MEDIA AND CLAIMSMAKER FRAMING OF CONTROVERSIAL ENVIRONMENTAL ISSUES:
A FRAME MAPPING ANALYSIS OF MOUNTAINTOP REMOVAL MINING

A Thesis in
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by
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ABSTRACT

This study employed frame mapping analysis to explore claimsmaker and media framing of mountaintop removal mining, a controversial coal mining technique practiced in Appalachia. Frame mapping analysis is an objective technique for framing research that conceptualizes frames as independent variables affecting public opinion and policy through a framing cycle. Claimsmaker frames were identified from texts such as press releases and archived material on Web sites. Media framing of the issue was assessed longitudinally from 1985-2004 in newspaper articles. Specific frames and their constituent words were identified through the frequency and co-occurrence of key terms within the text. The associative relationships among the frequency and co-occurrence of these terms allow the frames to be represented in three-dimensional space by plotting eigenvalue coordinates on a graph. Supporters and opponents used very different frames for the issue—a result that stems from their different goals regarding the issue. Opposing claimsmakers had a greater number of frames for the issue than did supporters. Opponents also used more water-related frames than did supporters. Despite a decrease in the number of media frames for the issue between the two time periods analyzed, media framing seemed to become more sophisticated over time. No stakeholder frames were replicated in the media texts, suggesting that resonance has not occurred and that the issue remains in the competition phase of the frame cycle. This study raises and to some extent addresses questions about how to determine whether a particular frame is or is not being repeated in another time period or replicated in another place. It also suggests that intractable issues such as environmental controversies may not follow the same course through the framing cycle as less-contentious issues. This dissertation discusses the theoretical, methodological, and practical implications of frame mapping analysis for claimsmakers, policymakers, journalists and journalism educators.
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This dissertation is dedicated to my grandfather, Bernard C. Gilbert, to whom my education and well-being were very important. By fate or coincidence, the final defense of this work occurred on Aug. 10, 2004, which would have been his 94th birthday.

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Chapter 1: INTRODUCTION

The purpose of this study is to learn more about the competition among claimsmakers (or discrete advocacy groups who attempt to influence opinion and policy) and the role the media play in their efforts to define and control discourse over controversial environmental issues. Such issues became quite prominent in the media and public agendas during late 20th century and continue to be so today. Many of these environmental issues are quite controversial, with two or more sides bitterly opposing one another. As such, environmental issues are good venues in which to study the competition among claimsmakers and way their efforts play out in the media.

Of the methodological tools available to media scholars, framing is one of the most promising. New frame analysis techniques offer an objective way to determine how claimsmakers are framing an issue and to assess the impact of their efforts on media coverage. What’s more, advances in theory allow the results of frame analyses to be tested as indicators of change in public opinion and policy. This study attempts to contribute to a growing body of knowledge related to claimsmaker framing of controversial issues, the role the media play in that process and the impact it all has on the life of the issue in the social arena.

To accomplish these goals, this study will involve a frame mapping analysis of newspaper coverage of mountaintop removal mining, which is a controversial coal-mining technique practiced in Appalachia. This issue is well-suited for an examination of the type sought here because it is controversial, has a long history, and existed as a regional issue before emerging in the national media. Specifically, this study will seek to determine how claimsmakers and the media have framed the issue over its life. This
research will follow in the footsteps of several past studies that have used frame mapping analysis to illustrate claimsmaker and media framing of a science or environmental issue (Dyer, Miller & Boone, 1991; Miller, Boone & Fowler, 1992; Riechert & Miller, 1994; Riechert, 1996; Miller & Riechert, 2000; Koella, 2002). In doing so, this study will further refine the techniques and understanding of frame analysis.

A very real policy struggle is playing out among claimsmakers in the life of contentious issues, and a scientific examination of how the competitors operate is valuable for our understanding of communication’s role in public discourse. The spiral of opportunity theory suggests that when frame resonance is achieved between a claimsmaker and the media, that claimsmaker likely has succeeded in the struggle for dominance among competing claimsmakers (Miller & Riechert, 2001). The theory also suggests that if a claimsmaker can maintain frame resonance with the media, resonance with public opinion may follow. And if resonance between the claimsmaker and the public is maintained, law and policy will ultimately be affected.

This study makes an important contribution by raising questions about whether the spiral of opportunity and frame resonance theories work for an issue such as mountaintop removal mining in the Appalachians, which is relatively unobtrusive for most Americans, backed by a powerful industry and regulated by governmental channels that the literature reports are unresponsive to public input (U.S. EPA, 2000). Issues such as this one seem so controversial and inaccessible as to derail the frame cycle that, according to frame resonance theory, drives policy outcomes. With no end to the fighting among claimsmakers and no opportunity for public opinion to affect policy, issues such as this one can seem intractable.
This study tracked almost 20 years of claimsmaker and media frames of mountaintop removal mining from 1985 through 2004. In the process of doing so, it began to address the questions of how best to determine whether claimsmakers are using identical frames and whether the contemporary media are using the same frame they were in a previous time period. Through the use of a rigid but reliable method of determining whether a particular frame was being repeated elsewhere or at another time, this study determined that for the mountaintop removal mining issue, no stakeholder frames were replicated in media texts. This finding has theoretical implications for frame resonance theory by raising the intractability issue discussed above. It also has methodological implications for frame mapping analysis because it raises the question of how best to measure frame resonance.

The apparent lack of resonance between media and claimsmakers is a new and significant contribution to the field of frame mapping analysis because this study is the first to use frames as an independent variable to predict the stage or position of mountaintop removal mining within the frame cycle. (The frame cycle follows the process by which claimsmakers compete to control how an issue is framed. Their efforts to do so begin with emergence, then competition, leading to the dominance of one frame. In the cycle, the dominant frame becomes the media frame, the public frame, and eventually the frame that controls policy decisions.) No other study that we could find has used the frame mapping data to predict the position of the issue within the cycle (Mark Miller, personal communication, Jan. 6, 2004). Instead, other studies have only used the data to illustrate how an issue has been framed and how claimsmaker and media
framing have changed over time. There is a good theoretical and conceptual basis for using the data to do more.

Finally, this study sought to determine whether national mediation of a previously regional issue would affect framing by claimsmakers, the media, or both. Mountaintop removal mining has been practiced in West Virginia since 1968. Opponents have resisted mountaintop removal mining since before the first mine was actually opened (Darmstadter, 1999), but the issue did not emerge in the national news media until the late 1990s (Hansbarger, 2000; U.S. EPA, 2000). In part, that speaks to the unobtrusiveness of the issue to those outside Appalachia, but more importantly, it was an opportunity to ask whether the transition of an issue from local/regional to national was related to any changes in how it was framed (by either claimsmakers or the media). Note that this question does not imply causation or even directionality, but simply that one change may be related to another. Few, if any, other issues offer this kind of opportunity because it is rare for a contentious environmental issue to exist on a regional level for years without widespread national mediation. What’s more, most issues lack such a precisely known emergence into the national media, making such as comparison problematic. Answering the question of whether national mediation of a previously regional issue would affect framing is important because it would provide empirical evidence about important aspects of media effects on public discourse. Although a number of factors prevented this study from fully pursuing an answer, the attempt to do so may underscore the importance of the question.
The broad social implications of this study include a better understanding of the factors that direct public discourse over contentious issues, particularly the effectiveness of advocacy groups’ efforts and the role of the mass media. This study offers a valuable piece of the public opinion puzzle by examining the full outcome of strategic attempts to influence society through the media. Those close to an issue may be familiar with the platforms, arguments and propaganda put forth by claimsmakers. And those who follow news coverage of an issue will have a feel for how it is handled in the media. But the frame mapping analysis procedure employed here offers a much more thorough and detailed picture of the discourse than even personal familiarity and involvement can offer. Every frame, no matter how subtle, is catalogued, and the full range of similarities and differences among texts can be precisely compared. For the particular stakeholders in the mountaintop removal mining debate, this study is an overdue look at the results of 35 years of debate. Everyone—even those without scholarly credentials in communication studies—seems to instinctively sense that the media are the best hope for grassroots movements undertaking an uphill battle to change the status quo. Few channels are effective conduits in allowing public input to directly affect policy. Even the boards, commissions and public hearings that are designed to do so are ineffective. Perhaps that is why everyone fighting for a cause also seems to clamor for media attention. This study lays bare the otherwise invisible form such pursuits ultimately assume.
Chapter 2: ISSUE CONTEXT AND BACKGROUND

It is important to have a sophisticated and nuanced understanding of an issue before trying to make sense of the frames that have emerged around it from claimsmaker competition. To not do so would leave one contextually ill-prepared to understand subtle and sometimes multiple meanings that comprise a frame. Instead of issue-specific interpretations, one may be inclined to apply generalizations gleaned from similar issues or to stereotype a frame’s meaning based on first appearances. Therefore, this chapter will explore mountaintop removal mining and the literature relevant to that issue. The chapter includes three main sections: one offering a brief history of coal and the rise of surface mining in West Virginia, a second exploring the biological dimensions of mountaintop removal mining, and a third exploring human dimensions of the issue.

A Brief History of Coal and the Rise of Surface Mining in West Virginia

Coal is the most plentiful stock energy resource in the world (Marion & Roush, 1982). There is far more coal in the world than there is oil or natural gas. The former Soviet Union holds half of the world’s vast coal reserves, while the United States has 25 percent, and China has 13 percent.

European settlers first found coal in the New World in 1701 in Virginia (Kentucky Foundation, 2002). Records indicate that coal was first mined in America in 1748, and the first commercial shipment of coal occurred 10 years later in 1758. From that point on, the coal mining industry steadily grew, spreading across the settled regions of the country and increasing production.
The first recorded instance of surface mining occurred in Danville, Illinois in 1866. Around this time, coal production began a steep increase. Production surpassed one million tons a year in Kentucky alone, aided in part by technological advances such as the steam-powered shovel, which appeared in 1877. Underground and surface mining both continued to grow rapidly in the next 100 years. The only laws or regulations applied to the burgeoning industry dealt with the health and safety of the miners, and most of these were the result of worker unrest, unionization and strikes. For example, 1880 saw the enactment of the Mine Ventilation Law, 1890 the Miner Pay Law, and 1900 the Child Labor Law. However, laws to protect the environment were much less common.

Technology to enable the growth of surface mining continued to develop. In 1932, the first walking dragline excavators were introduced. These were primitive versions of the machines that would make mountaintop removal mining feasible in the late 20th century. In 1940, auger surface mining was developed.

For decades, coal money paved the way for the development of new, highly efficient technologies. The result was that coal productivity continued to grow while the number of people employed in the coal industry dwindled. Now, it takes only a handful of men to operate a highly productive longwall mine, which uses nearly automated machinery to cut swath hundreds of feet wide through the coal seam. These large, rectangular longwall cuts, called panels, can measure more than 1,000 feet in length. They employ a self-advancing hydraulic roof support system that moves forward as the coal seam is cut away. No attempt is made to support the mine ceiling after the machine moves forward. The roof simply caves in, all but ensuring subsidence problems, including a loss of wells, springs and groundwater, for the surface land above the mine.
The room-and-pillar method used before longwall mining left about 50 percent of the coal seam in place, thus greatly reducing subsidence. But the longwall technique is more efficient, allowing the industry to compete on price and production. A longwall mine using this technology can produce 3.65 short tons of coal per employee per hour. Surface mines, which are more environmentally destructive than underground mines, are even more efficient at 4.28 short tons per employee per hour (Energy Information Administration, 1996).

Coal is mined in 26 of the 50 states in America. West Virginia bears the brunt of that activity, producing roughly 15 percent of the coal mined in America. Only Wyoming produces more coal than West Virginia. The Mountain State produces twice as much coal as Pennsylvania and six times as much as Ohio. In 2002, there were 1.09 billion short tons of coal removed from the ground in America. West Virginia produced 150 million of that total.

West Virginia began producing coal around 1880. Production in West Virginia grew steadily through the late 1800s and early 1900s, reaching 30 million tons a year by the turn of the century. During World War I, production rose sharply from about 85 million tons a year to more than 150 million tons. Since then, production has been consistently strong but punctuated by sharp fluctuations. Only twice since 1923 has coal production in West Virginia dipped below 100 million tons a year—first during the Great Depression and again near the end of the energy crisis/recession of the mid 1970s. By the turn of the 21st century, annual coal production in the Mountain State was at or near all-time highs of more than 180 million tons, although production dropped slightly in 2001 and 2002 (www.wvminesafety.org). Drops in coal production are almost always the
result of coal companies shutting down mines and laying off workers during periods of low demand. It is not profitable for them to continue producing coal at rates exceeding demand, so companies carefully manage their production to meet but not exceed sales.

Despite overall increases in production and decades of intensive mining, estimates of coal reserves in the United States have not gone down. In fact, estimates regarding the amount of coal left in the ground and how long it will last have become controversial points. Both numbers are in constant flux.

Before going on with a discussion of the opposing sides in the argument over the longevity of coal stocks, it is necessary to define what is meant by reserves and resources. The term “resource” identifies all the known coal. This amount can and does change as new coal deposits are located. Predictably, estimates of the extent of coal resource go up often whenever new exploration is undertaken.

Reserves, on the other hand, identify coal deposits that are feasible to mine. Much of the known coal resource is either unreachable or impractical to mine. Just as the resource parameter is constantly growing because of new discoveries, the reserves also grow consistently when new technologies make previously impractical coal reserves profitable to mine.

The U.S. Department of Energy, which compiles statistics from industry-supplied data in all coal mining states, estimates that 497.7 billion short tons of coal are known to exist in America. Of that, 33.7 billion short tons are in West Virginia. Not all of that coal resource is obtainable. As of 2002, the DOE estimated that 269.4 billion short tons of America’s coal were recoverable. Of that, 18.5 billion short tons of recoverable coal lie in West Virginia.
Obviously, there is a limit to the resource, and eventually, reserves could be depleted. However, the environmental damage associated with mining and using coal would make the depletion of the reserves a very undesirable course of action. The need for finding alternative energy options is not to avoid running out of coal (and energy), but rather to avoid the continued environmental degradation that mining and using coal bring.

Nevertheless, there is a strong contingent of stakeholders in the coal debate who argue that we will run out of coal (and other fossil fuels) if we continue to use them at either our current rate or at an exponentially growing rate. Anyone who understands the power of compound interest realizes the kinds of increases that can be seen when something grows at 5 or 6 percent a year for 100 years or more.

A long line of philosophers and pundits have predicted problems of resource scarcity if use is not managed on a sustainable scale. Malthus’s (1798) writings about the danger of population growth and unbridled resource use are cited by many who seek to illustrate fears that coal reserves will be depleted, leaving us unprepared to meet our energy needs.

Perhaps the best example of predictions about the exhaustion of energy reserves came from the Club of Rome report (Meadows et al., 1972). The Club of Rome report is one of the classic, seminal works regarding the sustainable use of resources and offers a wealth of valuable insight. The Club of Rome report came in the same year as the United Nations Conference on the Human Environment in Stockholm, Sweden, where the term “sustainability” was coined.

However, the Club of Rome report was wrong in its estimates about the imminent depletion of coal. The report predicted that known coal reserves would be gone by 2083
if used at a realistically exponential rate. The Club of Rome report also predicted that even if the available coal reserves increased fivefold, they would be depleted by 2122 if used at the same realistically exponential rate.

It is clear now that those predictions were wrong. We will not run out of coal by 2083, nor by 2122, even of our use continues to grow (McCabe, 1998). Although some may see the inaccuracy of the Club of Rome and similar predictions as good news, it really is not. That’s because the environmental consequences of mining and burning coal far into the future are much graver than the consequences of running out of it.

Surface mining, which includes mountaintop removal mining, has come to dominate underground mining in America. In the mid-1900s, more than three fourths of all coal was mined underground. But by the 1970s, the equation had changed, and more coal was being produced by stripping away the surface of the ground than by tunneling underneath it. As of 1995, surface mines accounted for 64 percent of all coal production in America. The share from underground mines had fallen to 36 percent (Darmstadter, 1999).

That does not mean that underground mining decreased. To the contrary, production by all methods in all regions has increased during the last 50 years; it’s just that surface mining increased much more greatly than did underground mining. Much of the activity that caused the statistical upsurge in surface mining occurred in the West, particularly Wyoming, where low sulfur (but low BTU) coal was easy and cheap to mine. In fact, the overall increase in coal production has had the predictable economic effect of driving down prices.
More than 20 years ago, coal produced from underground mines in West Virginia sold for about $60 per short ton. At the same time, coal from western strip mines sold for only $20 per short ton (Darmstadter, 1999). Prices for coal from both surface and underground mines have fallen since then, but the latter have taken the hardest hit. As of 2002, the average price for coal from underground mines was about $26 per short ton, while coal from surface mines sold for about $13 per short ton. (Energy Information Administration, 1996). Hidden within these average prices is the fact that western coal, particularly that from surface mines, is much cheaper than Appalachian coal. This price advantage for western coal has driven the price of Appalachian coal much lower than eastern operators would like. It is one of reasons why Appalachian mining companies claim mountaintop removal mining is necessary. They argue that without large-scale mountaintop removal mines, it is impossible to mine coal profitably and compete with western coal.

But just because the technology and equipment exist to strip vast areas does not mean that it is the most-profitable path. If too much overburden must be removed, the profitability of finally getting to the coal underneath is reduced. Called the “stripping ratio,” this measure of overburden moved per ton of coal retrieved is seen by some as a common sense way to determine when a strip mining should not be used.

“Experience with ever-larger dragline deployment in mountainous parts of Appalachia (mountaintop removal mining) appears to have led to some dampening in enthusiasm for significant surface mine expansion. Thus, firms that could start a large-capacity, highly efficient,
underground longwall operation would be particularly unlikely to initiate a large dragline/surface mine instead” (Darmstadter, 1999, p. 45).

West Virginia was the first state to legislate controls on surface mining. It did so in 1941 with a law that required strip mine operators to put up a bond of $150 per acre of land mined. If they did not adequately reclaim the land after mining, they would lose the bond. In 1945, the law was amended to raise the bond to $500 an acre. To meet the requirements and recover their bond, operators had to fill in any areas dug out during mining, replace topsoil, establish a drainage system to control flooding and erosion, and revegetate the area with grasses, trees, shrubs or vines (Munn, 1973). Ironically, that very first law made many of the same requirements as the most modern of reclamation regulations, and like the current surface mine regulations, it lacked substantive enforcement. Lack of enforcement has been a consistent problem with laws designed to regulate the coal industry and protect the environment of Appalachia. After more than a decade of lax or nonexistent enforcement, the West Virginia Legislature significantly weakened the law in 1963. Many of its requirements were stripped, and the security bond was lowered from $500 an acre back to $150 an acre.

Perhaps sensing the advent of mountaintop removal mining, a grassroots organization called the Citizen’s Task Force on Surface Mining (CTFSM) brought renewed vigor to the fight against surface mining in West Virginia in 1967. The group circulated a petition demanding, among other things, a ban on surface mining on steep mountain slopes (Schmidt & Stoneman, 1972). CFTSM’s efforts culminated in another round of stiff legislation in 1967, but again the law was not enforced. Coal companies
basically operated as they saw fit, obeying the law when it was convenient (and touting their “great environmental performance” in these cases) but ignoring the law when it was inconvenient or too costly. Within four years of the passage of the strict 1967 law, surface mine operators had cut 6,563 linear miles of highwalls, benches and banks in West Virginia. More than 390 square miles of land (250,000 acres) had been stripped (Montrie, 2003). Much of that area was completely barren and plagued by altered soil composition—a factor that favors invasive plants and animals over native species. In fact, most if not all of the grass and woody shrub species used for post-mining reclamation were non-native species, selected because they were “superior” to native species at revegetating the poor soils left after mining.

Meanwhile, technology was marching forward, as was the trend toward increased efficiency. Coal production was up, but prices were falling. Employment too was in a gradual decline as coal companies replaced manpower with machines—often blaming competition with western coal, falling prices and new environmental regulations as the reason. West Virginia’s first mountaintop removal mine opened in 1968, and it ushered in a whole new era of contention over surface mining. What makes mountaintop removal mining different from other strip mining is that, because of advances in machinery, entire mountaintops can be removed. Previously, draglines were not big enough to make it practical to alter the landscape on that scale. But while this unprecedented new mining technique went unnoticed by the nation at large, some of the Appalachian locals became increasingly unhappy with the coal industry and its methods.

In 1970, John D. (Jay) Rockefeller was the secretary of state and a candidate for governor of West Virginia. At the time, Rockefeller along with State Senator Si Galperin
and Richard Austin, Galperin’s legislative aide, pooled their collective resources to serve as a conduit for public opposition to surface mining. Rockefeller’s deep pockets funded a group called Citizens to Abolish Strip Mining (CASM), which during the early 1970s became the largest, best-organized and most-effective grassroots movement against surface mining West Virginia has ever seen. CASM’s efforts brought the state closer than it has ever been—before or since—to banning surface mining. In January 1971, Galperin introduced a bill in the West Virginia Legislature that would have banned surface mining. The bill was changed multiple times during its arduous trip through the Legislature, and by the time it was passed later that year, its strongest provisions were a two-year moratorium on strip mining in counties in which it wasn’t already being practiced and an increase in the reclamation bond to $560 an acre. It should be noted that the only counties that weren’t already being stripped (and were thus included in the two-year moratorium) weren’t very good targets for stripping anyhow. As such, the two-year moratorium wasn’t much of a victory for opponents of surface mining.

What is absent in the sanitized description of legislative initiatives and outcomes is the strong, sometimes violent, outpouring of emotion over the issue. West Virginia was split by the conflict over surface mining and later mountaintop removal mining. Residents, environmentalists, and even some miners (mostly underground miners) fought an uphill battle to stop the practice of surface mining.

The coal industry, the United Mine Workers union, and many rank-and-file miners rallied at every turn against attempts to abolish strip mining. They claimed that any restriction of surface mining, let alone an all-out ban, would decimate the mining industry and result in massive unemployment and economic woes. Such a claim is hard to
substantiate because the numbers can be manipulated to support either perspective, but in 1999 (almost 30 years after the CASM era) a consultant hired by the coal industry to determine the impact of a ban on mountaintop removal mining announced the surprising finding that such a ban would cut coal production by 10 percent and jobs by even less.

In part because of the anti-establishment political mood of the late ’60s and early ’70s, and in part because the opposition movement was new and had not yet been worn down by defeat after defeat, the efforts of early groups such as CTFSM and CASM were very vigorous, sometimes including civil disobedience. Demonstrations where the two sides clashed often turned violent, requiring police intervention. But in the end, it was the failure of state regulators to enforce existing law that would maim the opposition to surface mining.

Meanwhile, Rockefeller was learning a lesson about politics in West Virginia. Although he had handily captured the democratic nomination for governor, he lost the general election to Arch Moore, in part because of his strong opposition to surface mining. Galperin, who had worked with Rockefeller and CASM, also paid with his political life for crossing the coal industry. But unlike Galperin, Rockefeller learned from his mistake and quickly reversed his position, becoming a staunch supporter of the coal industry and of surface mining in West Virginia. As a result, he went on to become a two-term governor from 1977-1985 and a four-term U.S. senator from 1984-2004.

It was 1979 before another bill to ban surface mining went before the West Virginia Legislature. It was defeated, and no such measure has been taken up since.

An interesting footnote in West Virginia politics is that Rockefeller’s governorship was book ended by Arch Moore. Moore, who taught Rockefeller not to
cross the coal industry, was governor from 1969-1977 and again from 1985-1989. During his first run as governor, Moore was indicted for extortion but later acquitted. In 1990, after his second period (third term) in the governor’s office, Moore was convicted of mail fraud. He served two years in federal prison and has reportedly been considering a return to politics in West Virginia.

West Virginia wasn’t the only state serving as a battleground over surface mining. Kentucky, Ohio and Pennsylvania were among the Appalachian states to see opposition to the practice during the mid 20th century. And there was also action at the federal level. In fact, U.S. Representative Ken Heckler, a Democrat from West Virginia’s Fourth District, helped to push four attempts at a federal law to ban surface mining. Two of them, one in 1971 and another in 1972, actually made it through both houses of Congress, albeit in a very watered-down form. Despite having been de-toothed in committee, both bills were immediately vetoed by President Ford, suggesting that a nationwide ban seemed even more unlikely than a state abolition in West Virginia.

However, Congress was passing environmental legislation at the time, including the Clean Air Act in 1970, the Clean Water Act in 1972 and the Endangered Species Act in 1973, all of which gave some hope that a law affecting surface mining might be possible at the federal level. Such a law would come in 1977. It was called the Surface Mining Control and Reclamation Act. SMCRA has failed to stop the abuses of surface and mountaintop removal mining, and the fact that after more than 25 years, it is still the best and only protection available, says a lot about how the fight over mining has turned out (Montrie, 2003). As with many of the state laws that came before it, SMCRA had the
potential to be an effective law, but only if it was enforced. The language of the SMCRA directed strip mine operators to:

1. “Maximize” initial recovery so that a second disturbance to recover other seams in avoided.
2. Restore land to a condition that allows at least as good a use as that prior to mining with extra effort required if the land is considered prime agricultural land.
3. Except where impractical, restore land to the original contour.
4. Stabilize area to avoid erosion.
5. Segregate and preserve the quality of topsoil or a subsoil of better quality than the actual topsoil.
6. Avoid disturbance of hydrologic balance with special emphasis upon alluvial valleys in the West.
7. Revegetate the reclaimed land.

(Gordon, 1978, p.9)

A breakdown of the SMCRA requirements shows how the law failed in practice. First, the section requiring the land to be restored to “at least as good a use as that prior to mining” is subjective. To some, a pristine Appalachian hardwood forest with its delicate understory and rich fauna is about the greatest use or condition of land imaginable, but to others, including mine operators and state regulators, it’s just a bunch of trees, and a wasteland of non-native grasses will suffice nicely as an equal-or-better post-mining condition.
Secondly, the requirement that land be returned to approximate original contour is vague, and the inclusion of the caveat “except where impractical” gives the coal industry a pass to tear down anything, including entire mountains, and then simply say that it’s impractical to replace the contour. In fact, this requirement has been so thoroughly ignored that the coal industry now includes in its discourse the argument that mountaintop removal mining is good because it provides flat land, which is a “rare” and “valuable” commodity for development in West Virginia.

Likewise, the requirement to avoid disturbance of the hydrologic balance has been blatantly ignored. More than 700 miles of streams have been buried by valley fills in West Virginia, which violates not only SMCRA but the Clean Water Act as well.

And finally, the requirement that reclaimed land be “revegetated” was woefully inadequate. It allowed coal operators to sow inexpensive seed from non-native invasive species such as fescue and rye grass, crown vetch and tartarian honeysuckle. The disturbance of land in strip mining is enough of an invitation for invasive species, but to intentionally plant them throughout the area ensures that native flora and fauna will never regain a foothold. These shortcomings were not anticipated when SMCRA was passed.

When SMCRA was passed in 1977, most of its supporters assumed mountaintop removal mining would occur only infrequently, in exceptional circumstances. And perhaps that explains why the law’s provisions defining reclamation after mountaintop operations are so vague. Operators are required to reclaim the land so that it “closely resembles the general surface configuration of the land
prior to mining,” or the “approximate original contour” (AOC). This standard could make mountaintop removal mining completely impractical in places like eastern Kentucky and southern West Virginia, where grades often exceed 20 degrees. But it has not been interpreted that way by coal companies, and regulatory officials contend their hands are tied because nobody agrees what AOC really means (Montrie, 2003, p.198).

Even those who assert SMCRA has been a success agree that it has, in many ways, been hijacked by partisan politics and bureaucracy (Gerkin, 1987). Prior to 1977, 25 states regulated surface mining in some manner. However, none of the state regulations met the requirements that would be forthcoming in SMCRA (www.osmre.gov). Turf wars between state regulators and federal officials from the Office of Surface Mining Reclamation and Enforcement have further eroded its effectiveness (Gerkin, 1987).

As far as the battle over surface mining goes, it seems clear that mountaintop removal mining has become ground zero for the debate. The first law regulating surface mining was passed in West Virginia in 1941, and ironically, the battle is still centered in the heart of West Virginia—the only state to lie entirely in Appalachia. The fate of Arch Coal’s 3,100-acre Spruce No. 1 mountaintop removal mine in southern West Virginia, which currently appears to be in the hands of lawyers, will undoubtedly spell the next chapter in the ongoing battle. Plans for that mine have been idled because U.S. District Judge Charles Hayden II blocked the permit on grounds that burying miles of streambed
under hundreds of feet of rock and dirt violates the Clean Water Act. But the Bush Administration plans to weaken the protection of streams, giving the edge to coal companies. Clearly, the outcome is iffy. But when one steps back and looks at the big picture of mountaintop removal operations, it seems that the coal industry has been proceeding relatively unaffected by its opponents. For instance, after the various state initiatives to curtail surface mining in the 1970s, the efforts of CASM and other grassroots organizations, and the best federal legislation ever passed to regulate surface mining (the SMCRA of 1977), the coal industry responded in the 1980s with the largest period of growth in mountaintop removal mining to that point. During the ‘80s, 44 mountaintop removal mining permits were issued for 9,800 acres of land. And then, when the mountaintop removal mining issue gained national status in the late 1990s, mostly because of outcry over Arch Coal’s Spruce No. 1 mine, the coal industry managed an even bigger increase. From 1995 through 1998, 38 mountaintop removal mining permits were issued affecting an unprecedented 27,000 acres in Appalachia (Montrie, 2003).

**Biological Dimensions of Mountaintop Removal Mining**

Mountaintop removal mining is a controversial issue (Hansbarger, 2000). For years, opponents have waged a campaign against the practice of mountaintop removal mining. Many of these opponents object to mountaintop removal mining on environmental grounds. They contend that mountaintop removal mining and valley fills damage the environment in ways that are unacceptable and irreversible.

**Overview**

Objections to mountaintop removal mining on environmental grounds involve issues such as the conservation of existing plant and animal life and often times, the
conservation of natural systems on which that plant and animal life depends. The natural science that most directly addresses those concerns is called conservation biology.

According to a common textbook on the subject, conservation biology is defined as “an integral approach to the protection and management of biodiversity that uses appropriate principles and experiences from basic biological fields such as genetics and ecology from natural resource management fields such as fisheries and wildlife and from social sciences such as anthropology, sociology, philosophy and economics” (Meffe & Carroll, 1997, p. 676). Conservation biology is based on the premise that biodiversity is a natural resource with “intrinsic value,” or value irrespective of its economic worth or utility for humans. The purpose of this section is to examine the effects of mountaintop removal mining from the perspective of conservation biology. This will entail considering the impacts of mountaintop removal mining on the biodiversity and ecological integrity of the affected region. The purpose of such an examination is to better understand the objections that many opponents of mountaintop removal mining proffer in the continuing social discourse over the practice.

**Mountaintop Removal Mining Defined**

Mountaintop removal mining is defined as a mining technique used in steep terrain in which the tops of mountains and ridges are removed to expose the coal that lies beneath them (U.S. EPA, 2000). This process results in the removal of all plant and animal life from the affected mountaintops and ridges. The rock and dirt (mountaintop) that is removed during mining is then deposited into adjacent valleys, usually at the head of a hollow. The deposition of millions of tons of rock and dirt into the valleys buries the streams that occur there, eliminating virtually all life from these areas as well.
Mountaintop removal mining affects larger areas than other mining techniques (Chamblin, 2002). Mountaintop removal mines and the accompanying valley fills are usually 25 square kilometers in size or larger. While mountaintop removal mines account for only 17 percent of surface mine permits in West Virginia, they occupy 44 percent of the total surface mine area (OSM, 2001). If the practice continues at its current rate, about 230,000 acres or 350 square miles of Appalachian hardwood forests eventually will be converted to mountaintop mines (Ward, 2002). Mountaintop removal mining is practiced because it is the most cost-effective way to mine coal in mountainous terrain (Fedorko & Blake, 1998). The technology used and the economy of scale involved allow mining companies to realize a maximum profit through the practice of mountaintop removal mining. Mountaintop removal mining is used primarily in the Appalachian region, particularly the mountains of West Virginia, Kentucky, Tennessee and Virginia (EPA, et al., 2000).

Region Defined

The rough Appalachian topography in which mountaintop removal mining is practiced has made the region unique, both in terms of its geology and the biological diversity it supports. Specifically, the area of Appalachia in which mountaintop removal mining is practiced includes three ecoregions: the Western Allegheny Plateau ecoregion, the Central Appalachian ecoregion, and the Southwestern Appalachian ecoregion. An environmental impact assessment of mountaintop removal mining conducted by five state and federal agencies asserts that the area is home to what is arguably the most diverse collection of plant and animal life found in the United States:
Ecoregional analysis at a national level has highlighted the biological significance of the Appalachian ecoregions. These ecoregions are unique in the world because they combine characteristically northern species with their southern counterparts, and thus boast enormous richness and diversity. Individual watersheds and mountain peaks within the Appalachian ecoregions have been isolated for millions of years. That, in combination with relatively mild environmental conditions, has provided a perfect setting for the evolution of unique species of plants, invertebrates, salamanders, crayfishes, freshwaters mussels and fishes. These species include great numbers of organisms, including terrestrial, aquatic and plant species, which are supported by the Appalachian ecoregions (Stein et al., 2000). The southern Appalachians have the richest salamander fauna in the world (Petranka, 1998; Stein et al., 2000). The Appalachian ecoregion forests represent some of the last remaining stands of a forest type that was once widespread in the northern hemisphere. These rich deciduous forests have been profoundly altered over the past few centuries and are becoming increasingly threatened. (EPA, et al., 2000)

Orientation to General Threats Posed by Mountaintop Removal Mining

When mountaintop removal mining was first practiced in West Virginia in the late ‘60s and early ‘70s, it was considered to be more environmentally friendly than other types of surface mining, specifically contour mining. For instance, a study conducted for the Environmental Protection Agency in the mid 1970s concluded that mountaintop removal mining was “an environmentally desirable surface mining technique in the steep
sloped terrain of southwestern West Virginia and eastern Kentucky when conducted in compliance with existing reclamation criteria” (Shelly and Loy Inc., 1979, p. 6). The current literature seems to lack such views, and it seems widely understood and accepted that mountaintop removal mining causes enormous environment harm that cannot be righted through reclamation attempts. After they’re torn down, the mountains and ridges in mountaintop removal mining areas cannot be rebuilt. For numerous reasons, attempts to return the areas to “approximate original contour” do not work. What’s more, streams die when buried under tons of rock, and even downstream, changes in chemistry, acidity, and dissolved nutrients seriously damage watersheds. Also, the mixed mesophytic, northern hardwood, and oak forests that are destroyed in mountaintop removal mining do not regrow on the reclaimed sites. The rich association of delicate forbs and flowering plants found in the forest understory perish as well. The reclaimed areas are usually limited to grassland communities or a low quality mix of garbage trees and invasive species. These low-quality habitats are wholly unsuitable for the majority of highly evolved and niche-specific species of wildlife that depend on the unique landforms, hydrology and forests of the Appalachian ecoregions.

