**Topic:** Effects of Southwest Virginia Coal Mining on the Environment 1950-2000

**Intro:** Coal mining has been a major industry in Southwest Virginia for several decades. The coal industry has brought jobs to a region that desperately needs them; however, it has brought other aspects that are not quite as positive. Coal mining has impacted the region’s environment, by changing the region’s landscape and geography when coal is extracted from the mountains (especially through mountaintop removal). Coal mining in the region has affected wildlife, forests, farms, watersheds, buildings, and people, sometimes in negative ways. Fortunately, some of these negative impacts on Southwest Virginia’s environment as a result of coal mining have been addressed by the regions citizens and the government.

**Working Thesis:** Southwest Virginia coal mining has had major impacts on the region’s environment and beyond in the latter half of the twentieth century; however, these environment impacts may not be totally negative or irreversible.

**Working Outline**

1. Introduction
2. Southwest Virginia Historical and Economic Background

In this section an overview will be given of Southwest Virginia’s history, geography, economy, and culture. Also, an overview will be given of coal mining’s history in Southwest Virginia. An overview of the economic impact of coal mining in Southwest Virginia will be given as well, including some economic statistics.

1. Coal mining impacts on Southwest Virginia’s Geography

 In this section coal mining’s impact on the alteration of Southwest Virginia’s geography and landscape will be discussed. This section will include the impact on forests. These geographic impacts result in impacts on other sections of Southwest Virginia’s environment.

1. Coal mining impacts on Southwest Virginia’s Water Sources

In this section coal mining’s impact on the region’s rivers, creeks, streams, springs, and groundwater will be discussed. These water source impacts from coal mining affect farms, wildlife, and people in significant ways.

1. Coal mining impacts on Southwest Virginia’s Wildlife and People

 In this section coal mining’s impact on the region’s wildlife and people will be discussed.

 Coal mining can create an environment this hazardous to wildlife habitats. Coal mining

 can also harm people, as the buildings they work or live in are affected and the farms or waterways they depend on are hazardous. Air pollutants from coal mines can also negatively impact wildlife and people.

1. Coal mining impacts beyond Southwest Virginia

In this section coal mining impacts on the environment beyond Southwest Virginia will be discussed. Does the regions winds or rivers carry the impact of coal mining into other states? Also, what is or isn’t coal mining’s contribution to Global Warming, and does Southwest Virginia play an important role?

1. Repairing the impacts of coal mining in Southwest Virginia

In this section the ways government and citizens are addressing coal mining’s impact on the regions environment will be discussed. State and federal laws have started addressing the problem, and reclamation projects have been done in affected areas.

1. Conclusion

 Coal mining has been a major industry in Southwest Virginia for several decades. The coal industry has brought jobs to a region that desperately needs them; however, it has brought other aspects that are not quite as positive. Coal mining has impacted the region’s environment, by changing the region’s landscape and geography when coal is extracted from the mountains (especially through mountaintop removal). Coal mining in the region has affected wildlife, forests, farms, watersheds, buildings, and people, sometimes in negative ways. Fortunately, some of these negative impacts on Southwest Virginia’s environment as a result of coal mining have been addressed by the regions citizen’s and the government. Southwest Virginia coal mining has had major impacts on the region’s environment and beyond in the latter half of the twentieth century; however, these environment impacts may not be totally negative or irreversible.

