RUNNING HEAD: Mountaintop Removal

Disproportionate Burden of Environmental Hazards

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Mountaintop Removal

Introduction

Mountaintop Removal Mining (MTR) is a surface mining method that has gained popularity, fairly recently, as the primary coal mining technique. The tops of mountains are blasted off to reveal veins of coal that would otherwise be too difficult to remove with the traditional underground method. This method is especially popular in the Appalachian mountain range, where there exist an abundance of coal in thin strips below the surface of these mountain peaks. Plenty of other metals and minerals also exist below the surface soil, grasses, and trees on these mountaintops. Though the MTR process targets only coal, it also disrupts sedimentary strata and exposes these minerals and metals to the elements.

Upward of 1.2 million acres have already been affected, and "500 mountains destroyed" in the mountain region (Appalachian Voices, 2017) This process not only disrupts the natural landscape, it also has fallen under scrutiny for its disruption of the health and quality of life for community populations within the Appalachian states of Tennessee, Kentucky, Virginia, and West Virginia. The sediment that is blasted from the tops of these mountains is supposed to be replaced after the mining is done, but it often gets dumped into valleys and streams, which results in a toxic slurry that poisons water sources and mountain streams (Fahrenthold, 2010). In the interest of public health, scientific review identifies that these communities experience high rates of aggressive cancers and chronic diseases, and that there is a strong correlation with proximity to these mining sites, and to the environmental effects of MTR. The effects of MTR mining are apparent across state lines and throughout many communities in the Appalachias, but in order to pinpoint more specific data, this paper begins by examining Wise County, Virginia as a microcosm of the issue at hand, and compares its data to other regional statistics. There

however do exist limitations in the community specific data at this point in time, and so other areas of this paper address the Appalachian region as a whole.

Description of the community at risk

Geographic Area

Wise County encompasses six towns in the southwestern area of Virginia: Appalachia, Big Stone Gap, Coeburn, Pound, St. Paul, and Wise. The county is 405 square miles, a lot of which is fairly mountainous as the county resides in the central part of the Appalachias, with 2 square miles of that making up water sources (US Census Bureau, 2017). Within the county is Jefferson national forest, which is protected from MTR, though 40 percent of the total land area in Wise has been affected by mountaintop mining (Appalachian voices, 2017)

Demographics

The population in the 2010 census was 41,452 and according to a 2017 estimate that total has dropped to 38,586 (US Census Bureau, 2017). The majority of residents are non-Hispanic whites at 93%. After that, African-Americans make up 5.2% of the total population, followed by 1.1% Latino/Hispanic, 0.30% Asian, 0.1% Native American, 0.01% Pacific Islander according to the 2010 census. 52% of the population is male and 48% female. The median household income is $36,352 and the per capita income is $20,896. The percentage of people in poverty is 23.5% (US Census Bureau, 2017). In terms of education levels, 75.2% have at least graduated from high school and 14.4% of that have a bachelors degree or higher (Data USA, 2016).

Environmental conditions

Air and water quality in this region are affected as hazardous particulate matter from heavy metals from the mining sites are picked up by the wind and rain, and end up in streams, lakes, and other freshwater sources, or in the ambient air. In a representative community study of southwestern Virginian mining towns, at two locations along a road running through Wise

Mountaintop Removal
County, air sampling "revealed the presence of antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, selenium" (Aneja, Isherwood, & Morgan, 2012).

Health Statistics

Health Issues

The main health conditions and issues that people in this region deal with are diseases of a chronic nature, and are likely accelerated by environmental conditions. "Incidences of lung cancer and other respiratory diseases in coal-mining Appalachia are disproportionately higher than the regional and national averages, after accounting for smoking and non-coal industry emissions"(Appalachian Voices, 2017). In Wise County, cancer, diabetes, and obesity are the main diseases of concern, according to a 2015 study by Norton Community Hospital in partnership with Mountain States Health Alliance. This study also revealed that lung cancer rates and cancer death rates were higher in Wise County than that of the state, at 90 people vs. 64.4 per 100,000 and 226.52 vs 176.36 people per 100,000 (Norton Community Hospital, 2015). These rates are nearly double the cancer incidences of the state and national averages, and one interesting correlation is the fact that mountaintop removal mining in Virginia mainly takes place in the southwestern quadrant (Appalachian Voices, 2017). These data are congruent with a study published in the journal Geospatial Health linking exposure to coal mining practices with higher cancer incidences and mortality rates, but in the state of West Virginia" (Hendryx, Fedorko, & Anesetti-Rothermel, 2010). Another environmental health study in 2014 revealed the relationship between surface mining, high levels of particulate matter, and examined the effect of particulate matter on epithelial bronchial tissue, and discovered a compelling correlation of higher lung cancer rates. It found that the levels of ambient particulate matter in these communities

throughout Appalachia were at the threshold of concentration wherein the particulates began to have a carcinogenic effect (Luanpitpong, et. al 2014). Dr. Michael Hendryx, a contributing author in this study and a researcher at Indiana University who specializes in studying the impact that surface mining has on human health states that "with this study we have solid evidence that mining dust collected from residential communities causes cancerous human lung cell changes" (Lung Cancer News Today, 2014).

Other relevant diseases that the county of Wise and other Appalachian communities experience are diabetes, poor nutrition and birth defects, as well as cardiovascular disease (Norton Community Hospital, 2015).