There is a wealth of information available on the threats mountaintop removal mining poses to the ecosystems of areas in which it is practiced. While the amount and detail of the related information can seem daunting, what is best taken from the voluminous nature of it all is how serious and far-reaching the threat really is. From the largest geological consideration such as the irreparable loss of the mountain itself to the destruction of microscopic ecosystems that exist among bacteria, fungi, phytoplankton,
and algae in the soil and water, the scope of what is lost in mountaintop removal mining is far reaching.

Effects on Watersheds

Because mountaintop removal mining involves valley fills or head-of-hollow fills, streams are directly impacted when they are buried under rock and dirt removed as the mountain or ridge is dismantled. Although records are incomplete and estimates vary, between 550 and 900 miles of stream have been buried in this way because of mountaintop removal mining in Appalachia. Many of these streams in higher elevations or at the heads of hollows are headwater streams, so called because they are the origins of the watershed and have few or no tributaries emptying into them. As such, many headwater streams are small and seem lifeless—nothing more than drainages. However, these small headwater streams are home to a rich variety of aquatic life, and they are crucial to the health of the entire watershed that lies downstream from them (EPA, et al., 2000). Small headwater streams absorb and process a mass of organic material disproportionate to their size. This process is essential to the subsequent energy flow throughout the downstream ecosystem. Much as capillaries are essential to the absorption and distribution of nutrients in the circulatory systems of animals, so are the smallest branches of aquatic ecosystems essential to absorbing and transporting nutrients and cycling energy in a watershed.

The “river continuum concept” (Vannote, Minshall, Cummins, Sedell & Cushing, 1980) suggests that the entire watershed complex, from headwater streams all the way to major rivers, has evolved together as a continuum so that the chemical and biological processes that take place at each point are dependent on the health and proper function of
processes and systems taking place upstream. These chemical and biological processes regulate the energy flow and nutrient cycling in a stream ecosystem—invisible forces that support unseen life forms and help purify the land, air, and water. The river continuum concept suggests that headwater streams, then, are crucial to the function of higher-order streams that lie downstream.

It is fairly obvious that burying these stream systems under mountains of dirt and rock kills them: “The filling of stream segments essentially eliminates the existing stream habitat and aquatic functions of those reaches” (EPA, et al., 2000). The individual life forms that are lost when valley fills bury streams include various single-celled plants and phytoplankton. Wallace, Webster, and Lowe (1992) indicate that the fast-flowing headwater streams in southern Appalachia are home to several unique species of algae. Invertebrate animals living in these headwaters include mayflies (Ephemeroptera), stoneflies (Plecoptera), caddisflies (Trichoptera), dragonflies and damselflies (Odonata), beetles (Cloeoptera), dobsonflies and alderflies (Megaloptera), true bugs (Hemiptera), springtails (Collembola), true flies (Diptera), crayfish (Decapoda), isopods (Isopoda), worms (Oligochaeta and Annelida), and snails (Gastropoda) (U.S. Fish and Wildlife Service, 1998; Science Applications International Corp., 1998). Additionally, 46 species of amphibians and 41 species of reptiles are found in and around stream environments proximate to mountaintop removal mining locations in Appalachia. These include mole, dusky, woodland, four-toed, green, spring, red, mud and brook salamanders as well as newts, hellbenders, mudpuppies, skinks, toads and several species of frogs including cricket, chorus, true, leopard, and pickerel frogs as well as multiple species of tree frogs. The life histories of many of these species are still largely unknown, but as research
continues into the biology of West Virginia’s reptiles and amphibians, it is becoming apparent that most of them have evolved to be highly specialized and niche-dependent (Waldron, 2000).

All of these life forms as well as the energy flow and nutrient cycling they support are lost when delicate mountain streams are eradicated by mountaintop removal valley fills. The environmental impact statement issued by five state and federal agencies concludes that all streams, even small headwaters, play a vital role in the aquatic ecosystem. According to the report, “small streams have maximum interface with the terrestrial environment with large inputs of organic matter from the surrounding landscape; serve as a storage and retention site for nutrients, organic matter and sediment; are sites for the transformation of nutrients and organic matter to fine particulate and dissolved organic matter; and are the main conduit for export of water, nutrients, and organic matter to downstream areas” (EPA, et al., 2000).

In summary, light and the input of allochthonous material are the two limiting factors in the contribution of energy to a river ecosystem as a whole. When an energy source is altered or removed in the upstream reaches, downstream biological communities are also affected. The value of headwater streams to the river ecosystem is emphasized by Doppelt et al. (1993): “Even where inaccessible to fish, these small streams provide high levels of water quality and quantity, sediment control, nutrients and wood debris for downstream reaches of the watershed. Intermittent and ephemeral headwater streams are, therefore, often largely responsible for
maintaining the quality of the downstream riverine processes and habitat for considerable distances.” (EPA, et al., 2000)

Mountaintop removal mining has also been shown to cause a detrimental increase in the amount of sediment carried in streams (Hansbarger, 2000). Headwater streams are especially susceptible to picking up sediment if it is exposed in the areas through which they flow and/or if their velocity is increased by changes in ground stability or slope. It is essential that the volume and velocity of water in headwater streams be kept low to minimize erosion and sedimentation, but mountaintop removal mining has frequently resulted in problems related to these aspects of headwater stream function (U.S. EPA, 1984). Suspended solids carried in headwater streams has a strong negative effect on the various aquatic life forms that live in them (Hansbarger, 2000).

Mountaintop removal mining also often results in detrimental changes in water PH and chemistry (Hansbarger, 2000). Because coal and the rock layers surrounding it are much more acidic than surface rocks and soil, their exposure during mining results in acidic runoff into nearby streams (Starnes & Gasper, 1995). This increase in acidity kills many species of aquatic life in headwater streams as well as in the higher-order streams into which they flow. This increase in acidity continues even after mined areas are reclaimed because of groundwater seeping up through acidic layers deep within the earth (Hansbarger, 2000). Also, reclaimed areas often are less stable than the original area, resulting in continued problems with erosion and pollution of remaining streams.

In addition to continued erosion and acidification, there are other reasons why reclamation fails to adequately address problems related to watershed health. The literature asserts that, despite attempts by the industry to “mitigate” damage caused to
aquatic ecosystems by mountaintop removal mining, the damage cannot be reversed or made good. “As onsite aquatic mitigation possibilities may be limited, offsite compensatory mitigation often has been recommended….However, it is highly unlikely that either replacement streams or pond/wetland systems developed as compensatory mitigation for filling headwater streams would ever compensate for the loss of endemic and rare species present in numerous headwater species” (EPA, et al., 2000).

Effects on Forests

The broadleaf deciduous forest communities that cover about 85 percent of the Appalachian Mountain region are unique in the world. Geographically, they are located in a transition area between southern and northern vegetative zones, and as such, they contain species from both areas. The extremely variable topography of the mountains adds to this effect of mixing northern species with southern species because forest communities that ordinarily might be separated by hundreds of latitudinal miles can be found on the same mountain, separated only by a few hundred feet in elevation or a different directional aspect.

Briefly, the diverse Appalachian hardwood forests can be classified into three categories: the “mixed mesophytic” forest, which includes “cove hardwood” forests, “oak woods,” and “northern hardwoods.” Mixed mesophytic forests are the most diverse woodlands in the Southeast. They contain more than 30 canopy species (Hinkle, McComb & Marcus, 1993). These diverse forests can never be reproduced after a disturbance as profound as mountaintop removal mining. Even with regulations requiring reclamation to the “approximate original contour,” Larry Alt, a West Virginia Division of Environmental Protection permit supervisor, told the Charleston Gazette, “We just can’t
stack it as high as God did” (Ward, 1998). To begin with, much of the material removed in mountaintop mining expands after being disturbed. Therefore, in the post-mining condition, there is a greater volume of material to be dealt with (EPA, et al., 2000).

Also, what had been solid rock is reduced to rubble after it’s blasted and gouged apart, so there is a problem with the stability of reclaimed areas if they are graded to anywhere near the steep angles found in the original mountainous terrain (EPA, et al., 2000). Any attempt to recreate the steep topography of southern West Virginia presents its own impediments to the growth of native hardwood tree species found in the mixed mesophytic forests. For instance, repeated grading by heavy equipment compacts the soil, which has been shown to retard water absorption and prevent the development of deep root systems necessary for most native tree species. The effects of soil compaction are long lasting and can be expected to persist for hundreds of years below the depths that freeze and thaw yearly (Sharratt, Voorhees, & Gatto, 1997).

Changes in soil chemistry and biology also affect the ability of an area to support native forests after mountaintop removal mining. For instance, the presence of mycorrhizal fungi in the top layer of soil has been shown to be important to the survival of trees (Marx & Artman, 1979). However, this fungus can only be found in soil from the top 10 feet of original material. The common use of “alternative” top soiling materials may mean the absence of this fungus (EPA, et al., 2000).

Another large obstacle to the suitability of reclaimed mountaintop removal mines for native tree associations is the use of invasive, non-native species for erosion control. The use of non-native grasses and ground cover to prevent erosion also prevents the establishment of native tree species. “While the original forested habitat was crossed by
flowing streams and was comprised of steep slopes with microhabitats determined by slope, aspect, and moisture regimes, the reclaimed mines are often limited in topographic relief, devoid of flowing water, and most commonly dominated by erosion-controlling, herbaceous communities” (EPA, et al., 2000).

Also, disturbed areas such as mountaintop mine sites are more susceptible to invasive species than mature areas that have not been disturbed and that have full and healthy populations of native species (Meffe & Carroll, 1997). This imperils species of native plants living near the area as well because after invasive populations become established, there are often able to spread more easily into adjacent areas.

It is for the above reasons that scientists from five state and federal agencies concluded that mountaintop removal mining “may involve changing thousands of acres of hardwood forests into grasslands” (EPA, et al., 2000). While research has been done on developing ways in which forestry can be successfully implemented as a post-mining land use, much of the work has focused on growing white pine (Pinus strobus) or other species as a monoculture. It is unlikely that the diverse Appalachian forests could ever be reproduced in post-mine environments, particularly in mountaintop removal sites because the extreme topography lies at the heart of bringing together what has been described as “the most biologically diverse ecosystem in the southeastern United States” (Hinkle, et al., 1993).

Effects on Wildlife

The profound changes that mountaintop removal mining brings to the Appalachian forests mean equally profound effects on the terrestrial wildlife species that use those forests. “Mountaintop mining operations in the Appalachian coal fields involve
fundamental changes to the region’s landscape and terrestrial wildlife habitats” (EPA, et al., 2000).

**Habitat Loss/Invasive Species**

The two most serious threats to biodiversity in the world today are habitat loss and the introduction of exotic species, in that order. Of all plants and animals listed as threatened or endangered in the United States, 85 percent are so listed because of habitat loss while another 49 percent owe their imperiled status, at least in part, to invasive, exotic species (Wilcove, McMillan & Winston, 1993). In addition to being the top two threats to imperiled plant and animal populations, habitat loss and the introduction of exotics are also the two main effects that mountaintop removal mining has on the area in which it is practiced (EPA, et al., 2000). These facts are especially critical given the importance of the Appalachian region for many species of wildlife:

The mixed mesophytic forest of the Appalachian coal fields supports one of the richest floral, breeding bird, mammal and amphibian communities of any upland eastern U.S. forest type (Hinkle et al., 1989; cited in McComb et al., 1991)…. West Virginia is considered the primary component of a major geographic area of importance to neotropical migratory birds in the Northeast. This recognition is based on the relatively high concentration of high-priority bird species occurring in this area. For example, some of the highest concentrations of Northeast forest species such as cerulean warbler, Acadian flycatcher,
worm-eating warbler, Louisiana waterthrush, scarlet
tanager, and wood thrush occur in West Virginia.
Consequently, decisions affecting the forested habitats of
these species in this area can have a large effect on the total
population of these species (Rosenberg and Wells, 1995).
(EPA, et al., 2000)

The unique habitats found in the southern Appalachians are also home to
at least 14 species of vertebrates that can be found nowhere else in the world. The
endemic species are seriously imperiled when the only areas they can live in are
destroyed on the large scales occurring with mountaintop removal mines.

**Fragmentation**

Neotropical migratory songbirds such as the above-mentioned species nest in the
canopy of mature hardwood forests. For unknown reasons, the flourish only in interior
reaches of such forests, far away from openings such as fields or clear cuts. The
deforested areas created by mountaintop removal mining are openings of the type that
greatly reduce the suitability of an area for interior species. A study conducted by five
state and federal agencies concluded that “forest-interior songbird abundance was lower
in fragmented forests, particularly for a few species known to be sensitive to
fragmentation (e.g. Ovenbird)” (EPA, et al., 2000). Although outright habitat loss is the
most serious threat facing imperiled wildlife populations, deforestation can affect interior
species for a number of reasons beyond the physical loss of habitat. For instance, the
phenomenon of forest fragmentation also poses a problem. When a previously unbroken
tract of forest is divided by a mountaintop removal mining operation, forest
fragmentation reduces the suitability of the remaining forest regions for many species of wildlife. For instance, area sensitive species are species that require large tracts of habitat—much more so than would seem necessary given their resource requirements and the sizes of their breeding territories. For example, the black and white warbler, a small neotropical migrant, will not nest in areas containing fewer than 500 acres of unbroken forest habitat (EPA, et al., 2000).

Fragmentation presents another problem when it prevents individuals of a species in one habitat patch from dispersing to other patches or mating with individuals from those other patches. When fragmentation presents a barrier to the exchange of genes, populations can become isolated and potentially experience genetic drift, or loss of genetic similarity with other populations of the same species (Meffe & Carroll, 1997). Forest fragmentation can also reduce the effective population size and the amount of genetic diversity available in the isolated populations, making the individual populations more susceptible to extinction (EPA, et al., 2000). The fragmentation of habitats and creation of barriers to dispersal or travel for mating is a significant threat for many of the salamander species found in Appalachia. The southern Appalachians have more species of salamanders than anywhere else in the world, and a number of these are found nowhere else (Petranka, 1998; Stein, Kutner & Adams, 2000). “Mined landscapes, once composed of forested habitat, become a mosaic consisting of meadow and forest patches. Thus, the resulting landscape takes on a checkerboard pattern, and habitat patches become isolated. Once isolated, rates of extinction increase because rates of colonization decrease” (EPA, et al., 2000).
**Edge Effect**

Deforestation from mountaintop removal mining also affects many interior species through an increase in the amount of edge habitat created. Edge is defined as a transition zone where two different habitat type meet. Certain species make use of this edge habitat, but many others, including forest interior species, avoid it. The portion of the boundary that can be considered edge habitat varies for different species and different edge “effects” being considered. Meffe and Carroll (1997) list estimates ranging from as short as 10 meters to as far as 5,000 meters. For many forest interior species, the zone in which detrimental edge effects occur can be rather large, as much as a quarter mile. For instance, that means that for sensitive interior species, a 650-acre mountaintop removal mine not only eliminates 650 acres of valuable forest habitat, it renders unsuitable a swath of forest along the edge of the mine a quarter mile wide and nearly four miles long. For the above example, that’s approximately as much area as was deforested by the mine itself.

There is much speculation as to why the edge effect is detrimental to some forest interior species (Meffe & Carroll, 1997). It is known that overall species diversity is greater in edge zones, and it has been suggested that competition with the additional number of species found there may be part of the reason edge is detrimental to interior species. Some people, including the coal companies that operate mountaintop removal mines, assert that the increased diversity found in edge habitats is a benefit to the goal of biodiversity, but the scientific community largely disagrees (EPA, et al., 2000). Edge, when created by mountaintop mining in Appalachian hardwood forests, is detrimental because it favors the proliferation of already common species at the expense of rare or
endangered species. For many high-priority species of neotropical migrant songbirds, edge is detrimental for two reasons. As already discussed, many of them will not nest in or near edge, even if the trees there are mature hardwoods identical to those found in the forest interior. For those that do nest in or near edge habitat, nest parasitism by brown-headed cowbirds (Molothrus ater) takes a significant toll on their viability as a species. Many times, the production of neotropical migrants nesting in edge habitats with cowbird populations is so low as to represent a net loss. That means that the breeding adults using these biological sinks have come from source populations in other areas, thereby putting a drain on the overall productivity of the species.

Conclusion

Objections to mountaintop removal mining on “environmental” grounds are built around the fact the practice does irreversible harm to the geology and hydrology of the region in which it is conducted, thus destroying fragile ecosystems and the plant and animal life that depends on them. The “environmental” objections also decry the fact that mountaintop removal mining affects very large areas, thus posing a serious threat to the biological integrity of the Appalachian ecoregions, which already represent rare and in some cases unique natural resources. Further weight is given to these “environmental” objections by an increasing awareness of the dangers posed by habitat loss and the introduction of invasive species—which are recognized both as the biggest threats to biodiversity everywhere and as the main effects of mountaintop removal mining on Appalachia. Those who oppose mountaintop removal mining on “environmental” grounds see a great intrinsic value in the existence of the natural systems and life forms that have evolved in and depend upon the Appalachian ecoregions. They object to the
destruction of these resources because they see them as more valuable than the economic benefits realized through mountaintop removal mining (Ward, 1999).

Standpoint of Coal Industry

The coal industry does not agree with the assertions of area residents who object to mountaintop removal mining, journalists who report what they see at mine sites, or scientists from government agencies such as the EPA who find the practice irreversibly damaging to the ecology of Appalachia. What follows is a block of material taken directly from a Web site devoted to industry claimsmaking. It does not come from a third party, but is a purely partisan text of the kind that was analyzed as supporting claimsmaker text in this study. What follows is a reliable example of the coal industry’s position and dialogue regarding mountaintop removal mining:

Mountaintop Mining is simply coal mining activities that occur at the topmost portion of a mountain. There have been various emotional statements in the press about this form of mining that are neither based on fact nor supported by the truth. This overview is an attempt to provide a viewpoint not readily portrayed in the press and to clarify many misstatements. It is important to accurately present another perspective on mountaintop mining so that individuals can examine for themselves the various viewpoints and arrive at their own conclusions on this mining method. Only through education with all of the facts can controversial issues be accurately studied. …The
future of Appalachia has to be tied to economic diversity. A mono-industry economy is not healthy for the long-term viability of a region. Ideally, jobs that pay factory wages are the goal. Higher wages insure that every household can sustain a decent standard of living. Tourism has been touted by many as a viable alternative. An editorial by Bill Bishop with the *Lexington Herald-Leader* made a very eye-opening point that tourism is principally built on minimum wage jobs and that tourism alone is no bargain for a region. One major drawback facing the region is the availability of level land out of the floodplain---something people in the rest of the country take for granted. For an individual to create level land in mountainous terrain, this task is difficult and financially almost impossible. The responsible use of Mountaintop mining creates level land, land that has the potential for many other uses. … The coal industry does an excellent job of reclamation. The people who work for coal companies live in the same area and have a great deal of pride in their company’s reclamation efforts. One of the favorite reclamation uses today, that has been strongly encouraged by fish and wildlife governmental agencies and environmental groups, is leaving the land in a condition that will enhance use by fish and wildlife. We’ve seen a
resurgence of wildlife at reclaimed mine sites across the region because of leaving open spaces, trees and shrubs that provide nourishment for wildlife and ponds that contain water year round. There is more wildlife than ever, in part because of reclaimed coal lands. It was on reclaimed land where over 150 mountain elk were released recently in Kentucky. As a practical matter, this could not have occurred other than on a reclaimed coal mine site (Mountaintop Mining, 2004).

Regarding changes to the topography and hydrology of the Appalachian ecoregions, the coal industry again disagrees with those who oppose the practice. When responding to opponents, the coal industry asserts that the claims of critics are not true:

Only the topmost portion of the mountain is mined and generally leveled for the maximum recovery of coal. Once reclaimed, it’s hard to tell that mining had ever occurred there. It still looks like a mountain. What’s left is flatter, more useful land on the top of the mountain. … Typically you think of a steam with flowing water year-round.

Ninety-five percent of the "streams" that are covered with fill material (rock and sandstone) are actually intermittent or ephemeral streams---those that basically flow only in connection with a rainfall event. These streams could be characterized as "gullies" or "dry branches". A new "water
course" along the top of the fill and down both sides of the face of the fill is created to replace the existing "gully" or "dry branch." (Mountaintop Mining, 2004)

In summary, the coal companies argue that their reclamation processes work well, but that even if they didn’t, mountaintop removal mining would still be a good thing because the Mountain State has too many mountains and needs the flat land that results when reclamation standards cannot be met. The industry also disagrees that the uppermost tributaries of a watershed should be considered streams because they don’t carry water all the time. Industry spokespeople call them “gullies” or “dry branches” and say that they can be replaced with “water courses” along the top and down the sides of valley fills, which seems to suggest that they could absorb and transfer allochthonous material as effectively as the structures they replace.

Human Dimensions of Mountaintop Removal Mining

Mountaintop removal mining, a technique in which the tops of mountains and ridges are removed to allow more efficient access to coal, has been practiced in West Virginia since 1968. Residents of southern West Virginia have relied upon natural resource extraction for most of their history—far longer than mountaintop removal mining has been practiced. However, their heritage as “Mountaineers” and their ties to the Appalachian Mountains predate both. When mountaintop removal mining threatens this part of their identities, attitudes toward mining may change.

Overview

As the latest chapter in the coal mining history of Appalachia, mountaintop removal mining seems to be amplifying many of the issues traditionally associated with
natural resource extraction and creating some new ones. These issues affect the people living in the area and subsequently also affect the societal discourse that plays out regarding mountaintop removal mining. The purpose of this section is to explore the ways in which mountaintop removal mining affects the people and communities of Appalachia in general and southern West Virginia in particular.

**Community Perspectives and Context**

Communities and the people who live there define their environments in accordance with projections of themselves (Greider & Garkovich, 1994), and they define themselves as products of their heritage (Bridger, 1996). While that assertion may sound confusing, somewhat contradictory, or even tautological, it is a good abstraction of the complexities involved in the process society undergoes while negotiating issues such as mountaintop removal mining. Understanding the effects that an activity such as mountaintop removal mining may have on an area requires a contextual understanding of how that community defines itself. That, in turn, requires understanding the history of the region, particularly if that history involves issues similar to the one being considered. For Appalachia then, it is necessary to understand the community imagery and its related history with coal mining in order to fully appreciate the effects that mountaintop removal mining may have.

The process of defining one’s environment pursuant to projections of self-image is called social construction of the environment (Greider & Garkovich, 1995). In this way, a given physical environment can hold different meanings for different people, depending on the personal values they use to define themselves. What’s more, people of regions with long histories tend to incorporate their traditions into contemporary images
of who and what they are. The effects of heritage narratives and individual social constructions of the environment are felt strongly in decisions regarding land use and natural resource issues (Bridger, 1996). For mining communities such as those that comprise Appalachia, both the personal images people have of themselves and the heritage narratives that are built around the histories of their families and towns are tied closely to coal. The effects that self image and heritage narratives have on societal discourse help to explain the significance coal mining has for Appalachia. Even though coal mining has brought much strife to the communities of Appalachia, it is a part of the region that neither the towns nor their residents can jettison. It also helps to shape their future reaction to mining-related issues.

**Historical Perspectives**

Communities that rely on natural resource extraction for their economic base face unique and complicated problems. Originally, all humans and all communities relied on natural resource “extraction” for their existence. Subsistence lifestyles meant gathering whatever natural resources one needed to survive. At this level, such a relationship is simple and rather uncomplicated. But when industrialized communities, which rely on an economic system to value goods and services, seek all their inputs from natural resource extraction, the simplicity of subsistence living is replaced with a complex social environment that can leave the future of the community in jeopardy if not carefully managed.

The “boom-and-bust” cycle of prosperity followed by destitution is perhaps the most common and easily understood malady to beset communities built around natural resource extraction. In America, this was a common occurrence in the late 19th and early
20th century for logging and mining towns. Large numbers of people would flock to such towns in times of prosperity, often investing in permanent lifestyles that were lost when the resource-based prosperity ended. In these times, natural resource extraction was a labor intensive practice that required considerable manpower. While this allowed a lot of people to partake in the prosperity, it also meant that a lot of people suffered when lean times began. Despite the boom-and-bust cycle, many people living in resource-dependent communities adopted a fatalistic attitude toward the process, perceiving the hard times as inevitable. Interestingly, such a phlegmatic attitude toward the boom-and-bust cycle also fostered perseverance, with many communities adopting the attitude that if hardships would surely come again someday, so too would times of prosperity. Whether the resource is coal, timber, gold or something else, it is pure folly to expect finite local resources to provide indefinite support when extracted at rates that exceed the rate of either supply (replenishment) or demand.

Exceeding the rate of supply or replenishment was a common problem in logging communities. “Cut-and-run” logging outfits would strip all the local forests at their disposal and then move on, leaving behind those who had built towns. In the United States, government regulation of logging companies today assures that the abuses of past cut-and-run practices no longer plague timber-dependent communities (Humphrey, 1990). Instead, the concept of sustainable forestry ensures that consumption does not outstrip supply, and while this may limit the size of the operations in an area, and thus the size of the communities that can grow around them, it helps to prevent the traditional boom-and-bust cycle. While the concept of sustainable forestry does not have a great deal
of direct transferability or utility for coal-dependent communities, it does reveal the value, from a social perspective, of not abusing the resources that support a community.

Traditionally, coal-dependent communities have been subject more to the vagaries of demand. Whether through ruthless companies who will move their operations without notice to save on production costs or through market fluctuations caused by a mild winter or increased use of alternative fuels, those who make a living extracting coal often find themselves abruptly out of work. Nowhere are the effects of dependency on the coal industry more evident than in Appalachia, where coal mining and industrialization evolved together. Early examples of the development of “company towns,” or communities built and controlled entirely by mining companies, paint a grim picture of the relationship between rural Appalachian residents and the coal industry (Gaventa, 1980). Throughout Appalachia, pre-industrial subsistence lifestyles persisted for generations before coal companies made natural resource extraction into big business. Once the transition was made, the previously adaptable and independent residents quickly became dependent on the new lifestyle allowed by a natural resource economy. Books detailing life in company towns reveal the severity of the dependency and control: “The mining company controlled nearly every aspect of community life, from work, shopping, education, retail merchandising, and medical care. The company store became the hub of coal mining community life, while non-denominational and generic wooden frame churches were the rule for religious expression. The company provided schools and medical facilities as well” (Jones, 2000).

The complete control that coal companies exerted over their workers’ lives eliminated any choices they might have had. Because the “towns” were unincorporated
private holdings, the companies could and did forbid political meetings and even media activity. Workers were paid in the company’s own currency, which could only be used at company stores. Working conditions in the mines were extremely unsafe, and companies did little or nothing when problems were reported. Unions were discouraged, and the workers were at the mercy of their employers. For early coal companies, the prospects of improved compensation or working conditions were simply impediments to higher profits. Greater productivity was their priority, and the best way to ensure it was to thoroughly control the means of production, which included workers.

Conditions improved for miners as unions evolved during the early 20th century. In many cases, violent, armed conflicts between workers and the companies were necessary before miners were able to leverage real improvements in their conditions. The “mine wars” that took place in West Virginia include the Paint-Cabin Creek War of 1912-1913, the Mingo-Logan Mine War of 1919-1921, and the Northern Coal Field War of 1925-1931 (U.S. EPA, 2000). The lawless violence of these conflicts is hard to imagine today, but like some kind of civil war, it paved the way for a very different future in the coal fields of Appalachia.

The gross abuse of 19th century coal miners no longer exists in America, but many tribulations remain for residents of coal-dependent communities. These problems stem from the fact that coal mining has been such an integral part of life in Appalachian communities for generations. Because of this connection, any change in the former necessarily causes changes in the latter.
Current Forces

One change in Appalachian coal mining in recent decades has been the increase in mechanization and an accompanying decrease in the need for manpower (U.S. EPA, 2000). From its beginnings with large numbers of low-paid workers, coal mining has evolved into a high-tech industry with fewer but better-paid workers who perform specialized jobs involving machinery. In 19th century Appalachian coal towns, manpower was the key to making mines productive, but that began to change for the first time in the 1920s, when greater mechanization and blasting technology began to displace human labor. A spike in the use of hydropower during this period also resulted in lower demand for coal (Shifflett, 1991). The replacement of men with machines and the vagaries of demand are problems that continue to plague coal-dependent communities today. West Virginia, which is home to more coal miners than any other Appalachian state, has suffered the most from this steady reduction in coal jobs. From 1970 until 1997, West Virginia has lost nearly 5 percent of its mining jobs every year. From 1989 to 1998, for instance, the number of coal miners working at mountaintop removal mines in West Virginia fell from 6,434 to 4,019—an average annual decrease of 5.1 percent (U.S. EPA, 2000). Underground mines experienced similar staffing cutbacks of 5.8 percent per year during the same period. Decades of steady cutbacks in manpower have made mechanization the bane of many mining towns, and mountaintop removal mining, which uses technology unavailable in earlier eras, is seen by many as the next step in the progression of mechanization and job loss.

Areas in which coal mining traditionally provided a large portion of the employment now struggle to provide service-sector jobs or other types of employment for
out-of-work miners. Many regions cannot support other industry or employment sources and subsequently struggle with double-digit unemployment and a dwindling tax base (U.S. EPA, 2000). The demoralizing result of such trouble is an erosion of the sense of community in coal mining regions, increases in clinical depression, drug and alcohol abuse, domestic violence, crime, suicide, disintegration of family life, and a variety of psychological problems (Mooney, 1998).

**Contemporary Perspectives**

Given the reality of coal mining in Appalachia, and its long history there, how do West Virginians frame mountaintop removal mining? How do communities go about negotiating the social discourse necessary to arrive at conclusions regarding norms and standards, policy or regulation? The answers to those questions remain largely unexplored, probably because the avenues for such social discourse remain unorganized and therefore hard to study. There is little question that mountaintop removal mining is controversial (Hansbarger, 2000). Debate and conflict swirl around the issue, but not through the organized channels that have been developed to address natural resource issues in other places. A substantial body of knowledge is developing that shows how organized deliberation and consensus-building within communities can lead to long-term success in addressing environmental, land-use and natural resource issues (Wittayapak & Dearden, 1999; Lachman, 1997; Bromley, 1994). However, these methods for the definition and sustainable operationalization of a community’s will regarding natural resource issues have yet to reach West Virginia. “The land use planning function in West Virginia, when it is carried out at all, has usually been carried out by ad hoc boards and commissions, which are not integrated into local policy development or decision making”
Simply put, there are few organized channels through which community sentiment can affect decision making, and the ones that do exist are nothing more than token institutions that have no real effect.

The absence of organized channels for community input does not mean that there is none to be had. A scoping exercise conducted in advance of an environmental impact assessment of mountaintop removal mining by five federal and state agencies found a considerable groundswell of local concern over the issue. Input was gathered from citizens regarding overall attitudes toward mountaintop removal mining as well as particular concerns regarding effects. Some of those who submitted comments during the scoping exercise regard mountaintop removal as a negative impact on the well-being of the affected communities, while others perceive the effects of mountaintop removal favorably. A common theme with those who perceive mountaintop removal favorably is that it creates flat land in an area that otherwise has none. These people see flat, developable land as a much-needed resource that is more of a benefit to the area than prohibitive, mountainous topography. Some of those who disagree describe the historical and cultural significance of the mountains for Appalachian communities. Their assertions reveal that rural Appalachian lifestyles draw on what Bridger (1996) would call “heritage narratives” involving the mountains:

I have spent the last 15 years ministering in various ways to people in the coalfields of West Virginia and Kentucky, and I have seen with great sadness the effects of the degradation of the natural environment, disruption and loss of community, and assault on the cultural heritage and spirituality of the people. As a seventh-generation West Virginian, I also
experience the pain myself … Appalachian people love this mountain home with a strength equaled by few, but our mountains are being destroyed in the name of greed. When they are gone, we will have nothing left, and our spirits will be truly crushed (Warren, 1999).

The damage and fallout of mountaintop removal will be irreversible and devastating to our waters, the wildlife, and ecology. And after their 15 years of seam extraction, they’ll [the coal companies] walk away from the destruction (Dillon, 1999)

I want to state up front that I am against this practice. I believe mountaintop mining destroys a precious gift of our Creator to his people…. I also believe it places the lusts and desires of a few wealthy individuals far above the rights and needs of the majority of the people of our state. I believe it destroys our forests, desecrates our streams, ruins our landscape, changes the natural balance of nature, allows foreign and undesirable species of wildlife to flourish, endangers natural and desirable species, ruins our silence, steals our land, destroys our homes, and brings a poverty and loss of morale among the people in coal mining areas (Stover, 1999). (U.S. EPA, 2000, III.U-15)

The interagency scoping exercise that produced the above-cited letters is not the only evidence to suggest that coalfield residents cannot automatically be considered sympathetic with mining interests, especially when mountaintop removal mining is the issue. A study of coalfield residents found that if forced to choose, most would opt to preserve the streams, mountains and wildlife of Appalachia, even if it meant losing the
economic benefits that mountaintop removal mining may offer (Ward, 1999). The study found that concern for the environment was strongest in the poorest, most rural areas—a finding that supports that assertion that heritage narratives involving strong cultural ties to the land are the building blocks for social constructions that favor conservation over exploitation. The basis for this strong cultural connection to the land may reach all the way back to the 18th century pioneers who settled Appalachia. Often described as being significantly different of character and ideology, the earliest residents of Appalachia were loners of sorts who sought out the isolation of the rugged mountains and hollows. They preferred this environment—and the freedom it offered—over the colonial towns of the East Coast (Gaventa, 1980). Vestiges of this independence and love of the land are still being discovered today. Previously undocumented because of a lack of record keeping, ethnographic researchers are discovering how significant subsistence gardening and the harvest of non-traditional forest resources are for rural West Virginians. If the emerging research is accurate, the preservation of “culturally significant landscapes” and the resources they contain may be among the most important issues for some residents of rural Appalachia (Hammett & Chamberlain, 1998; Hufford, 1998).

Effects on Communities

In all, the scoping exercise conducted as part of the EPA’s environmental impact statement drew 646 verbal comments and 95 written comments. These responses were analyzed and divided into categories based on the nature of the concerns expressed in them. A number of environmental issues relating to mountaintop removal mining were identified and categorized as either aquatic issues or terrestrial issues. Also identified were eight concerns that could broadly be described as human/community issues (U.S.
EPA, 2000). These eight community issues and the effects the EPA suggested they might have on coalfield residents are as follows:

- Effects of mining on scenery and culturally significant landscapes

As discussed previously, mountaintop removal mining has strong negative effects on culturally significant landscapes. To paraphrase the input the EPA received during its scoping exercise, anyone who loves West Virginia’s mountainous countryside and finds great intrinsic value in its existence feels a great sadness and sense of loss when it is destroyed through mountaintop mining and valley fill operations. To those who value such things, the intricate wonders present in even a few square feet of forest land make the loss of thousand of acres a tragedy of holocaust proportions. The importance of culturally significant landscapes is not restricted to intrinsic value. Subsistence gardening and the harvest of non-traditional forest products in Appalachia comprise an unknown but significant economic benefit to rural residents.