 Southwest Virginia is a rugged region located in the Appalachian Mountains of the Eastern United States. The Cherokees and Shawnees were two major Native American tribes to live in the region before the arrival of European settlers (Hibbard 2, The Cherokee). European settlers began to arrive in Southwest Virginia during the 1700’s, with the famous frontiersman Daniel Boone residing in the region from time-to-time (Hibbard 2). The first coal discovered in Virginia by Europeans was in Goochland County in the central portion of the state in the late 1600’s; however, coal was discovered in Southwest Virginia by 1750 with the assistance of a Shawnee Indian who knew where the coal deposits were (Hibbard 2). In the late 1700’s coal was discovered in sections of Pulaski and Montgomery counties in the New River Valley (Hibbard 2). Small-scale pit mining took place in the New River Valley by 1790, and then underground mining began to take place in that area (Hibbard 2). Despite the discovery of coal most people in Southwest Virginia were still primarily small-scale farmers until after the Civil War (Mooney 3). The fifty-year time period from 1880 to 1930 was a huge transition for Southwest Virginia as coal mining and other occupations dependent on the industry became the primary source of employment, as coal production in this region increased dramatically (Mooney 3). This is the time period where railroads were built into the region including the Norfolk and Western Railway built across the state from Hampton Roads (Hibbard 4). With the coal piers in Norfolk and Hampton Roads, Southwest Virginia coal now had access to global markets (Hibbard 4). With the railroads coal output increased in the New River Valley coalfields (Hibbard 3, 6). Before the railroads, U.S. census figures reported in 1880 only 2,497 tons of coal were produced in Montgomery County; however, with the railroads that figure increased to 14,108 tons in 1887, and by 1929 over 100,000 tons of coal were being shipped annually from the county (Hibbard 6). Peak coal output from Montgomery County was during World War II when the county produced 202,000 tons of coal that year (Hibbard 6). Over six million tons of coal had been produced in the New River Valley before coal mining virtually came to an end in the 1950’s (Hibbard 6, 7).

 The other major coalfields further to the west in Southwest Virginia began to see dramatic increases in coal production with the railroads as well in the 1880’s and 1890’s (Hibbard 4). Wise County is a good example of this increase, as in 1889 only 188 tons were produced without railroad access; however, by 1897 with railroad access that figure had sky rocketed to 712, 211 tons (Hibbard 4). The expansion of coal mining affected the social and economic landscape of Southwest Virginia, as residents moved from the country into coal towns (Mooney 3). The regions’ residents who used to be self-sufficient farmers were now dependent on the coal industry and the industry’s business owners to make a living (Mooney 3). Sometimes these coal towns were afflicted with a lack of law and order, which resulted in violence (Hibbard 14). Coal miners also experienced at times contaminated drinking water from untreated sewage, as well as unsafe working conditions which resulted in frequent injuries and fatalities (Hibbard 15). Despite these negatives coal mining usually improved the quality of life in Southwest Virginia, and for the most part coal companies treated their workers well (Hibbard 15). Coal production continued in Southwest Virginia; however by the 1920’s and 1930’s mechanization had already begun to replace hand labor in the region (Hibbard 7). Mechanization combined with the Great Depression lead to job losses in the coal industry, with a rebound occurring in the 1940’s due to World War II (Hibbard 7). Surface mining also made its debut in Southwest Virginia during World War II, as before the war all the mining in the region was done underground (Hibbard 10). The numbers of miners in Southwest Virginia also peaked during the war, as the number of miners in 1942 was 19,416 (Hibbard 10).

 After World War II the coal industry in Southwest Virginia continued to change as mechanization, and more dependence on oil plus natural gas for energy, lead to another round of major job losses in the coal industry (Hibbard 10; Mooney 4). From 1949 to 1954 forty percent of the region’s miners lost their jobs, decreasing the region’s coal workforce from 18,341 to 10,888 (Hibbard 10). The peak number of working mines in Southwest Virginia was at 1,807; however, that number has declined since then despite increased coal production (Hibbard 10). The number of coal workers in the region’s coal industry continued to fluctuate, as 14,000 coal miners were employed in 1987, with that figure decreasing fifty percent to 7,000 miners in 1996 (Mooney 4). This volatility in the coal industry has led to high unemployment in Southwest Virginia, as in 1994 all seven counties in the coal producing region had unemployment rates well above the state average of 4.9% (Zipper 3). Two of these counties in 1994 were in a category that no locality wants to be in, as Buchanan County had the state’s second highest unemployment rate at 15%, and Dickenson County had Virginia’s highest unemployment rate of 16.2% (Zipper 3). High unemployment in Southwest Virginia has led to other problems including poverty, welfare dependency, emotional distress, and outmigration from the region (Mooney 15). Despite this the coal industry is very beneficial to the people employed in it as they made around $40,000 to $50,000 a year, which was a very respectable amount of money to make in the 1990’s (Mooney 15). In 1993 the coal industry provided over forty percent of personal income in Southwest Virginia, plus the industry generated over $36 million dollars in local and state tax revenues (Mooney 6). The region’s coal industry also provides jobs in other business sectors like the railroads, which when taken into account provided directly or indirectly 40,000 jobs; plus it generated around $150 million in state and local tax revenues (Mooney 6). As of around 1990 Virginia was the seventh largest coal producing state in the U.S. (Hibbard 1).

