

# APPALACHIAN HEARTBREAK

## Time to End Mountaintop Removal Coal Mining



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Coal is America's dirtiest energy source—and the country's leading source of global warming pollution. Pollution from coal plants produces dirty air, acid rain, and contaminated land and water.

Nowhere is the debate over how far we are willing to go for inexpensive energy more contentious than in the coalfields of Appalachia. It is there—between the hollows of West Virginia, beyond the bluegrass of Kentucky, bordering the Blue Ridge of Virginia, and above the smoky vistas of Tennessee—where mining companies are blowing up America's oldest mountains to get the coal beneath the peaks. Without a doubt, mountaintop removal is the world's worst coal mining. Often referred to as “strip mining on steroids,” it is scarring the landscape and threatening communities throughout Appalachia.

Instead of extracting the coal by underground mining, mountaintop removal uses explosive charges and large machinery to remove the mountain and get to the coal. More than 500 mountaintops have already been destroyed and more than one million acres of forest have been clearcut. Well over a thousand miles of valley streams have been buried under tons of rubble, polluting drinking water and threatening the health and safety of all who make their home in the region.

Ultimately, mountaintop removal is a symptom of failed federal energy and environmental policy and a conscious effort on the



Kayford Mountain, West Virginia

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part of the mining industry itself to keep consumers, businesses, financiers and state and local government in the dark about the extent of extraction-related harm from coal use.

The Natural Resources Defense Council's (NRDC) position on mountaintop removal is clear: the solution to the ecological, economic, and cultural harm inflicted by this controversial mining practice is *not to mend it, but to end it.*

## The Basics of Mountaintop Removal

Coal companies conduct mountaintop removal predominately in the central Appalachian Mountains, comprising western Virginia, southern West Virginia, eastern Kentucky, and northeastern Tennessee. Although it has existed in some form since the 1960s, this method became prevalent during the 1990s, in part because of increased electricity demand and a decrease in easily accessible coal supplies. After larger and heavier machinery was introduced, coal companies could profitably blow the tops off mountains to take out the coal.

Surface or strip mining currently accounts for 40 to 45 percent of coal production in Central Appalachia. Approximately 10 percent of all of the nation's coal comes from this region.<sup>1</sup> The coal that the companies seek is layered below the surface in seams, some less than a foot thick. To get to it, forest cover is completely cleared on the mountaintop and then explosive charges are detonated to break through the surface layer. Every day, approximately 2,500 tons of ammonium nitrate/fuel oil explosives are detonated—equivalent to the power of a Hiroshima bomb every week.<sup>2</sup> Afterward, the debris is bulldozed over the side of the mountain and into the streams below. Towering 20-story draglines—so large that they must be assembled on site—are then used to scrape out the coal. Each scoop of these draglines is capable of moving more than 100 cubic yards of soil, or enough to fill seven dump trucks.<sup>3</sup>

## Trading Mountains for Moonscapes

Mountaintop removal and the dumping of wastes and debris into adjacent valleys is the greatest earth-moving activity in the United States.<sup>4</sup> To date, 502 peaks have been leveled throughout Appalachia, including Kentucky (295), West Virginia (135), Virginia (65), and Tennessee (7).<sup>5</sup> These mined mountaintops encompass more than 1.1 million acres, an area nearly the size of Delaware.<sup>6</sup> If continued unabated, a total of 631 square miles of mountains could be leveled by 2012.<sup>7</sup>

Companies can extract such narrow coal seams profitably because of the mechanization that eliminates the need for workers, as well as the gigantic scale of these operations and lax environmental oversight. A typical mountaintop mine removes the top 600 to 800 feet from a mountain—the equivalent of lowering a mountain nearly the height of the Statue of Liberty.<sup>8</sup> A large mountaintop mine may exceed 10 square miles and produce 750 million cubic yards of wastes—or roughly twice the amount of material it took to build the Great Wall of China.<sup>9</sup> And mountaintop mines are getting larger. In Kentucky, for example, the number of mines greater than 100 acres has increased significantly over the past few years to a total of more than 800 as of 2008, 122 of which exceed 1,000 acres in size.<sup>10</sup>

## Farewell to Forests

The forests of southern Appalachia represent the most biologically diverse temperate deciduous forests in the world.<sup>11</sup> They provide vital wildlife habitat, mitigate flooding, and recycle nutrients.<sup>12</sup> Mountaintop removal is destroying these forests at an alarming rate. The Environmental Protection Agency (EPA) estimates that at current rates of deforestation from mountaintop removal, the total forest loss by 2012 would be 1,408,372 acres (or 2,200 square miles).<sup>13</sup> The loss of forest cover this size means the loss of 3.14 million tons of carbon dioxide sequestration annually.<sup>14</sup>