- Effects from mountaintop removal mining on flooding of downstream communities

Mountaintop removal mining definitely changes the topography and drainage patterns of large areas (U.S. EPA, 2000). Computer modeling indicates rainwater drains from the deforested areas faster than it would from the original terrain and native vegetation. The EPA report indicates that the increased peak flow of runoff would not be enough to cause flooding under normal circumstances. However, the draft of the EIS from which those estimates came was prepared before two consecutive years of deadly flooding in southern West Virginia that are now being blamed on mountaintop removal mining (Clines, 2002; Radmacher, 2002; Shogren, 2002). New anecdotal evidence
(flooding) suggests that the dynamics of severe thunderstorms and rapid runoff over hundreds or thousands of acres of deforested mountain land are hard to predict.

- Effects of blasting on homes, water wells, and quality of life

  According to the EPA’s summary of findings related to blasting and quality of life, there is a shortage of scientific evidence to either support or refute claims of blasting damage to homes or wells. Some data suggest that heavily regulated blasting is within predetermined safe levels and should not be causing damage. However, contradictory anecdotal evidence also exists. Coalfield residents reportedly complain often that damage is occurring to homes and wells, regardless of data suggesting negligible effects. The summary of findings was more conclusive regarding quality of life. The EPA report suggested that the worry and hassle of fighting over the alleged effects of mining had a negative effect on quality of life for coalfield residents. That is to say, the quality of life for people in mountaintop mining areas is being adversely affected, regardless of actual structural effects on their homes, wells, and property.

- Potential health risks of airborne dust and fumes from blasting and other mining operations

  Airborne dust and fumes present the most risk for people with pre-existing respiratory problems such as asthma or chronic obstructive pulmonary disease. For others, the effects may be significant only when in the “immediate area” of the mining activity. The EPA study determined that at mountaintop mines in the Appalachian region, “detectable concentrations of respirable dust, total dust, nitrogen dioxide, nitric oxide, carbon monoxide and ammonia were found in ambient air locations both in close proximity to the mining operation and at a distance of greater than 1,000 feet from the
blasting operation” (U.S. EPA, 2000, p. ES-19). Dust from coal trucks and other equipment traveling on dirt roads away from the mine sites was also identified as a legitimate problem.

- Valley fill stability

As with the risk of flooding, the EIS downplays the likelihood that valley fills would fail and send mudslides crashing down steep Appalachian hollows. Although anecdotal evidence exists to suggest that mud and sediment loads in streams increase as water runs off deforested hillsides, there seems to be little support for the concern that valley fills may fail, threatening downstream residents. Concerns of this nature seem to stem from experiences such as the Buffalo Creek disaster in which a slurry dam failed and sent millions of gallons of sludge, mud and water crashing down a populated hollow. Because valley fills are not designed as dams, there is little potential for damage from their failure. As with other deforested areas, the most significant community-related risks posed by valley fills may stem from rapid runoff during times of rain and dust during dry periods.

- Ability for reclaimed mined land to provide an economic or social benefit to coalfield communities

Although many people who support mountaintop removal mining do so because they believe the flat land it creates is a valuable economic and development opportunity, the EPA suggests that few mountaintop sites are used for such purposes. Most end up as grasslands devoid of both native wildlife and development. According to the EIS, the Surface Mine Control and Reclamation Act of 1977 requires that post-mining land use parameters be clearly spelled out and followed. Very few mountaintop removal mining
sites receive “higher use” status for development when such decisions are made during the process of issuing mining permits. This suggests that flattened mine lands are not turning out to be the great economic opportunities some suggest they might.

- Economic impacts of reducing mining

The EPA asserts that coal mining of all kinds represents 3 percent of West Virginia’s total employment and personal income. Although 3 percent may not sound like a lot, the EIS suggest that it represents a “considerable role” in the economy of the region. The study does not estimate how much of that 3 percent is represented by mountaintop removal operations.

- Environmental justice

Environmental justice seems to be lacking in the regulation and oversight of mountaintop mining operations in Appalachia. Despite laws requiring federal agencies to ensure environmental justice for minority, low-income or poorly educated residents, the EPA seems to suggest in its EIS that such matters are not considered. The EPA states that low-income, poorly educated “environmental justice populations” are prevalent in rural Appalachia and that these residents are disproportionately affected by mountaintop mining. For instance, these residents “merit special consideration in public involvement efforts.” They also suffer disproportionately from blasting disturbances because “they tend to live in substandard or non-traditional housing with poorly constructed wells” (U.S. EPA, 2000, p. ES-22).

Other concerns not listed on the EPA’s list of community issues include the effects of mountaintop removal mining on tourism/recreation and the occurrence of coal mine drainage and acid mine drainage. The literature suggests that regardless of
regulatory policy, coal mining in Appalachia will continue to decline because of market forces, and that the area should seek to diversify its economic base because coal reserves are finite and will run out eventually (West Virginia University, 2000). So far, tourism has shown to be West Virginia’s most promising economic prospect. Travel and tourism contributed 2.54 billion dollars to West Virginia’s economy in 1991 and continue to grow at an even faster rate than coal mining is declining (West Virginia University, 2000). From 1993 to 1998, the number of visitors to the state and the length of their stays increased significantly. In 1998 alone, tourism revenues increased 21 percent from the year before (West Virginia Department of Tourism, 1999). However, West Virginia’s appeal as a tourist destination hinges on its scenic beauty. West Virginia’s mountains are what set it apart from other states, and they are the basis of the tourism for the area. Some perceive large-scale mountaintop removal mining as a potential threat to tourism in West Virginia (U.S. EPA, 2000). If the state loses its mountains, what will it have to offer for a tourism industry built around the scenic beauty of the Appalachians? With the inevitable decline and loss of the coal industry already under way, it would seem shortsighted to ruin the state’s best chance of sustainable economic salvation in order to secure a few more years of economic benefits from mountaintop removal mining.

Coal mine drainage and acid mine drainage are also real considerations whenever coal mining takes place in West Virginia. Since 1977, both issues have been required to be addressed in every new mine permit issued. However, problems with drainage still occur despite this consideration. Mine drainage is a serious problem for communities in the area because it adversely affects the suitability of affected groundwater and streams for consumption and recreation. It also degrades their aesthetics. Throughout Appalachia,
the cost of dealing with just the mine drainage that currently exists will reach 42.6 billion dollars (U.S. EPA, 2000). Mine drainage problems can exist anywhere acidic or metal-laden material from deep underground is disturbed in such a way that it comes into contact with groundwater or vice-versa. Today’s mountaintop removal mines and the accompanying valley fills are already much larger in size and volume than traditional contour mines, and they continue to grow. While mountaintop removal mines account for only 17 percent of surface mine permits in West Virginia, they occupy 44 percent of the total surface mine area (OSM, 2001). If the practice continues at its current rate, about 230,000 acres or 350 square miles of Appalachian hardwood forests eventually will be converted to mountaintop mines (Ward, 2002). That leaves the potential for costly mine drainage problems on a scale never before seen.

Conclusion

Based on the literature reviewed here, mountaintop removal mining affects Appalachian communities in a number of ways, most of them negative. The most significant effects of mountaintop removal mining, in terms of human dimensions and community, seem to be the loss of culturally significant landscapes, the potential for severe flash flooding, and a potential threat to the growing tourism industry in West Virginia.

Southern West Virginia communities and their residents draw a strong part of their self identity from heritage narratives involving their ancestral roots in the Appalachian Mountains. Many places across America define themselves through ties to locally unique landforms, but perhaps nowhere are communities and local culture so inextricably linked with the local landscape than in Appalachia. West Virginia is the only
state to be completely encompassed in the Appalachian Mountains, and the heritage of the first mountaineers who sought refuge in the steep hollows more than 250 years ago remains very important for many of those living there today. Mountaintop removal mining destroys the landscapes with which rural residents associate their heritage and thus their self-identities. This lowers the quality of life for residents of Appalachia and erodes the sense of community in their towns.

With each year that goes by, more is learned about the long-term effects of mountaintop removal mining. With record devastation from flooding for two straight years, it seems that concern over large-scale deforestation and its effect on the hydrology of the mountains may be warranted. With 1,500 homes destroyed by early summer flooding in 2002, the potential devastation facing Appalachian communities is clear. While many people accept environmental degradation as a result of mining, new direct threats such as flooding may change the attitudes of some local residents toward the coal industry they have lived with all their lives.

People in Chopping Block Hollow, an old coal hamlet that corkscrews handsomely down the side of Dunham Mountain, used to speak in awe of “the 50-year flood” that swept through their homes after a drenching storm in 1957. But that historic reference has been washed away this year as residents have repeatedly had to muck out their houses and businesses. They aim their anger up the mountain at a mining technique aptly named mountaintop removal.

“Every time we get a rain now, it’s the 50-year flood, what with all the destruction coming off that mountain,” says Betty Collins, who
complained of shoveling four-inch-deep mud and silt off her property after five rainfalls since May. Hollow dwellers insist that the lucrative blasting and grinding away of the mountaintop for its coal in the last four years have stripped their hillsides of vegetation, obliterated streams and drainage patterns, and turned the hollow into an overflowing funnel every time rain drains off the mining plateau being created above their houses…. “The company and the government inspectors tell us the rain’s an act of God,” said Betty Banks, who lives here. “Well, it wasn’t God who went up on our mountain with a ‘dozer to leave it naked. They are destroying us here.” Banks said her property had not flooded in 40 years before decapitation of the mountain. (Clines, 2002)

Mountaintop removal mining also has the potential to negatively impact tourism in West Virginia. Because the state’s tourism industry is built around the scenic beauty of the Appalachian Mountains, the conversion of thousands of acres into barren, flat grasslands is an obvious concern. Allowing mountaintop removal mining to threaten tourism is particularly unadvisable because the former is a finite, resource-based extraction activity that is declining steadily toward an inevitable end while the latter is a sustainable, long-term economic prospect that has been growing rapidly for more than a decade.

The literature suggests that West Virginia communities need organized, responsive channels for input through which residents can affect the land use and policy decisions made in their areas. To be sustainable, these community-based initiatives must first determine the views of the residents, reach consensus regarding goals, and provide a
mechanism to ensure long-term monitoring so that the system doesn’t fall apart (Lachman, 1997). Effective channels for input and systematic rigor in planning and enactment are essential to ensure these community-based programs are successful. The patchwork of planning boards and commissions that now exists in West Virginia does not seem to effectively tap or represent the wills of the communities it is supposed to serve (U.S. EPA, 2000). This difficulty in organizing and actuating community initiatives is especially problematic in areas such as Appalachia, where the effects of natural resource dependency may weaken the ability of the community to stick through the process well enough to achieve long-term success (Krannich & Luloff, 1991). Conflicting worldviews among rural residents also may impede a community-based consensus on the issue. Clearly, mountaintop removal mining affects the people and communities of southern West Virginia. The long-term effects of the practice are difficult to predict, even from other literature specifically focusing on resource-dependent regions in similar situations (Freudenburg & Frickel, 1994). More research is needed into the direction of social discourse and environmental policy regarding mountaintop removal mining in order to understand the long-term effects of the practice on Appalachian communities.
Chapter 3: LITERATURE REVIEW

Now that the issue of mountaintop removal mining has been clarified in the previous chapter, this chapter will focus on the research literature necessary to provide context for the operationalization and interpretation of this study as it relates to several fields of academic inquiry. It does this by reviewing certain parts of the literature on mass media effects and public opinion, particularly as they relate to the mediation and discourse surrounding environmental issues. It also visits certain parts of the literature related to risk analysis and risk perception, which for controversial issues involving science, technology and the environment, is essential to understanding the impetus behind claimsmakers’ initiatives, media treatment, and public perception.

Mass Media, Public Opinion, and the Mountaintop Removal Mining Issue

Since mountaintop removal mining emerged as a national environmental issue in the late 1990s, people from outside Appalachia have joined residents to oppose the practice fervently and for a variety of reasons. Their actions have included legal challenges to stop mountaintop removal mining and the valley fills that go along with it. In reaction, the coal industry, related interests and some local residents who support the practice have responded to the opposition, creating a classic case of an issue with two bitterly opposed sides.

Overview

The transformation of mountaintop removal mining from something few people had heard about into a well-known and highly controversial environmental issue involved several factors. The mass media were clearly one of those factors, and they continue to be an integral part of public discourse regarding the matter. Whatever policies and
regulations eventually emerge and whatever public opinions form regarding mountaintop removal mining, the media will undoubtedly play a significant role in the outcome. This section will review the literature pertinent to media effects, public opinion and social discourse over environmental issues in general and mountaintop removal mining in particular. The purpose of this section is to reveal how the media may impact the process of social deliberation over mountaintop removal mining.

Public Opinion and the Environment

Research on public opinion toward the environment suggests that widespread awareness of the need to conserve natural resources, including forests, wildlife and wild vistas, began to develop in the mid 1800s. The vanguards in this movement were artists such as John Muir, writers such as Ralph Waldo Emerson and Henry David Thoreau, and wealthy urban citizens. Beginning in the 1930s, sufficient public support existed to allow a variety of conservation initiatives to become policy, including the Civilian Conservation Corps, the Soil Conservation Service, the U.S. Fish and Wildlife Service, and the Pittman-Robertson Act, which generated funds for wildlife habitat conservation.

Widespread public participation in the form of environmental activism developed in the late 1960s, ironically at about the same time the first mountaintop removal mine was opened in West Virginia. After Earth Day in 1970, public interest in environmental issues waned until the early 1980s. By Earth Day in 1990, “public concern for environmental quality reached unprecedented levels” (Dunlap, 1991, p. 285). Since then, the trend in public environmentalism has been toward one of “global issues” and the “green movement” (McAllister & Studlar, 1999). The literature offers mixed reports when exploring demographic patterns in public opinion regarding environmental issues.
Some suggest that age, income, education level, and political affiliation all predict level of concern and opinion regarding environmental issues (Theodori & Luloff, 2002; Dietz, Stern & Guagnano, 1998) while others report little predictive value in demographics, suggesting instead that variables such as understanding of the issue are more reliable indicators (O’Connor, Bord, Yarnal & Wiefek, 2002). A study of public opinion regarding mountaintop removal mining in West Virginia found that opposition to the practice was not strongest among affluent urban residents but rather among rural residents with lower incomes and educational levels (Ward, 1999). However, public opinion and public understanding may be two different things. A 1999 survey of 1,500 Americans found rather poor understanding of even basic facts underlying environmental issues (NEETF, 1999). The conclusion is that people may claim to care about environmental issues, but they do not understand them very well and are not likely able to make fact-based judgments regarding the issues (West, Lewis, Greenberg, Sachsman & Rogers, 2003).

Controversial Elements of Mountaintop Removal Mining

As the review of the literature indicates, there are several aspects of mountaintop removal mining that fuel controversy and serve as platforms for public opinion regarding the issue. To begin with, it is a technique used when other strip mining methods are either not feasible or not economically desirable. As the name implies, the tops of mountains are removed using explosives and large machines called draglines, and the excess material, or spoil, is deposited into adjacent valleys. As a result, the mountains are leveled, and nearby streams are lost as well when buried under millions of tons of rock and dirt. Mountaintop removal mines involve significantly more land area than traditional
surface mines, sometimes thousand of acres (Chamblin, 2001). In total, 320,000 acres, or 350 square miles, could be consumed by mountaintop removal mining in Appalachia (Ward, 2002). The practice is extremely controversial (Hansbarger, 2000). Objections to mountaintop removal can be divided into two categories—those with environmental dimensions and those with human dimensions. Environmental dimensions include geologic concerns such as the loss of landforms on which the Appalachian ecoregions depend; hydrologic impacts such as the loss of streams, wetlands, seeps and other aquatic environments; the loss of aquatic ecosystems dependent upon the biochemical processes and energy cycling functions of naturally occurring hydrologic features; loss and adverse effects to surface and groundwater resources; the destruction of habitat unique to the Appalachian ecoregions and essential for endemic plant and animal species; the loss of thousands of acres of broadleaf deciduous forest communities; especially the mixed mesophytic forest communities of the region; deforestation, forest fragmentation and increased edge effect on a variety of area-sensitive and forest-interior species of neotropical migrant songbirds and niche-specific herpetiles; and concerns over exotic and invasive plant and animal species. Human dimensions include the loss of culturally significant landscapes; the risk of increased flooding in downstream communities; the threat to West Virginia’s growing tourism industry; the effects of blasting on homes, water wells, and quality of life; potential risks of airborne dust and fumes from mining operations; valley fill stability; inability of reclaimed mine lands to provide economic or social benefit to coalfield communities; uncertainty of environmental justice for rural residents; and the cost and negative effects of acid mine drainage on affected communities (U.S. EPA, 2000).
People oppose mountaintop removal mining for a variety of reasons related to the above impacts, but the coal industry favors the technique because it allows the profitable extraction of coal that previously was impractical to mine. Mountaintop removal mining is extremely mechanized and relies on technology rather than manpower to be productive. As a result, mountaintop removal mining is seen by many as yet another step by the coal industry to increase production and profits while employing fewer and fewer people. Although mountaintop removal puts much less money into the community through wages than labor-intensive mining used to, it still generates a large tax base for the area, and so politicians have a reason to favor mining interests over opposing interests.

All of this has made mountaintop removal mining quite contentious. However, controversy over the practice did not occur until the late 1990s. Mountaintop removal mining in Appalachia seemed to operate virtually unnoticed and unchallenged for nearly 30 years of its 35-year existence. The emergence of strong, widespread opposition to mountaintop removal mining seemed to coincide with national media coverage of the issue:

Increased concern about mountaintop mining operations occurred in 1997 and 1998, both in the media, by federal agencies, and in notices of intended litigation related to the subject…. Press coverage of public issues with mountaintop mining surfaced beginning in August 1997, in television, periodicals, and newspapers, including U.S. News and World Report, ABC’s ‘Night Line’ program, as well as the Charleston (WV)
It is unclear what effect the debut of mountaintop removal mining as an issue in the mass media had and continues to have on the simultaneous development of social discourse and subsequent policy decisions regarding the mining technique.

Journalism and Public Opinion

Most news-writing texts assert that reporters should strive to cover happenings that greatly impact the economy, community and environment of their readers. Matters of great controversy are likewise highly newsworthy. As shown above, mountaintop removal mining qualifies as a newsworthy issue in all of these areas and more. That, no doubt, is the justification the media would have given in 1997 if asked why they were covering mountaintop removal mining. But what effect do the media have on public perception, opinion, discourse and policy regarding mountaintop removal mining?

Publicity

One way the media may help to make opinions into majority opinions is by disseminating them to a mass audience (Schoenbach & Becker, 1995). In the case of mountaintop removal mining, national media coverage of an issue from deep in the mountains of southern West Virginia undoubtedly put the topic before many people who otherwise would not have known about it. If the media, in their attempt to key in on and explain the controversy, put before a national audience the opinions of those opposed to mountaintop removal, then clearly the conduit for widespread adoption of these opinions
had been created. This simple act of “publicizing” an opinion or providing it with “publicity” is one of the basic effects the media can have on public opinion.

As for influencing opinion about an issue after it has been raised, the media often claim to mirror society in their coverage (Schoenbach & Becker, 1995). Hence, when they carry messages regarding controversial issues, the media suggest that these opinions already seem to be the public opinion. After all, the media are only reflecting an image of what reporters encounter when investigating public matters. Following this logic, the media are merely “indicants” or indicators of public opinion. However, it must be considered that many people who consume media are not involved in the issue being mediated. In fact, many will be unaware of its existence before receiving the mediated message containing the issue. Thus, the media can quickly spread existing opinion. In this way, outrage against mountaintop removal mining may spread as 1) the issue is publicized through media coverage, and 2) opinions opposing it are included in that coverage. Furthermore, there is evidence to suggest that the media do more than simply increase the scale of existing public opinion regarding an issue. Various media effects theories suggest that the press may, under some circumstances, shape public opinion, not merely spread it.

Social Construction of Reality

Virtually every living adult in America today knows something about a place he has never been or believes something about an issue she has never encountered. So much of what we know and believe about distant (and sometimes not-so-distant) places comes from experiencing them through media. For more than 10 years, Americans have developed rich repertoires of knowledge about Iraq and its leader, Saddam Hussein. And
likewise, many Americans have formed strong opinions about the social and political environment of Iraq. However, virtually none of these people has ever been there or had any interaction with Hussein at all. For all they know, he may not even exist. Lippmann (1922) made similar assertions about the ability of the media to construct realities concerning issues for which people have no direct experience.

Media messages containing information on social relations and the norms and structure of society automatically include “ideological bents” that help shape the viewers’ perceptions and opinions regarding the content of the messages. “Vicarious cultivation of social conceptions is most clearly revealed in studies verifying the direction of causality by varying experimentally the nature and amount of exposure to media influences” (Bandura, 1994, p. 76). These influences, in which the media construct realities for their consumers, have been observed in both television and print media.

The media’s role in constructing social realities is especially powerful for large and complex societies. In these places, many of the events that comprise the news are of issues with which local audiences have little or no personal experience. For the majority of Americans, news coming from the mountains of southern West Virginia is definitely outside the bounds of personal experience. Even among West Virginia residents, few live near mountaintop removal mines or would have an occasion to learn about them without mediated information and accounts. Within the state, southern West Virginia or the “downstate” region is culturally isolated from the Northern and Eastern panhandles. So even for people in other areas of the state, the media may be their only source of information regarding mountaintop removal mining. As such, the opinions carried in media messages may be the only, or at least the first, opinions that people encounter. For
national audiences, the social construction of their perceptions of reality in West Virginia seems equally likely to rely exclusively on the media.

However, by the late 1990s, when mountaintop removal mining emerged as an issue in the national media, many Americans had been seeing, hearing and thinking a lot about other environmental issues. In fact, since the first Earth Day was celebrated in 1970, Americans have been exposed to a steady diet of environmental issue, both through media and other channels (Dunlap, 1991). This previous exposure to environmental issues, most of which are controversial and lead to opinion formation, may have had a real effect on the way the “newest” such issue—mountaintop removal mining—was received and processed by people who had come to learn about other environmental issues in the same way.

**Priming**

“…When people witness, read or hear of an event via the mass media, ideas having a similar meaning are activated in them for a short time afterward, and these thoughts in turn can activate other semantically related ideas and action tendencies” (Jo & Berkowitz, 1994, p. 45). The above description of the priming theory of media effects suggests that people’s reactions to new information will be influenced by any previous experience or existing attitudes they possess toward similar issues. The mountaintop removal mining issue encompasses a panacea of longstanding environmental issues such as deforestation, the protection of aquatic resources, and wildlife conservation to name but a few. American media consumers had had plenty of prior experience with these and other environmental issues by the time mountaintop removal mining debuted in the mass media in the late 1990s. And so for many people, this “first brush” with the new issue
was likely to have activated semantically related ideas they had regarding other
environmental issues. In this way, these pre-existing experiences and opinions regarding
environmental issue were likely to prime their reactions to mountaintop removal mining.
But however “primed” people may be to react to an issue such as mountaintop removal
mining, the fact remains that until the media put the issue before them, they won’t be
talking about it. That assertion is corroborated in the case of mountaintop removal
mining, which failed to gain nationwide attention for nearly 30 years but then did so quite
quickly after becoming an item on the media agenda in the late 1990s.

**Agenda-setting**

The agenda-setting function of the press has been shown to be especially powerful
for environmental issues (Atwater, Salwen & Anderson, 1985). For many environmental
issues, media coverage dictates almost exclusively the success or failure of the issue to
enter the arena of public discourse. In fact, longitudinal studies have suggested that when
it comes to environmental issues, the media agenda is more influential than the public
agenda and real-world conditions (Ader, 1995) or the agenda of the scientific community
(Maher, 1994) in generating widespread awareness of an issue or of its causes and
effects. The agenda-setting effect of the media operates so convincingly with
environmental issues because they are unobtrusive for the majority of news consumers
(Zucker, 1978). The literature on issue obtrusiveness and issue salience suggests that the
agenda-setting function of the press for any issue will depend on how much the issue
intrudes directly into the lives of the news consumers (obtrusiveness) and how important
they believe it is, based on their personal values (issue salience). An issue may be salient
without being obtrusive, such as when somebody cares deeply about something without
having it affect his or her life every day. Environmental issues commonly follow this pattern. Less common is the scenario in which an issue is obtrusive but not salient. For example, if someone lives along a busy street, traffic is obtrusive for them because it is present in his or her life every day. However, if that person doesn’t care about noise and fumes and doesn’t mind being in traffic jams, then the heavy traffic, as an issue, may not be salient. Unlike issues such as the economy or health care, for which a large proportion of news consumers may have had personal experience, environmental issues, although they may be salient for people, do not obtrude into their daily lives. That’s why the agenda-setting effect is so strong for environmental issues—people have little or no direct experience from which to base their perceptions (the issue is low in obtrusiveness), but yet they are compelled to care deeply about the issue once they learn that it exists (it is highly salient). That assertion is in keeping with the previously discussed observation that most people are unaware of environmental issues such as mountaintop removal mining until they learn of them through mass media. The tendency for people to quickly and readily embrace the media agenda on environmental issues leaves open the question of the power the media have in shaping public opinion and driving social discourse regarding issues such as mountaintop removal mining. In addition to a commanding role in influencing which environmental issues are talked about and when, do the media affect public opinion through the way they frame these issues?

Framing

“The concept of framing is central to an understanding of the media role in shaping environmental debate” (Liebler & Bendix, 1996, p. 54). This is because framing, unlike agenda-setting, provides a way to determine the flavor of media coverage of
environmental issues (Maher, 2001). Framing on the part of those making the claims involves selecting and using certain viewpoints and descriptions of an issue while ignoring others (Entman, 1991). Meanwhile, framing on the part of media researchers involves searching texts for the patterns of words, relationships among words, phrases and meanings that claimsmakers have embedded there. While agenda-setting simply provides an indication of which issues are being talked about, framing provides insight into the content and qualities of those messages. This is particularly important for issues such as mountaintop removal mining because environmental issues are generally controversial, with strong viewpoints from at least two opposing sides seeking to have their opinions become the dominant public opinion. This competition for frame dominance often unfolds around environmental issues:

Frames found in the news media may have their roots elsewhere. The information campaigns of environmentalists and the timber industry have produced frames, i.e., competing social realities of the old-growth controversy. Each side has engaged in rhetorical strategies creating frames that are then “…reframed by the other group with an antithetical or oppositional context.” (Liebler & Bendix, 1996, p. 54)

This struggle for dominance in the realm of public opinion carries with it very high stakes for the opposing viewpoints that comprise the controversy in environmental issues. One side’s ability to have its viewpoint become the dominant public opinion often spells the difference between winning a policy battle and losing it. This is because the outcome of policy struggles hinges as much on social values and public opinion as it does on scientific knowledge (Vale 1970, 1988). Can variations in media framing of an issue
play a role in determining which opinions become dominant in the public sphere? In short, the answer is yes.

The literature suggests that media frames often become the dominant public frames for environmental issues. For instance, the media consistently frame urban sprawl as an issue that is caused by development, overlooking the truth and failing to accurately frame population growth as the real cause of sprawl (Maher, 1996). This has affected public opinion, which mirrors the media frame in labeling development as the cause of sprawl. Both media and public frames of the sprawl issue differ from the frame scientists use when communicating the issue. And even though press releases and interviews from scientists may be a source of information for stories related to urban sprawl, it is the media frame of “development” that has become the dominant public frame regarding the issue (Maher, 1994). This type of effect has been documented elsewhere, as news coverage of scientific issues often fails to get at the root causes or fully explain details (Bendix & Liebler, 1991). The evidence suggests, then, that media framing of an issue has a lot to do with how the public frames an issue. And as previously discussed, value-based public frames, particularly for environmental issues, often carry as much weight as factually based evidence in making policy decisions.

There is further evidence directly linking media framing of controversial issues such as mountaintop removal mining with the outcome of social discourse over those issues across time. However, framing methodologies have not always offered an objective, replicable way to measure such changes. Past framing research has left a lot to be desired in terms of reliability and validity. For that matter, even clear definitions of terms and concepts have been absent in much of the framing literature. Among
quantitative, social-behavioral research into media texts, the content analysis has long been the king of precision. By comparison, framing has been a sloppy attempt at progress for the field of analyzing media messages.

Much of the early research on framing relied on a qualitative approach with an individual researcher working alone, as the expert, to identify frames in media content. This approach makes frame identification a rather subjective process. Does one reader saying a story is using a “conflict” frame make that really the case? There is danger in this kind of lone-scholar analysis that the identification of a set of possible frames can be done arbitrarily. An unsystematic approach to defining frames could mean that the set of possible frames is not exhaustive or that the frame categories are not mutually exclusive. Also, without a systematic approach to defining possible frames, researchers may tend to find frames that they are consciously or unconsciously looking for. Researchers might also tend to define frames in a stereotypical or conventional way (Tankard, 2001, p. 103).

However, the problem was not lost on several mass communication scholars who recognized not only the lack of order within the framing paradigm, but also its potential, if only a solid method could be devised. Framing has strong potential as a method for the study of media texts as well as for public opinion, persuasion, and policy research. “This
could include investigations of the effectiveness of various strategies used by political strategists and public relations practitioners or how events shape the news” (Miller, 1997). By comparison, content analysis can only count the occurrence of codified elements. Attaching meaning to them is difficult without straying into the realm of subjective judgment. Likewise, agenda setting tells only which topics the media are publicizing. It does nothing to reveal the tone or flavor of those topics, but instead “strips away almost everything worth knowing about how the media cover an issue and leaves only the shell of a topic” (Kosicki, 1993).

The first attempts at introducing rigor and systematicity into framing research were rather crude. Gamson’s confusing coding sheets were one of the early prototypes (Fisher, 1997). Gamson also helped to devise what he called a “media package” for use in empirical framing research. The “media package” is a long paragraph of key words, phrases, and other descriptors that is supposed to capture the essence of the frame being sought (Gamson & Modigliani, 1989). It bears a striking resemblance to the exhaustive definitions used in content analysis to allow coders to identify all aspects of a category and to more readily identify the types of stories that belong there. In fact, the media package serves the same purpose. It is designed to allow separate framing researchers to reach the same conclusion when assigning text or parts thereof to a particular frame.

Another early attempt at lending rigor to framing studies was Swenson’s list of story elements (Tankard, 2001). The method is not far removed from some of the looser methods used in sociology, although Swenson (1993) wrote that it was nearly 100 percent reliable in test-retest trials. The elements are merely a list of story attributes such as
gender of the author, placement of the article in the paper, the “morality orientation” of the article, and some others.

Early attempts at rigor within the framing research community also included the “list of frames” approach, which advocates the compilation of a list of frames that will serve as guideposts for future researchers by providing them with the frames they should expect to find (Tankard, et al., 1991). The idea seems to be based on the premise that good scholarship will build on the contributions of past researcher to grow a body of knowledge. It also seems to borrow from the idea that a proven set of coding categories can be used again and again in content analysis with good results.

Tankard himself writes that the “list of frames” approach “… is not necessarily heavily quantitative. Rather, it attempts to be systematic about frame identification and to show that there are defining characteristics of media frames that different observers can recognize and agree upon” (Tankard, 2001, p. 103).

Tankard asserted that without more progress toward precise, empirical approaches to framing, the field will never achieve any significant theory-building power. What is needed, he asserts, is a method for which reliability can be verified. The method must also provide clear working definitions and parameters, purge subjectivity from the system, allow replication, and provide results that are meaningful and useful.

Frame mapping analysis is one approach that captures all of the above criteria plus some additional benefits to be discussed shortly. The frame mapping method uses Miller’s VBPro and VBMMap computer programs for analyzing verbatim text and multidimensional scaling of concepts. The programs are based mathematically on the frequency and co-occurrence of key terms in text. Frame mapping analysis is one of the
emerging methodologies of framing research being used to identify differences in media coverage over time. As one of the few methodologies designed specifically for longitudinal use, frame mapping has been applied to show support for the framing-related theories of frame resonance and the spiral of opportunity (Miller & Riechert, 2001). Both of these concepts are related to competition, over time, for media frames and public opinion.

We examine the news media framing of public life in the context of contentious issues where opposing interests and values collide…. We argue that opposing stakeholders try to gain public and policymaker support for their positions less by offering new facts or by challenging their evaluations of those facts and more by altering the frames or interpretive dimensions by which the facts are evaluated. Member of these competing public and private stakeholder groups become claimsmakers when they articulate their perspective. As people discuss their position, they are making claims about the issues. Often, these claims are explicit, but perhaps just as often they are implied…. The process of framing becomes more apparent when stakeholders compete for support. They do this by talking across each other, not by dialogue…. Controversies persist precisely because stakeholders martial different facts and different interpretations of the facts. In a word, they frame things differently. (Miller & Riechert, 2001, p. 107)

The spiral of opportunity is the period in the framing cycle during which the competing groups struggle to present their frames of the issue through the news media. It
is an “opportunity” because either side could prevail. It contains four phases: emergence, conflict, resonance and resolution (Miller & Riechert, 2001). Eventually, one frame or set of frames will come to dominate the others and resonate with the public opinion. The framing cycle theory suggests that this transition will catapult the dominant frame into such a position of superiority that the competing frame is completely crushed. The stakeholder group that had relied on the competing frame to gain the upper hand in struggle over public opinion must abandon the frame or change it enough so that it is new or fresh and try again. In this condition, one frame is so dominant that even those stakeholders trying to advance competing frames must use the dominant frame in their communication because it has come to define the issue as it currently exists. This resonance phase of the framing cycle is where the public discourse concept of “consent” resides.

The concept of consent suggests that the media do a lot to create and maintain public consent by painting a uniform picture of the world for everyone and by providing everyone with a homogenous, common point of reference (Robinson, 1995). When media frames become dominant frames in society, everyone—even those who disagree—recognizes a certain perspective as being dominant, while competing frames are universally recognized as subordinate. This condition can be illustrated in a quote from a West Virginia resident submitted as public input during a scoping exercise conducted by the U.S. Environmental Protection Agency as part of an environmental impact assessment on mountaintop removal mining: “My personal opinion is that mountaintop mining has been and is beneficial to West Virginia and to the environment in which I wish to live” (U.S. EPA, 2000, p. III.U-16). The underlining has not been added. The
original comment included it for emphasis. Clearly, this person, who supports mountaintop removal mining, believes that her opinion lies outside the dominant public frame. Some public opinion research would corroborate her apparent perception, as at least one study has indicated that residents of the state solidly oppose mountaintop removal mining (Ward, 1999). As such, she feels compelled to qualify her comment by suggesting, though the use of underlining, that the environment in which she wishes to live is probably different from the environment in which most other people would want to live. This suggests that the frame of mountaintop removal as environmentally detrimental is recognized as dominant, even among those who oppose that frame. Some believe that the frame that emerges as dominant in the resonance phase of the framing cycle will come to influence public policy making related to the issue:

When the resonance process is complete, one frame comes to dominate the debate, and decision makers set public policy to conform to it. In this situation, proponents of the losing frame see no opportunities to win converts under their old frame. In this case, they can either adjust their rhetoric to a new frame or concede and withdraw from the policy debate.