 Southwest Virginia’s geographic characteristics are a major reason the region produces coal. The commonwealth of Virginia is divided into five geographical regions: Coastal Plain, Piedmont, Blue Ridge, Ridge and Valley, and the Cumberland Plateau (Randolph 12). The Cumberland Plateau is also known as the Appalachian Plateau, which extends into nearby Kentucky and West Virginia (Roth 9). Nearly all of Southwest Virginia lies in the Blue Ridge, Ridge and Valley, or Appalachian Plateau geographic regions (Randolph 12). Nearly all the coal mining in Southwest Virginia occurs in the Appalachian Plateau region in Virginia’s seven westernmost counties: Buchanan, Dickenson, Lee, Russell, Scott, Tazewell, and Wise (Hibbard 10). Buchanan, Wise, and Dickenson counties are the three highest coal producing counties, as they are entirely or almost entirely located in the Appalachian Plateau region (Hibbard 10; Randolph 12). The Appalachian Plateau is a region that consists of narrow valleys and steep mountains formed from an eroding high plateau (Roth 9). The Appalachian Plateau is composed of sedimentary rocks from the Cambrian and Pennsylvanian Age, during which time Southwest Virginia’s coal was produced (Roth 9). The Clinch, Pound, and Powell are three major rivers in Southwest Virginia, whose watersheds encompass the coalfields (VA Game and Inland Fisheries). It is important to note that these rivers are not part of the Chesapeake Bay Watershed, as they are well to the west of the Eastern Continental Divide line; therefore, Southwest Virginia’s coalfields cannot be directly blamed for the pollution problems in the Chesapeake Bay. These three rivers in Southwest Virginia flow into nearby Tennessee or Kentucky, so it is possible for Southwest Virginia coalfields to pollute rivers in those two states (VA Game and Inland Fisheries).

 Southwest Virginia is culturally different from the rest of Virginia, as Southwest Virginia is definitely considered a part of Appalachia (Appalachian Regional Commission). The region is unique in that it borders four states: Kentucky, North Carolina, Tennessee, and West Virginia. Southwest Virginia is hundreds of miles from the state capital in Richmond. Parts of Southwest Virginia including the small city of Norton are closer to seven other state capitals than Richmond (Norton). Some people may view this as a good thing; however, if any person needs to address an environmental, social, or economic issue related to the coal industry to the state government, the long distance to Richmond could create problems. For example a citizen who has a full-time job with an environmental concern that needs be addressed in the capital may not be able to take off from work a couple of days to go to Richmond. Also, the state government may ignore environmental or other concerns related to region’s coal industry, as it may see the issue as just a far off and minor problem. The state government may only get worried if the tax revenues from the coal industry do not come in. There are environmental groups like the Sierra Club, Virginia Conversation Network, and Southern Appalachian Mountain Stewards that have addressed environmental concerns related to coal mining in the region. In some cases these environmental groups have opposed coal mining practices that they believe are harming the environment.