Forests not completely destroyed by mountaintop removal become fragmented, converting ecologically diverse interior forest to edge forest at a rate of up to five times greater than regular forest loss.<sup>15</sup> As the forests are converted from interior to edge, they lose much of their ecological function supporting the floral and faunal diversity of Appalachia.<sup>16</sup> Among the wildlife at risk from the fragmentation and loss of Appalachia's mature forests are millions of migratory songbirds.<sup>17</sup>

## Vanishing Valley Streams

With mountaintop removal the trees, soil, and debris scraped from the ridgetop do not get placed back on the mountain. Machines dump this waste, known as “overburden,” into the valley below. The regional hydrology changes because of the drastic topographic and vegetative alterations of the landscape, and the streams flowing down the mountainsides and through the valleys below disappear. Burying waterways under tons of mining waste, known as a “valley fill,” poisons and obliterates them.<sup>18</sup> As recently stated by an agency official:

“EPA is confident in the body of science that demonstrates adverse effects downstream of mountaintop mining and associated valley fills, particularly as they relate to conductivity and overall water quality.”<sup>19</sup>

Between 1985 and 2001, 6,697 valley fills were approved in Appalachia, covering 83,797 acres of land and potentially affecting 438,472 acres of watershed.<sup>20</sup> Valley fills can be as wide as 1,000 feet and over a mile long, and each can contain as much as 250 million cubic yards of wastes and debris—enough to fill almost 78,000 Olympic-sized swimming pools.<sup>21</sup> Burying fragile headwater streams located in valleys exterminates virtually all forms of life that get interred under millions of tons of waste and debris. From 1985 to 2001, the EPA estimates that valley fills buried 724 miles of streams.<sup>22</sup> Another study conducted by the Office of Surface Mining Reclamation and Enforcement (OSM) found that approximately 535 miles of streams were negatively affected by mining from 2001 to 2005.<sup>23</sup> All told, nearly 2,000 miles of Appalachian headwaters have been buried or polluted by mountaintop removal, and the damage to Appalachian watercourses has continued at an average rate of 120 miles per year.<sup>24</sup>



Pollution downstream of mountaintop removal site, West Virginia  
CREDIT: J. Henry Fair

Even waterways not completely destroyed by valley fills can suffer from mining pollution. These headwaters are home to some of the most biologically diverse aquatic species in the world, including many found nowhere else on earth—and they serve as the source of drinking water for local residents.<sup>25</sup> Valley fills release trace metals and toxins into surrounding waters for decades after their creation. According to the EPA, over 63 percent of streams located in the coalfields are “impaired” by alarming levels of heavy metals and toxic chemicals, which can harm aquatic species and threaten human health.<sup>26</sup> For example, studies have found increases in calcium, magnesium, total dissolved solids, hardness, manganese, and more threats to water quality.<sup>27</sup> Some streams in West Virginia, for example, have seen 30-40 fold increases in concentrations of sulfate, which is toxic to plants and other organisms.<sup>28</sup> Selenium, which can be highly toxic to aquatic life even at relatively low concentrations,<sup>29</sup> has been found downstream of some mountaintop mining sites at levels over 15 times the threshold for toxic bioaccumulation, causing deformation and reproductive failure in fish.<sup>30</sup> Once polluted by selenium, an aquatic habitat remains difficult, if not impossible to restore.<sup>31</sup>

## Legal Loopholes

Mountaintop removal is rogue mining. However, it is authorized under current regulations. There are two primary statutes that govern mining and waste disposal processes: 1) the Surface Mining Control and Reclamation Act of 1977 (SMRCA), which is administered by the U.S. Department of Interior's Office of Surface Mining (OSM); and 2) the Clean Water Act of 1972 (CWA), administered by the EPA and the U.S. Army Corps of Engineers (Corps).<sup>32</sup>

Most of the legal battles surrounding the disposal of mountaintop removal mining waste in streams have arisen under the CWA, which generally prohibits pollution from being discharged into waters of the United States unless a permit is obtained. Under the law, state water pollution control authorities must ensure that industrial pollutants do not violate water quality standards, and such standards are not permitted to allow waterways to be used for waste assimilation. Thus, if regulated as a typical industrial pollutant, mining spoil should not be discharged into the nation's waterways. The CWA, however, also authorizes the Army Corps of Engineers to permit the discharge of "dredged or fill material" into water bodies, a process often used for construction projects in waters.<sup>33</sup>