(Miller & Riechert, 2001, p. 113)

If this is true, then “winning” the struggle to gain dominance in the cycle of framing controversial issues such as mountaintop removal mining has serious implications for stakeholders, as future policy decision may hinge on the outcome. Some support for this assertion can be seen in the discourse over mountaintop removal mining already. For instance, Hansbarger (2000) noted in his thesis that homogenous public
opposition (indicative of a frame having reached the resonance phase) may be having an impact on policy:

In the past, [mountaintop mine] permitting was done to create jobs and bring economic relief to areas of southern West Virginia. Recently, permitting has become a bigger problem for coal companies associated with mountaintop removal mining. This has been due to public outcry, interest groups, and recognition by many resource agencies (i.e. U.S.FWS, EPA) that impacts from mountaintop removal mining are substantial, and warrant close attention, monitoring and, in certain cases, exclusion (EPA Region 3 Website, 1999)….If the ‘no build option’ is chosen, the coal company can take its case to the supreme court. The Spruce Mine case … is at this stage. Arch Coal Company wants to open the mine, but due to public outcry, and recommendations from the U.S. FWS and the West Virginia Highlands Conservancy, they have not been allowed to start the mine.” (Hansbarger, 2000, p. 31)

However, Hansbarger goes on to assert that in other cases, policymakers decide to permit mountaintop mines regardless of public input or even existing laws prohibiting the practices associated with the method:

Sometimes, decisions are made to proceed with a development even though there is a public outcry against it or there are known environmental impacts. This has been the case with mountaintop removal mining sites, even though environmental impact assessments have identified potentially ‘irreparable damage’ to the environment that violates
federal law such as the Surface Mine Control and Reclamation Act, [which prohibits] the filling of perennial and ephemeral streams…. Decisions on significant public or private development projects are not, in fact, made following the logic of a rational model. Instead, decisions are influenced by nonscientific factors such as agency and corporate power and interest group politics…. Coal companies have had the upper hand in dealing with mountaintop removal mining issues in West Virginia to this point. Recently, federal and state agencies have begun to bring to bear their considerable resources as well in the debate over mountaintop removal mining.” (Hansbarger, 2000, p. 32)

The vagaries of policy decision regarding mountaintop removal mining in West Virginia may suggest that the issue is so new that no one frame has reached the resonance phase of the cycle and rallied the momentum of public opinion necessary to consistently win the day. However, a lack of organization and effectiveness among the local government bodies that are supposed to channel public discourse and bring the will of the people to bear in policy decisions in West Virginia may have as much as to do with the status of the issue as anything. When describing land use and development policies related to mountaintop removal mining in West Virginia, the EPA said this: “The land use planning function in West Virginia, when it is carried out at all, has usually been carried out by ad hoc boards and commissions, which are not integrated into local policy development or decision making. Planning has not been internalized as a central policy or program concern of local government. A number of counties have no planning
commission and, of those that do, some have no staff and no effective power” (U.S. EPA, 2000, p. III.R-4).

Simply put, there are few organized channels through which community sentiment can affect decision making, and the ones that do exist are nothing more than token institutions that have no real effect. This situation could impede the process by which issue frames influence public opinion and subsequently policy. Despite these roadblocks to public input into policy, there are those who believe that an organized public could do much to take back public life and affect policy (Boyte, 1995). And while many assert that the media, not the public, control deliberation in America (Page, 1996) the literature on framing would suggest that whichever group is able to implant its frame most successfully into media coverage may well end up controlling both public opinion and policy, if only indirectly. Given the plausibility of that scenario, it seems logical to explore the media’s track record in dealing with environmental issues in order to learn more about the possible direction public discourse over mountaintop removal mining could take in the years ahead.

Frame mapping analysis offers a solid method for the operationalization of such a study. It includes many of the needed improvements in framing research without losing any of the richness of deep textual analysis. In fact, the computer algorithms used in the cluster analysis identify relations among key words and phrases that no human eye could spot.

What’s more, frame mapping analysis opens up several new possibilities for framing research that were probably not feasible before. For one thing, frame mapping analysis and the underlying theories of frame resonance and spiral of opportunity suggest
that frames be seen as a preceding factor in policymaking. The idea of claimsmakers determining media content by competing to place their frames there seems to contradict the agenda-setting tradition, which is confident that the media set the public agenda and not vice-versa (Wanta, 1997). However, the frame mapping theories do not suggest that all claimsmakers are successful in placing frames and controlling media content. Far from it. In fact, few actually succeed in winning the media frame. It is very much in keeping with spiral of opportunity and frame mapping theories that the media set the agenda and determine which frames will make it through the gatekeeping process.

The frame mapping theories (spiral of opportunity and frame resonance) also propagate investigations into news coverage as an independent variable shaping public opinion as well as law and policy. These are all much-needed theoretical and conceptual advances for the mass communication discipline. Frame mapping analysis is more than a method for objective, replicable analysis of the qualities (not just content) of media messages. It is also accompanied by two theories that contribute to present and future public opinion and policy research.

**Media and the Environment**

Despite the suggested power of the media over public deliberation, the literature suggests that when it comes to scientific matters, a category to which many environmental issues belong, the media are less than savvy. For one thing, news reporters covering science and the environment rely heavily on “information subsidies” such as press kits and expert source testimonials in their stories (Griffin & Dunwoody, 1995). And even with these aides, many scientists complain that reporters misinterpret or otherwise incorrectly report even the most basic details. Also, reporter’s assessments of
which environmental issues are the most important do not agree with scientist’s ratings (West, Lewis, Greenberg, Sachsman & Rogers, 2003; Maher, 2000). One of the biggest problems reporters seem to have when covering science or the environment is making the coverage simple and understandable enough for the non-scientific public that is their audience (Masterton, 1992). Some suggest that this difficulty in parlaying understandability to the public stems from the fact that environmental issues are more complex than other commonly mediated issues. In fact, the comparative difficulty of reporting on environmental issues may explain why journalists are often uninterested in environmental reporting and rate it a low priority, even while these same journalists acknowledge that it is high on the public’s priority list (West et al., 2003). The Association for Education in Journalism and Mass Communication, an academic research outlet, has a subdivision dedicated to improving the process of “science communication,” or reporting on science and environmental issues in the mainstream media. Academic think tanks such as the AEJMC subdivision and their professional counterparts such as the Society of Environmental Journalists (SEJ) endeavor to solve the problems that plague environmental reporting, but the fact remains that the media perform much differently when covering these matters than when reporting other issues. Some media critics argue that alternative voices are shut out of media coverage on the environment (Hansen, 1990), probably in deference to industry and government elites (Griffin & Dunwoody, 1995). And even with the extensive use of information subsidies, scientists are sometimes unable to get the media to adopt their suggested frames for environmental issues (Maher, 1994). Quantitative newspaper research has indicated that governmental agencies are the claimsmakers who most often succeed in shaping media texts by having
their public relations materials appear there (Sachsman, 1973; Smith, 1993). There is nothing in the literature to suggest yet how the media’s coverage and framing of mountaintop removal mining has compared with their performance on other environmental issues.

Conclusion

Having just emerged in the mainstream media fewer than six years ago, the mountaintop removal mining issue is seemingly unexplored by media scholars. This is unfortunate, because it is a contentious issue around which the winds of public discourse are swirling rapidly. The issue’s 35-year history in southern West Virginia but only recent emergence in the national media are an opportunity to analyze the effect that the debut of media attention will have on public discourse and policymaking. The literature suggests that mountaintop removal mining should be a relatively unobtrusive issue for most Americans and even many West Virginians. As such, the agenda-setting function of media coverage should operate strongly and put the issue squarely on the public agenda. This appears to have happened already or to be in the process of happening. Its semantic similarity with other environmental issues should mean that the environmental schemas of many Americans are primed to assimilate the mountaintop removal mining issue and readily process the matter in terms of public opinion. However, new framing research suggests that quite a struggle may lie ahead among stakeholders seeking to make their frames of the issue the dominant media frames as well. Whichever stakeholder group succeeds in setting the media’s frame for the issue should eventually prevail in driving out all competing frames and finding resonance between its frame and the public opinion. This has strong policy implications, and given efficient channels of democratic
deliberation, should precede dominance in the decision making arena. Frame mapping analysis is needed to determine which stage the mountaintop removal mining issue has reached in the spiral of opportunity framing cycle and to identify which frames appear to be emerging, defining the discourse, and approaching resonance with a solidified public opinion.

Effects of Risk Analysis and Risk Perception on Mountaintop Removal Claimsmaking

Perception of risk—both on the part of the media and the public—is perhaps the most powerful factor directing the success or failure of an environmental issue.

Overview

Claimsmakers offer varying portrayals of the environmental risk posed by a practice such as mountaintop removal mining. These varying claims about risk drive the controversy (competition) among stakeholders. As such, differences in risk perception are responsible for the very birth of these controversial issues. Conflicting accounts of risk also fuel uncertainty over science, technology and environmental matters (Friedman, Dunwoody, & Rogers, 1999). These two factors of controversy and uncertainty are hallmarks of environmental discourse. They legitimize news coverage of the issue while simultaneously complicating that coverage tremendously. They spawn public participation and yet at the same time decrease the likelihood of a quick or easy resolution. Perceptions of risk are responsible for creating the issues, legitimizing media coverage of them, and directing public discourse over them. Untangling how claimsmakers frame environmental risks, how the media report them and how the public perceives them is crucial for social scientists who hope to build theory and make
predictions about these processes. Therefore, it is essential to discuss the risk literature as part of the theoretical underpinning for a study such as the one proposed here.

The transformation of mountaintop removal mining from something few people had heard about into a well-known and highly controversial environmental issue involved several factors. The mass media were clearly one of those factors, and they continue to be an integral part of public discourse concerning how much environmental risk is acceptable from practices such as mountaintop removal mining. Claimsmakers do much to shape that media coverage as they compete to disseminate various claims about the risk posed by mountaintop removal mining. Whatever policies and regulations eventually emerge and whatever public perceptions of risk finally form regarding mountaintop removal mining, claimsmakers and the media will undoubtedly play significant roles in the outcome. This section will review the literature pertinent to public perception of environmental risk as affected by claimsmakers and media framing of that risk and apply it to the mountaintop removal mining issue.

Risk

It seems that no uniform definition exists for the term “risk” as used in academic circles to describe the study of potentially uncertain or dangerous actions or behaviors and people’s reactions to them. Despite this, the study of risk, risk theory, and risk analysis are vast. The earliest studies of risk involved cataloguing and predicting people’s reactions to situations of chance such as taking a bet or rolling dice given the potential of a specific outcome (Slovik, 2000). These laboratory experiments were methodologically sound and produced defensible results about people’s risk-taking tendencies in controlled
circumstances, but they did little to shed light on people’s perception of real-life risks such as living near environmentally damaging industry.

In light of this shortcoming in early studies, quite a bit of the contemporary “risk” literature addresses environmental risk—or the potential danger and uncertainty stemming from various human uses of the environment. The focus of this environmental risk analysis tends to involve the effect of a particular environmental risk on people and their perception of and behavior toward that potential risk. Dunwoody (1991) asserts that this human perception of risk occurs on two planes—cognitive and affective. Simply put, people may know one thing about an environmental risk but feel another way about it that is at odds with what they know.

For instance, someone may know that nuclear power is cleaner than coal-burning power plants, and also quite safe, but still be uncomfortable with it as a “risk” based on affective perceptions. Similarly, someone may know, cognitively, that mountaintop removal mining is environmentally devastating, but still not actively oppose it because of feelings that the mining industry helps the local economy or is part of the area’s heritage.

This cognitive/affective distinction in risk perception also marks a split within the discipline of risk analysis. The two competing or opposing approaches can be labeled the objectivist (or rationalistic) approach and the subjectivist approach.

The objectivist tradition of risk analysis tends to follow the cognitive model in assessing risk. The objectivist notion suggests that there is one true degree of risk posed by an action or event. For instance, the risk of dying in an airplane accident can be determined statistically by using factors such as how frequently one flies, how frequently
planes crash and how often people survive plane crashes. Determining the known degree of risk involves nothing more than obtaining all the needed information and calculating it.

Conversely, the subjectivist approach to risk analysis asserts that there may be various degrees of risk surrounding a single event and that these variations in risk are the result of differences in individual perception of risk. For instance, if someone is deeply worried about being a victim of crime, then for that person, the risk posed by violent crime is greater than it is for someone who is unconcerned about the issue. While the objectivist approach may assert that, statistically, both of the people in the above example may be incorrect in their perception of the risk (one overestimating it and the other underestimating it), the subjectivist approach would argue that both are correct. To support such a seemingly illogical assertion, subjectivists would say that the person who is extremely worried about risk is indeed affected more by crime than the unconcerned person because he or she probably lives in fear and may, as a result, enjoy a lower quality of life. The subjectivist approach is newer than the objectivist tradition. Subjectivist assessments of risk are gaining momentum within the research community and have been for some time. The split between these two approaches can be quite deep, and ironically, the study of controversial environmental risks is itself quite controversial at times.

Traditionally, risk assessment “experts” tend to use objectivist approaches to scientifically calculate risks. This involves quantifying the hazard in question, assessing how much of the hazard it takes to actually cause harm, assessing how much of the hazard is actually being manifested, and finally assessing how large the impact is, both individually and socially (West, et al., 2003). Not surprisingly, this approach to assessing risk differs from the way lay people process the risk of a hazard facing their everyday
lives. People tend to reach a conclusion about risk in a way more similar to the subjectivist approach (in fact, the subjectivist approach is modeled to more closely match the way the public processes risk and to incorporate these public “methods” into risk analysis (Priest, 1995).

There is a third-person effect at work in risk perception as well (Dunwoody, 1991). Some people consistently assert that potential risks are more of a threat to others than to themselves. For instance, people studied as a part of risk analysis research usually report that a particular environmental risk will pose a greater threat to others or to society at large than to themselves. Little explanation of this third-person effect has been offered, but some have said that it stems from the belief that one’s own risk avoidance or compensation skills are superior to that of others (Dunwoody, 1991).

The “double standard” of this third-person effect and the tendency of people to process perceptions of risk differently in their cognitive and affective schemas suggest a number of things, including the idea that something other than their own independent judgment is affecting people’s perceptions of risk. The literature has clearly identified the media as an outside influence that likely shapes people’s expectation and perception of risk. But as is often the case, the media are not the only variable at work:

We have found that individuals are willing to use media channels for knowledge about risk, but rely on interpersonal channels to inform their level of worry about risk. We tend to see media channels—newspapers, magazines, television and radio—as telling us something about our world but not ourselves. We think it is likely that
individuals use the mass media risk stories for information about risks but resist content in those channels that attempts to tell them how worried to be about risks. Secondly, we think individuals will regard the ‘information about’ risks as telling them something about risk as a social phenomenon, not about the risk to themselves personally (Dunwoody, 1991, p. 27).

**Claimsmaking**

However, the media do not operate in isolation. Claimsmakers are a necessary part of the equation because they provide claims or messages that the media can adopt or pass over in the news selection process. Dunwoody’s assertions about the role of the media in shaping public perception of environmental risks do not directly mention the function of claimsmakers, but without them, the media would not work the way they do. Miller and Riechert (2001) assert that claimsmakers, also called stakeholders, help to shape the way the media frame an issue by promoting certain frames in the claims and dialogue they put forth. Competing claimsmakers vie for the spotlight of the media because the claimsmakers who most successfully embed their frame of the issue into media coverage will likely gain a foothold in public opinion (Miller & Riechert, 2001).

As stakeholders find access to journalists, they may be able to win visibility for their selective issue definition by exposure in the mass media. Journalists, striving for objectivity, depend on spokespersons as sources for information and comments. This dependence would
suggest a win-win situation in which reporters need a quote, and a group of representatives want to publicize their perspective. As issues become more complex, they involve multiple stakeholders or claimsmakers who then compete for access to news reporters. …Conflict motivates stakeholders to increase their efforts to shape media content. Stakeholders make substantial efforts to have their points of view reflected in the media (Miller & Riechert, 2001, p. 112).

But as is sometimes the case, all the desire in the world cannot guarantee claimsmakers a place in the media spotlight. For example, mountaintop removal mining, a destructive method of coal extraction practiced in Appalachia, has been under way since 1968. Local opposition to the mountaintop removal mining has existed since the first mountaintop removal mine was opened on Bullpush Mountain in West Virginia almost 35 years ago by Cannelton Industries. However, for much of that time, opponents were unable to forge a place for themselves in the national media or in the policymaking arena. Powerful industry leaders and state regulators quietly went about the permitting process required to operate the mines, ignoring federal watershed protection laws in the process. It has only been since 1997 that the issue has emerged in the mainstream media and claimsmakers could begin to compete for a venue from which to publicize their frames (U.S. EPA, 2000).

The reason claimsmakers sometimes find themselves unable to tap the media stems from the philosophy underscoring newsgathering in America. To begin with, news
coverage, which is the dominant form of media exposure sought by claimsmakers of environmental issues, relies on a news peg to activate or legitimize attention (Sachsman, 1991). There are many worthwhile and important (to somebody) issues that never receive attention from the news media because the news judgment used by American journalists requires that news peg with which to justify coverage. A news peg can be thought of as the reason or justification for doing a story. Often, a recent development or timely happening can be the news peg that justifies news coverage of an otherwise un-newsworthy event. Without something new or different, it can be hard to find a news peg for certain issues. Mountaintop removal mining seems to have been one such issue. It failed to catch national media attention in the late 1960s and early 1970s when it was new and recency could serve as the news peg. Because the initial opportunity was lost, there was no history of news coverage that could legitimize follow-ups—another frequent news peg. It was a long time (nearly 30 years) before developments surrounding the mountaintop removal mining issue provided a real news peg, thus allowing claimsmakers to attract and keep the attention of the national news media.

Mountaintop removal mining also may have failed to attract media attention until the late 1990s because media coverage of environmental matters tends to focus on events, not issues (Sachsman, 1991). The focus on events instead of issues means that although thousands of acres of mountain habitat were being leveled and hundreds of miles of valley streams were being buried by tons of rock and dirt, as long as the process was gradual, mountaintop removal mining would remain merely an issue and not a singular event that could be isolated and held up to symbolically represent the less conspicuous underlying issue (Greenberg, Sachsman, Sandman & Salomone, 1989). While local
opponents of mountaintop removal mining and claimsmakers trying to speak out against the practice may have felt that the issue was of utmost importance and newsworthiness, it simply did not find a foothold in the national media because it lacked event status.

Perceptions of risk, more than perhaps anything else, affect journalists decisions to focus on spectacular rather than chronic environmental issues (Allan, Adam & Carter, 2000; Sachsman, 1991). Journalists know that the public finds exotic, memorable and mysterious risks much less acceptable than those that are familiar, easily forgotten, or simple (West, et al., 2003). For many Americans, coal mining deep in the Appalachians isn’t as exotic, memorable, or mysterious as other environmental issues. Therefore, perceptions of risk regarding the issue were unlikely to measure up to flashier topics. For that reason, the longer mountaintop removal mining continued uneventfully, the less likely it was to qualify as hard news. The need for a spectacular splash or singular defining event may seem a whimsical criteria for awarding newsworthy status to issues such as mountaintop removal mining, but the news media rely heavily on such cues and triggers to guide their coverage. The news mix is far from a perfect representation of all the worthwhile issues that could be treated. Instead, it is a selection of what’s available—a selection based in objectivity and designed to avoid bias. Miller & Riechert (2001) put it this way:

Journalists don’t report issues; they report news.

When journalists scrutinize the world looking for news they evaluate what they see according to news values, which are the criteria for deciding what to report and what emphasis to provide. Because issues often are not directly attached to
news values, they can lie dormant until they are impelled onto the public agenda. Walter Lippmann (1922) said of news: There must be manifestation. The course of events must assume a certain definable shape, and until it is in a phase where some aspect is an accomplished fact, news does not separate itself from the ocean of possible truth (p. 340). (111)

**Media Attention and the Effect on Risk Perception**

With the issue of mountaintop removal mining, at least three developments, or manifestations as Lippmann would call them, occurred near the turn of the 21st century to provide some news pegs and events on which to hang coverage of the issue. Those developments included a federal lawsuit over largest mountaintop removal mine ever proposed, the release of a draft environmental impact statement by the U.S. EPA, and two straight years of deadly flooding that experts directly linked to hydrologic changes resulting from mountaintop removal mining.

The first of these developments involved plans for a huge mountaintop mine in southern West Virginia. In 1998, Arch Coal Inc. began moving forward with plans to open what would be the largest mountaintop removal mine in history. At 3,100 acres, the Spruce No. 1 Mine would turn nearly five square miles of forested mountain land into a virtual moonscape. In light of such a prospect, the West Virginia Highlands Conservancy filed a federal lawsuit to stop the permit for the Spruce Mine, asserting that the valley fills that accompany mountaintop removal mines violate the Clean Water Act. In 1999, U.S. District Judge Charles Hayden II blocked the permit. The mine remains unopened,
but Arch Coal has continued to push for permit approval. The legal wrangling over the Spruce Mine permit and the implications of the Clean Water Act for valley fills were a clear and unmistakable news peg. Hayden’s ruling and the promise of appeals and further legal action promised that never again would the issue lack a news peg. The media were free to report, and the claimsmakers were free to compete in an attempt to make their frame the media’s frame, thereby gaining the coveted conduit to public opinion.

What’s more, the spectacular scale of the huge Spruce No. 1 Mine and its distinction as the largest mountaintop mine ever planned helped to put a face on the mountaintop removal mining issue. It provided the “spectacular” manifestation needed to help the media get past the problem of reporting on a seamless environmental issue.

Lawsuits often provide the news peg that results in media coverage of a longstanding environmental risk. For example, a lawsuit seeking compensation for workers sickened in a radium factory was one of the first instances of environmental risk claimsmakers finding success through the media as a result of litigation. In the early 1920s, workers at the U.S. Radium Corporation spent their days working with deadly radium-based paint (Neuzil & Kovarik, 1996). The glowing paint was applied to the faces and dials of watches so that they could be read in the dark. In addition to working without protective clothing, the workers were taught to shape the tips of the paintbrushes with the lips after every few strokes. Many of the workers became sick and died as a result of radium poisoning.

Five women, who through diligent research, came to the conclusion that their ailments were work related, probably from the radium paint they used, sued the company
seeking damages. However, they had a difficult time persuading anyone that radium was the source of their ills:

There was a resistance to warnings about the dangers of radium to society—highlighting the importance in the relationship between ideas and social structure. In addition, radium was seen as part of the arena of science and medicine and, as such, enjoyed a certain legitimacy that made it almost beyond criticism. Science was seen as having all the answers, and people were reluctant to question it. It was not until … mainstream media outlets became involved in the story—and that involvement was accelerated by the legitimatization of the legal system—that the radium girls finally settled their lawsuit (Neuzil & Kovarik, 1996, p. 50).

As claimsmakers, the five women sickened by radium had to fight preconceived notions about the risk they had faced. Public opinion framed radium positively before their efforts to overturn that picture and change the status quo. Ironically, the same media that eventually helped the five women frame radium as risky were largely responsible for the positive frame of radium had existed previously:

The radium craze in America, which began around 1903, familiarized the public with the word radium. One historian stated, ‘The spectacular properties of this element and its envisioned uses were heralded without restraint in
newspapers, magazines, and books…’ (Badash, 1979, p. 25). Stomach cancer could be cured, it was imagined, by drinking a radium concoction that bathed the affected parts in ‘liquid sunshine’ (Badash, 1979, p. 25). …An overview of newspaper and magazine articles on radium in the first decades of the 20th century found their tone to be strongly positive (Weart, 1988). (Neuzil & Kovarik, 1996, p. 39)

The five women died before their lawsuit was settled, but posthumously, they succeeded as claimsmakers in their bid to reframe the environmental risk of radium.

At about the same time as the West Virginia Highlands Conservancy lawsuit and the Spruce Mine controversy, another news peg developed that further justified media attention to the mountaintop removal mining issue. The Environmental Protection Agency and four other government agencies had been compiling a huge and very comprehensive environmental impact statement on mountaintop removal mining and valley fills. The report was supposed to be released in 1999, but had fallen behind schedule. By the year 2000, the EPA still had not set a definite date for completion of the document, which had already grown to more than 900 pages. The Charleston (West Virginia) Gazette, a newspaper in the heart of Appalachia, filed a Freedom of Information request to force the EPA to release the document, finished or not. As a result, the EPA released what it called a preliminary draft of the report. It is perhaps the most thorough report on mountaintop removal mining ever written, and, surprisingly to some, strongly condemns mountaintop removal mining as devastating to plant and animal life, the area’s watersheds, the land itself and the people and communities who live in its
shadow. The release of the EPA’s environmental impact statement, even if just in preliminary draft form, was another strong news peg for media coverage of the issue.

Finally, devastating floods in 2001 and 2002 provided both the “spectacular” and the “event-centered” elements needed to make an otherwise chronic but mundane environmental risk newsworthy. The floods were not the result of excessive rainfall, but instead occurred after nothing more than normal early summer rains fell on vast areas of deforested mountaintop removal mine land. Without the natural vegetation, and with a greatly altered topography, the ability of the land to handle even moderate runoff had been severely compromised. As a result, communities downstream of several newly opened mountaintop removal mines were devastated. Significant loss of property and life occurred for two years in a row in the Appalachian Mountains of West Virginia. As a result, hydrologists warned that the effects of large-scale mountaintop removal mining on the watersheds of affected areas may be much more damaging than originally predicted, even by computer models. (Clines, 2002; Radmacher, 2002). The devastating floods washed out entire hollows, destroyed homes and drowned residents. Media coverage of the floods consistently linked the disasters to changes in rainwater runoff resulting from the deforestation of mountaintop mining, giving the media a “spectacular” disaster that just had to be reported. And because the floods were such singular events, not merely chronic abuses spread over time but punctuated moments of terror in which potential risk morphed into deadly reality, they provided the tangible “events” needed to legitimize media coverage of the issue.

The news peg of a federal lawsuit to block a mine permit based on the Clean Water Act, the spectacular size of the huge Spruce No. 1 Mine, and the event-centered
nature of not one but two years of deadly flooding downstream from deforested mine areas provided multiple opportunities for media coverage of the mountaintop removal mining issue and subsequently for claimsmakers to compete for that coverage.

Since the late 1990s, competition among claimsmakers for media attention regarding the mountaintop removal mining issue has been fierce. On one side, environmentalists decry mountaintop removal mining for the countless affronts it poses to the forest, land, water and air. Community activists cite the harm done to Appalachian culture when the mountains—the area’s history—are destroyed. Coal industry officials respond by asserting that mountaintop removal mining should be accepted because of the revenue it generates. Citizens weigh in on all sides, including varying degrees of moderation. Reporters looking for varying points of view to include in their stories don’t have to search for long, because the strong competition among claimsmakers is never far away. As one of the newer environmental risk issues to surface in the mainstream media, mountaintop removal mining, and the claimsmakers who are invested in it, have benefited from the trial and error of those who went before them. Since the environmental movement began to take off in the 1960s, journalists and claimsmakers have had plenty of experience dealing with one another on “green” issues. As a result, claimsmakers pursuing the mountaintop removal mining issue are quite media savvy. Organizations such as “Environmental Media Services” exist solely to “provide journalists with the most current information on environmental issues” (Environmental Media Services, 2003).

However, with issues involving environmental risk, the presence of a news peg to ensure media attention does not guarantee that claimsmakers seeking to increase public
perception and concern about a particular risk will be successful in doing so. The literature provides several examples of claimsmakers facing an uphill battle in their efforts to increase public awareness of risk. For example, in the 1920s, claimsmakers attempted to reframe the environmental risk posed by leaded gasoline, which was introduced in 1923 as a way to reduce premature ignition (knocking) in combustion engines, thereby increasing their efficiency and power (Neuzil & Kovarik, 1996). Some people, including scientists and public health advocates, were aware and concerned about the potential health risks of leaded gasoline. But the gasoline and automobile industries had their own scientists who worked hard to perpetuate a frame of leaded gas as a risk-free development with many advantages and no dangers. The issue of leaded gasoline emerged in the media in 1924 after a series of illnesses and deaths at a Standard Oil refinery were blamed on lead poisoning. New Jersey health department officials told newspaper reporters about a “mystery gas” that was driving some workers at the refinery “violently insane” and killing others.

“The workers—not the press—called the leaded gasoline additive looney gas because it caused hallucinations and delusions of persecution. Later, reporters would find that du Pont workers called tetra-ethyl lead production facilities the ‘butterfly factory’ because of hallucinations of winged insects” (Neuzil & Kovarik, 1996, p. 141).

The bizarre illnesses and deaths provided the news peg necessary for media coverage of the leaded gasoline issue, but despite heavy media coverage and the presence of claimsmakers attempting to frame leaded gas as an unacceptable environmental risk, the process failed to affect public opinion or policy.
Neuzil and Kovarik assert that the inability of claimsmakers to successfully project onto public opinion their frame of leaded gas as risky stems from the failure of the media to sort factual claims from false ones. Although the New York World—one of the newspapers providing most of the coverage of the issue—was a longstanding supporter of public health interests, the editors failed to inform their readers about the real risk of leaded gasoline. The knowledge necessary to frame the risks of lead poisoning was easily available, but the journalists simply failed to cut through partisan posturing on the issue. Instead, they simply reported on a “scientific controversy” between claimsmakers working to frame leaded gasoline as a public health threat and claimsmakers for the gasoline and automobile industries who said it was safe.

In addition to a scientific “disagreement” over whether leaded gas was safe, the industry claimsmakers also reported that tetraethyl lead was the only substance that could eliminate engine knocking, while opposing claimsmakers disagreed, saying a variety of less risky processes were available. Again, instead of investigating the veracity of competing claims, the media were content to simply report the controversy and let the pursuit of the truth end there. As a result, leaded gas remained on the market, and the controversy faded away until the EPA finally moved to eliminate leaded gasoline for good in the 1970s (Neuzil and Kovarik, 1996).

A similar scenario is under way now with the mountaintop removal mining debate. Claimsmakers for the coal industry insist that intensive mountaintop removal mining is the only way coal mining can survive in Appalachia. They say less efficient and less destructive methods would fail to compete with Western coal mines in states such as Wyoming and with foreign coal from other countries. As with the industry claims that no
feasible alternatives existed for leaded gas, opponents greet with great skepticism the claim that mountaintop removal mining is the only way for the coal industry to survive.

The success of the industry claimsmakers in maintaining the status quo regarding leaded gasoline, even after competing claimsmakers emerged in the mainstream media and framed the issue as an environmental risk, underscores the precarious relationship between the media and claimsmakers in affecting public perception of risk. Just emerging as a competing frame is not enough. Gaining dominance as the media frame is necessary in order to capture public opinion or affect public policy. If the media drop the story or fail to adopt any of the competing frames, the competition will stall.

From Staking Claims to Making Results, the Push for Policy

Policymaking decisions hinge on public opinion (or the lack thereof), and public opinion hinges on the ability of claimsmakers to make their frame the media frame, thus shaping the perception of environmental risk. The persistence, strength and direction of media coverage of mountaintop removal mining remains to be seen, as does its subsequent effect on public opinion and policy.

In Appalachia, where mountaintop removal mining is practiced, the media are trusted as a source of information regarding environmental risks (Riffe & Knight, 2002). Appalachian residents in southeast Ohio, just across the Ohio River from the coal fields of West Virginia, find local media more trustworthy than government or industry sources.

While government agencies are made up of expert sources that most of us rely upon to explain environmental dangers, suspicion of government is often associated with rural and Appalachian culture. Further, negative views of
“exploitative” businesses and companies are as old in Appalachia as company mining towns. Local news media … enjoy a position of trust as sources of environmental information, at least for the Appalachian Ohio River Valley studied here (Riffe & Knight, 2002, p. 18).

Information—in this case information about the environmental risk of mountaintop removal mining—is one of the strongest functions of the media. Meadows (1991) asserts that media-borne information about environmental risk can be one of the most powerful motivators for change in public opinion. It is more effective at changing public opinion than attempts based in persuasion or coercion. Information—pure and direct—can be a powerful purveyor of change.

The media have done more to address and bring positive change to situations of environmental risk than any other institution (Frome, 1998). The ability of the media to magnify public awareness and thus public opinion regarding issues is a powerful ingredient in the process of policy change. But in West Virginia, a lot of that power may be lost because of weak connection in the last step of the issue cycle process—transforming public opinion into public policy. When describing land use and development policies related to mountaintop removal mining in West Virginia, the EPA said this:

The land use planning function in West Virginia, when it is carried out at all, has usually been carried out by ad hoc boards and commissions, which are not integrated into local policy development or decision making. Planning
has not been internalized as a central policy or program concern of local government. A number of counties have no planning commission and, of those that do, some have no staff and no effective power (U.S. EPA, 2000, p. III.R-4).

Simply put, there are few organized channels through which community sentiment can affect decision making, and the ones that do exist are nothing more than token institutions that have no real effect. This situation could impede the process by which public opinion affects policymaking and regulation. At least one survey seems to suggest that public opinion in the region is strongly opposed to mountaintop removal mining (Ward, 1999), suggesting that public perception of the environmental risk posed by mountaintop removal mining may already be high. However, the literature clearly indicates that if significant policy change regarding mountaintop removal mining is to be realized, claimsmakers seeking to frame the issue as an unacceptable environmental risk must maintain dominance in the media frame until such time as public opinion comes to influence policymaking.

Research Questions and Hypotheses

Given the above review of the literature related to mountaintop removal mining, the media, claimsmakers, and framing research, the following research questions and hypotheses were posed:

Research Question 1:

How is mountaintop removal mining framed by claimsmakers?
Spiral of opportunity theory suggests that a claimsmaker challenging the status quo must try different frames until finding one that works to change the current system (Miller & Riechert, 2001). That means opponents often proliferate numerous frames in an attempt to succeed in the framing struggle. For this issue, the coal industry represents the status quo, and opponents of mountaintop removal mining are trying to change the current system (change the way mining is being conducted). As such, opponents will probably put out more frames in an attempt to find one that works (achieves resonance and wins policy).

Hypothesis 1: There will be more (a higher number of) oppositional frames (opposing mountaintop removal mining) than supportive frames.

Research Question 2:

What is the relationship between claimsmakers’ and media’s framing of the issue?

The spiral of opportunity theory suggests that the relationship between claimsmaker and media framing depends on the position of the issue in the frame cycle. Anecdotal observations of the condition of the battle between the coal industry and environmentalists would suggest that the issue is still in the competition phase, meaning no resonance has yet been achieved. Empirical corroboration of that anecdotal observation would require measuring the degree (or lack thereof) of claimsmaker frame use in media texts. If media texts were laden with one claimsmaker’s frames, then resonance may have been achieved. If the media frames do not resonate with claimsmaker frames, the issue likely remains in the competition phase of the frame cycle.
(Miller & Riechert, 2001). Based on the apparent presence of competing claims in the media, the latter condition (lack of resonance) seems probable. As such, we propose that the claimsmakers remain in pre-resonance competition.

