were at least 35 families living in the Roanoke Valley (White 1982). By 1770, the population of the Roanoke Valley was large enough to prompt the settlers to petition for the creation of a new county (White 1982). Before the Revolutionary War, the Roanoke County area was characterized by a few large estates owned primarily by settlers of Scotch-Irish and Welsh descent. After the war, the area was characterized by a large number of smaller farms owned by people of a variety of nationalities (Roanoke Valley Historical Society n.d.).

Most of the early settlements in Franklin County were located between the Blackwater and Pigg rivers, and included Rocky Mount, Mount Pleasant, Jamestown, Wisenberg, and Germantown (J. R. Smith 1977). Agriculture and the mining and manufacturing of iron were the main economic pursuits in the county throughout the nineteenth century (West Piedmont Planning District Commission 1973).

The population of Henry County increased dramatically in the years following the Revolutionary War (Pedigo and Pedigo 1977). Tobacco was the most important crop, and many farmers were dependent on the work of slaves. The first industry for the production of plug tobacco in Henry County was started by the Gravely family in 1792. Numerous other tobacco companies were established in Henry County during the next several decades (Windle 1975a).

3.11.5 1800-1900 – Agrarian to Industrial

The arrival of the Virginia and Tennessee Railroad in 1852 marked the redefinition of Roanoke (still known as Big Lick) as an important crossroads town. Over the next several decades, tobacco warehouses and manufactories were built near the depot and filled with crops grown in Franklin, Henry, Pittsylvania, and Floyd counties. However, substantial growth did not occur until after the Civil War (White 1982). By 1860, the population had grown to 8,048. During this time, farmers in Roanoke County continued to raised wheat, corn, oats, hay, and livestock. Only 20 percent of the farmers grew tobacco in 1850, but this number had risen to 50 percent by 1860. Corn and wheat remained the most important crops, however, and this fact is demonstrated by the number of grain mills being built at this time.

In 1860, the population in Franklin County had increased to 20,098. By this time there were 30 grain mills in the county, along with 14 sawmills, 17 tobacco manufacturing plants, and five wool-carding mills in addition to an iron bar plant and a pig iron plant. The iron industry formed the backbone of the Rocky Mount economy (Salmon 1986; J. R. Smith 1977). Tobacco was the largest crop followed by corn, oats, and wheat (Salmon and Salmon 1993).

Tobacco continued to dominate the Henry County economy during the antebellum period. Ridgeway, south of Martinsville, was the economic center of the county before the Civil War, and its prosperity was largely based on the sale of tobacco and tobacco products (Windle 1975a). In 1860, there were 31 tobacco factories in Henry County, joined by two saw mills, two flour mills, two steam mills, one iron foundry, one boot and shoe manufacturer, one saddle and harness maker, and one tanner (Windle 1975b). In 1860, the population in Henry County had increased to 12,105.

Many of these towns remained very isolated during this period. It appears that no real effort was made to improve the road between Franklin and Big Lick until 1828. The Franklin Turnpike was built in 1840 and connected Danville, Rocky Mount, Big Lick, and Fincastle (Wingfield 1996).

During the Civil War, Henry and Franklin Counties were able to avoid many of the ravages of war. However, Roanoke was not as lucky when Union raids destroyed a train depot, storehouses, telegraph lines, bridges, mills, furnaces, and houses.

By the end of the war the region, like much of the rest of the South, was devastated. The tobacco industry, however, soon pulled the county out of its economic slump. By the end of the nineteenth century, Henry County had established a reputation for both its tobacco and its furniture. Tobacco was largely responsible for the rapid recovery of Roanoke County as well. When Big Lick (Roanoke) was chartered in 1874, it boasted at least six tobacco factories, and within seven years, the town had more than 68 buildings (White 1982). By this time, railroad surveyors were working in the Roanoke Valley, planning the location of the site where the Shenandoah line would connect with the Norfolk and Western line. The decision to connect the lines at Big Lick resulted in unprecedented growth in the town. The establishment of the town as a railroad center led to a tremendous rise in population – from about 700 people in 1881 to 5,000 in 1884 (Salmon and Salmon 1993).

The first railroad through Franklin County was constructed by the Franklin and Pittsylvania Railroad Company between 1878 and 1880 and operated until 1933 (Cundiff and Ramsey 1986). This railroad greatly facilitated the transportation of iron ore out of the region. In addition to iron, area mines yielded soapstone, talc, mica, coal, asbestos, and gold. By 1892, the Roanoke and Southern Railroad passed through Rocky Mount, then Martinsville, and on to Winston-Salem, North Carolina. Farming (of tobacco and corn, primarily) was still the predominant occupation of the county, but the mining industry was growing.