 One environmental impact of coal mining in the region is that Southwest Virginia’s geography has been altered and changed. From 1882 to 1988 around 2,184,906,070 tons of coal was produced in Southwest Virginia, with four of the seven counties having peak coal production years in the 1980’s (Hibbard 10). With that much coal extracted from the ground for over a century from thousands of mine sites around the region; Southwest Virginia’s landscape has certainly been altered. According to the Sierra Club sixty-seven mountains have been blown up or removed for coal mining purposes (VA Sierra Club). Mountaintop removal results in mountains being shorted by hundreds of feet, and these mountains become barren wastelands (VA Conservation Network). Both the Sierra Club and Virginia Conservation Network report that 156,000 acres of terrain including forests have been destroyed as a result of surface mining (VA Conservation Network; VA Sierra Club).

 Even though the geographical alterations and changes caused by mountaintop removal or surface mining can be very apparent to the naked eye, underground mining can alter the geography of an area as well. A majority of the coal mining that occurred in Southwest Virginia from 1973 to 1988 was done underground (Roth 5, 6). Surface mining consisted of one-third of the region’s total coal production in 1976, and only seventeen percent of coal production in 1988 (Hibbard 10). Underground mining has its environmental advantages; however, a serious threat from underground mining is subsidence or sinking ground (Roth 2). Subsidence can alter the geography of an area through structure and road damage (Roth 2). Landform alterations can also occur as surface elevation is lower resulting in fissures and cracks in the land, albeit the impacts from this are seen as relatively minor (Roth 3). A more serious concern resulting from subsidence is the impact on water resources at or near an underground mining site (Roth 3). Coal mining’s impacts on Southwest Virginia’s geography have resulted in impacts on other sections of the region’s environment.

 Southwest Virginia coal mining has also had major impacts on the region’s water sources. This includes the regions rivers, creeks, streams, springs, and groundwater. Surface mining including mountaintop removal can alter streams through valley fills (EPA). Nationwide around 724 miles of streams were covered by valley fills from 1985 to 2001 (EPA). From 1992 to 2002 around 1,200 miles of streams nationwide were in some way affected by surface mining through roads, ponds, coal removal areas, or valley fills (EPA). In Virginia around 151 miles of streams were affected by surface mining from 1992 to 2002 (VA Conservation Network). Surface mining can also result in toxic minerals and excess sediment ending up in streams (VA Conservation Network). Several creeks and rivers in Southwest Virginia have been declared impaired waters due to having excessive amounts of sedimentation in them (VA Department of Environmental Quality). Surface mining can increase the amount of minerals in streams; however, the amount varies by location and an increase in minerals does not necessarily decrease the stream’s water quality (EPA). Surface mining can also increase base flows in streams leading to a higher potential for flooding; however, this varies by location as well (EPA).

 Underground mining can also affect water sources in Southwest Virginia. Underground mining can affect streams, aquifers, springs, and groundwater through subsidence (Roth 3). Subsidence can cause cracks in stream beds and aquifers resulting in declining water levels or even these water sources drying up (Roth 3). The impacts of underground mining on a water source are going are going to differ from location to location (Roth 26). In some areas underground mining may result in lower water levels for only the short-term, as an aquifer or spring would eventually replenish itself (Roth 26, 28). However, streams, springs, and aquifers can also suffer lower water levels or in some cases completely dry up for the long term (Roth 28). Then in some cases underground mining can make more groundwater available for development (Roth 28). From 1981 to 1987 the Virginia Division of Mined Land Reclamation (VDMLR) investigated seventy-three citizen complaints of water loss as a result of underground mining (Zipper, Balfour 1). Out of the seventy-three cases the VDMLR confirmed forty-one of the water loss complaints resulted from underground mining, while only seven of the water loss complaints were confirmed to have not been not caused by underground mining (Zipper, Balfour 11). Most of the confirmed cases were in Russell and Wise Counties (Zipper, Balfour 11). Like surface mining, underground mining can also alter streams by increased base flows depending on location (Roth 29). This also differs from location to location, but underground mining does not have a major impact on the water quality of affected streams and groundwater (Roth 28). However, in Southwest Virginia coal mining in general has resulted in some groundwater becoming contaminated as a result becoming acidic through mine drainage (VA Department of Environmental Quality). Coal mining impacts on Southwest Virginia’s water sources result in impacts on other aspects of the region’s environment as well.