Hypothesis 2: The issue remains in the competition phase of the cycle.

Research Question 3:
How has framing of the issue changed over time?

Opponents of mountaintop removal mining are finding that using the Clean Water Act to block mine permits is a successful strategy. The Clean Water Act forbids any activity that destroys a permanently flowing stream. This is the objection that Judge Hayden used in 1999 to block the opening of Arch Coal’s Spruce No. 1 mine. Clearly, mountaintop removal mining does irreparable environmental damage to more than streams, but that is the only objection with enough legal teeth to be effective. This suggests that the role of water has increased in the debate over mountaintop removal mining. What’s more, as the size of mountaintop removal mines increased in the 1990s, large-scale deforestation and disruptions in drainage and hydrology caused unexpected, chronic flooding in some areas. Even computer models did not predict these ramifications of the huge mountaintop operations, but scientists and environmentalists now know that they are real (US EPA, 2000). Together, the successful blockage of some mine permits using the Clean Water Act and the devastating floods that now plague southern West Virginia almost every year provide a conceptual rationale for expecting “water-related” frames to increase among opponents. As spiral of opportunity theory suggests,
claimsmakers seeking to challenge the status quo should seek to adopt successful new frames that will help improve their competitive platform. Given the increase in water-related issues surrounding mountaintop removal mining, it seems reasonable to test the idea that the use of water-related frames will have increased.

Hypothesis 3: Among media texts, the emphasis on “water issue” frames will have increased during the last period analyzed (1998-2004).

Hypothesis 4: Among stakeholder texts, opponents will use more water-related frames than will supporters of mountaintop removal mining.

Mountaintop removal mining existed for nearly 30 years as a regional environmental issue before rapidly emerging in the national media in the late 1990s. The literature on mass mediation of environmental issues suggests that such extra publicity oftentimes helps those opposing an environmental risk (Neuzil & Kovarik, 1996). In this case, the 1990s saw the founding of several new state-level environmental organizations opposed to mountaintop removal mining and burgeoning memberships for all such groups. This also likely changed the nature of oppositional claimsmaker frames appearing in the media.

Hypothesis 5: There will be more (a higher number of) oppositional frames in the second period of media text (1998-2004) than in the first (1985-1996).
Chapter 4: METHOD

As a frame analysis, this study examined texts written about the issue of mountaintop removal mining. Two types of text were sought: partisan texts and media texts. A partisan text was conceptualized as any material written by a claimsmaker trying to influence public discourse and policy regarding an issue. Partisan texts were operationalized as press releases or other written propaganda produced by corporate interests or advocacy groups for dissemination to the media or the public (See Appendix C). Media texts were conceptualized as texts written about the issue by the news media. Media texts were operationalized as newspaper articles retrieved during searches of electronic news databases using the keywords described below (See Appendix B).

The texts used in this analysis (partisan texts and media texts) were treated as populations rather than samples. This is because in each case, the search for text was exhaustive. All partisan texts and media texts that could be obtained were included in the analysis. Certainly, some existing newspaper articles could have been missed because they were not available in the electronic databases used to search and access articles. Also, volumes of partisan texts have undoubtedly been lost over the years because they were never preserved or recorded anywhere. Nonetheless, the compilations of partisan and media texts gathered for analysis here were exhaustive in that they included all relevant items that could be obtained. As such, they were treated as populations.

Partisan texts addressing mountaintop removal mining were gathered to determine how supporters and opponents frame the issue. A partisan text is material that is obviously written to further a particular viewpoint. Most commonly, partisan texts used for frame mapping analysis research include press releases sent by advocacy groups to
the media, but they also can include text from Web sites devoted to advancing a viewpoint on the issue, printed material with the same objective, or letters to the editor (Mark Miller, personal communication, Jan. 6, 2004).

Additionally, newspaper articles, hereafter referred to as media texts, were gathered from electronic archives of U.S. newspapers. The media texts were collected from two discrete time periods. These media texts were gathered to determine how the media have framed the issue and to what extent claimsmaker frames have appeared in the media. This is important because the spiral of opportunity theory that accompanies frame mapping analysis suggests that resonance of frames between a stakeholder and the media is an indication of success in the struggle for dominance among claimsmakers. Therefore, it is important to know not only how the claimsmakers are framing the issue, but how well their frames are represented in media texts.

For many issues, the amount of media and claimsmaker texts available is rather limited. In these cases, it is best to gather all available texts for analysis. Although the number of texts needed for frame mapping analysis varies depending on how heavily laden the texts are with relevant frame terms, the analysis seems to work best with data sets including at least several dozen cases. Where available, data sets with about 100 cases (individual texts) work quite well (Mark Miller, personal communication, April, 10, 2004). The lengths of the texts may be a more critical factor than the number analyzed. The VBPro program used to analyze the texts performs best on articles 500 words in length or longer. Articles significantly shorter than 500 words (sometimes called briefs) cause the VBPro program to report high degrees of co-occurrence among all words in the text. This happens because, compared with the word patterns of more typical length news
articles, all words in briefs occur in close association with one another. As such, only texts longer than 500 words were selected. Electronic databases indicate the number of words contained in the articles retrieved during searches. Articles with fewer than 500 words were not copied into the text file for analysis.

**Partisan Texts**

Claimmaker texts (partisan texts clearly written to further one group’s position on the mountaintop removal mining issue) were gathered from the claimsmakers’ own Web sites. The Web site of every prominent supporting claimsmaker involved in the issue was accessed. These included Web sites of individual companies as well as various industry and trade association, unions, and special interest political groups. The internal search functions within these Web sites were used to search for archived press releases and other partisan texts contained within. The claimsmakers were identified through their prominent involvement in the issue. A Google search for more claimsmakers retrieved none that had not already been targeted for analysis. As such, the population of supporting claimsmakers was deemed exhaustive.

These press releases and other texts reflect the frames individual stakeholders used in the mountaintop removal mining debate at various times in the life of the issue. The term “mountaintop removal mining” was not widely used before 1993, although the practice had existed since 1968. Before the early ‘90s, most texts written about surface mines in the mountains of West Virginia (most of which involved some degree of mountaintop removal) would be best identified by the co-occurrence of the terms “strip mining” and “West Virginia.” From the mid-1990s on, searches for texts with the terms “mountaintop removal mining” would produce the desired documents. Given this, the
search for these partisan texts (press releases) was conducted by selecting documents in which the term “West Virginia” co-occurred with at least one of the following three terms: “mountaintop removal mining,” “strip mining,” or “surface mining.” Opposing stakeholder texts came from the Web sites of several groups opposing mountaintop removal mining, including Appalachian Center for the Economy and the Environment, Coal River Mountain Watch, Ohio Valley Environmental Coalition, Southwings, West Virginia Citizens Action Group, the West Virginia Environmental Council and the West Virginia Highlands Conservancy. Supporting stakeholder texts were obtained in the same way, with many coming from Platts Coal Outlook, Arch Coal Inc., Massey Coal Company others.

Media Texts

A time-series compilation (i.e. a compilation over time from 1985 to present) of media texts were gathered from Lexis-Nexis Academic Universe and from cnpapers.com, the online archive of the Charleston Gazette and Charleston Daily Mail. Prior to the early 1990s, the Charleston papers were the only media outlets reporting on the mountaintop removal mining issue, so these sources were especially valuable in obtaining media texts in the early years of the analysis. The same key words (West Virginia in conjunction with surface mining, strip mining or mountaintop removal mining) that were used to search for partisan texts were used to obtain media texts. Both Lexis-Nexis and cnpapers.com are set up to be searched using key words in the same way. Media texts were selected from two time periods: 1985 through 1996 and 1998 through 2004. These two time periods were selected for a longitudinal analysis because they bookend the emergence of the issue into the national media in 1997.
Analysis

The unit of analysis was the key word(s) comprising each frame.

After the partisan texts were gathered, the supporting texts were saved as a single Microsoft Notepad file and prepared for entry into VBPro. The same process was followed for the opposing texts, resulting in a second file containing materials from oppositional claimsmakers. Preparation involves spell checking the text, adding the # symbol followed immediately by a numerical identifier for each article (#1, #2, etc.) and placing square brackets [] around identifying text not to be analyzed. It is essential that the case number (#1, etc) be followed by an “enter” or “return stroke” as if starting a new paragraph so that no text is on the same line as the identifier.

The two files (supporting claimsmakers and opposing claimsmakers) were run separately in VBPro, as were the two periods of media text analyzed. The steps of analysis in VBPro were as follows:

The Microsoft Notepad document containing the full-text articles was saved in the same directory as the VBPro operating files, thus allowing the program to access the text. The Notepad document was formatted using VBPro’s formatting function. The formatted file was then used in VBPro’s alphabetizer to produce an alphabetized list of all the words in the file. Next, VBPro’s frequency rank sorter was used to produce a frequency list of all words appearing in the text. The more frequently a word occurs in a file, the higher it appears on the ranked frequency list. As might be expected, common words and articles such as “the,” “of,” “and,” “is,” etc. are always at the top of such a list. However, words that are relevant to the issue being frame analyzed (in this case, mountaintop removal mining) also begin to appear close to the top of the list. These relevant words
continue to appear interspersed among insignificant terms throughout the frequency list. The relevant terms from the frequency list were selected while the unimportant terms were discarded, leaving a shorter list of only the relevant terms that appeared in the text. This refined list of important words was formatted into a search file. Creating the search file requires a Microsoft Notepad document beginning with facing arrows such as this: `><`. Each word in the list is then typed on its own line, with facing arrows (also on their own line) separating each word. Groups of words that should be considered together are typed without arrows separating them. The search list must end with facing arrows followed by one return stroke, as illustrated in this example of a few of the search terms used in one of the samples of media text:

```markdown
><
   explosives
><
   hardwood
><
   aquatic
><
   landscape
><
   oppose
   opposed
   opposition
><
   employment
><
   overburden
```

The sample search list shown above illustrates how facing arrows separate terms or groups of terms being analyzed in text. Notice how the word “oppose” and its closely related derivatives “opposed” and “opposition” are grouped together.
Next, the code function of VBPro used the search file to search the text for patterns of co-occurrence among the words on the list. VBMAP then uses the table of raw counts of frequency of co-occurrences to calculate a matrix showing the cosine coefficient of every term with every other term. The cosine coefficient is similar to the correlation coefficient. This matrix is then automatically aligned so that the averages of every row and column equal zero. Next, VBMap uses the cosine coefficient values to extract the first three eigenvalues for each word on the search list. Eigenvalues are numbers between -1 and 1 that provide a standardized index of how a factor relates to other factors in determining overall variance within a data set. In this study, the eigenvalues assigned standardized values to each word showing how similar or different words were to one another (based on their frequency and co-occurrence within the text). Words with similar or identical eigenvalues were used similarly in the text and would work together to explain a portion of the overall variance in word use within the text.

A comma-delimited list of these eigenvalues was imported into SPSS where hierarchical cluster analysis using the agglomerative method and cosine distance metric was used to produce a dendogram showing how the words selected for the search list clustered together. Words that clustered together on the dendogram at a rescaled distance cluster combination value of 2 or less were considered part of the same frame. It should be noted that the issue of determining the number of clusters present in a dendogram has long plagued cluster analysis researchers. Those who are concerned with solving the problem suggest that no definitive, universally useful method has been or likely will be discovered (Aldenderfer & Blashfield, 1984). For some applications, including the current study, there is no need or desire to limit the number of clusters present because...
the intent is not to compress data into manageable sets but rather to explore the association between all possible clusters present.

When all clusters (frames) had been identified, they were named. Naming the frames requires knowledge of the subject matter, familiarity with the texts from which the frames came, and an understanding of the issue. To name a frame, its constituent terms were examined in context using the VBPro search function. The defining element of most word clusters (frames) will be immediately evident to anyone familiar with the issue being analyzed. The goal is to select a label that best reflects the meaning and use of the frame as it relates to the issue being analyzed. Labeling the frames is more than just a convenience. Unlike merely assigning a numerical identifier to each frame, naming them helps provide a better understanding of each frame’s real purpose by distilling the core, defining element of the cluster. Although the labeling process may seem subjective, it is no more subjective than deciding what each category means in a content analysis. The difference is that in content analysis, the categorical definitions are determined in advance, while in frame mapping analysis, the meaning of each frame is determined after the frames have been objectively derived.

After labeling, the three mean eigenvalues were calculated for each frame by averaging the eigenvalues of its constituent terms. The mean eigenvalues for each frame were then entered as data in SPSS and a three-dimensional interactive graph was produced using the three eigenvalues for each frame as coordinates for a point in three-dimensional space.

Mapping all of the frames in this way in three-dimensional space made it easy to see associative relationships among entire clusters (frames), which aided in evaluating the
way mountaintop removal mining had been framed in the different texts. The first
eigenvalue of a frame was plotted on the X axis, the second on the Y axis, and the third
on a third axis representing depth. It is important to note that the axes do not correspond
to any conceptually meaning characteristics of the text that can be named or identified.
They are abstractions of the co-occurrence patterns among the word and frames within
the text. The purpose of graphing the terms is to visually depict these otherwise abstract
relationships. Those who designed and have done the most work with frame mapping
analysis assert that naming the axes is a fruitless pursuit: “We have had little success in
providing meaningful labels for the dimensions, as is common practice in conventional
factor analysis” (Miller & Riechert, 2001, p. 116).

The above-described process of identifying and mapping frames was applied to
the opposing claimsmaker text, the supporting claimsmaker text, both periods of media
text, and a combined file containing the full text of both claimsmakers. Both claimsmaker
texts (supporters and opponents) were combined into a single file so that their frames
would be analyzed and mapped together. The purpose of this (as a step beyond mapping
the claimsmakers separately) was to search for differences between the two claimsmakers
when their eigenvalues were extracted from the same body of text using the same search
list.

Mapping the claimsmakers separately shows precisely how each one frames the
issue, but they cannot be directly compared by then graphing the separately derived
eigenvalues onto the same map. Such a map might look OK, but the coordinates would
be mathematically indefensible because each claimsmaker’s frames would have been
extracted without considering the variance contributed by the other. Thus, apparent
differences would not be valid. The result would be something like taking several pictures of a scenic vista from different distances and then attempting to combine them for a panoramic view. They would not match up with one another because they were taken from different distances. Likewise, if the eigenvalues being mapped are not extracted from the same file of text, the proportion of total variance explained by each will not be comparable.

Although combining the claimsmaker text into a single file and analyzing it together takes care of the above-described problem, it creates another potential complication. Because many of the search terms are shared by both claimsmakers, some of the frames that emerge are not the exclusive domain of a particular claimsmaker but rather are the result of shared use of some terms in both supporting and opposing texts. Because the frame mapping analysis procedure is so sensitive to changes in word frequency and co-occurrence, such a change affects the entire frame set that emerges. Claimsmakers will not have the same frames under such analytical circumstances as they did when analyzed individually. This does not mean that such an analysis is useless. In fact, it is possible to sort out which frames are the result of shared terms. To do this, a term that would never appear in any of the texts was added to each of the opposing claimsmaker articles, but not to the supporting claimsmakers’ texts. This specially planted term was added to opposing texts to verify which frames were from the opposing claimsmakers. The dendogram produced during the hierarchical cluster analysis indicates which frames occur in close proximity to the specially planted term. Those that cluster closely to the term belong to the claimsmaker in whose text the term was added. Frames that cluster the farthest from the specially planted term have the least co-occurrence with
it and thus belong to the claimsmaker from whose text it is absent. It is thus possible to
map the claimsmakers together and still tell which frames are from opponents, which are
from the supporters, and which are shared between the two.

Ideally, the same type of combined analysis used for the claimsmakers would
have been conducted with the two samples of media text. Unfortunately, the populations
of media text and the accompanying search lists were too large to combine. The operating
limitations of VBPro prevent search lists of longer than 120 sets. The search list of each
period of media text included 120 sets, so combining them would have produced a search
list twice as long as VBPro could handle. An inspection of the lists revealed no feasible
way to reduce them without severely limiting the depth of the resulting frame analysis.
Chapter 5: RESULTS

A total of 196 media texts and 110 partisan texts were gathered and analyzed. There were 98 media texts from each of the two time periods (1985-1996 and 1998-2004). There were 40 partisan texts from opposing claimsmakers (against the issue) and 70 press releases from supporting claimsmakers (for the issue).

Following hierarchical cluster analysis, 16 frames were identified from the text of opposing stakeholders (Table 1) while 13 frames were identified from the text of supporting claimsmakers (Table 2). The two periods of media text contained 24 and 20 frames, respectively (Tables 3 and 4). When the claimsmakers were analyzed together, 20 frames were detected, with 11 of them belonging to opponents and 6 to supporters (Table 6). Three of the frames were the result of the competing claimsmakers using the same words in different ways (sharing terms).

Hypothesis 1, which predicted there would be more (a higher number of) oppositional frames (opposing mountaintop removal mining) than supportive frames, was supported. As noted above, opposing claimsmaker frames outnumbered supporting frames 16 to 13 when analyzed separately and 11 to 6 when analyzed together.

Hypothesis 2, which predicted the mountaintop removal mining issue would remain in the competition phase of the frame cycle, was supported. Neither claimsmaker achieved resonance with the media. In fact, not a single claimsmaker frame emerged from the media texts, suggesting that the media were constructing their own frames of the issue rather than adopting claimsmaker frames.

Hypothesis 3, which predicted that among media texts, the emphasis on “water issue” frames would have increased during the last period analyzed (1998-2004), was
supported. There was one water-related frame out of 24 total frames in first time period of media text, while there were five water-related frames out of 20 total frames in second media sample (Table 5). The single water-related frame in the first period contained three terms that were used a total of 100 times. The five water-related frames in the second period contained a total of 19 terms used a total of 616 times.

Hypothesis 4, which predicted that among stakeholder texts, opponents would use more water-related frames than would supporters of mountaintop removal mining, was supported. There were two water-related frames used by supporting claimsmakers and six water-related frames used by opposing claimsmakers. The two water-related frames used by supporters contained a total of seven terms. The six water-related frames used by opponents contained a total of 13 terms. Water-related terms were nearly twice as common in opposing claimsmaker text (1.14 % of all words) as they were in supporting claimsmaker text (0.61 % of all words).

Hypothesis 5, which predicted there would be more (a higher number of) oppositional frames in the second period of media text (1998-2004) than in the first (1985-1996), was not supported. There were no opposing stakeholder (or supporting stakeholder) frames in either period of media text.
<table>
<thead>
<tr>
<th>Frame Number</th>
<th>Frame Name</th>
<th>Constituent Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Agency</td>
<td>environment, environmental, agency, agencies, public, illegal, rivers, groups, government, natural</td>
</tr>
<tr>
<td>2</td>
<td>Water</td>
<td>buffer, environmentalists, regulations, officials, legal, legalize, resources, administration, law, laws, change, changes, rule, ruling, disaster, mountaintop, mountaintops, water, waters, waterways</td>
</tr>
<tr>
<td>3</td>
<td>Stream</td>
<td>miles, destroy, destroyed, destroying, destruction, stream, streams, permit, permits, waste, wastes, bury, buries, burying, removal</td>
</tr>
<tr>
<td>4</td>
<td>Valley Fill</td>
<td>lawsuit, protection, valley, valleys, fill, fills, filled, filling, impact, study, court</td>
</tr>
<tr>
<td>5</td>
<td>Appalachia</td>
<td>Appalachia, Appalachian, rock, industry, flow</td>
</tr>
<tr>
<td>6</td>
<td>Diverse</td>
<td>diverse, temperate, devastate, devastated, devastating, devastation, towns</td>
</tr>
<tr>
<td>7</td>
<td>Native</td>
<td>native, rich</td>
</tr>
<tr>
<td>8</td>
<td>Mountain</td>
<td>mountain, mountains, Mountain, hardwood, topsoil</td>
</tr>
<tr>
<td>9</td>
<td>Dragline</td>
<td>forest, mesophytic, species, dragline, rubble</td>
</tr>
<tr>
<td>10</td>
<td>Habitat</td>
<td>habitat, vegetation, landscape</td>
</tr>
<tr>
<td>11</td>
<td>Flood</td>
<td>flood, flooding, flooded, citizens, decision</td>
</tr>
<tr>
<td>12</td>
<td>Blasting</td>
<td>blasting, land</td>
</tr>
<tr>
<td>13</td>
<td>Communities</td>
<td>community, communities, problems, dust, fields</td>
</tr>
<tr>
<td>14</td>
<td>Sediment</td>
<td>people, sediment, home, homes, huge, MTR</td>
</tr>
<tr>
<td>15</td>
<td>Jobs</td>
<td>Jobs, strip, damage</td>
</tr>
<tr>
<td>16</td>
<td>Dumping</td>
<td>company, companies, dump, dumped, dumping</td>
</tr>
</tbody>
</table>

Table 1. Frames used by Opposing Claimsmakers
Table 2.
Frames used by Supporting Claimsmakers

<table>
<thead>
<tr>
<th>Frame Number</th>
<th>Frame Name</th>
<th>Constituent Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stream</td>
<td>fill, fills, stream, streams, downstream, buffer, perennial, intermittent, appeal, pending, legal, rule, rules, ruling</td>
</tr>
<tr>
<td>2</td>
<td>Court</td>
<td>filed, court, case, enforce, DEP</td>
</tr>
<tr>
<td>3</td>
<td>Water</td>
<td>industry, hearing, policy, policies, valley, water</td>
</tr>
<tr>
<td>4</td>
<td>Congress</td>
<td>Congress, bill</td>
</tr>
<tr>
<td>5</td>
<td>Bond</td>
<td>government, bond, bonding</td>
</tr>
<tr>
<td>6</td>
<td>Law</td>
<td>OSM, law, laws, federal, issue, issuing</td>
</tr>
<tr>
<td>7</td>
<td>Mountaintop Removal</td>
<td>mountaintop, removal, moratorium, controversy, variance, AOC, approximate, original, contour, contours, fish</td>
</tr>
<tr>
<td>8</td>
<td>Surface</td>
<td>surface, mine, environment, environmental, environmentalists, office</td>
</tr>
<tr>
<td>9</td>
<td>Jobs</td>
<td>economic, economy, employees, layoffs, jobs, application, strip, seam</td>
</tr>
<tr>
<td>10</td>
<td>Money</td>
<td>operation, operations, operators, operating, cost, costs, money, shut, watershed</td>
</tr>
<tr>
<td>11</td>
<td>Permit</td>
<td>state, official, officials, permit, permits, permitting</td>
</tr>
<tr>
<td>12</td>
<td>Lawsuit</td>
<td>agency, impacts, suit, lawsuit, litigation, applied, applications, regulation, regulations, regulators, regulatory</td>
</tr>
<tr>
<td>13</td>
<td>Habitat</td>
<td>value, diversity, forest, wildlife, habitat, reclaimed</td>
</tr>
</tbody>
</table>
Table 3.
Frames used in Media Text from 1985-1996

<table>
<thead>
<tr>
<th>Frame Number</th>
<th>Frame Name</th>
<th>Constituent Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mountaintop Removal</td>
<td>Earth, earth, bulldoze, bulldozed, bulldozer, bulldozers, bulldozing,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mountaintop, Mountaintop, mountaintops, removal, seam, seams, huge, economic,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>economically, dump, dumped, mountainsides, machine, machines</td>
</tr>
<tr>
<td>2</td>
<td>Valley Fill</td>
<td>valley, valleys, rock, fill, fills, stability, overburden, develop, development</td>
</tr>
<tr>
<td>3</td>
<td>Jobs</td>
<td>mountain, mountains, Mountain, Mountains, hollow, hollows, Hollow, union, miner,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>miners, job</td>
</tr>
<tr>
<td>4</td>
<td>Home</td>
<td>home, homes, workers, residents, employees, dust, blasting, blasted</td>
</tr>
<tr>
<td>5</td>
<td>Dragline</td>
<td>operation, operations, construction, Appalachia, dragline, truck, trucks,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>landscape</td>
</tr>
<tr>
<td>6</td>
<td>Fears</td>
<td>worth, fear, fears</td>
</tr>
<tr>
<td>7</td>
<td>Cultural</td>
<td>cultural, value</td>
</tr>
<tr>
<td>8</td>
<td>Historic</td>
<td>historic, historical, history, preservation, labor, work, complex</td>
</tr>
<tr>
<td>9</td>
<td>Political</td>
<td>Political, study</td>
</tr>
<tr>
<td>10</td>
<td>Strip</td>
<td>strip, striping, stripped, health, company, companies, Company, power</td>
</tr>
<tr>
<td>11</td>
<td>Reclamation</td>
<td>Site, sites, problem, problems, reclamation, reclaim, reclaimed,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>reclaiming, unreclaimed, massive, inspector, inspectors</td>
</tr>
<tr>
<td>12</td>
<td>Surface</td>
<td>surface, cost, costly, expensive, remove, field, disturbed, disturbance</td>
</tr>
<tr>
<td>13</td>
<td>Rule</td>
<td>protect, protection, rule, bill</td>
</tr>
<tr>
<td>14</td>
<td>Court</td>
<td>court, Court, issued, citizen, citizens, judge, legal, dispute</td>
</tr>
<tr>
<td>15</td>
<td>Impact</td>
<td>impact, impacts, waste,</td>
</tr>
<tr>
<td>16</td>
<td>Permit</td>
<td>control, fail, failure, failures, failing, bankrupt, bankruptcy, violation,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>violations, environment, environmental, group, groups, change, changes, changed,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>changing, changing, permit, permits, permitted</td>
</tr>
<tr>
<td>17</td>
<td>Lawsuit</td>
<td>industry, industrial, enforce, enforced, enforcing, enforcement, appeal, appeals,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>regulation, regulations, regulators, regulatory, environmentalists, law, laws,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>operator, operators, ruling, fines, public, lawsuit, lawsuits, suit, suits,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>litigation, penalties</td>
</tr>
<tr>
<td>18</td>
<td>Destroy</td>
<td>destroy, destroyed, destruction, live</td>
</tr>
<tr>
<td>19</td>
<td>Habitat</td>
<td>wildlife, habitat, forest, forests, trees, grass, bury, buries, plant, plants,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>planted, planting, topsoil, barren, native</td>
</tr>
<tr>
<td>20</td>
<td>Topography</td>
<td>flat, runoff, land, lands, life, slopes, steep</td>
</tr>
<tr>
<td>21</td>
<td>Soil</td>
<td>damage, damaged, varieties, soil</td>
</tr>
<tr>
<td>22</td>
<td>Stream</td>
<td>stream, streams, Stream, restore, restoration</td>
</tr>
<tr>
<td>23</td>
<td>Agency</td>
<td>agency, resource, resources</td>
</tr>
<tr>
<td>24</td>
<td>Legislature</td>
<td>Legislature, money</td>
</tr>
</tbody>
</table>

124
<table>
<thead>
<tr>
<th>Frame Number</th>
<th>Frame Name</th>
<th>Constituent Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aquatic</td>
<td>aquatic, diverse, diversity, alternative, forest, forests, downstream, nationwide, restrictions, study, science, scientific, lawsuit, lawsuits, litigation, threatened, endangered, species</td>
</tr>
<tr>
<td>2</td>
<td>Valley Fill</td>
<td>valley, valleys, regulation, regulated, regulates, regulating, bury, buried, burying, fill, fills, filling, filled, dirt, overburden, stream, streams, resources, Bush, administration, agency, agencies, acres</td>
</tr>
<tr>
<td>3</td>
<td>Rich</td>
<td>rich, damage, damaged, damaging</td>
</tr>
<tr>
<td>4</td>
<td>Ruling</td>
<td>waste, wastes, legal, hardwood, public, rule, ruled, rules, ruling</td>
</tr>
<tr>
<td>5</td>
<td>Legislative</td>
<td>legislative, violate, violated, violation, violations</td>
</tr>
<tr>
<td>6</td>
<td>Environment</td>
<td>hearing, enforce, enforcement, lawyer, lawyers, buffer, appeal, appeals, eliminate, citizens, court, ephemeral, environment, environmental, environmentally, environmentalist, environmentalists, decision, Appalachia, Appalachian, Haden, protect, protection, protecting</td>
</tr>
<tr>
<td>7</td>
<td>Political</td>
<td>political, destroy, destroyed, destroying, destruction</td>
</tr>
<tr>
<td>8</td>
<td>Health</td>
<td>home, homes, town, towns, health</td>
</tr>
<tr>
<td>9</td>
<td>Complaints</td>
<td>company, companies, industrial, industry, complaints, complained, terrain</td>
</tr>
<tr>
<td>10</td>
<td>Jobs</td>
<td>job, jobs, residents, life, family, families, employment, community, communities, economy, blast, blasts, blasting, explosives, obliterated, landscape, hollow, hollows, Hollow</td>
</tr>
<tr>
<td>11</td>
<td>Future</td>
<td>future, tighten</td>
</tr>
<tr>
<td>12</td>
<td>Permit</td>
<td>permit, permits, permitted, permitting, changes, changed, wildlife, habitat</td>
</tr>
<tr>
<td>13</td>
<td>God</td>
<td>God, devastated, devastation, devastating</td>
</tr>
<tr>
<td>14</td>
<td>Mountaintop Removal</td>
<td>rock, dump, dumping, dumped, mountaintop, mountaintops, removal, remove, illegal, illegally</td>
</tr>
<tr>
<td>15</td>
<td>Strip</td>
<td>strip, stripped, mountain, mountains, machine, machines, high, ban, banned, oppose, opposed, opposition, law, laws</td>
</tr>
<tr>
<td>16</td>
<td>Topography</td>
<td>level, steep, slopes</td>
</tr>
<tr>
<td>17</td>
<td>Approximate Original Contour</td>
<td>Earth, earth, inspector, inspectors, AOC, elevation, variance, variances, problems, hills, hilltops, reclaim, reclaimed, reclaiming, reclamation, surface, topography, exemption, exemptions, land, huge, flat, flatten, flattened</td>
</tr>
<tr>
<td>18</td>
<td>Flood</td>
<td>runoff, flood, floods, flooding, water, waters, waterways, watershed, watersheds, risk, risks, erosion, plant, planting, tree, trees, reforestation</td>
</tr>
<tr>
<td>19</td>
<td>Hydrologic</td>
<td>drainage, hydrologic</td>
</tr>
<tr>
<td>20</td>
<td>Grass</td>
<td>grass, politicians</td>
</tr>
</tbody>
</table>
Table 5.
Water-related Terms used in the Media Texts and their Frequencies

<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>streams (56)</td>
<td>aquatic (9)</td>
</tr>
<tr>
<td>stream (36)</td>
<td>downstream (12)</td>
</tr>
<tr>
<td>Stream (8)</td>
<td>streams (185)</td>
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<tr>
<td></td>
<td>stream (72)</td>
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<tr>
<td></td>
<td>creeks (6)</td>
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<td></td>
<td>buffer (44)</td>
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<td></td>
<td>ephemeral (7)</td>
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<tr>
<td></td>
<td>runoff (29)</td>
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<tr>
<td></td>
<td>flood (20)</td>
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<tr>
<td></td>
<td>flooding (38)</td>
</tr>
<tr>
<td></td>
<td>floods (11)</td>
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<tr>
<td></td>
<td>water (105)</td>
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<tr>
<td></td>
<td>waters (10)</td>
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<tr>
<td></td>
<td>waterways (18)</td>
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<td></td>
<td>watersheds (10)</td>
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<tr>
<td></td>
<td>watershed (6)</td>
</tr>
<tr>
<td></td>
<td>erosion (6)</td>
</tr>
<tr>
<td></td>
<td>drainage (22)</td>
</tr>
<tr>
<td></td>
<td>hydrologic (6)</td>
</tr>
<tr>
<td>TOTAL USES (100)</td>
<td>TOTAL USES (616)</td>
</tr>
</tbody>
</table>
Table 6
Frames Resulting from Analysis of Combined Claimsmaker Texts

<table>
<thead>
<tr>
<th>Frame Number</th>
<th>Frame Name</th>
<th>Constituent Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Appeal*</td>
<td>Perennial, intermittent, appeal, buffer, pending</td>
</tr>
<tr>
<td>2</td>
<td>Permit*</td>
<td>Issue, office, permit, permitted, permitting, decision, official, lawsuit, lawsuits, watershed, hearing, bill, bond</td>
</tr>
<tr>
<td>3</td>
<td>Court*</td>
<td>Impact, filed, case, court, agency, agencies, regulations, operation, operations</td>
</tr>
<tr>
<td>4</td>
<td>Policy*</td>
<td>Fill, rule, rules, ruling, policy, policies, Congress, cost</td>
</tr>
<tr>
<td>5</td>
<td>Employees*</td>
<td>Original, employees</td>
</tr>
<tr>
<td>6</td>
<td>AOC*</td>
<td>Variance, variances, contour, contours, approximate, AOC, controversy, surface, application, applications, layoffs, moratorium</td>
</tr>
<tr>
<td>7</td>
<td>Diversity**</td>
<td>Dragline, mesophytic, species, diverse, topsoil</td>
</tr>
<tr>
<td>8</td>
<td>Forest**</td>
<td>Forest, rubble, mountain, native, vegetation, rich, hardwood</td>
</tr>
<tr>
<td>9</td>
<td>Habitat**</td>
<td>Reclamation, reclaim, reclaimed, reclaiming, value, habitat, grass</td>
</tr>
<tr>
<td>10</td>
<td>Environment***</td>
<td>Groups, government, environment, environmental, environmentalist, change, changes, changed, valley, law, laws, economic, dump, dumped, resources, water, waters, protection, protecting</td>
</tr>
<tr>
<td>11</td>
<td>Streams***</td>
<td>Stream, streams, industry, legal, rivers, rain, rains, rainfall, waste, illegal, administration</td>
</tr>
<tr>
<td>12</td>
<td>Rock***</td>
<td>Rock, flow</td>
</tr>
<tr>
<td>13</td>
<td>Biological***</td>
<td>Biological, temperate, town, towns</td>
</tr>
<tr>
<td>14</td>
<td>Earth***</td>
<td>Earth, landscape</td>
</tr>
<tr>
<td>15</td>
<td>Bury***</td>
<td>Destroy, destroyed, destruction, destroying, disaster, miles, bury, burying, buried, Appalachia, Appalachian, natural, devastating, devastated, devastate</td>
</tr>
<tr>
<td>16</td>
<td>Jobs***</td>
<td>Public, enforce, enforcing, job, jobs, mine, mines, mined, mining</td>
</tr>
<tr>
<td>17</td>
<td>Sustainable***</td>
<td>Study, MTR, acres, sediment, sustainable, people</td>
</tr>
<tr>
<td>18</td>
<td>Blasting***</td>
<td>Land, lands, dust, community, communities, money, home, homes, blasting, families, large, fields, problem, problems</td>
</tr>
<tr>
<td>19</td>
<td>Mountaintop***</td>
<td>Mountaintop, mountaintops, removal, company, companies</td>
</tr>
<tr>
<td>20</td>
<td>Flood***</td>
<td>Flood, floods, flooding, flooded, damage, damaged, strip, stripped, citizens</td>
</tr>
</tbody>
</table>

Legend:  
* Supporting Claimsmaker Frame  
** Shared Frame (used by opponents, co-opted by supporters).  
*** Opposing Claimsmaker Frame
Chapter 6: DISCUSSION

This study revealed a number of findings, some of which were related to its hypotheses and others that shed light onto unhypothesized aspects of media and claims maker framing of controversial issues. Additionally, this study revealed much about the framing of the specific issue of mountaintop removal mining. Hypothesized, unhypothesized and issue-specific findings will all be discussed in this section, although separately.