In 2002, the Bush administration adopted a regulation aimed at validating mountaintop removal and similar waste disposal practices, and put the Corps in the lead for permitting these operations. It accomplished this by defining mining spoil from surface mines (and other similar wastes) as "fill material" to be regulated by the Corps—essentially legalizing mountaintop removal by allowing the dumping of mining waste into waterways. This regulation is referred to by mountaintop removal opponents as the infamous Bush "fill rule."<sup>34</sup>



Reclaimed MTR site, Kentucky

CREDIT: Rob Perks

## Wrecklamation

Federal law (SMCRA) requires the restoration of mountaintop-mined sites. This regulatory requirement, however, ignores the fact that it is impossible to replace the biological functions of a forested mountain whose ecological niche was 400 million years in the making. Regardless, mining sites are supposed to be returned to their approximate original contour (AOC). This stipulation requires that mining companies backfill and regrade the flattened mountaintops to closely

resemble the "original surface configuration." In reality, this never happens, primarily because little guidance exists for defining AOC, and even less has been done to enforce it.<sup>35</sup>

Successful landscape remediation at mountaintop removal sites remains an illusion for a number of reasons. In a typical mountaintop removal operation, a mining company will spend on average only about 0.6 percent of revenue on reclaiming the land the operation destroyed.<sup>36</sup> As part of the reclamation process, workers commonly re-seed the flattened mountains

with what the coal industry calls “vegetation conducive to the surrounding environment and wildlife.”<sup>37</sup> This often involves a process called hydroseeding, in which sprayers coat exposed rock with a concoction of fertilizer, cellulose mulch, and seeds of nonnative grasses—hardly an adequate substitute for the original diverse forest.<sup>38</sup>

Over the past 30 years, only a fraction of disturbed land in Appalachia has been reclaimed to even minimum standards. One reason is that mountaintop removal sites experience extremely slow rates of postmining recolonization by native plants and trees. That is because unlike other forms of industrial vegetation removal such as clearcut logging, strip mining removes topsoil. Enormous machines compact the once-fertile land that remains, reducing the ability of native plants to grow in the area.<sup>39</sup> Even if mining companies replace the topsoil stripped by the operation, the biological communities within the soil are no longer intact.<sup>40</sup> Such disruption fundamentally alters the hydrologic regime of the soil, greatly impeding vegetation growth. As confirmation of this, a study by the EPA analyzed the recovery rate of 55 West Virginia mining sites, ranging in age from 6 to 24 years post-reclamation. Overall, it found trees and shrubs to be in extremely low abundance compared to surrounding forests. The sites that had significant revegetation contained only a limited amount of biological diversity, often comprising only two or three species, which is a drastic reduction in comparison to the natural, biologically diverse forests surrounding the site.<sup>41</sup>

Waterways destroyed by mountaintop removal face even worse prospects for recovery than the forests that feed them. It is virtually impossible for mining companies to mitigate the damage by restoring or reengineering the destroyed waterways—either in appearance or function. These former rivers, creeks, and streams simply cease to exist after mining and *cannot* be functionally restored. In fact, there are no scientifically credible plans for mitigating these impacts.<sup>42</sup> Headwater streams buried by wastes, debris, and other forms of “overburden” are permanently destroyed, and removing the tops of mountains also obliterates paths of groundwater flow.<sup>43,44</sup> According to the EPA, restoration efforts have never re-created a functioning headwater stream on mined or filled areas through mitigation efforts.<sup>45</sup> As Dr. Emily Bernhardt, a Duke University stream ecologist, testified in a federal court case last year: “There isn’t a great deal of evidence—some would argue no evidence at all—that recreating streams will work” on mountaintop removal sites.<sup>46</sup>

### Flat Land Logic

For years, the mining industry has keenly exploited a gaping statutory loophole: SMCRA contains a stipulation that allows companies to restore the area to “equal or better economic use” without restoring the biological function of the mountain or restoring its contour. In theory, this means that coal companies may repurpose land to be used for “industrial, commercial, residential, or public use.” Under this rationale, the coal industry contends that leveling mountains provides one of the few economic opportunities for the citizens of Appalachia because the lowered and flat land of a reclaimed mine can be more easily developed than a steep-sloped mountain. However, economic development has taken place on less than 5 percent of leveled mountaintops in Appalachia to date.<sup>47</sup>

Insisting that Appalachia actually needs flattened mountains for economic development is grossly misleading and suggests that the only good mountain is a flattened one. After all, flat land is not in short supply in the region. In West Virginia alone there exists 1.3 million acres of undeveloped yet developable land.<sup>48</sup> Nearly one-quarter of mountaintop removal permits encompass areas already rated as having a high potential for development, an option destroyed by mountaintop coal mining. Thus the argument that more flat land is needed for development is flat wrong.