 Southwest Virginia coal mining also has major impacts on the region’s wildlife and most importantly its people. Southwest Virginia is a very biologically diverse region that has been affected by the loss of forests and animal habitats as a result of coal mining (VA Conservation Network). Mine runoff into local streams is also a threat to the regions wildlife. Selenium a toxic metal has been found in excess quantities in waterways downstream from mountain top removal mines can cause severe deformities in fish (VA Conservation Network). Smallmouth bass growth in the Powell River has been slow as a result of environmental factors and sedimentation (VA Department of Game and Inland Fisheries). The Powell River is also the location of a Virginia Cooperative Extension mine land reclamation project (VA Cooperative Extension). Coal mining could certainly be a major contributing factor to this, as coal mining can cause sedimentation in rivers. Also some studies indicate that mayfly populations have completely disappeared in areas downstream from valley fills (VA Conservation Network). This is significant since mayflies account for nearly half of the insects in the regions headwater streams, and the loss of mayflies can affect the regions food web and watershed ecosystem (VA Conservation Network).

 Southwest Virginia coal mining affects both the people that work in the mines and the citizens that live near the regions mines as well. It is well known that coal miners are at increased risk of acquiring respiratory problems like black lung. The risk of coal miners being injured or killed on the job is also there. There have unfortunately been coal miner fatalities in Southwest Virginia in the past, as one of the worse incidents occurred at the Southmountain Coal Company mine in Wise County on December 7, 1992 (VA Department of Mines Minerals and Energy). An underground mine explosion killed eight miners and seriously injured another miner (VA Department of Mines Minerals and Energy). Another severe mine incident occurred on June 21, 1983 at the Clinchfield Coal Company in Dickenson County, as an underground mine explosion killed seven miners and injured three (Wheatley). Coal mining can also impact the citizens that live near the coal mines as well. Elevated noise from blasting, higher flooding potential, contaminated drinking water, and health problems can all cause problems for nearby residents (VA Conservation Network). Some of the residential health problems caused by coal mining include kidney, lung, and heart disease, as well as premature death (VA Conservation Network). A West Virginia University found that mortality rates were higher in Appalachia (VA Conservation Network). Wells that dry up as a result of subsidence are also a serious problem to the regions residents, especially farmers (Roth 3). It is vital for farms to a have reliable source of water for their crops and livestock; as if the water source is contaminated or dries up that could result in a farm relocating or going out of business (Roth 3). Subsidence can also cause landform alterations that damage roads, residential houses, and other buildings (Roth 2).

 Southwest Virginia coal mining can also have impacts beyond the region into other states. There is some evidence especially in Kentucky that the runoff from coal mining in Southwest Virginia may be having an impact on one river in particular in the eastern portion of the state. The Levisa Fork of Big Sandy River in Pike County, KY was considered an impaired river as of 2002, with one of the causes being resource extraction (Kentucky 246). It is important to note that resource extraction can include multiple resources, as coal mining was not directly implicated as a source of the pollution. Also, coal mining in Eastern Kentucky or Southwest Virginia was not directly blamed for causing the Levisa Fork to be impaired. However, Pike County borders Southwest Virginia, and the headwaters of the Levisa Fork and some of its major tributaries including the Pound River are in Southwestern Virginia (NWS Charleston). So it is possible for coal mining in Southwest Virginia to be a contributing factor to the impairment of the Levisa Fork River. Portions of the Powell and Clinch River watersheds in adjacent Northeastern Tennessee as of 2004 were declared impaired; however, coal mining in Tennessee or Southwest Virginia was not considered the cause of the pollution (Tennessee 84-88). This is despite the fact that coal mining has had major impacts along the Powell River in Southwest Virginia (VA Cooperative Extension, VA Department of Game and Inland Fisheries). Southwest Virginia coal mining may impact Kentucky’s waterways more than Tennessee because most of the regions coalfields are much closer to Kentucky than Tennessee (Hibbard 1).