Interpretation of Results

Four of the five hypotheses in this study were supported. The four supported hypotheses offer additional clarity for our understanding of the framing process. The one unsupported hypothesis also offers something of value because it raises questions about how best to determine whether a frame has been repeated over time or between a claims maker and the media.

The Hypotheses

The support of hypothesis 1, which indicates that opposing claims makers have more frames for the mountaintop removal mining issue than do supporting claims makers, offers evidence for the argument that as challengers of the status quo (the existing system of mountaintop removal mining as a legal, widely practiced coal mining technique in Appalachia), opposing claims makers have attempted to proliferate a variety of frames so as to find one that will succeed in capturing the media frame and, ultimately, public opinion. The supporting claims makers, such as the coal industry and some government officials, have fewer frames for the issue, an indication perhaps of efforts to maintain the status quo by not proliferating new frames, which could bring about change. This is in
keeping with the literature on framing (Miller & Riechert, 2000), which suggests that supporting claimsmakers, by definition, support the current system, while opposing claimsmakers oppose the current state of an issue and want to change it. As such, supporting claimsmakers may work to maintain existing frames and resist frames that would either redefine or defeat the system currently supporting the status quo.

Generally and up to a point of diminishing returns, increasing the size of the sample of text analyzed in a frame mapping analysis will result in an increase in the number of frames that are found. As reported, there were 13 supporting frames and 16 opposing frames found in the populations of text analyzed here. This is despite the population of text from supporting claimsmakers being larger than that from opponents (40 articles versus 70). The fact that more frames emerged from the relatively smaller population of opposing stakeholder text seems to strengthen the case for the assertion that opponents have a larger repertoire of frames. When the claimsmakers’ texts were combined and analyzed together, the pattern remained. Opponents had more frames (11) than supporters (6).

Combining both populations of claimsmaker text into a single file for analysis was an effective way to detect differences between the two groups. After doing so, a dendogram of the combined cluster analysis was inspected (See Appendix A). A dendogram is a visual interpretation of the clusters (frames) that shows not only which words comprise each cluster but also which clusters are closely related to one another and which are not. To do this, a dendogram shows all of the words involved in the analysis along the left hand margin with branching connectors joining them. The connections split off like the limbs of a tree wherever clusters or groups of clusters differ from the others in
terms of co-occurrence. Each split or fork yields two branches. At the extreme right margin, all the branches eventually connect (all the words are eventually connected to one another because they are part of the same text, but the differences in their co-occurrence can be great.) By following the splits or forks in the dendogram from right to left, it is possible to trace the division of the text from the most profound split to the most intricate or subtle ones. The longer the linkage (on a standardized scale metric) from one split to the next, the more profound the difference between the clusters subsumed under the new split and those separated by the previous split.

The first split in the dendogram produced from the combined claimsmaker texts revealed the 6 supporting claimsmaker frames separated from the remaining 14 frames (See Appendix A). Within the 14 remaining frames, the next split of the dendogram separated the 3 shared frames from the 11 frames that fit best within the text of opposing claimsmakers. The next split of the dendogram separated the 11 opposing claimsmaker frames into a group of 6 frames (environment, streams, rock, biological, earth, bury) and another group of 5 frames (jobs, sustainable, blasting, mountaintop removal, flood). An inspection of these two super clusters revealed that the group of 6 frames dealt with biological dimensions of mountaintop removal mining while the group of 5 frames dealt with human dimensions of mountaintop removal mining. For instance, the biological dimension frames focused on environmental degradation, damage to the biodiversity of the Appalachian ecoregions, loss of aquatic resources and destruction of natural topography and landforms. The human dimension frames focused on the exploitation of miners by the coal industry, problems such as dust and blasting damage to homes, the dangers of overweight coal trucks, deadly flooding and the loss of culturally significant
landforms and resources. The literature had indicated that opposition to mountaintop removal mining was centered around two broad dimensions (US EPA, 2000). Seeing those dimensions (biological and human) emerge from the analysis corroborated expectations based on the literature.

Hypothesis 2 suggested that the claimsmakers (supporters and opponents) would remain in the competition phase of the frame cycle. As discussed earlier, frame cycle theory asserts that as claimsmakers attempt to frame issues, their efforts will follow four phases: emergence, conflict or competition, resonance, and resolution (Miller & Riechert, 2000). In the emergence phase, frames are proposed. In the conflict or competition phase, claimsmakers compete with one another to advance their own frames and defeat opposing frames. In the resonance phase, one claimsmaker has won the preceding competition and has succeeded in having its frames dominate media coverage of the issue (thus the winning claimsmaker’s frames and the media frames are identical). In the resolution phase, the successful claimsmaker reaps the rewards of winning the framing competition when policymakers adopt the frame and set laws or regulation in accordance with it.

Hypothesis 2 suggested that with the mountaintop removal mining issue, claimsmakers remain in the competition phase, with neither having achieved resonance with the media (the third phase of the cycle). Because the media frames were structurally different from any of the claimsmaker frames, it seems clear that neither supporters nor opponents have succeeded in persuading the media to march lock-step with their message. Instead, the media appear to be selecting themes from the claimsmakers’ discourse without adopting whole frames exactly as claimsmakers present them.
For the present study, the determination of whether a claimsmaker’s frame and a media frame were identical was made by matching the constituent terms making up each frame. Only if the media frame contained all of the same words as the claimsmaker’s frame would resonance have been achieved on that frame. Synonyms or semantically similar terms would not suffice. The exact same words would have to be present for the frames to be deemed identical. This was a reliable, objective way to make the determination necessary to test hypothesis 2 as well as Hypothesis 5. More subjective methods could have been employed, but only at the cost of reducing reliability. For instance, many of the media frames seemed to somewhat match the opposing stakeholder frames, especially in spirit. That is to say, the media coverage often seemed to take a pro-environmentalist, anti-industry tone. But asserting such an observation as a result would be hard to defend against challenges to the reliability of the method used to make the determination.

For example, in the current study, opposing claimsmakers, supporting claimsmakers, and the media all had a “jobs” frame. The supporting claimsmakers’ jobs frame dealt with layoffs and other economic hardship that allegedly would result from tougher restrictions on mountaintop removal mining. For opposing claimsmakers, however, the jobs frame was about the exploitation of miners by the coal industry, the loss of jobs as the industry comes to depend more on highly efficient machinery, and on the permanent environmental damage brought by mining jobs and how it diminishes the region’s chances of building long-term, sustainable jobs in the tourism industry. The media’s jobs frame appeared much more similar to the opponents’ jobs frame than to the supporters’. The media seemed to frame jobs in terms of the exploitation of workers and
of the environment for the economic benefit of a few. Although semantically very similar to the opponents’ framing of jobs, the media’s jobs frame was not identical. In fact, a look at the 13 constituent terms of the media (second time period) frame for jobs and the three constituent terms of the opponents’ frame for jobs shows large differences in the specific words chosen by the authors of the texts.

Particularly telling is the fact that while many of the words used in the media frame for jobs were not used by the claimsmakers in their jobs frame, the words did appear in other claimsmaker frames. For instance, the words “blast,” “landscape” and “community” were all included in the media (second period) frame for jobs. However, the opposing claimsmakers used the word “blast” not in association with jobs but in conjunction with the word “land” in what was called the blast frame. The word “landscape” was also used not in the jobs frame but along with the words “habitat” and “vegetation” in the habitat frame. And the word “community” appeared not in the jobs frame, but in conjunction with the words “problems” “dust” and “fields” as constituents of the community frame. As a point of reference for the method of frame resonance determination used here, this indicates that exact words were not duplicated in certain frames not because those particular words were not used in the text at all, but because they were used in different ways and in association with different terms. That is to say, the issues and themes were being framed differently. Had most of the terms used by claimsmakers simply been absent from the media texts, then it could be argued that no duplication of frame terminology would have been possible because the words simply weren’t there. Such an argument would still be weak because the authors of the media texts were certainly free to use the words of their choosing, and an absence of certain
terms would likely represent a conscious decision to avoid them in favor of other words.
But in cases such as the current study, when many of the same words are present in both
sets of text, it builds an even stronger argument for the assertion that the differences in
frames are the direct result of semantic choices made by the authors and not the product
of lexical limitations.

The media do indeed seem to be framing the issue for themselves, and the
claimsmakers seem still to be clamoring to outdo each other and to persuade the media to
see the issue their way, but reporting such an offhand observation as a result would be
highly subjective. The current system of assessing whether resonance has been achieved
(the presence or absence of identical word sets in computer-derived clusters of co-
occurring terms) allows the hypothesis to be tested and the answer to be defended in a
much more reliable, objective way.

Note that the names of frames repeat in several cases. For instance, both periods
of media text and the supporting claimsmaker text have a mountaintop removal frame.
This does not mean that the three share the same frame. In reality, each frame is different,
but they share a common name based on the words (mountaintop removal) that best
describe what the constituent terms have in common. Only if all of the constituent terms
were identical would they be the same frame.

Hypothesis 3 was the first of two hypotheses dealing with water-related issues.
Both water-related hypotheses sprang from the literature surrounding mountaintop
removal mining, which suggested that as a result of the Clean Water Act, a 1999 lawsuit
to stop valley fills of intermittent and perennial streams, and several years of record
flooding downstream from huge deforested areas associated with mountaintop removal mines, water would become a focal point in the late 1990s.

Hypothesis 3 suggested that over time, the media’s use of water-related frames would increase. As reported, media text from the second period analyzed did contain more water-related frames than did media text from the first period (increasing from one frame to five). These frames likewise contained more water-related words (19 versus 3). The frequency of the use of these terms also increased. For the words “stream” and “streams,” which are the only terms to repeat from the first period to the second, the frequency of use increased from 92 to 257 in text of the same length. In keeping with the hypothesis, the increase in emphasis on water-related frames can be explained by increased attention on the effect of valley fills on aquatic ecosystems, discussion of deadly flooding resulting from changes in the hydrology and drainage patterns caused by mountaintop removal mining, and by discussion of using the provisions of the Clean Water Act to establish buffer zones and prohibit the destruction of regularly flowing streams and creeks. All of the above-described phenomena combined to produce the hypothesized result of increased attention to water-related issues in media coverage during the second period analyzed.

Hypothesis 4 also involved water-related issues. It posited that opponents would use more water-related frames than would supporting claimsmakers because they (opponents) saw water issues as the most promising way to restrict or curtail mountaintop removal mining. According to frame resonance theory, supporting claimsmakers would likely limit their work with water-related frames to trying to discredit or redefine
opposing frames. Because water-related frames were not a strong part of the status quo, supporting claimsmakers would likely not emphasize them.

The results of the analysis not only support Hypothesis 4, they support the reasoning behind it as well. Opponents had three times as many water-related frames as supporters. And in total, the opposing frames contained nearly twice as many constituent terms as did the supporting frames.

Also as anticipated by the rationale behind the hypothesis, opponents seemed to be using water-related frames to decry the damage caused by mountaintop removal mining while the supporters appeared to use water-related terms to maintain the status quo and draw attention away from the opposing claimsmakers’ frames. For instance, opponents used a water frame that contained words “disaster,” “resources,” “environmentalists,” “changes” and “laws.” They also used a stream frame that included the words “destroy,” “destroyed,” “destroying,” “destruction,” “miles,” “waste,” “bury,” “buries,” and “burying.” Like the opponents, the supporting claimsmakers had a water frame, but it contained terms such as “industry,” “official hearings,” “policy,” and “policies.” The supporting claimsmakers also had a stream frame, but it dealt with the legalities of “buffer zones,” “pending legal appeals,” “rules and rulings,” and the technicalities of “perennial” and “intermittent” “streams.” In these cases, the frames used by opposing claimsmakers seemed to contain bold, powerful language that may have portrayed mountaintop removal mining negatively. Conversely, supporting claimsmakers frames seemed to be devoid of equally bold, powerful or negatively oriented language.

Hypothesis 5 asserted that the number of opposing claimsmaker frames appearing in the media texts would increase from the first period (1985-1996) to the second (1998-
This hypothesis had its basis in the history of mountaintop removal mining, which included the aforementioned increase in attention to water issues as well as a clearly defined emergence of the issue as a national environmental issue in 1998. In part because of the flurry of water-related issues surrounding mountaintop removal mining in the late 1990s, it jumped to national prominence almost instantly in 1998. Specifically, a lawsuit filed by the West Virginia Highlands Conservancy to halt the permit for Arch Coal’s Spruce No. 1 mine served as the news peg on which the national news media hung their coverage. Beginning in 2000, deadly floods caused large-scale changes in hydrology following mountaintop removal mining have occurred almost every year. For a while, news of these floods continued to keep the issue in the national spotlight.

This national mediation of the issue could have had an effect on how it was framed by claimsmakers, the media, or both. Hypothesis 5 suggested the number of opposing claimmaker frames appearing in the media would increase because both of the phenomena serving as news pegs for the national coverage (the deadly flooding and the lawsuit to stop the Spruce Mine) were events that favored opponents’ positions against the issue.

But as discussed, no claimmaker frames were detected in either period of media text analyzed. Although the media were indeed covering the ongoing legal battle and the floods, they seemed to be framing both in their own way, not in accordance with a particular claimsmakers’ frame. As a result, Hypothesis 5 was not supported.

**Media Framing**

Both populations of media text (1985-1996 and 1998-2004) were quite substantial, with nearly 100 newspaper articles from each period. All of the articles were
very substantive and highly germane to the issue. What they appear to tell us is that media framing of mountaintop removal mining seems to have become more sophisticated (despite a reduction in the total number of frames) as the arguments the media put forth have evolved. The media do indeed seem to be setting their own frames for the issue. They do not seem to be adopting claimsmaker frames, although overall, the tone of media coverage seems more sympathetic to opponents of mountaintop removal mining than to supporters.

A look at the frames used in the first period of media text shows what appears to be an emphasis on the big, obvious and sensational aspects of mountaintop removal mining—particularly the huge machines used to create the massive mines. Obviously, it takes big machines to tear down a mountain, and journalists from this early period seemed to latch onto that news peg as perhaps a place to begin the story. Thinking about the norms and conventions of journalism, it is easy to see why a reporter might focus on the larger-than-life aspects of the issue, including the size of the machines and the area mined. Those aspects seem to capture the elemental spirit of the early mountaintop removal mining story. Notice the emphasis some of the frames place on machines, trucks, bulldozers and draglines.

Another telling characteristic of the first period of media text was detected by examining the dendogram. The first and deepest split in the dendogram separates frames that seem to reflect the sentiments of opposing claimsmakers from another set of frames that more closely follow the approach of supporters such as the coal industry. The first set of frames includes the “destroy” “habitat” “topography” “soil” “stream” “agency” and “Legislature” frames. These frames seem to reflect the qualities of opposing claimsmaker
messages. See table 3 to inspect the constituent terms of these frames. The second set
included the “political” “strip” “reclamation” “surface” “rule” “court” “impact” “permit”
and “lawsuit” frames. These frames seem to resemble the legalistic tone of supporting
claimsmakers. Again, see table 3 to inspect the constituent terms. The fact that the
dichotomy between these two sets of frames was the first and biggest split in the
dendogram of the first media period would suggest that reporters were taking a textbook
approach to journalism and attempting to present both sides equally—or at least to make
the distinction between the two sides as clear as possible.

This illustration or reflection of competing claimsmakers’ frames in the media did
not persist in the second period analyzed. In fact, there were no sets of frames isolated in
the dendogram that seemed to obviously flow from claimsmakers’ arguments.
Interestingly, the first and deepest split in the dendogram separated the “flood” and
“hydrologic” frames from all the rest. Again, perhaps the special treatment and emphasis
of deadly flooding from mine runoff meant that these frames were handled much
differently than any of the other frames. For whatever reason, they did not co-occur with
the other frames, but instead were isolated in the text.

The second fork in the dendogram separated the “future” “permit” “God”
“mountaintop removal” “strip” and “AOC” frames from all remaining. A third fork,

nearly as deep as the second, separated the “political” “health” “complaints” and “jobs”
frames from the “aquatic” “valley fill” “rich” “ruling” “legislative” and “environment”
frames. Please see table 4 to inspect the constituent terms in each of these sets of frames.
The sets are grouped together in the table exactly as they appeared in the dendogram.
This order makes it easier to simultaneously inspect the constituent terms of the frame
sets mentioned because they appear sequentially in the table. Examining the sets of frames described above seems to show a unique framing approach. It does not follow the pattern from the first media period, where the schism between opponents and supporters was clearly reflected in two sets of media frames divided by the main fork of the dendogram. And despite seeming to be pro-environmental in tone, the media framing does not follow the pattern of opposing claimsmakers, whose opposition to mountaintop removal mining was divided into biological and human dimensions. Instead, the second period of media framing seemed to show a pattern all its own, one whose groupings might be labeled “land” “water” and “community.”

After the group containing the flood and hydrology frames, which have already been discussed, the next set of frames to cleave from the dendogram included “future” “permit” “God” “mountaintop removal” “topography” and “AOC.” These frames shared the theme of land, mountainous land in particular, and the role it plays as a natural resource. Much was made of the fact that mountaintop removal means taking a tall mountain and laying it low. The topography frame emphasized the gradient of the land, while the AOC frame reflected the contemporary wrangling over the impossibility of returning stripped areas to their approximate original contour. The God frame stemmed from the frequent use of a quote from a West Virginia Division of Environmental Protection inspector who, in discussing AOC, said something to the effect that “we just can’t stack it as high as God did.” His words have been used often over the years in the second period of media text, and they seem to reflect the tone in this set of frames.

Emphasis on water also seemed to be a hallmark of the second period of media text. Hypothesis 2 indicated that the use of water-related frames and terms increased
significantly. This increase in the raw number of water-related terms paralleled an apparent increase in the complexity and sophistication of messages related to water in the second period of media text. In addition to having the flood and hydrologic frames set apart from the rest of the frames, media text from the second period had a greatly expanded “valley fill” frame, which occurred in close conjunction with a large “aquatic” frame. Both of those frames dealt with the effects of burying streams under tons of dirt and rock. Likewise, the “environment” frame dealt largely with wrangling over buffer zones, or areas near streams and creeks where no disturbance is permitted. Even the name of the judge (Haden) who blocked a mine permit through his application of a law to protect streams from valley fills appeared in the “environment” frame.

Finally, the second period of media text contained a set of frames (political, health, complaints, jobs) that dealt with the problems that people and their communities had with mountaintop removal mining. This set of frames may be similar to the human dimension discovered in the opposing claimsmaker texts. Please see table 4 to inspect the constituent terms. One noteworthy point involves the “jobs” frame. It seems to be much more sophisticated than the jobs frame from the first period of media text—a characteristic that differentiates the two periods of media text on several levels.

It is interesting that no frames emerged from the media or claimsmaker texts dealing with energy-related terms. Much of the debate about coal hinges on its identity as a primary energy source for America. Supporters claim that coal is an important energy source because of America’s dependence on it. Conversely, opponents argue that the same dependence shows weakness and a lack of sustainability and foresight in America’s
energy policy. But neither supporters nor opponents pursued an energy-related frame, despite the fact that it would be easy for both to do so.

Clearly, media framing of the issue changed from the first period to the second. The total number of frames went down, yet the complexity and sophistication of the messages seemed to increase. The media seemed to evolve their own voice on the issue—one that opposes mountaintop removal mining but adopts neither the exact frames nor the patterns of discourse of opposing claimsmakers.

Mapping

Up to this point in the interpretation of results, all discussion has centered around the number of frames discovered and the nature of the constituent terms that comprised them. However, the frame mapping analysis method offers another level of insight that is quite valuable in assessing claimsmaker and media framing of an issue. The three-dimensional mapping of the frames, which shows their location in three-dimensional space, is a helpful way to observe patterns of otherwise invisible word usage present in the text. The location or position of the frames in three-dimensional space is of course an abstract measure. It has no real meaning because the words and frames are not floating around in space but are instead fixed to the pages on which they are printed. But the patterns of association between the words and groups of words (frames) are real indeed. Seeing the patterns is impossible without aids such as the 3-D imaging available through frame mapping analysis. In this case, the mapping process reveals some interesting and useful patterns. It should be noted that the axes of the maps are not labeled because there are no meaningful concepts to attach to the dimensions. They are abstract representations
of co-occurrence among words. See Chapter 4 for more explanation of why the axes on
the graphs are not and should not be labeled.

It also should be noted that this visual dissection of the frame maps is somewhat
subjective. It is meant to augment the objective determinations the frame mapping
software makes about the number of frames and the words that comprise them. There is
no concrete method in use to determine when a frame falls far outside the spatial realm of
the others or when it is just slightly disconnected from the main nucleus of a frame. Even
if there were such a concrete method, it would be purely arbitrary. The real value in
inspecting the 3-D maps is to observe and contemplate the relationships among the
frames. Attaching meaning to the differences observed through the visual aids (maps)
requires knowledge of the subject matter and a reading of the texts, so the interpretation
ultimately must lie with the human inspector anyhow.

These 3-D maps reveal textual characteristics visually that could only be
imagined as abstract qualities otherwise. Mapping the claimsmakers separately as well as
together allows two levels of inspection. First, by mapping them separately, a pure, exact
image of each claimsmaker can be obtained. That’s because each frame that is extracted
from a claimsmaker’s text is uniquely its own. When only one particular claimsmaker’s
text is present, the frame map that results is a pure representation of how that
claimsmaker framed the issue. This study made good use of the first level of inspection
by examining supporting and opposing claimsmaker frames on a separate, individual
basis.

The second level of inspection involves combining the claimsmaker texts into a
single file and examining the frames that emerge. As discussed, this places the
claims makers on the same metric and allows meaningful comparison of the spatial
differences among their frames on the 3-D map. When considering the results of this
combined analysis, remember that it will not produce the same set of frames for each
claims maker that were produced in the individual analyses. Cross contamination of
frames does occur when competing claims makers use the same key words in their texts.

Three-dimensional interactive graphs were produced for all four populations of
text (two periods of media text, the opposing claims makers and the supporting
claims makers) and for the file containing the combined texts of supporting and opposing
claims makers. Of these, two maps were especially useful in illustrating, through visual
demonstration, patterns that would otherwise be invisible. The first map of interest
depicted the supporting claims maker frames (See Figures 1 and 2). The second was the
graph of supporting and opposing claims makers mapped together (Figures 7 and 8).

The graph showing supporting claims makers mapped alone was useful because it
revealed one frame that varied greatly from all of the other frames in how it was used.
Specifically, the habitat frame was very distant from the other 12 frames used in the
supporting claims maker text. While the disparity is not obvious on a two-dimensional flat
map, rotating the 3-D image 160 degrees vertically and 280 degrees horizontally shows
how the habitat frame is spatially isolated from the other frames used by the supporting
claims makers (See Figure 2). This spatial difference means the authors used the words
that comprise the habitat frame very differently than the words that comprise the other
frames. The habitat frame was not used in close association with the other frames. In fact,
it was used in ways that prevented it from being associated with the other frames. As
used, it was not compatible with them.
The purpose of the 3-D maps is to show such differences and serve as the impetus for an inquiry into why the difference exists. The question raised by the map is: Why was the habitat frame isolated from the other frames in the supporting stakeholder texts? To answer the question, it is necessary to look at the other frames and to examine the use of the terms in context. Examining the text for these characteristics, it can be seen that the habitat frame is the only supporting stakeholder frame that sounds as if it should be an opposing claimsmaker frame. It contains the words “value,” “diversity,” “forest,” “wildlife,” “habitat” and “reclaimed.” Examining the use of these words in context in the supporting claimsmaker text, it seems that the coal industry and other supporting claimsmakers were trying to benefit their agenda by associating themselves and their overall message with the success of the various pro-environmental frames used regularly by the opposing claimsmakers.

The framing literature suggests that it is not uncommon for a claimsmaker to adopt a competing claimsmaker’s frame in order to share in its success and to partially change the frame’s definition and meaning by associating it with their message. The coal industry overtly claims that the reclamation process following mountaintop removal mining is a valuable improvement to the land as plant and animal habitat. When opponents write about reclamation, they disagree with such industry assertions. Opponents argue that the reclamation process does nothing to improve the situation for hundreds of plant and animal species erased by mountaintop removal mining but instead opens the door to invasive, non-native species of plants and animals. Opponents note that these invaders not only replace niche-specific native species on the mined land, they
encroach into adjacent unmined land everywhere it adjoins the mine site, stressing native species in large zones of edge where the two habitat types meet.

While opposing claimmaker texts describe reclamation as a failure, the coal industry continues to write about “valuing” highly “diverse” “forest” and “wildlife” “habitat” and caring for the same through effective “reclamation” techniques. As can be seen, both claimmakers are using many of the same terms, but the messages they are building seem to conflict with each another. This may be an example of one claimmaker attempting to co-opt the frame of another—an effect the framing literature says is common among competing claimmakers. By imitating a competitor’s frame, a claimmaker can reduce the effectiveness of that frame for the competitor. By co-opting a frame, a claimmaker can also redefine the frame somewhat by associating it with his message. The words used by supporting claimmakers in their habitat frame are different from the words that tend comprise their other frames. While in the habitat frame, the industry is writing about caring for the environment through reclamation practices, its other frames seem to send a different message and as such are not used in close conjunction with the habitat frame. This can be seen first by examining the spatial distribution of the frames on the three-dimensional map. The habitat frame is far away from the other frames, meaning that it does not appear in close association with them in the text or fit well into the overall pattern of the supporting claimmaker message. This can be confirmed by observing differences in the text that correspond with differences in the spatial distribution of the frames (which is based on their association and co-occurrence within the text). Ten of the 13 frames used by the supporting claimmakers group together quite well in a nucleus that represents the center of the coal industry’s
message. The names of these frames may tell a lot about the industry’s message and how it sees the issue of mountaintop removal mining: “money,” “jobs,” “law,” “permit,” “bond,” “Congress,” “lawsuit,” “surface,” “court” and “water.”

Two other frames do not fit with the rest as well as the first 10. The mountaintop removal frame and the stream frame are spatially more isolated from the center of the distribution of frames than any of the others (except the habitat frame, which as previously discussed is far outside the spatial realm of all others). The mountaintop removal frame contains, among other words, “mountaintop,” “removal” and “controversy.” The term “mountaintop removal” seems to belong in the environmentalists’ lexicon, and the coal industry generally avoids the term in favor of euphemisms such as “surface mining” or “mountaintop mining.” Therefore, the presence of the terms “mountaintop removal” in a supporting claimmaker frame is perhaps evidence of another instance of the industry attempting to co-opt a competitor’s frame. That is likely why, when mapped, the mountaintop removal frame does not fit as well with the supporting claimmakers’ message as do many of the other frames in their texts. That it does not fall widely outside the spatial distribution of the others (as the habitat frame does) is probably because the rest of the terms comprising the mountaintop removal frame deal with the legal technicalities of the AOC (approximate original contour) provision of the 1977 Surface Mine Control and Reclamation Act. In Appalachia, the coal industry routinely ignores the requirements to return stripped areas to the approximate original contour because it is impossible to do so. By focusing on the regulatory process of obtaining variances to the AOC rule, the industry seems to be framing mountaintop removal in terms that reflect a procedural paper trail of amended
permits and applications. Opponents, however, seem to be attempting to represent (and frame) the action in terms emphasizing the fact that mountains are forever destroyed and biodiversity forever lost in the practice.

Likewise, the stream frame is somewhat outside the nucleus of supporting stakeholder frames as represented in the 3-D graph of frame locations. As with the mountaintop removal frame, this is probably because the stream frame includes words such as “stream/s,” “fill/s” and “buffer,” which are used in conjunction with descriptions of the fact that valley fills bury streams under hundreds of feet of dirt and rock. It is usually the opposing claimsmakers who emphasize such matters in their texts. It is somewhat out of character for the coal industry to do so, which usually avoids discussing the effect of valley fills at all (notice that there is no valley fill frame for the supporting claimsmakers while the opponents and the media both have one). However, the words comprising the stream frame are not used in the same way opposing claimsmakers might use them. For the most part, the frame focuses on pending appeals and legal rulings allowing the industry to bury streams despite the provisions of the Clean Water Act directly forbidding such action. By getting lawyers to argue the flow characteristics of streams, the industry is often able to get permission from state regulators to fill perennial and intermittent streams, despite the law. Again, it is probably the way the terms are used that causes them to fall near the main message of the supporting claimsmakers. Perhaps it is only the tangential controversy attached to terms such as “stream,” “fill” and “buffer” that keeps the stream frame from fitting neatly inside the 10 frames that seem to distill the center of the supporting claimsmakers’ strategy for framing the issue.
None of the other individual 3-D maps seemed to reveal any frames as obviously isolated from their fellow frames as the habitat frame was in the supporting claimmaker text. In fact, the frames from the first period of media text (1985-1996) were quite evenly distributed, with none appearing to fall outside the fray (Figure 3). What this reveals is a body of text in which all themes and ideas are treated about the same. The frames are used freely and equally in association with one another so that none stands alone when the VBPro frame mapping software examined their frequency and co-occurrence. From a frame analysis standpoint, the finding of homogenous text with no stand-alone frames is as worthwhile a discovery as finding that one frame has been used and treated very differently than the others. Both findings reveal important characteristics of the text.

The frames in the second period of media text did not appear to be as homogenously distributed as those of the first period (Figure 4). Likewise, when mapped alone, the frames from the opposing claimmaker text seemed to be unevenly distributed, although no clearly isolated frames stood out (Figure 6). Without trying to make detailed inferences based on a subjective inspection of these maps (which would be both unreliable and indefensible as an analytical procedure), what can be said is that the general lack of cohesiveness among the frames when mapped in three-dimensional space seems to portray a variety of frames being used for different purposes within the text. It appears that not all of the frames are wrapped uniformly around a single thesis. Some seem to be used to further a particular theme or concept while others drive a slightly different agenda. For instance, notice that in the second period of media text, the flood frame and the topography frame appear shifted away from the bulk of the other frames (Figure 5). This makes sense, given the stand-alone importance of the flooding issue (and
the topography issues that help to enable it). That these two frames seem to disrupt the overall distribution of frames on the map may speak to the special emphasis the deadly floods in southern West Virginia have received in the contemporary press coverage of mountaintop removal mining. Given the complex, multi-faceted arguments regarding mountaintop removal mining, it is not surprising that bodies of text are not monolithic in their approach and treatment (framing) of the issue’s components.

The individual analysis and mapping of claimsmaker texts revealed some important findings. Among supporters, the individual analysis revealed one frame (habitat) varied widely from the others. Among opponents, the analysis and mapping showed no wildly deviating frames but rather a thorough mix of frames that were neither highly unified nor systematically divided. Although valuable, the findings stemming from individual analysis of claimsmakers do not tell the whole story and do not allow the two claimsmakers to be directly compared.

The analysis and mapping of the combined claimsmaker texts was perhaps the most insightful investigation of this study. Hierarchical cluster analysis of the eigenvalues derived from VBPro and VBMap (using the combined texts and a combined list of search terms with duplicate words eliminated) revealed the presence of 20 frames. Graphing the coordinates of these 20 frames using the interactive graph function of SPSS revealed what appeared at first to be a relatively uninteresting map (Figure 7). It appeared that the kind of environmentally based frames opponents would use were mixed up with the legal and procedural frames of supporters.

However, the map has much more to show than might first meet the eye. To make sense of the pattern present, it was necessary to inspect the cluster analysis dendogram on
which the frames were based. First, inspecting the initial fork of the dendogram revealed a deep split. Six of the frames (AOC, employees, permit, appeal, court, policy) were closely related to one another but deeply removed from the remaining 14 frames. The division between these 6 frames and the remaining 14 was the most profound split present in the cluster analysis of the text. Inspecting the composition and context of these 6 frames revealed that they were supporting claimsmaker frames. They were very similar to the core set of frames extracted from the supporting claimsmaker text in the individual analysis. What’s more, searches for key words in context using VBPro revealed that the words comprising these 6 frames were used almost exclusively in supporting texts. Context searches for these words rarely returned examples of them being used in opposing texts.

The next fork in the dendogram revealed another split nearly as deep as the first. It separated 3 closely related frames (diverse, habitat, forest) from 11 others.

The 11 remaining frames were very similar to the frames extracted from the opposing claimsmaker texts in the individual analysis. Searches for key words in context revealed that the terms comprising these 11 frames were used quite often in opposing texts but rarely in supporting texts.

Further evidence to indicate that these 11 frames were opposing stakeholder frames was found by using the specially planted term. The special term, which would not occur naturally in any of the texts, was planted in each of the 40 opposing claimsmaker articles before analysis in VBPro. In the subsequent dendogram, that special term was central to the 11 opposing stakeholder frames (as would be expected, given that it was planted in every one of them). It appeared in the core of the frame that was at the middle
of the relational web connecting the 11 frames. To put it another way, it could be said that the term was at the center of the center for the 11 opposing claimsmaker frames. Given that the term was placed in all of the opposing texts and none of the supporting texts, the only plausible explanation for its presence at the heart of these 11 frames is that they were opposing claimsmaker frames.

The next split in the dendogram revealed that the 11 opposing frames were divided into a group of 6 frames (including the frame containing the special term) and another group of 5 frames. Inspection of composition and context revealed that the 6 frames (biological, earth, bury, rock, streams, environment) dealt with biological dimensions of mountaintop removal mining while the other 5 frames (sustainable, flood, mountaintop removal, blasting, jobs) dealt with human dimensions. The presence of a biological and a human dimension within the opposing claimsmaker frames makes sense given what the literature had to say about the reasons for opposing mountaintop removal mining. The environmental impact statement authored by the EPA and four other governmental agencies found a similar pattern in opposition to the practice. That environmental impact statement assessed the effects of mountaintop removal mining as well as public opinion regarding those effects. Its findings included evidence that opposition to mountaintop removal mining falls into two general categories—objections based on biological or human dimensions. That the current analysis of oppositional claimsmaker framing found these same broad patterns in its results is evidence of concurrent validity for this study.