It is far more common for former mountaintops to be converted into fallow fields, suitable at best for other forms of industrial processes. Indeed, although approximately 92 percent of mountaintop-mined land in Appalachia was originally forest, much of the postmined land (almost 50 percent) will be converted into biologically impoverished fields.<sup>49</sup> In Kentucky, for instance, only 8 percent of postmining land use in 2008 was returned to forests—92 percent was not—and

a little more than 1 percent of postmining land has been converted for commercial use.<sup>50</sup> Clearly, the data show that there is plenty of suitable land for economic development already, without the need to create yet more with mountaintop removal scars.

Conversely, there is a marked absence of data to indicate that converting Appalachia's lushly forested mountains into lifeless molehills offers the promise of economic prosperity. Far more could be done for local economic development by leaving the landscape intact than by destroying the mountains for short-term gain. Coalfield residents already use the natural environment as a source of income, as well as an integral element of Appalachian culture.<sup>51</sup> Moreover, environmental quality and tourism are positively correlated.<sup>52</sup> But mountaintop removal eliminates the ability of Appalachian residents to use the natural beauty of their surroundings to grow their economy through tourism. Tennessee has emphasized using mountains for tourism development instead of energy exploitation. In 2007, tourism contributed \$14.2 billion to Tennessee's economy.<sup>53</sup> To be sure, the sand traps of a handful of golf courses constituting reclaimed mountaintop mining sites hide the fact that the destruction of the Appalachians permanently hinders a better economic use of the region's natural resources.

### Replacing Miners with Machines

In television commercials, on billboards and bumper stickers, at the workplace, in the schools, and through political contributions, the coal industry tries to perpetuate the myth that mining is an economic blessing, rather than a curse to the people of Appalachia. But, in essence, mountaintop removal eliminates the miner from coal mining. That's because increased mechanization associated with strip mining has drastically lowered the number of mining jobs needed to produce each ton of coal.

Relying on strip mining—and especially mountaintop removal—as a means to produce jobs actually threatens the region's economic future. Even in places where the coal industry employs a majority of individuals, this influence is set to decline. A study by the U.S. Geological Survey has predicted that high-quality Appalachian coal beds will last no more than 10 to 20 years into the future, after which coal production is expected to dramatically decline.<sup>54</sup> And because of mechanization, as production declines, employment falls at a much greater rate. Between 1973 and 2003, mining employment fell at a rate seven times faster than mining production—coal production in the strip mines of Appalachia fell by 6.82 percent between 1973 and 2003 while employment fell by an astounding 43.1 percent.<sup>55</sup>



Blast overburden loaded into earth mover

CREDIT: J. Henry Fair

Despite the coal industry's influence, the actual overall number of surface mining jobs is relatively economically insignificant in Appalachia. In West Virginia, surface mining directly accounted for 0.89 percent of all jobs in the state

in 2006.<sup>56</sup> During the same year in Kentucky, surface mining directly accounted for 0.03 percent of jobs; in Virginia, 0.04 percent of jobs; and in Tennessee, 0.01 percent.<sup>57,58,59,60</sup> All told, today there are less than 14,000 strip miners in Appalachia, compared to a peak of over 150,000 in the 1950s—and mining jobs account for less than 1 percent of all jobs in the region. In some counties mining does constitute a larger percentage of total employment; however, mining wages account for a large percentage of total wages in these areas not because “mining jobs are so numerous, but because other jobs are so scarce.”<sup>61</sup>

### Mineral Rich, Cash Poor

Another false argument put forth by mountaintop removal proponents is that mining produces a significant amount of tax revenue for the states in which it occurs. But the truth is that the highest levels of unemployment and lowest levels of income for the Appalachian region tend to occur in areas with the greatest amount of mining.<sup>62</sup> Indeed, counties that produce the most coal in Appalachia often are the poorest in the nation.