 Southwest Virginia coal mining also has impacts beyond the region because of coal mining’s contribution to Global Warming or Climate Change. Coal mining in general is a major contributor to Global Warming. Carbon dioxide is the greenhouse gas that is the largest contributor to global warming, and fossil fuel combustion is the largest source of carbon dioxide emissions in the U.S. (EPA). Coal is a fossil fuel, and the largest source of fossil fuel combustion is generating electricity mainly through burning coal (EPA). Methane is also a contributor to global warming and coal mining produces methane (EPA). It is well known that Global Warming could lead to global temperature increases, sea level rises, and more extreme weather patterns. Southwest Virginia coal mining does contribute to Global Warming; however, it is not necessarily a major contributor. Coal production is around five to six times higher in Kentucky and West Virginia (U.S. Department of Energy). This does not even take into account global coal production from countries like China. So while Southwest Virginia coal mining is a contributor to Global Warming, other states like Kentucky and West Virginia are bigger contributors due to their much higher coal production.

 In areas where Southwest Virginia coal mining has negatively impacted the regions environment, there are things being done to repair the damage and prevent the damage from happening again. Citizens and the government are working to address the issues caused by coal mining in the region. Environmental groups like the Sierra Club, Virginia Conservation Network, and Southern Appalachian Mountain Stewards are involved in repairing the environmental, as well as opposing measures they believe will further harm the regions environment. Virginia’s government and two of the state’s universities have been involved in trying to repair environmental damage in the region as well. The Virginia Cooperative Extension is joint venture between Virginia State University and Virginia Tech to improve the state’s farms, forests, as well as environment (VA Cooperative Extension). The Virginia Cooperative Extension has been working on a mine reclamation project on the Powell River to combat the negative effects of coal mining on the river (VA Cooperative Extension). The reclamation projects on the Powell River include restoring forests, wildlife, plants, building development and combating acid mine drainage (VA Cooperative Extension).

 There are also State and Federal laws in place to repair, regulate, or prevent future environmental damage to the regions environment. It is mainly up to the State and Federal governments to have laws in regard to coal mining because the local governments in the region do not have the financial or other resources available to handle the environmental impacts of coal mining. One state law on the books is the Virginia Coal Surface Mining Control and Reclamation Act (VA Department of Mines Minerals and Energy). Other state laws involving keeping Virginia’s water resources clean include the Ground Water Management Act of 1992 and the Virginia Water Quality Improvement Act of 1997 (VA Department of Environmental Quality). The state has the authority to not issue or revoke mining permits from coal companies that violate any state law in relation to environmental, miner, or public safety (VA Department of Mines Minerals and Energy). There are also Federal laws in place to repair and protect the environment as a result of coal mining. The Surface Mining Control and Reclamation Act of 1977 is a federal law that regulates coal mining in order to protect the environment (EPA, Office of Surface Mining). The Clean Water Act is another federal law that protects waterways from pollution from coal mining (EPA). These State and Federal laws help protect Southwest Virginia’s environment from the negative affects of coal mining in the region.

 Southwest Virginia coal mining has had a major impact on the regions environment. It has affected the regions geography, water resources, forest, wildlife, and most importantly its people. Sometimes these affects have harmed the regions environment; however, fortunately many of the damages have been addressed and in some cases repaired. It is important today that all Virginia State and Federal laws in relation to coal mining be enforced, especially laws regarding water. It is also important for the regions coal miners and the general public to be aware of the hazards from coal mining in the region. Ending coal mining in Southwest Virginia could be devastating, so it is vital for coal mining in the region to continue to become more environmentally friendly. Also, the region may want to try to diversify its economy so it will not be as dependent on coal. Now while coal mining in Southwest Virginia has had major impacts on the regions environment, its impacts beyond the region are generally more minor in nature. This is good, as this puts the main focus on coal mining working to have less negative environmental impacts in Southwest Virginia.

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