Therefore, the combined analysis of claimsmaker texts revealed 6 supporting claimsmaker frames, 11 opposing claimsmaker frames (6 dealing with biological
dimensions and 5 dealing with human dimensions) and a group of 3 frames that are not associated closely with either claimsmaker (although they are slightly more closely related to the opposing claimsmakers than to the supporting claimsmakers, based on the branching of the dendogram). Again using the search function of VBPro to look for the application of these frames in the text, inspection of key words in context revealed that the terms present in the diversity, habitat and forest frames were used by both claimsmakers. This sharing of the constituent terms explains why the frames don’t fit neatly with either of the claimsmakers, but rather form a separate cluster of their own when mapped in three-dimensional space. On their face, these 3 frames may sound as if they should belong to opposing claimsmakers because they deal with pro-environmental concepts and issues. But remember that the separate analysis of supporting claimsmaker texts revealed a “habitat” frame straying widely from the other core frames. As discussed, the constituent terms of the habitat frame found in supporting claimsmaker texts included “value,” “diversity,” “forest,” “habitat,” and “reclaimed.” Notice that at least one of these terms appears in each of the 3 frames clustered together in the analysis of combined claimsmaker texts. The 3 frames seen there are, in effect, the supporting claimsmakers’ habitat frame combined with the opposing stakeholders use of the same and similar terms in their texts. The picture that emerges is of 3 frames that are the result of two competing claimsmakers using the same words for different purposes. Opponents of mountaintop removal mining seem to be using them to articulate their pro-environmental agenda while the coal industry appears to be co-opting the terms in an attempt to advance their agenda through any benefit the use of these presumably successful frames would offer.
The best visual depiction of these differences can be achieved by taking the 3-D map of the 20 frames extracted from the combined claimmaker texts and marking the supporting and opposing claimmaker frames with different label icons (in this case, squares for the former, circles for the latter and triangles for the 3 frames resulting from shared terms). Figure 8 shows the 20 frames labeled this way in three-dimensional space with the map rotated 0 degrees vertically and 20 degrees horizontally (the angle that most clearly shows the relationships among the frames). As can be seem from figure 8, the combined analysis of the two claimmaker groups revealed a lot about how they frame the issue of mountaintop removal mining. Some of the information revealed in this combined analysis confirms findings from the individual analysis of claimmakers. For instance, it confirms that supporting claimmakers seem to frame mountaintop removal mining in very detached, institutional terms but that they will co-opt a frame or two dealing with wildlife or habitat issues in an attempt to compete with opponents. It also confirms that opponents have more frames than supporters. Beyond corroborating the findings of the separate analyses, the combined analysis shows that supporters and opponents are visibly different in their framing of the issue and that the only overlap between the two occurs in a narrow range of co-opted frames. The combined analysis shows that even when the texts are compiled, the framing patterns of both claimmakers remain relatively pure. There is very little blurring of the distinction between claimmakers or cross-contamination of frames because of shared term use. And of course, the combined analysis allows the frames of the two claimmakers to be plotted on the same map. As indicated by figure 8, doing so reveals that the two competing claimmakers are spatially isolated from each other. This observation is empirical
evidence in support of the assertion that the two are markedly different. Without the combined analysis, no valid visual composite of their framing approaches would be available to support that claim. Therein lies the highest value of analyzing and mapping the competing claimsmakers together.

To recap the reasons behind the patterns observed here in claimsmaker and media framing, it seems reasonable to suggest that, in some ways, the mountaintop removal mining issue has developed much as the literature on framing suggests it should have. But in other ways, the issue has split from what is thought of as the traditional framing cycle. Although the earliest period in the life of the issue was not analyzed here (because text was not available electronically) it seems that the coal industry and the environmentalists are not typical competing claimsmakers. According to the framing cycle, controlling policy on an issue is the ultimate objective of the framing competition. But in the case of mountaintop removal mining, the coal industry already controlled policy when the “competition” began in 1968 when the first protesters publicly objected to the first mountaintop removal mine opened in West Virginia on Bullpush Mountain. Instead of two competing claimsmakers both starting from nothing and aspiring to capture the media frame, public opinion and, ultimately, policy, the conflict began with the coal industry seated at the helm of the policy controls and grassroots environmental groups seeking to overtake control of the state’s laws and policy surrounding mountaintop removal mining. This echoes the longstanding assertion that the state regulatory agencies are in the back pocket of the coal industry, despite such an arrangement working against the interest of the majority of the public (U.S. EPA, 2000).
With the claimsmakers positioned in this way, it makes sense that the industry would talk as little about the issue as possible, and that the supporting discourse that did take place would be very low key and constructed so as to downplay controversy and draw attention away from the animated dialogue of opponents. These opponents, mostly environmentalist and citizens groups, seem to have just the opposite goal. They seemed to be trying to draw all the attention they could, national attention if possible, to the mountaintop removal mining that was taking place deep in the mountains of Appalachia—out of the sight and consciousness of most Americans.

Challenging the status quo is a more difficult proposition than maintaining it—especially when the conventional avenues for public input regarding law and policy are unresponsive. Petitioning state regulators and participating in public portions of the planning process for use of natural resources were not working for mining opponents in West Virginia or surrounding states. The media were the only venue that offered a level playing field where all comers would be considered, which is exactly what appears to have happened in the first period of media text analyzed. As discussed, it seems that in the first period of media text, reporters were dutifully seeking out and reporting both sides of a classic, two-sided controversy. However, the literature suggests that reporters may become adversarial toward official sources, especially ones related to the government, when it comes to controversial environmental issues (Block & Lehman-Wilzig, 2002; Hall, 1979). Such a tendency could explain the shift in media coverage between the two time periods.

The first period of media text contained a medley of supporting and opposing claimsmaker themes. But the second, most current period of media text seemed to
roundly speak against the industry and in favor of the environmental movement opposing mountaintop removal mining. These characteristics are in keeping with trends such as civic journalism that encourage a revival of muckraker-style reporting where the wrongdoings of government and industry are vetted in the public eye. For instance, the Charleston Gazette and Charleston Daily Mail seem to have embarked on just such a muckraking endeavor with their “Mining the Mountains” series of investigative reports into how the coal industry and state regulators ignore the law and abuse the region’s natural resources through mountaintop removal mining. That series, as well as dozens of articles not officially a part of it, seemed to carry the themes, if not the exact frames, of opposing claimsmakers.
Figure 1
Supporting Claimmaker Frames Rotated 345, 45 Degrees

Dot/Lines show Means
Figure 2
Supporting Claimmaker Frames Rotated 160, 280 Degrees

Dot/Lines show Means

Habitat Frame

Other 12 Frames
Figure 3.
Period 1 Media Frames Rotated 345, 45 Degrees
Figure 4.
Period 2 Media Frames Rotated 345, 45 Degrees
Figure 5.
Period 2 Media Frames Rotated 345, 60 Degrees
Figure 6.
Opposing Claimmaker Frames Rotated 345, 45 Degrees
Figure 7.
Frames of Both Claimsmakers Mapped Together, rotated 345, 45 Degrees
Figure 8.
Frames of Both Claimsmakers Labeled Separately, Rotated 0, 20 Degrees

Legend:
○= Opposing claimsmaker frames, human dimension.
●= Opposing claimsmaker frames, biological dimension.
□= Supporting claimsmaker frames.
▼= Frames used by opponents but co-opted by supporters.
Theoretical Implications

This study was the first to use a longitudinal comparison of media frames with claimsmaker frames to predict the position of the issue in the four-stage frame cycle. In most framing studies concerned with policy outcomes, the position of the issue within the frame cycle (based on real-world observations) has been used to predict what might be going on with the frames. Using frames as the independent variable and the position of the issue within the frame cycle as the dependent variable or outcome is a novel contribution of this study that strengthens frame resonance theory by providing more evidence related to the framing cycle. This theory-building approach matches a trend in some contemporary framing research, such as frame mapping analysis, to help solidify framing as a research method by building a directional research agenda for the field. One characteristic of the direction frame mapping analysis is lending to the field of framing research involves the use frames as independent variables to accomplish a variety of research goals, including learning more about claimsmakers and the nature of their messages. This study helps to further that endeavor.

The support of Hypothesis 2 offers theoretical implications well beyond the issue-specific finding that even after 30 years, claimsmakers seem to remain locked in the throes of competition, attempting to gain control of media coverage of mountaintop removal mining. It offers public policy research in general and frame mapping analysis in particular more evidence that some issues may be intractable. These issues are seemingly so contentious and controversial that claimsmakers will never move beyond the competition phase of the frame cycle. With less controversial issues, losing claimsmakers will eventually concede to what becomes the dominant frame as resonance is achieved.
with the media. When this happens, resolution is achieved and the cycle will remain in equilibrium unless something happens regarding the issue to motivate claimsmakers to challenge the status quo. But some issues engender such passion in claimsmakers that they may never quit fighting. Such a dynamic creates an intractable controversy and derails the frame cycle—stranding it in the competition phase. This finding helps to further fine tune our use of frames as independent variables in public opinion and policy research because it clarifies a pathway for the framing action other than the one that leads straight from competition to resonance.

Understanding more about the intractability of some issues also enhances our understanding of the framing cycle and the kinds of issues for which it carries predictive validity. It may be that the framing cycle just won’t work for a certain class of issues. Cataloguing some of these issues is the first step to establishing a profile of issue characteristics that lead to intractability.

However, the real study of interaction among claimsmakers and the media has just begun. The idea that media attention is something to be competed for, and that when achieved, can lead to the advancement of policy initiatives, is central to frame resonance theory. As a broad idea, it permeates public opinion study. But understanding the subtleties of how such competition works will require scholarly input from a number of disciplines. Studies such as this one illustrate the importance of such work and act as a force encouraging convergence among a number of lines of social science inquiry.

Gatekeeping

Gatekeeping theorists have long asked why the media select certain news items and ignore others. Even the news wires are the narrow end of a large bottleneck that
restricts all but a small fraction of possible news items from entering the public discourse via the media. Frame resonance theory, which asserts through the framing cycle that agenda-driven frames emerge, compete, achieve resonance and ultimately affect policy, is innately tied to the gatekeeping function of the media. If the media ignore a claimsmaker, then that claimsmaker’s agenda is doomed, according to frame resonance theory. Often, discussion of frame resonance theory seems to assume that claimsmakers only need to worry about their struggles with one another, and that if they best their competition, the media will automatically adopt their frame, and the cycle will move to the next stage. Gatekeeping theorists would be quick to point out that the process is not so automatic and the outcome not so assured. News judgment, pressure from other unrelated issues for the finite space of the news hole, and the issue attention cycle all conspire to complicate the future for competing claimsmakers.

If the issue over which claimsmakers are competing does not appeal to the norms and conventions of journalistic news judgment, then moving a particular frame into the media spotlight will be difficult. Claimsmakers need a journalist’s sense of news judgment in order to be sure that they are portraying their issue and their frames for it in the most newsworthy way. Such a portrayal may or may not match the original vision an agenda-driven claimsmaker had for an issue. The issue of mountaintop removal mining stands on uneven ground when it comes to aligning claimsmakers’ and media judgment. Regionally in Appalachia, the issue has not been hard to sell to the media. First, it is a story rife with controversy. What’s more, supporters and opponents both agree that it affects a lot of people (although they disagree about how). Finally, the issue involves money and other highly valuable assets such as the area’s vast natural resources. All of
these characteristics (controversy, impact and money) make the mountaintop removal mining issue automatically newsworthy to local media.

National media, however, were a different story. As with most things in Appalachia, mountaintop removal mining is unobtrusive for the majority of Americans. Persuading media outside of the Appalachian core that the issue is of high news value was a difficult stumbling block for claimsmakers. Even within the state of West Virginia, northern newspapers, which are farther away from the region where mountaintop removal mining is practiced, were ambivalent to the issue through much of its history. The gatekeeping literature tells us that editors look for a news peg on which to hang new issues with no record of prior coverage. Without this justification, it is hard for a regional story to break into the national media. This study offers some theory-building fodder for gatekeeping researchers trying to build a profile of the type of news pegs that work best for ushering regional stories into national mediation. For mountaintop removal mining, it was a lawsuit in federal district court and chronic flooding with multiple fatalities that provided a news peg for national coverage of the issue.

But even national mediation is no guarantee of policy success. The issue attention cycle dictates that an issue will have a finite shelf life in the media spotlight, after which time publicity will fade—regardless of whether policy initiatives have been achieved. National mediation of mountaintop removal mining already seems to have run its course. The flurry of national media attention that began with Bill Moyer and PBS in 1998 and went on to include the three major networks and AP wire stories in most large newspapers seemed to subside in 2003 and 2004. The issue is still mentioned
occasionally in The New York Times and other national newspapers, but the crescendo of coverage that seemed certain to end in regulatory reform did not do so.

Ecological Models of Social Competition

Perhaps the most profound theoretical implication this study brings to social science research outside of mass communication studies is the aspect of competition among claimsmakers. Since the days of Robert Park in the Chicago School of sociology, ecological theorists have linked competition among sociological interests to theories of competition in the natural world, mainly Darwin’s theory of evolution and its underpinning tenets (random mutation, natural selection, Mendelian genetics, etc.) The current study offers conceptual and theoretical fodder for the extension of such ecological models of interpreting social interaction. The claimsmakers examined in the current study competed in their efforts to frame public discourse over mountaintop removal mining. Opposing claimsmakers, who were challenging the status quo, proliferated a variety of frames for the mountaintop removal mining issue in an attempt to find one that would ensure media coverage and successfully capture public opinion. The proliferation of frames functioned as a series of mutations, developing slightly different versions or variations on a basic theme—opposition to the issue. The process of determining which, if any, of the frames would achieve resonance with the media or with policymakers then paralleled the process of natural selection in an ecological model of frame resonance theory. Those frames that afforded a competitive advantage would be retained while those that did not would be jettisoned as failed experiments. Successful frames then would be seen as positively adaptive characteristics.
In the current study, opposing claimsmakers seem to have generated a set of relatively successful frames related to water. The flood frame dealt with the deadly flooding. The stream, aquatic and water frames dealt to varying degrees with the Clean Water Act and the Surface Mine Reclamation and Control Act and issues of protecting streams from mining operations. These frames were successful in that they led to an injunction stopping the Spruce No. 1 Mine as well as national media coverage of the issue that turned out to be quite sympathetic to the opponents’ agenda.

More detailed, longitudinal studies of claimsmaker framing over the life of an issue could further refine the ecological perspective of competition. For instance, do the arguments of competing claimsmakers evolve at a uniform rate through the constant generation of frames, or is the evolutionary process variable, as the principle of punctuated equilibrium has illustrated in biological evolution? If the framing struggle can be shown to persist in long periods of equilibrium punctuated by short bursts of frame proliferation, then the field of framing research can make another contribution toward refining ecological models of social competition. The current study was unable to offer a longitudinal picture of claimsmaking for the mountaintop removal mining issue, but its analysis of media framing showed evidence that framing of an issue can change quickly. In doing so, this study provides theoretical support for an ecological model of a punctuated equilibrium pattern in the evolution of frames.

Game Theory

For years, game theorists have examined how governments, corporations and individuals compete in the social policy arena. The theoretical common ground between frame resonance theory and game theory needs to be fleshed out by a study grounded in
game theory that compares claimsmaker competition across several issues. The current study looked at one issue and examined claimsmaker competition only indirectly by assessing the frames they put forth. It carries theoretical implications for a study of claimsmaker competition because it found evidence that claimsmakers will not only seek to advance their own competitive fitness by finding successful frames but that they will also seek to damage their competitors by co-opting successful frames, thus redefining them through association.

The matter of issue intractability addressed here also carries implications for a study based in game theory because the whole premise behind an intractable issue is that the competitive interface between claimsmakers varies depending on the issue. The framing literature suggests that certain highly contentious issues will never advance to the resonance phase of the frame cycle because claimsmakers will not allow them to do so. The current study found some evidence to suggest that mountaintop removal mining may be such an issue. Game theory could offer a more detailed exploration of claimsmaker competition, considering such factors as rationality (maximizing payoff through consideration of probabilistic outcome), Cournot learning (predicting competitor’s actions by sequentially applying most recently used successful strategy), and whether claimsmakers were operating as if the framing competition were a zero-sum, variable-sum or constant-sum game.

Frame resonance theory already incorporates some elements of game theory. For instance, frame resonance theory asserts that when one frame becomes dominant, the subordinated frame will fail and must be discarded or redefined if the claimsmaker is to have any chance of succeeding. No amount of persistence will rally a losing frame once it
has become subordinate. This concept shares close theoretical ground with the game
theory concepts of dominant strategy and dominated strategy. In the former, the dominant
strategy is successful regardless of the actions of the competitors. Likewise, the
dominated strategy always fails, regardless of competitors’ actions.

As game theory continues to be applied in a variety of new places, including mass
media and social discourse, theories such as frame resonance, which is built around the
notion of competition among claimsmakers, should be called upon as part of an
interdisciplinary theoretical substrate for the expanding knowledge base.

Science Communication

Sometimes, the media fail to properly adjudicate conflicting scientific claims in
news reports. By allowing competing claimsmakers to portray their respective sides of an
issue, some in the media believe that they have fulfilled their obligations as journalists by
simply giving equal time to each side of a controversy. But in many cases, journalists
would do better to sort fact from fiction and report accurately on where the truth lies and
why. The leaded gasoline controversy discussed earlier in this paper is one such example
of the media abdicating their responsibility to present their audience with an
understandable account of the truth. Reporters often fail to adjudicate the claims of
conflicting sources in science and environmental stories because the subject matter may
be hard to understand. Weighing expert testimony isn’t as easy as discerning the truth
about a controversial zoning change before city council. Other times, the scientific
community may be legitimately undecided about an issue, in which case honest conflict
with no clear resolution is an acceptable outcome. The difficulty in sorting out conflicting
scientific information is one reason why specialty reporters with scientific backgrounds
work the science and environment beat in many news outfits. The current study underscores the need to understand this aspect of science journalism. It also illustrates the consequences that can await if journalists fail to step in and adjudicate conflicting scientific claims—or at least put the arguments in context so the audience can conclude the truth for itself.

Valley fills and reclamation are two topics that elicit conflicting information from claims-makers. Mining opponents point out that all valley fills, no matter where they are located or what type of stream they bury, do irreparable harm. Opponents also point out that reclamation fails to return the land to any condition remotely resembling its pre-mining state.

But the coal industry texts contain alternative arguments on both issues. Supporting claims-makers have argued that filling only the headwaters of a stream is harmless. They have also challenged the distinctions among ephemeral, intermittent and perennial streams during the permitting process. And after mining, they assert that their reclamation practices are successful. They assert that the techniques are the result of years of improvement and refinement and that in many cases, these advanced reclamation techniques leave the land in better condition than it was before mining. By emphasizing these points often enough, mining supporters have propagated the notion that the impact of valley fills is subjective and that reclamation of mined land has been a success.

Reporters covering matters such as these for which there is conflicting claims-maker information need to weigh the arguments and seek factually based resolution where there is contradiction. The current study was not intended to examine the science communication of mountaintop removal mining, but the text analyzed here contained
examples of both good and bad science reporting. Environmental stories are usually rife with controversy. Also, the requisite context for these issues often involves technical, scientific information, which gives competing claimsmakers an easy opportunity to twist hard-to-understand concepts to suit their needs. Being able to competently process the necessary information is a hallmark of good reporters in general, but for science communicators, subject-matter competence is especially important.

Based on claimsmaker framing of mountaintop removal mining and the media texts examined here, several aspects of the issue were identified as obvious trouble spots for science communicators. As mentioned, industry propaganda about the reclamation process and the impact of valley fills are issues that science communicators should be aware of when negotiating the mountaintop removal mining issue. Equally important are these automatic but little-mentioned aspects of mountaintop removal mining:

- The effect of deforestation on populations of niche-specific plants and animals that live or breed nowhere other than large, unbroken tracts of Appalachian hardwood forests. Most people have never seen or even heard of these plants and animals, but they are the lifeblood of Appalachia and can exist nowhere else.

- The effect of edge, or the area where two different habitat types meet as the result of disturbances such as mountaintop removal mining.

- The far-reaching impact of non-native, invasive species on indigenous plants and animals. Land disturbance through mining encourages the problem, and the reclamation process actively promotes it by intentionally planting non-native grasses, shrubs and trees.
From a scientific standpoint, the three aspects of mountaintop removal mining described above are among the most important matters to discuss. But they are rarely heard over the banter and rhetoric surrounding other aspects of the issue.

**Methodological Implications**

Framing is a research method still in the process of defining itself. Relatively new, objective approaches such as frame mapping analysis have much to offer the larger overall practice of framing research. This study used VBPro and VBMap, two software packages developed by Mark Miller to support objective content analysis and framing analysis of text. As mentioned, the development of objective methods to conduct framing studies has coincided with new ways to conceptualize framing, including the idea of using frames as independent variables (causes) rather than dependent variables (effects). This perspective of frames as independent variables allows new lines of inquiry such as the idea that frames drive a framing cycle, which is tied to and in many ways directs the action of claimsmakers and the media as public discourse helps to decide law and policy.

Much of the previous framing research has conceptualized frames as dependent variables. That is, frames have been seen as the product of various decisions on the part of claimsmakers, the media, or anyone else who authors text or promulgates discourse. When conceptualized in this way, the motivations of the authors become the independent variable (cause) while the frames are the result or dependent variable. While this principle is not incompatible or otherwise at odds with the current study’s conceptualization of frames as independent variables (frame resonance theory operates on the assumption that claimsmakers and the media are making intentional decisions regarding their framing choices), the perspective here is shifted slightly to think not about
why the authors frame issues as they do, but about the effect their frames will have on the life of the issue. The importance of this subtle shift in how frames are conceptualized has implications for how they are measured in objective methodologies such as frame mapping analysis.

In previous approaches to framing research, frames were seen on a larger, thematic scale that facilitated making subjective observations about the author’s motivations. For example, framing research based on a conceptualization of frames as dependent variables might involve analyzing text for any themes that might speak to the motivations of the author. That type of an approach to framing research would be focused on the ostensible patterns of framing that emerge from a subjective analysis of the text. It might also provide, as results, findings about how authors consistently ignored certain aspects of an issue, thus framing the topic somewhat differently through omission rather than inclusion of certain subject matter. The method of frame mapping analysis used here is quite different from the subjective approach described above. It operationalizes frames not as the ostensible thematic patterns that spring forth from a reading of the text but as patterns of word association that may or may not be readily recognized from a reading of the text.

Determining the frames present in a text through computer-based analysis of frequency and co-occurrence of terms is, methodologically, a very different approach from more subjective forms of frame analysis. The two approaches are not merely alternative ways of doing the same thing. Objective frame mapping analysis that operationalizes frames as clusters of words requires thinking of frames not as the obvious themes that emerge from a reading of texts but rather as more detailed patterns of word
usage that may or may not be immediately obvious. That is to say, frame mapping
analysis is concerned with the words that are used while previous approaches to frame
study have been concerned with the message that a researcher believes is being sent,
regardless of the words used. The latter method is not concerned with which pattern of
words gives rise to the theme that emerges, nor does it care whether two different texts
use different words to express the same meaning. The focus is on what is perceived, not
the mechanics that lie at the heart of the text.

Consult Tables 1 through 4 and consider the subtle differences between many of
the frames identified in the various claimsmaker and media texts analyzed in this study. It
seems highly unlikely that anyone could perceive the presence of each of those frames by
reading the texts. The “frames” revealed through a subjective reading might, by the
metric applied in frame mapping analysis, be the equivalent of super frames that actually
contain several distinct clusters of words. Remember that in the hierarchical cluster
analysis used to determine frames in the current study, closely related clusters or frames
will appear adjacent to each other in the dendogram. Lumping several of these closely
related clusters together into a super frame would be an easy thing to do during a
subjective reading of the text. Overlooking some of the less obvious clusters would also
be easy to do.

Some might contend that if the computer-derived frames do not correspond to the
ostensible frames found in a subjective reading, then the former are invalid because they
do not match the pattern that human readers would discern. The caveat to such an
assertion is that all human readers would not discern the same pattern, so it is impossible
for that unreliable method to be completely valid either. Frame mapping analysis reveals
the patterns of word association that are present in the text. The claimsmaker who authored the text may not even be aware of the precise set of frames it contains, but that does not change the fact that the patterns exist. Thinking of frames as patterns of word association to which readers or even the authors may be oblivious is quite a different paradigm from thinking of frames as the obvious results of authors’ thematic decisions.

Even in very non-committal text that seems to be written circuitously and offers nothing at all in the way of thematic substance, frame mapping analysis will find real patterns of co-occurrence among key words. Such analytical power is a valuable tool, for example, in comparing two very similar populations of text in which the differences in framing would be subtle. It is also useful in tracking subtle changes in framing over time, the interpretation of which can otherwise be subject to the discrepancies between the researcher’s contemporary thematic perspective and that of the author from a previous period.

The deep-running differences between operationalizing frames as ostensible themes versus operationalizing them as patterns of word co-occurrence that may or may not be immediately obvious carry methodological implications for framing research. Both methods have advantages and disadvantages. Although this study employs the objective method of frame mapping analysis, it is not our intention to declare that subjectivity can be purged from framing research. As discussed elsewhere, perfectly objective methodologies can present seemingly insurmountable obstacles. For example, in the current study, the criteria used for determining whether a frame had been repeated or replicated was highly reliable and objective, but seemingly too rigid. Such an application may be the ideal place to inject subjectivity into the framing analysis. We did not do so
here, but future studies may need to if valid conclusions about claimsmaker and media framing are to be drawn for other issues.

**Agenda-Setting and Framing**

Frame mapping analysis using this software makes several important contributions to mass communication research in general and the framing field in particular. A discussion of these contributions should begin with the research method often considered a close relative of framing. Agenda-setting does not necessarily pre-date framing, but it certainly organized more quickly as a clearly defined research method. Agenda-setting studies determine whether the media have set the public agenda for a given issue. That is, they determine whether media coverage of some issue is responsible for injecting the issue into the public discourse. In the vernacular of agenda-setting, the issue is referred to as an object. As might be expected, each object or issue has a number of aspects that people might want to talk about. These aspects are called attributes. In what has become known as the second level of agenda-setting, some researchers have applied the agenda-setting model to the study of attributes (Iyengar & Simon, 1993). That is, they have determined the media’s role in influencing which aspects of an issue the public talks about. Of course, to do this, it is necessary to first identify the attributes that exist for a given issue. It is in this identification of attributes that the orbits of agenda-setting and framing are at their closest. Framing has always promised to do a better job than agenda-setting at identifying attributes because the former is designed to assess the quality of messages while the latter is designed to determine whether an object or its attributes have been transferred from the media to the public agenda.
Agenda-setting uses content analysis in conjunction with public opinion surveys to show both correlation and directionality in agenda flow. Content analysis involves assigning text to pre-established categories or searching text for the presence or absence of pre-established elements. It does not allow the constitution of those categories or elements to vary freely as the text is processed. The researcher determines them in advance. In framing, the goal has always been to conceptualize frames or attributes as something determined by the author of the text, not by the researcher studying it. Framing, then, involves analyzing text and identifying frames as they emerge. This ad hoc way of analyzing text made it difficult to replicate the results of past studies and stalled the growth of framing into a mature field with a well-defined research tradition (McCombs & Ghanem, 2001).

Frame mapping analysis, as applied in the current study, overcomes the shortcomings of content analysis (rigid, pre-established categories) inherent to agenda-setting as well as the ad-hoc nature of much of the prior framing research. By allowing a computer program to sort the text by frequency and co-occurrence of the words that comprise it, VBPro and VBMap determine sets of words that, because of their co-occurrence, constitute the frames of an issue (or the attributes of an object, to use agenda-setting terms). They have not been pre-determined by the researcher, and the pattern of frames that develops is affected only by the patterns of word use chosen by the author of the text. Most of the framing literature is pervaded by the idea the media or other author embeds the frames in the text, and that the nature of frames is not subject to the vagaries of the researcher. In effect, the method of frame mapping analysis used in the current study is the purest iteration possible of that concept. All the researcher needs to do is
name the frames that emerge and determine the role they played in the text. This is far less subjective than trying to come up with the frames on one’s own by reading the text over and over again and thinking hard about what seems to be there.

Although it has its advantages, frame mapping analysis does not reduce the study of frames to an effortless, error-proof exercise. It is still necessary to properly interpret the clusters of words (frames) that emerge. The complexities and nuances of the English language can make this a challenge, and it is still necessary to have a mastery of the issue’s subject matter before attempting frame mapping analysis. Just as with other approaches to framing, it is necessary to conduct a detailed reading of the text being analyzed. Sarcasm, wit, innuendo and hyperbole within a text can all conspire to sabotage a careless interpretation of the frames that emerge from it, and in many cases, negative qualifiers such as “never” and “not” can reverse the meaning of entire passages within the text. If such textual events occur frequently, the meaning of frames will shift, although not ostensibly. Frame mapping analysis reduces the subjectivity in framing research to a reasonable level, but a careful interpretation of the result is still necessary to reach valid conclusions.

Applying frame mapping analysis—a relatively new method of framing research—raises its own set of questions and concerns. One of the chief complaints in the framing literature is that the traditionally subjective methods of determining frames led a lack of uniformity among frames for an issue. As might be imagined, researchers identifying frames subjectively were coming up with different sets of frames each time an issue was analyzed. This led some to yearn for a master list of frames for each issue (Tankard, 2001) or even a codified classification like the Dewey decimal system to
categorize all frames for all issues (McCombs & Ghanem, 2001). Although computerized frame mapping analysis guarantees the same frames will emerge each time a given sample of text is analyzed, it may not solve the problem of finding a uniform set of frames for an entire issue. Based on the fact that no sets of identical frames emerged for any of the populations of text analyzed in the current study, it may be that computerized frame analysis will not bring consistency to the disordered overall picture of framing research.

On the other hand, it may not be necessary to acquire a master list of frames for every issue after all. Mass communication research has always been a fractured field of study (Maher, 2001). To expect that to change and have framing researchers cooperate to decipher a universal directory of frames is probably unrealistic. After all, framing changes over time and varies among claimsmakers. Most framing investigations would seem adequately served by a method that would precisely identify the frames at play during a given time or in the particular text being analyzed. Frame mapping analysis fulfills that need.

Implications for Stakeholders

This study has something to offer a variety of stakeholders. It offers useful insight into the mountaintop removal mining issue, but it also offers findings of utility related to framing, public opinion, discourse, and policymaking in general.

Claimsmakers

Seeing the changeable nature of issue framing over time clearly illustrates the importance of persistence for claimsmakers. When seen over time, framing is never static. It is in an almost constant state of change. Claimsmakers and the new themes and
concepts they bring to the table in an attempt to generate new frames or redefine old ones drive this process of change. Therefore, the importance of persistence as a claimsmaker cannot be understated. Putting a message out one time, no matter how compelling or exquisite it might be, will not have as much effect on the direction of the issue’s framing as repeating, in large quantities, a less eloquent or even less valid agenda. The literature on propaganda and persuasion is clear about the effectiveness of message repetition—a lesson that carries a great deal of worth for the framing field as well.

Supporters of mountaintop removal mining seem to have done a better job with this than opponents. The coal industry has consistently framed post-mining reclamation techniques as a success. As claimsmakers, they have asserted that the ecological damage of mountaintop removal is trivial and that it comes with benefits that outweigh any costs. The industry has also, through persistence, perpetuated its version of a jobs frame that portrays coal mining as the lifeline of Appalachia and any attempt to restrict it as a sure ticket to economic doom.

That supporters of mountaintop removal mining act on the importance of persistence and repetition better than opponents is manifested in the fact that nearly twice as much partisan text was available supporting the practice as was available from opponents. Perhaps the PR machine of the coal industry is better organized and better funded than that of grassroots environmental groups. Regardless, the lesson for claimsmakers in all issues is that message repetition and persistence seem to be very important in the battle over public opinion and policy.

In addition to persistence, proliferating a large number and variety of frames is also important for claimsmakers seeking to change policy or opinion for an issue. When
challenging the status quo, it seems helpful to field as many new frames for an issue as reasonably possible. Doing so serves to present a profound, nuanced argument regarding an issue. An argument based on a variety of frames presents a much more thoughtful, detailed and credible image than does one based on one or two rudimentary frames. A claimsmaker employing the latter approach may be perceived as having a shallow argument that either has not been sufficiently investigated or that lacks substance.

Proliferating a large number of frames is also useful in that it increases the likelihood of selecting a frame that will win resonance with the media and the public. That is not to say that frames should be selected blindly and that sheer numbers will increase the chance of prevailing in the way that buying more lottery tickets increases one’s chance of winning. Frames should be selected and used based on characteristics that would suggest they could be successful. But despite being selected based on their apparent merit, determining which frames will succeed and which will fail is not something that can be done with absolute certainty. As such, the more frames a claimsmaker employs, the greater the likelihood that one of them will resonate. What’s more, a larger repertoire of frames seems to increase the efficacy of each individual frame because the overall credibility of the claimsmaker’s position on an issue seems to increase with the number of frames used. This makes sense because an argument supported with many points (frames) is more persuasive than one for which only one or two supporting points are offered.

Proliferating a large number of frames also allows a claimsmaker to seek greater publicity for the message. With each new frame for an issue comes the opportunity to issue a fresh series of press releases or initiate a new round of discourse. Keeping the
issue alive and in the public agenda in this way is part of the battle claimsmakers face. Nuanced framing also brings more voices into the discourse as more people with special interests or concerns are attracted by specific frames for an issue.

Finally, claimsmakers should be aware of the importance of word choice and the significance of consistency in word choice for framing. Frame mapping analysis is based on matters of word usage (frequency and co-occurrence). As such, a frame mapping study reveals how important word choice is for framing endeavors. This study showed the subtle difference in terms comprising frames between the claimsmakers and over time in the media samples. Individual words carry specific meaning and cumulatively, these terms shape and direct the efficacy of the frames used to portray the issue. As such, attention to word choice and usage is not a task that claimsmakers should take lightly in their policy struggles.

**Policymakers**

By keeping current with framing research, policymakers can learn a lot about the forces that drive policy change. Almost every policy, regulation or law is mediated before, during and after its effective life. As such, there is a lot of opportunity for claimsmakers and the media to affect the discussion and ultimate course of action regarding such matters. The framing actions of claimsmakers and the media are the impetus behind policy dynamics.

Policymakers make the decisions that ultimately affect all of us by determining the course of the issues. As such, they are expected to be well-versed in all matters germane to the issue being decided. Congress seeks expert testimony and undertakes lengthy investigations before making decisions because having all relevant information is
seen as critical to the weighty policymaking processes involved in a representative democracy.

No matter how closely policymakers follow an issue, it is virtually impossible for them to perceive all the subtleties of claimsmakers’ arguments without systematic help such as that offered through structured studies of issue framing. A policymaker could read every article and press release regarding an issue, watch all the television coverage it receives, and attend every public hearing, press conference and protest rally, but he or she would still not be able to conceptualize the claimmaker and media frames as comprehensively as would be possible by reviewing a framing study such as the current analysis of mountaintop removal mining. Seeing the exhaustive sets of frames and their constituent terms reveals precisely how the issue has been handled by claimsmakers and the media—a level of inspective resolution impossible without such aids as frame mapping analysis. Studying the objectively derived frames for an issue will complement a policymaker’s personal involvement with the issue and widespread consumption of issue-related discourse. Seeing the full scope of frames applied by the claimsmakers and the media will allow policymakers to better put their understanding of the issue in context, lending a new level of awareness. This awareness of the critical function of terms and frames can affect policymakers’ subsequent consumption of discourse, leading to increasingly careful and thoughtful reading of issue-related text.