The first railroad to be built in Henry County was the Danville and New River Railroad, which extended from Danville to Stuart by way of Martinsville in 1880. In 1890, the Roanoke and Southern Railway was extended through the county. This railroad later became part of the Norfolk and Western Railroad (J. R. Smith 1977). The introduction of the railroad facilitated the importation of the raw materials that contributed to the tremendous growth of industries in the county during the following decades (Martinsville-Henry County Woman's Club 1976). With the arrival of the railroad, many of the industries that had been scattered around the county moved to Martinsville, which had been incorporated in 1873 (Coe 1969; J. R. Smith 1977). Agriculture was still important to the economy, as evidenced by the fact that there were 22 corn and flour mills in Henry County in 1889 (Martinsville-Henry County Woman's Club 1976).

3.11.6 1900 to 1950 – Industrial Urbanization

The City of Roanoke continued to be a hugely successful railroad center during the early twentieth century. Between 1900 and 1930, the population of the city grew from 21,495 to 69,206. The county's population during the same time period grew from 15,837 to 35,289. By 1930, although still primarily agricultural, Roanoke County was home to 113 industries that manufactured 421 different products (Stevens 1930). Many of these were associated with the iron industry and the railroad: Virginia Bridge and Iron Company; the Norfolk and Western Railway; the Virginia Railway; Roanoke Ironworks; Walker Machine and Foundry Corporation; Virginia Iron, Coal, and Coke Company; Roanoke Iron and Bridge Works; Salem Foundry and Machine Works; and Roanoke Railway and Electric Company. Companies manufacturing building supplies were also well represented by the following firms: Exchange Lumber Company; Adams, Payne, and Gleaves, Inc. (millwork, bricks, sashes, doors); Central Manufacturing Company (millwork, building supplies); Harris Hardwood Company; J. H. Marsteller Company (building stone, tile work, tombstones); Roanoke-Webster Brick Company; and Salem Brick Company. Other major employers in the town at this time included industries associated with the manufacture of rayon, cotton, wool, varnish, cans, and furniture, as well as several utility companies. As these industries grew, there was a corresponding decrease in the importance of agriculture to the economy of the county and an increase in the supplies that had to be imported from other counties (Stevens 1930).

The population of Franklin County in 1900 was 25,953 and by 1910, the population had increased to 26,480. By this date, tobacco production in the county was only half of what it had been 50 years previously. Many of the farmers in the region stopped growing tobacco during the early years of the twentieth century and invested their efforts in apple orchards, poultry farming, truck gardening, and raising fodder for beef and dairy cattle (Hopkins 1986a). The arrival of the Norfolk and Western Railroad, along with the growth of the city of

Roanoke, provided Franklin County with a much larger market for its farm products than it had had in the past (Hopkins 1986a).

Agriculture, mining, and the manufacturing of furniture continued to be important to the economy of Franklin County during this period. The population decreased dramatically from 1910 until the Depression years, in part due to the increased mechanization of farming and the effects of the Depression. The population of the county was 26,480 in 1910 and only 24,337 in 1930 (Hopkins 1986c; West Piedmont Planning District Commission 1976).

By 1906, the tobacco industry in Henry County had largely collapsed, and local industry became more diversified. Bassett Furniture Company opened in 1902, and during the second half of the twentieth century, Bassett Furniture Industries became the largest manufacturer of furniture in the world. The manufacture of textiles was another industry that became important to the area during the early years of the twentieth century, and Henry County soon became known for cotton and knit fabrics and silks. Building materials also became an important source of income for the residents of Henry County during this time (Windle 1975b).

Henry County was relatively unharmed by the Great Depression of the 1930s, and industry continued to expand in the 1940s. E. I. DuPont de Nemours and Company built one of the largest nylon plants in the world just south of Martinsville in 1941, and in 1942 the Lacy Manufacturing Company began manufacturing textiles in Martinsville (Coe 1969).

3.11.7 1950 to Present

Although the major tobacco factories had disappeared from Henry County by 1906, tobacco continued to be the main cash crop for farmers until the late twentieth century (Coe 1969). Other industries, such as the DuPont nylon plant, became established, and between 1940 and 1970, Henry County experienced continued population growth that corresponded with the expansion of industry (Coe 1969; West Piedmont Planning District Commission 1973).