Influencing environmental and social factors

Environmental/Social Factors

As previously stated, the percentage of people in poverty in Wise is 23.5%, and the per capita income is $20,896, and some of the other environmental and social factors that influence the health of Wise County and other areas in the Appalachian region are poor health behaviors such as smoking, low/lower middle class socio-economic status, and "problematic access to medical care"(Hendryx, Fedorko & Anesetti-Rothermel, 2010). One promising aspect for the future of Wise County health, however, is that they have three separate hospital facilities and the Southwest Virginia Regional Cancer Center. Additionally, exist institutions of higher learning in the area such as the liberal arts University of Virginia at Wise, and the Mountain Empire Community College, which focuses on technical career development

Economy

Wise has an economic dependence on the coal industry, stemming from its historical background when the county experienced "unprecedented growth" in the late 19th century as a

result of a booming coal energy industry, and "railroad routes were established to ship coal to its many market destinations" and so the towns within the county "grew up along the rivers and railroads"(County of Wise, 2013). In 2012, the Virginia City Hybrid Energy Center was established in Wise, and it currently supplies 150,000 homes with power by burning coal and other "biofuels"(County of Wise, 2013) This furthers the demand for coal mining within the area, and also furthers the occupational dependence on coal within Wise, which is quite common in the Appalachias. Other industries cited on the Wise County website include "metal fabrication, extraction of minerals, and wood and forestry products"(County of Wise, 2013). These resources such as metal/mineral fabrication and extraction also pose occupational health risks, as ingestion/inhalation of particulate matter in these contexts further increases the chance of respiratory and cardiovascular issue.

Policies

A 1990 amendment to the Clean Air Act had a major impact on the demand for the process of mountaintop removal mining. The amendment aimed to reduce the causes and effects of sulfurous compounds in coal in the creation of acid rain. To combat this, the amendment called for cleaner coal that would burn less sulfur. The coal mined from MTR is often much cleaner than coal mined through underground methods, and so this process of mountaintop blasting, deforestation, and habitat destruction became much more commonly practiced.

There are certain environmental policies that are meant to work in the favor of the residents and to curtail the effects of mining company interests and greed. Back in 1977, the Surface Mining Control and Reclamation Act (SMCRA) was enacted to "establish a nationwide program to protect society and the environment from the adverse effects of surface coal mining operations" and to ensure that surface mining would not take place if reclamation and restoration

of the land were “unfeasible”(Office of Surface Mining Reclamation and Enforcement, 1978). Along with the statutes in SMCRA, there is the requirement that Approximate Original Contour (AOC) ought to be restored. The definition for AOC according to the act is that “surface configuration achieved by backfilling and grading of the mined area …including any terracing or access roads, closely resembles the general surface configuration of the land prior to mining” (Respec, 2018).

The Environmental Protection Agency (EPA) continues to this day to require that mining companies release an impact statement addressing the ecological effects that their practices will have on the mountaintop they are removing, and on the surrounding area. They are also required to get a National Pollutant Discharge Elimination System permit under the Clean Water Act, which is supposed to be a way for mining companies to be accountable for the pollutants that they discharge into water sources and into the air (EPA, 2016).

Conclusion

Mountain-top mining is a fairly new practice, gaining popularity after the 1990 Clean Air Act amendments increased demand for low-sulfur coal, which exists in the mountainous deposits in the Kentucky (KY) and West Virginian (WV) stretch of the Appalachias. While there were efforts to make mining companies prove the safety of their procedures and the effects they would leave behind, they clearly have not been effective enough and these vulnerable communities suffer the consequences in the form of poor health outcomes, and ecological destruction. From the reviewed literature, it appears that only recently have there been efforts to determine a causal link between the health issues experienced in communities that surround these coal mining sites, and the mining practices that take place. Not only is the destruction of mountaintops detrimental to the delicate ecology of the Appalachian wilderness because of toxic chemical runoff and

habitat destruction, but the water sources of local communities and air quality are being affected. Disproportionate rates of lung cancer, heart disease, and other illness associated with the contamination exceed national standards, after accounting for occupational hazards, and smoking rates. This in turn leads one to understand that indeed there is a causal relationship at play, and that greater regulations ought to be advocated.

Recommendations

As a way to address other health and behavioral issues in the Appalachias, tobacco cessation programs should be more actively implemented in the Appalachian region to reduce rates of death by cancer and other cardiorespiratory diseases. These intervention programs should target children and teens, as they are at an age where they are susceptible to copying their parent's habits without being educated of the consequences and impact of their chronic habits.

Another recommendation is that there should be more community outreach and empowerment on the population level within these areas. They should be more educated about the impact that particulate matter has on their lungs, and should even be supplied with respirators in certain areas. There should be more monitoring of the air quality, and alerts should be sent out each time a mining company begins development. Forums/counsels should be orchestrated, in order to regulate industry within their community.

Finally, one recommendation related to policy concerns the observation that mountaintop mining industry is not regulated enough and so there have to be greater statutes put in place to hold these companies accountable. It would be best if amendments or additions were made to the already implemented SMCRA. Different organizations are fighting to refine how industry standards are enforced, and are advocating for the preservation of the natural landscape There is the standard that the mountain ridgeline has to be restored to its Approximate Original Contour

under the Surface Mining Control and Reclamation Act and that's very much up to interpretation. Under SMCRA, states have to take on the burden of restoring abandoned sites. Fines should be much higher for the mining companies and the acceptable pollutant levels should be tailored back.

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Mountaintop Removal

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