The implication for policymakers is that, in order to fully understand the issues over which they hold decision-making authority, they need to be aware that words and frames are the building blocks from which the discourse is constructed. Cognizance, then,
of the terms and frames in play by claimsmakers and the media is critical for sound decision making.

Additionally, this study was the first to attempt to predict the position of an issue in the framing cycle based on the characteristics of media and claimsmaker framing. As discussed, this study’s attempt to discern the position of the issue within the framing cycle ran into trouble because of the criteria used to determine whether frames were being repeated or replicated. Nonetheless, frame resonance theory suggests that when a claimsmaker’s frames resonate with the media, public opinion will follow. Policymakers routinely use public opinion polls to guide their decision making. Frame resonance theory would suggest that the position of an issue in the framing cycle can help predict future shifts in public opinion (because if resonance with the media has been achieved, then resonance with public opinion is likely to follow). Therefore, if future research can find a valid way to determine when frame resonance has been achieved, then policymakers could add frame mapping analysis to the list of tools (such as public opinion polls and focus groups) they use to monitor the factors of public discourse that lead up to policy change. These predictive applications of frame mapping analysis—along with 1) an increased awareness of the importance of words and frames as structural components of public discourse and 2) the greater contextual understanding afforded by seeing all active claimsmaker and media frames for an issue—represent the most important implications for policymakers.

Journalists

This study and others like it can help journalists better understand the role they play and the power they wield in society. Our estimates of the media’s power to influence
public opinion have gone from early “magic bullet” theories that overestimated media influence to limited effects paradigms that may have shortchanged them and finally to the middle ground of contemporary media theory that suggests the media may have a moderate degree of power in shaping public life. Agenda-setting theory established that the media set the public agenda but do not have much influence over people’s convictions or beliefs. Framing research may tend to credit the media with having a little more influence than agenda-setting suggests. Framing resonance theory suggests that without the media, claimsmakers have no conduit through which to reach the masses. Although the Internet has made it easier for claimsmakers to circumvent the media and exercise their First Amendment rights on a mass scale, the practical reality is that without the media spotlight, it is difficult to attract much of an audience, no matter what the message. Establishing an extensive body of framing research could help to answer the question of the media’s role in social discourse. Yes, the media are likely to be involved in almost all discourse of importance to society, but methodologies such as frame mapping analysis can help to determine whether the media were crucial to the outcomes or whether they were simply “along for the ride” as claimsmakers and others shaped the course of public policy.

The current study seems to support the notion that the media play a powerful but not omnipotent role in discourse surrounding controversial environmental issues. Note that in the current study, the media did not adopt either claimsmaker’s frames for the mountaintop removal mining issue. These results suggest that, in the case of mountaintop removal mining, the media did not adopt themes of convenience made readily available by claimsmakers attempting to advance their agendas. Instead the media, as the literature
suggests they often do in controversial environmental issues, acted as watchdogs, operating as adversaries of official sources (the media frames were, in many cases, thematically opposed to the industry frames) while maintaining autonomy from those claimsmakers also operating as adversaries of the coal industry. The ultimate result of the media’s framing decisions seems to be that much of the information the public receives regarding mountaintop removal mining is not and never has been the unfiltered assertions of claimsmakers. As such, the media have retained their influence as gatekeepers for this issue.

It seems unlikely that many reporters, even those who may have devoted several years of their careers to covering the mountaintop removal mining issue in Appalachia, can discern as accurate a picture of media coverage of the issue as is available through this study. Frame mapping analysis can provide an exhaustive survey of any and all frames appearing in any sample of text desired. As demonstrated here, it can also allow a longitudinal comparison of changes in samples across time or differences among multiple samples of text.

Reporters often review past coverage of an issue to get background on which to base their current efforts. Typically, newsroom research of that type involves reading clippings that another reporter has collected or visiting the paper’s archive or the library. Part of the utility in that exercise is to gain a factual understanding of the issue, but there is more. In addition to absorbing facts, reporters are also noticing how an issue was covered. What they do with that information is up to them. They may try to emulate past coverage and match its tone, or they may try to approach it from a fresh angle with a different perspective. Either way, what they are engaged in is a type of framing study.
They are considering how the issue was framed in the past, and they are then making framing decisions of their own as they proceed with their reporting.

It has always been hard to persuade journalists to accept and use academic research in the newsgathering and reporting endeavors (Pew Center, 2000). However, frame mapping analysis of current issues can be useful to journalists by providing a richer, more thorough picture of how they and their predecessors have framed an issue. Reporters actively seek insight into such matters already, so convincing them that the need is there should not be a problem. Persuading them to accept the method may be difficult. Many working journalists with no academic research experience may be turned off by the idea of interpreting a frame mapping study such as this one. But if the results can be brought to bear in the newsroom, the effect will be a benefit to journalists trying to discern how issues have been covered in the past.

Many journalists, because of their training, are quite aware of effect that word choice and word usage can have on a message. As people attuned to the importance of word choice and word usage, journalists should be quick to recognize the semantic utility of frame mapping analysis, which is based on the association and co-occurrence of key words in text. Seeing the nuanced patterns of word associations that comprise the results of a frame mapping analysis can help journalists fine-tune their understanding and use of terms for a given issue. This semantic utility, along with the benefit of better discerning thematic trends in past coverage, are the principle implications of frame mapping analysis for journalists.
Journalism Educators

The implications of this study for journalism educators read like a compilation of the implications for all other stakeholders, including claimsmakers, policymakers and journalists. As media watchers, journalism educators will find value in the results of framing studies that speak to the processes underpinning competition among claimsmakers and to the policy ramifications of mass mediation of the various successful frames.

For those academics who study and teach public opinion, public relations or policy law, frame mapping analysis and studies that employ it offer a chance to advance both theory and applied understanding of these disciplines. For instance, the results of this study on framing of mountaintop removal mining can be used to analyze the public relations efforts of the coal industry, which has historically placed a strong emphasis on managing its public image. If the industry’s public relations efforts are manifested in its framing choices, then PR educators can look to framing studies for details of how these efforts were operationalized and whether they were successful.

Those who study public opinion and persuasion can look to the results of framing studies to analyze the efforts of competing claimsmakers. Frame resonance theory suggests that the framing choices made by supporters and opponents of an issue will directly reflect their attempts to advance their own special interests and agendas. If that assertion is correct, then a frame mapping analysis of any issue will contain in its results evidence of how competing claimsmakers went about trying to win the hearts and minds of the public.
This study specifically revealed the significance of a lawsuit by the West Virginia Highlands Conservancy seeking to block Arch Coals’ Spruce No. 1 Mine. When the late Judge Charles Haden blocked Arch’s permit for the Spruce Mine, media and claimsmaker texts began to bristle with frames containing various legal terms. For educators who specialize in policy law, the specific composition of legal and water-related frames could reveal a lot about how law and policy matters related to mountaintop removal mining 1) affected claimsmakers and 2) were used by claimsmakers to bring about further change.

Educators who teach news writing or journalism can find value in frame mapping analyses because they provide comprehensive cross sections of media performance. For instance, this study specifically shows that media framing of mountaintop removal mining became more nuanced or sophisticated over time as journalists employed frames in both greater numbers and complexity. For educators, such a result (and the issue-specific minutia on which it is based) offer the chance to advance real understanding of the journalistic craft. Teaching journalism often relies on theory or generalizations about the craft and its practice. Studies such as frame mapping analyses, which show how journalists actually performed in their coverage of an issue, are a chance to make tangible some of the otherwise hard-to-get-at aspects of applied journalism. For instance, concepts such as accuracy, fairness, balance and bias are discussed regularly in journalism education. Sometimes, they are even supported anecdotally. But a comprehensive analysis of the media’s detailed framing choices for an issue provides real evidence on which to base a discussion about all of the aforementioned concepts and more.
Educators who teach and study theories of communication will find value in frame mapping analyses because they can reveal the mechanics of the communication process. For instance, the current study reveals in great detail how the media framed mountaintop removal mining. At total of 44 media frames containing 406 specific terms were identified for two periods of media text. These very specific frames show precisely which aspects or “attributes” of the issue the media emphasized in their coverage. As such, a researcher or educator seeking to investigate the second level of agenda-setting for mountaintop removal mining would find a highly valuable and defensible starting point in the results of this frame mapping analysis. That researcher could then proceed to measure whether the “attributes” of mountaintop removal mining reflected in the media frames were being transferred to public discourse for the issue.

Framing research offers something of interest and value not only to educators whose focus is the mass media but to those whose realms include other disciplines in the social sciences. Frame mapping analysis can reveal the history of social discourse over the life of an issue, facilitating richer analysis of issue case studies in academic environments. Sociologists and geographers know that understanding our social world requires understanding the dynamics that drive discourse and determine policy. As such, methods such as frame mapping analysis offer something of value to education at many levels, but journalism education in particular.

Software-related Issues

Even software as specific as VBPro and VBMap can be used in a variety of ways. When used as it was here, these software packages empower a promising method of framing research. The software allows an objective determination of the frames that are
present in any given population of text. The frames and the exact words that comprise them are determined with certainty. The software also generates data that can be used to illustrate the associative relationships among the frames.

This study has shown how media and claimsmaker framing can be compared to predict the position of an issue in the framing cycle. This study also shows how media and claimsmaker framing might be used to reveal how framing of an issue changed after a particular date, event or development in the discourse. And when used with the hierarchical cluster analysis and interactive graphing functions of SPSS, these methods can reveal patterns among the words and frames of text that are invisible to the naked eye.

During the course of conducting the current study, several methodological issues developed that illustrated how VBPro and VBMap could be improved to facilitate a better analysis of frames.

First, the search lists that VBMap requires in order to derive eigenvalues from a file of coded text are limited to about 120 words or groups of words (more specifically, 120 sets divided by facing arrows). Larger search lists will cause the program to abort. Particularly in large samples of text, limiting the search list to these parameters seems to limit the profundity of the results. In both populations of media text analyzed here, limiting the search list to 120 words or groups of words required the omission of several terms of potential interest. The terms that had to be omitted were low-frequency words, and the limit of 120 seems sufficient to capture all of the high-frequency words, so it is possible that the limit is not as much of a shortcoming as it might seem. In any case, limiting the search list to about 120 terms often requires a frustrating process of
elimination where tempting words must be discarded from analysis just to get the
software to operate.

Another software implication arising from this study involves a means of
comparing and interfacing search lists in VBPro. It would be useful if the software could
support a function where two separate search lists could be merged and terms originally
in both lists would appear only once (duplicates eliminated).

It would also be useful to have a function that would compare two search lists
(without combining them) and indicate which terms occur in each and which terms are
unique to each.

Finally, it would be useful if VBPro and VBMap would indicate why they abort
or crash when they do so. A number of conditions can cause them to shut down, but the
software did not provide us with any error messages or other indications of why.
Troubleshooting the sometimes minor problem can be time consuming and frustrating.
Two Achilles heels that seem to trip the software up quite often are:

1) having a word or words in the search list that is/are not exactly as they are in
the text. This could be as simple as capitalizing a term that is not capitalized (or vice-
versa), adding an “s” to a word that appears only in singular form, or spelling a word
differently than it appears (although not necessarily incorrectly—for instance “changed”
instead of “changes”). With numerous forms of the same word and varying uses of
capitalization in many of the sets, the opportunities to make a mistake multiply fast. Any
one of these mistakes will cause the software to abort without explanation. It would be
tremendously helpful if the software would indicate which word or words in the search
list were giving it trouble. Finding the mistake otherwise is like looking for the proverbial
needle in a haystack. Again, the computer must know which word or words caused it to crash. Sharing that information would be a very (user) friendly thing for the software to do.

2) If in delimiting the text file, one does not make sure to hit return after every case number (that is, allow text to appear on the same line as the case number identifier), text will appear in the coded file, which should contain only numbers. This error will not make itself known until trying to derive eigenvalues from the coded file in VBMap, at which point it will crash the program.

Limitations

This study suffered from two major limitations. First, the availability of partisan texts was limited both in quantity and in longevity. It was impossible to find old partisan texts (say much before 1998) for a longitudinal analysis. We could find no source of old press releases from advocacy groups, probably because they have such time value that they are useless to everyone except communication researchers after a few months of their issue date. Currently the most reliable place to find such partisan texts is from the claimsmakers’ own Web sites. Most have archives of their old press releases, probably only because keeping them available online requires no effort and makes the Web site seem more comprehensive. Even contemporary partisan texts were rare, and it was difficult to acquire enough to analyze in VBPro (which works best with large sets of text).

The second major limitation was that media texts (in this case, newspaper articles) are not available electronically in good numbers earlier than about 1994. Lexis-Nexis and comparable databases such as Dialog are often considered comprehensive representations
of the nation’s newspaper media, but they are truly weak if one attempts to retrieve articles before the Internet age (roughly the early to mid 1990s). Doing so may leave one with the false impression that the issue in question received little or no press coverage during the 1980s or earlier. Lexis-Nexis is particularly misleading in this way because it does not give a naive researcher any indication that the reason few if any hits are being returned is that the database may only be searching one or two newspapers (usually The New York Times and the Washington Post) if the search is limited to years before the early ‘90s. The reason the databases are incomplete is that few if any newspapers stored full text archives electronically before the Internet boom and the move toward online editions of papers. Microfilm and microfiche archives have always existed, but no one is in a hurry to convert them to electronic stores. This issue will become less problematic in future generations because most all newspapers are keeping electronic archives now. So by the year 2050, if someone wants to analyze 50 years of newspaper coverage, getting access to searchable, full-text archives will be easy. But for now, really good electronic searches of full text newspaper databases only work for dates within the last decade or so.

In this study, we had hoped to conduct longitudinal analysis of media texts from 1968 (the date the first mountaintop removal mine was opened in West Virginia) through the present. Such a time period would completely capture the lifespan of the issue. However, the length of the longitudinal analysis had to be truncated to 1985-2004 because that was as far back as text could be accessed electronically. Actually, getting an acceptable population of media text back to 1985 was only possible because the newspapers responsible for most of the issue’s coverage (Charleston Gazette and
Charleston Daily Mail) have an online library where their own full text is available electronically as far back as that date.

For other types of research such as content analysis, microfilm reserves are an acceptable substitute for electronic archives. But frame mapping analysis requires importing the full text as a Microsoft NotePad document—something easily done from electronic archives but extremely problematic with other storage media.

This study was also limited in its ability to examine how framing of the issue changed as a result of its emergence in the national media. As discussed, mountaintop removal mining is uncommon in that a discrete period can be isolated when it emerged from a regional, grassroots issue to a nationally mediated one. Unfortunately, the ability of the present study to assess changes related to the emergence of the issue in the national media was limited by two factors: 1) the lack of sufficient partisan texts for a longitudinal analysis of claimsmakers and 2) methodological strictures inherent to the frame analysis necessary to ensure reliability and defensibility of results.

First, we were unable to obtain a good population of partisan texts from the period before the issue emerged in the national media. Advocacy groups seem to live in the present, and old press releases and other partisan material are seldom available. This made it impossible to get a before-and-after measure of claimsmaker texts. Although it was possible to get adequate populations of media text before and after the issue became nationally mediated, without parallel populations of partisan texts, it was not feasible to make predictions about which changes were correlated with the issue emerging in the national spotlight and which were correlated with other factors.
Secondly, the objective method used to determine whether a claimsmaker frame was being repeated in the media text was quite rigid. As a result, the sensitivity of this test was low. As reported in the discussion surrounding Hypothesis 5, no claimsmaker frames were found to repeat anywhere in either of the populations of media text analyzed, despite several bearing strong semantic and thematic similarity. Perhaps this lack of sensitivity was a bad thing in that it limited the internal validity of this study. But on the other hand, it was a boon for reliability. No other method would have been as reliable, and had repeating frames been found, their existence would have been irrefutable. That none were found may or may not be an indictment against the method of determination used here (requiring exact matching sets of words). As discussed, patterns of word use found in different frames suggest that terms really were being used in different ways to support different frames.

Validity of the method aside, the fact that no repeating frames were found greatly limited this study’s ability to make observations about differences in the framing of an issue before and after its emergence in the national media. Had at least some of the frames been repeated from time one to time two in the media texts, then the frames that did change could have been compared with changes in the claimsmaker frames to distinguish which changes in framing were the result of new directions for the issue and which were perhaps related to national media attention.

This study’s findings related to framing of mountaintop removal mining mirror trends seen in other research examining media and public discourse over environmental issues. On these points, the external validity of this study seems high. For instance, as suggested by Hall’s (1979) role theory, journalists adopt a watchdog role when reporting
environmental issues and usually favor the environmentalist side of the issue. The finding that the media frames more closely matched those of opposing claimsmakers and that they became even more so over time is a finding that can reasonable be generalized to other national environmental issues. Enough evidence has been collected to expect that media will operate in a similar way when reporting future environmental issues.

The framing characteristics of claimsmakers are also aspects of the current study that are externally valid. In the current study, the coal industry used low-key, non-inflammatory language to frame mountaintop removal mining. Such framing decisions are logical for an advocacy group like the coal industry seeking to maintain the status quo. There is no advantage for them in having the issue enter the public discourse, but if it is going to be there, the best strategy would be for them to attempt to tame the dialogue and keep outrage to a minimum. Sterile, mundane language that would downplay discourse over the issue would be one way to do so. On the other hand, environmentalist advocacy groups are seeking to change the status quo regarding the issue. As such, it would be in their best interest to frame the issue using language that would attract attention and increase public discourse. These patterns of claimsmaker behavior seem universal and could reasonably be expected with most environmental issues.

Few, if any, of this study’s other findings are generalizable to different environmental issues. The unique life history of the issue prevents changes in framing over time from being externally valid. As discussed, mountaintop removal mining existed for nearly 30 years as a regional issue before emerging quickly into the national spotlight. This pattern is uncommon and probably affected framing in ways that would not occur with regularity in other issues. Also, the extremely contentious nature of the issue means
that it may be intractable. The normal process of public discourse, which often involves compromise and consensus, may be distorted or absent in the debate over mountaintop removal mining. As early as the 1970s, protests over the issue involved violence and gunplay. Few other issues engender such reaction—a fact that seems likely to result in unique long-term patterns in how the issue is framed.

Directions for Future Research

The more people who employ frame mapping analysis using the VBPro and VBMap software packages, the more this wing of framing research will develop. Each time the technique is used to determine how claimsmakers or the media frame a particular issue, another model for future applications will be generated. The VBPro and VBMap software, when used in conjunction with hierarchical cluster analysis and 3-D graphing in SPSS, provide insight into frames, their makeup and interrelations unavailable in any other way. Seeing the otherwise invisible association and co-occurrence between and among words and frames is a particularly valuable asset that this method offers researchers.

Two specific needs of frame mapping analysis research include 1) more work on locating the phase of the issue in the framing cycle and 2) work with issues in which stakeholder frames are repeated in the media.

The current study suggests that some issues may be intractable and will remain mired in the competition phase of the frame cycle while other, less contentious issues will eventually move on to the resonance and resolution phases. Some good goals for future research would be to identify specific issues that fall into both categories and, on a more general level, to make some observations about what might distinguish these two types of
issues. Explaining the phenomenon of issue intractability would provide a big piece of the puzzle to understanding the frame cycle and its utility in public opinion and policy research.

Future research would also be well directed toward the goal of either identifying and studying some specific issues for which claimsmaker frames repeat in the media (using the same method for determining repetition applied here) or devising a better method for doing so. If the method used in the current study (requiring sets of exactly matching words) is too rigorous, it could be that frames would rarely or never repeat. This would be an unfair and inaccurate way to measure whether claimsmaker frames are being adopted and used in media texts. Either way, future research should identify issues with frames that repeat in media texts as well as issues that do not (as the current study would suggest mountaintop removal mining has not). Then, by considering the differences between the issues and the circumstances surrounding their framing, we can learn more about framing in general and the frame cycle in particular.

The insight that frame mapping analysis offers into claimsmaker and media framing promises a better understanding of the way issues play out as public deliberation unfolds—but again, only if it is applied to enough issues. As a field, science communication is built on the premise that science issues are different from non-science issues. Science communication suggests that the issues are treated differently by claimsmakers, the media and the public. Frame mapping analysis is one way to provide substantive insight into how the discourse over science issues unfolds and to offer answers to the questions science communication raises.
Further research may also resolve some larger theoretical matters such as issue intractability. Frame analyzing enough different issues could eventually increase our certainty about whether all issues follow the same course in the frame cycle. If they don’t, which seems more likely, then perhaps we will be able to say something about how and why the issues vary.
## APPENDIX A

### DENDOGRAM OF OPPOSING CLAIMSMAKER FRAMES

Rescaled Distance Cluster Combine

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APPENDIX B
SAMPLE MEDIA TEXT (NEWSPAPER ARTICLE)

[June 1, 2003, Sunday SECTION: News; Pg. P3B LENGTH: 1954 words HEADLINE: Mining study abandons options on valley-fill limits June 1, 2003, Sunday BYLINE: Ken Ward Jr.]

Mountaintop removal study - What's next
Federal agencies will accept public comments on the draft Environmental Impact Statement through Aug. 29. A final version will be issued after the comments are considered.

Any new rules, regulations or policies prompted by the study results would not be implemented until after the report is finalized.

It is also possible that the study results could be challenged in court under the National Environmental Policy Act, or NEPA. To find out more about what NEPA is and how it works, visit http://ceq.eh.doe.gov/nepa/nepanet.htm.

Written comments on the study may be submitted to John Forren, U.S. Environmental Protection Agency (3EA30), 1650 Arch St., Philadelphia, Pa., 19103.

Public hearings have been scheduled for July 22 at The Forum at The Hal Rogers Center in Hazard, Ky., and July 24 at the Little Theater of the Charleston Civic Center in Charleston, W.Va. Each hearing will have sessions from 2 to 5 p.m. and 7 to 11 p.m.

Copies of the study are available via the Internet at http://www.epa.gov/region3/mtnrrem/. The study, along with an archive of mountaintop removal articles and documents, is also available at http://wvgazette.com/mining.


Copies may also be requested by calling the EPA Region 3 office at (800) 228-8711.

For further information about the draft EIS, contact the following agency representatives:

Two years ago, federal regulators studying mountaintop removal mining considered limiting valley fills to small streams in the upper reaches of watersheds.

In preliminary drafts of their study, government officials came up with four alternatives to restrict the size of valley fills.

Those alternatives, the agencies said in several versions of their report, should be the heart of any plan to improve regulation of mountaintop removal in Appalachia.

In the first official version of the study, released late last week, the Bush administration abandoned consideration of any such restrictions.

Instead, the federal Office of Surface Mining and the Army Corps of Engineers would approve or reject fills on a "case-by-case basis," according to the draft Environmental Impact Statement, or EIS, issued Thursday.

Agency officials promised that a more detailed and better-coordinated review of mining permit applications would reduce the number and size of streams buried by valley fills.
"Some people may think an absolute limit is appropriate," said Mike Robinson, an OSM program manager who helped write the report.

"But we think it should be a site-specific decision," Robinson said. "The case-by-case method is a lot more flexible."

The National Mining Association praised the government proposal as a "road map for further environmental improvements at Appalachian coal mining operations."

Environmental activists and coalfield citizens said the Bush proposals are contrary to the statement goal of the study: To limit the environmental impacts of mountaintop removal.

"The federal agencies have broken their promise," said Cindy Rank, mining chairwoman for the West Virginia Highlands Conservancy. "We have some greasing of the permitting process and rollback of protections."

Joan Mulhern, senior legislative counsel for the Washington group Earthjustice, said, "Only in Bizarro World could this document be considered to be calling for reduced environmental impacts."

'Increasingly concerned'

In mountaintop removal mining, coal operators blast off entire hilltops to uncover valuable low-sulfur coal reserves.

Huge shovels and trucks haul away the coal. Dozers and more trucks shove leftover rock and dirt - the stuff that used to be the mountains - into nearby valleys, burying streams.

In 1998, the Conservancy filed the first in a series of major lawsuits to try to curb mountaintop removal.

To settle part of the initial lawsuit, the corps and other agencies promised to conduct a detailed study of mountaintop removal's environmental effects.

At the time, the agencies said that they were "increasingly concerned" about damage to forests and streams. In a Federal Register notice announcing the study, the agencies said that, when the review was complete, the results would be used to draw up new rules "that would minimize the potential for adverse individual and cumulative impacts of mining operations."

Under the legal settlement, the study was supposed to take two years and be completed by December 2000.

Several times, West Virginia political leaders, including Gov. Bob Wise, blocked formal public release of a preliminary draft. But over the last two years, thousands of pages of study documents and draft reports have been obtained through public records requests.

2 1/2 years late

On Thursday - 2 1/2 years late - the first official draft of the mining study was released.

The U.S. Environmental Protection Agency and the Fish and Wildlife Service joined OSM and the corps in announcing the release.

In press briefings and news releases last week, agency officials said little about the environmental impacts found by the study team.

A joint news release included only one sentence about the effects, and it emphasized a reduction in mining permits since the legal battle began.
"Permit data comparing surface coal mining operations approved since 1998, with those authorized for the five years prior to 1998, show that the total area of Appalachian watersheds covered by valley fills was cut by over 50 percent and the total length of streams covered by these fills was cut by over 25 percent," the release said.

Buried in the more than 5,000-page report and in dozens of attached scientific studies were detailed descriptions of the damage already done by mining and gloomy predictions of future impacts.

For example, between 1985 and 2001, nearly 6,700 valley fills were approved in the study region, which included West Virginia, Kentucky, and parts of Virginia and Tennessee.

Those fills, the study found, covered an area of nearly 84,000 acres - more than the total acreage of all West Virginia state parks combined.

In West Virginia alone, valley fills buried an area of more than 25,000 acres, or enough to cover 19,000 football fields.

Across the region, valley fills have already buried about 724 miles of streams, the study concluded.

"The direct burial of stream segments by excess spoil for [mining] operations is a long-term irretrievable commitment of resources for the buried stream segment," according to the study.

In a report on cumulative impacts of mountaintop removal, the study team concluded that more than 1,200 miles of streams have already been damaged directly or indirectly by mining. Over the next 10 years, the study stated, another 1,000 miles of streams could be damaged.

Also, the study found, mountaintop removal reclamation practices are leaving rich, diverse forests as flattened or rolling grasslands.

"Results of this study support the thesis that fundamental changes to the terrestrial environment of the study area may occur from mountaintop mining," the study stated.

"For example, it is estimated that the study area may have lost approximately 3.4 percent forest cover in the last 10 years from surface mining," it stated. "This equates to 380,547 acres.

"When adding past, present and future terrestrial disturbance, the study area estimated forest impact is 1,408,372 acres, which equates to 11.5 percent of the study area."

The study team noted that, "The southern Appalachians have been identified by the Nature Conservancy as one of the hot-spot areas in the United States for rarity and richness.

"This region is known to have the highest regional concentration of aquatic biodiversity in the nation," the study said. "For this reason, it is hypothesized that impacts which result in decreases in genetic diversity, as measured by loss of species, loss of populations or loss of genetic variants, would have a disproportionately large impact on the total aquatic genetic diversity of the nation."

Unpublished drafts

When agencies write these kinds of studies, they are required to consider "alternatives" for government action: build a highway or not, cut down all of the trees in a forest or only some of them.

An EIS is supposed to be a sort of cost-benefit analysis that weighs environmental harms of government - and society's - actions.

In their unpublished preliminary drafts of the mining study, federal officials stated that they would consider
four alternatives for future limits on valley fills:

A baseline alternative. Basically, agencies would do things as they had been before lawsuits over mountaintop removal were filed. "Under this alternative, fills would not be restricted to any particular stream segment," according to a draft obtained in 2001 through a Freedom of Information Act request.

A very strict limit on valley fills. Coal operators would not be able to dump waste rock and dirt into very small streams, defined as those that drain more than 75 acres of land.

A middle-of-the-road approach. This would allow valley fills in larger waterways farther downstream. Regulators were evaluating watersheds ranging from 76 acres to 250 acres.

Another compromise route. Fills would not be limited to any particular size streams. But other new regulations would be written to "reduce the aquatic, terrestrial and community impact" of mining.

In the study released last week, federal regulators dropped consideration of these alternatives.

Instead, the alternatives now being considered all focus on which government agency will handle which of the various permits required for mining operations.

Under the proposed "preferred alternative," the agencies "would develop enhanced coordination or regulatory actions, while maintaining independent review and decision making by each agency."

The government would come up with a "joint application" that coal companies would file to seek all of the permits needed under various environmental laws.

"In summary, joint evaluations of [mining] proposals would result in more expansive considerations of both environmental impacts and effective treatments to mitigate those impacts," the study stated.

During press briefings, all officials from all of the involved agencies praised the proposal.

"We are very pleased with the direction this EIS is going," said Greg Peck, a deputy EPA administrator. "It's going to provide better protection for the environment."

Environmentalists were skeptical that better coordination by various agencies - without concrete new restrictions - would lead to smaller valley fills.

"We expected there to be limits on the size of fills," said Joe Lovett, executive director of the Appalachian Center for the Economy and the Environment. "The science clearly shows that those kinds of limits are appropriate.

"What is remarkable is that those studies were actually used to loosen the reins on mountaintop removal, rather than tighten them," Lovett said.
"It's a tragedy, an Appalachian Tragedy, what is happening in the coalfields now," said Julia Bonds, a member of a group of West Virginia residents called Coal River Mountain Watch. "You drive the main roads and you see a mountain to the left and a mountain to the right. The problem is that you can't see what's behind that mountain."

What's behind is a different story entirely. The landscape changes from lush, tree-covered mountains to a barren moonscape - the result of a mining practice called mountaintop removal. Julia's home, in the southern West Virginia coalfields, is one of the places where such mining is most common.

"See those trucks down there?" said Virginia Rorrer, another resident, pointing into the distance at a group of six dumper trucks, looking like miniature toys. "Those trucks have tyres that are almost three metres tall." The scale made it almost impossible to comprehend.

To date, approximately 162,000 hectares, an area half the size of Luxembourg, have been flattened by mountaintop removal, or, as the mining industry now wants it to be called, 'mountaintop mining'. Hundreds of metres of mountain are blown away in order to get at the thin seams of coal underneath. Once the coal is removed, the excess debris is dumped into nearby valleys and streams. Hundreds of thousands of hectares and over 700 km of streams have been covered by this 'valley fill'.

All this is done with the approval of the US Army Corps of Engineers and the state's Department of Environmental Protection (DEP), the two regulatory agencies charged with protecting the state's air and water and carrying out federal laws.

West Virginia is home to some of the richest mineral resources in the Appalachian mountain chain. The mountains here have been mined for over 100 years. Most families here have several generations of miners; many can trace their roots back to nearly 200 years. In the late 1800's, their mineral rights to vast tracks of land were bought by out-of-state industrialists for a few dollars. Many people became miners to make a living and thousands died of miner's diseases - black lung and silicosis.

Deep mining, where shafts are dug into the ground, was replaced in the 1950s and 60s by strip mining, where large machines and blasting are used to eat into the side of a hill to get at the coal. For the past 20 to 30 years, companies have been required to reclaim and restore to the original contours the area they strip-mine. Yet even after all that time it is rare to see trees growing on this 'restored' landscape.

West Virginia is one of the poorest American states: it ranks 49th out of 50 states in household income, and many argue that this is partly due to an over-reliance on extractive industries such as coal and timber, and absentee ownership of those industries. The coal industry claims that mountaintop mining is benefiting the mountain-locked region by creating flat areas to bring new businesses and industries to this poverty-ridden state. Yet in the 30 years that coal companies have been levelling mountains only two per cent of the sites have been used for any development.

Residents argue that in any case they are paying too high a price - their communities, homes and water supplies are being irreversibly damaged. The blasting is fracturing aquifers and the water table is dropping. And dust is coating the landscape. When it rains, inches of rock dust turn hard and kill vegetation.

Two years ago, citizen's groups hauled the DEP and Army Corps of Engineers to the court, and in May the Federal District Judge ruled that the agencies must stop issuing new permits for mountaintop mining when there is no use designated for the valley fill associated with it. The ruling stated that the permits ran counter
to the Clean Water Act's goal to restore and maintain the chemical, physical and biological integrity of America's waters. The coal industry denounced the ruling, saying it would mean the loss of 32,000 miners' jobs in Kentucky and West Virginia over the next five years.

"It used to be that when a coal company came in the community boomed," says Larry Gibson, a Coal River area resident. "Now they move everybody out. They make it hard for people to live there. The community aren't getting the profit; it's just a handful of people at the top."

In fact, the people in the coalfields see less money from mountaintop removal than do their neighbours in the larger cities of West Virginia. Coal companies pay a severance tax on coal, which is collected by the state and then distributed to communities on a per capita basis. This means that the larger towns, which are typically farther from the coalfields, see more of the money than do the small communities who live with the disruption on a day-to-day basis.

Take for instance the town called Sylvester (population 300), where a coal-preparation plant crushes coal brought in from the surrounding mines.

Pauline Canterberry, 72, says that by August this year, the town had received only $300 from the severance tax. Yet in the past two years, Sylvester has lost its well water and is now coated with dust. "The state thinks it can't do without it and they're permitting a part of the state to be destroyed for the economy of the state," she says.

In March, the national Environmental Protection Agency (EPA) privately briefed US President George W Bush's officials on the issues surrounding mountaintop mining. The contents of the briefing were obtained through the Freedom of Information Act by Trial Lawyers for Public Justice and the Appalachian Center for the Economy and the Environment. The documents say the area is home to "some of the best forest habitat in the world" and goes on to describe wholesale deforestation, toxic pollution, burying of streams and other environmental destruction being caused by mountaintop mining.

A scientific study by the EPA states, "Mountaintop mining operations in the Appalachian coalfields involve fundamental changes to the region's landscape and terrestrial wildlife habitats."

Larry Gibson of Kayford Mountain knows these changes well. His ancestors have been there for over 200 years - now he is the only resident, his 30 hectares of land virtually surrounded by more than 5,000 hectares of mountaintop removal.

"I was born in 1946; this mountaintop farm was thriving then," he says. "All this land was filled with corn and sweet potatoes and that bank right there had honeybees. My daughter was born in 1987. When she was born, the mountains were gone."
BIBLIOGRAPHY


VITA

Marc Seamon

As of 2004, Marc Seamon had 10 years of professional media experience in newspaper and radio. He has a bachelor’s degree in communication (West Liberty State College 1996), a master’s degree in journalism (West Virginia University, 1998) and a master’s degree in educational psychology (West Virginia University, 2000). His journalism thesis was a longitudinal examination of sensationalism in daily newspaper. His educational psychology thesis was a comparison of instructional effectiveness between intensive and semester-length courses. In 2001, he accepted a Ph.D. fellowship at the Pennsylvania State University, where his research interests evolved to focus on newspaper content analysis and frame mapping analysis. He has numerous publications and conference papers. Seamon works with displacement theory, which is an extension of gatekeeping research that examines the effect of major news events on the rest of the daily news mix. He also works with frame mapping analysis to track claimsmaker and media framing as independent variables that affect public opinion and policy. In 2004, Seamon was hired as assistant professor of journalism at Marshall University. When not working, Seamon enjoys distance running, studying the natural world, and hunting in the woods and fields of West Virginia.