Consider Kentucky, where the coal industry generated a total of almost \$528 million in tax revenue in 2006, yet ended up *costing* the state \$642 million in subsidies that same year—a net *deficit* of \$115 million.<sup>63,64</sup> The annual median household income in Boone County, which is West Virginia’s biggest coal producer, is \$25,669—only about half the national average

of \$50,200,<sup>65</sup> even though the price of coal has risen 823 percent over the past decade.<sup>66</sup> In Virginia, the seven coal-producing counties pump out more than 40 million tons of coal a year, but they remain among the poorest counties in the state. In Wise County, for example, approximately 9 percent of people live below the poverty level, which is nearly double the Virginia state average.<sup>67</sup>

Mountaintop removal not only hurts the health of the environment, it also harms the health of the local population. A 2009 study found that coal mining areas in Appalachia have higher mortality rates than non-coal mining areas, which annually cost the region \$41-\$50 billion more than the economic contribution of the entire coal industry in terms of health-related expenses.<sup>68,69</sup> Thus, while coal may generate some taxable revenue, its costs outweigh any economic benefits. Indeed, what the data make clear is that coal mining in general—and mountaintop removal in particular—is more like a parasite to Appalachia’s environment and economy.

### A Clean Break from Dirty Coal

While industry proponents do not dispute that underground mining employs more individuals per ton of coal extracted than mountaintop removal, they insist that there exists no viable alternative for



Marsh Fork Elementary School and Shumate Impoundment CREDIT: J. Henry Fair

mining the coal deposits in question—some coal seams are just too thin and precariously placed to be extracted through underground methods.<sup>70</sup> In effect, putting a halt to mountaintop removal would entail giving up these dangerous, hard-to-reach areas. In some places this is certainly true. But most opponents of mountaintop removal would agree that if the coal cannot be mined without rampant destruction, then it should stay in the ground and the mountains left intact. After all, does the temporary employment associated with mountaintop removal justify the permanent economic and environmental damage it causes?

An additional argument can be made that ending mountaintop removal does not necessarily mean sacrificing economic development and job growth. In fact, Appalachia—along with the rest of the nation—stands to benefit by shifting away from dirty, destructive coal and investing in clean, renewable energy. A report by the Appalachian Regional Commission concluded that renewable energy development and investment could create nearly 70,000 new jobs for the region.<sup>71</sup> In contrast, mountaintop removal currently employs only about 14,000 individuals directly—and will not do so for much longer.

Coal River Mountain in West Virginia provides a useful case study of the opportunity for transitioning to a clean energy economy that might produce more jobs. The Coal River Wind Project has done extensive studies of wind as an alternative to strip mining 6,000 acres of the mountain.<sup>72</sup> The analysis reveals that investment in renewable energy, such as wind power, would provide more jobs and profit in the long run than the short-term economic gains of surface mining.<sup>73</sup> Unfortunately, this locally supported alternative energy project is jeopardized because Massey Energy recently began mountaintop removal operations on Coal River Mountain.

There are far cleaner and cheaper ways to meet America's energy needs. Yet industry apologists are spending millions of dollars to block clean energy solutions and persuade Americans that they can keep using coal without the consequences. The better solution is to repower America by investing in clean energy. Green technologies and renewable fuels will create millions of good-paying jobs, lift our poorest communities out of poverty, reduce dangerous pollution, and help fight global warming.

At the same time, an economic and environmental transition should also be considered for lands already denigrated by mountaintop removal. For instance, more research needs to be conducted as to the potential of biomass and carbon sequestration in Appalachia. Currently, production related to the biomass industry employs almost 82,000 people in Appalachia and gives business to more than 900 establishments.<sup>74</sup> Carbon sequestration also remains an option, but the fallow fields that characterize more than half of reclaimed mined lands have only one-fifth the carbon sequestration potential of proper reforestation; forests over mined land can sequester up to 290 metric tons of carbon per hectare over a 70-year period.<sup>75</sup>

### **No More Mountaintop Removal**

NRDC, along with our grassroots partners in Appalachia and concerned citizens across America, seek an immediate halt of all mountaintop removal coal mining by the Obama administration.

In addition, we urge passage of federal legislation to close the loopholes currently making the polluting process legal. This could be done by properly recognizing mining waste for what it is, and not linguistically detoxified fill material that it is now considered to be. Under the proper definition, valley fills would be constrained because of the restrictions supplied by EPA oversight—effectively eliminating mountaintop removal.

Legislators in Congress have proposed making such a change with bipartisan bills: In the Senate, the Appalachia

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Restoration Act (S. 696) would redefine fill material to exclude surface mining waste; the House bill, the Clean Water Protection Act (H.R. 1310), would redefine fill material to exclude any pollutant discharged into the water “primarily to dispose of waste.”<sup>76,77</sup> Passage of such legislation—signed into law by the president—would represent a long-overdue victory for those fighting to stop the destruction of Appalachia.

For more information or to support NRDC’s campaign, please visit: [www.NoMoreMountaintopRemoval.org](http://www.NoMoreMountaintopRemoval.org).



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