Franklin County, like Henry County, became increasingly urbanized after the end of World War II, with approximately 50 percent of the county's population living within five miles of Rocky Mount by the 1970s. After World War II, however, the population of Franklin County began to decrease until the 1960s (Hopkins 1986c). It was not until the 1970s that the population finally exceeded the level it had reached by 1910 (Hopkins 1986c).

Since approximately 1950, agriculture has become somewhat less significant in Franklin County, with manufacturing and industry becoming more prominent (West Piedmont Planning District Commission 1976). Nonindustrial pursuits remain vital to the region's economy, however. Poultry raising was important in Franklin County in the 1950s and early 1960s. Dairy farming outpaced poultry farming in the county during the 1960s. By the middle of the 1980s, Franklin County ranked third in Virginia in the number of dairy cows (Hopkins 1986a). At this time, on the other hand, there were only 58 farms in the county that were producing apples for commercial sale. In 1986, one of the local papers stated that "small farms constitute the county's most important industry" (Salmon and Salmon 1993). In spite of this statement, during the twentieth century the county has made the transition from a predominantly agricultural economy to one based more on industries such as the manufacturing of wood products and textiles (Flora 1986).

Roanoke County remained primarily agricultural until the late 1950s. While the production of wheat and corn fell during the 1940s, dairy, livestock and poultry farms were increasingly common. The decrease in the number of farms during the 1960s was largely due to an increase in population and the resulting use of former farmlands for residential purposes. The city of Roanoke continued to exhibit industrial growth, and between 1940 and 1965 the economic base of the county became less and less dependent on agriculture (Kagey 1988). The population of the county continued to grow at a rapid rate during the 1960s and 1970s, finally slowing during the 1980s. The county became increasingly urban and industrialized during this period. For example, the number of farms in the county in 1979 was only 40 percent of the number of farms in 1960, apple trees were only 26 percent of their 1960 numbers, and there were only 17 percent of the number of peach trees that there had been in 1960. Livestock production remained steady during this time and poultry

production increased. Industries that moved into Roanoke County in the 1960s-1980s included Ingersoll-Rand, Creative Construction, Atlantic Companies, Central Fidelity, Wendy's, First Virginia Bank, Corrugated Container, Country Cookin', Dominion Bankshares, Datacare, Medeco Locks, AMP, and John Hancock Steel. By 1980, the Roanoke County economy was primarily dependent on small-scale industry, and almost 60 percent of the workers in the county were employed by companies in the city of Roanoke (Kagey 1988).

TABLE 3.11-1
HISTORIC CENSUS

Year	Jurisdiction						
	Botetourt County	Roanoke County	Franklin County	Henry County	City of Roanoke	City of Salem	City of Martinsville
1790	10,524	--	6,842	8,479	--	--	--
1800	10,422	--	9,302	5,259	--	--	--
1810	13,301	--	10,724	5,611	--	--	--
1820	13,589	--	12,017	5,624	--	--	--
1830	16,354	--	14,911	7,100	--	--	--
1840	11,679	5,499	15,832	7,335	--	--	--
1850	14,908	8,477	17,430	8,872	--	--	--
1860	11,516	8,048	20,098	12,105	--	--	--
1870	11,329	9,350	18,264	12,303	--	--	--
1880	14,809	13,105	25,084	16,009	--	--	--
1890	14,854	30,101	24,985	18,208	--	--	--
1900	17,161	15,837	25,953	19,265	21,495	--	--
1910	17,722	19,623	26,480	18,459	34,874	--	--
1920	16,557	22,395	26,283	20,238	50,842	--	--
1930	15,457	35,289	24,337	20,088	69,206	--	7,705
1940	16,447	42,897	25,864	26,481	69,287	--	10,080
1950	15,766	41,486	24,560	31,219	91,921	--	Not Avail.
1960	16,715	61,693	25,925	40,335	97,110	--	18,798
1970	18,193	67,339	26,858	50,901	92,115	21,982	19,653
1980	23,270	72,945	35,740	57,654	100,220	23,958	18,149
1990	24,992	79,332	39,549	56,942	96,397	23,756	16,162
2000	30,496	85,778	47,286	57,930	94,911	24,747	15,416

US Historical Census Browser, Geospatial and Statistical Data Center, University of Virginia Library (http://fisher.lib.virginia.edu/collections/stats/histcensus/), Accessed August 2004.

US Bureau of the Census, Population of Counties by Decennial Census: 1900 to 1990 – VIRGINIA, Richard L. Forstall, Washington, DC 20233. Accessed June 2003