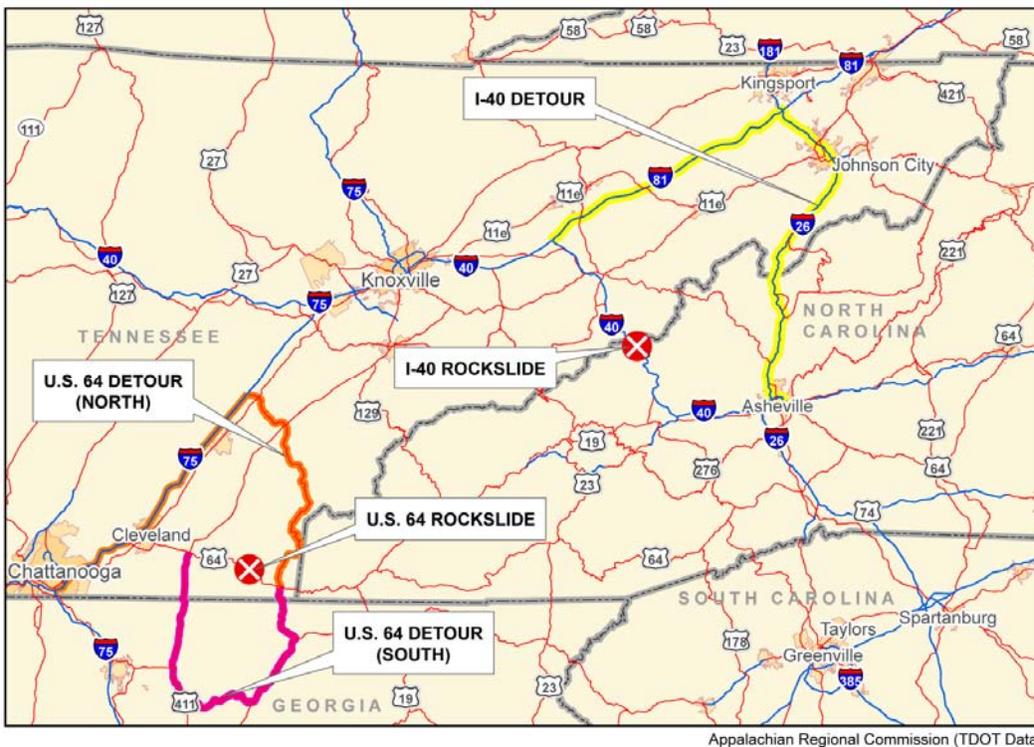


ECONOMIC IMPACT OF ROCKSLIDES IN TENNESSEE AND NORTH CAROLINA – Executive Summary

Two major rockslides occurred in the southwestern portion of North Carolina (NC) and southeastern portion of Tennessee (TN) during the fall of 2009. The first rockslide occurred on October 25th in Haywood County, NC, resulting in the closure of a section of Interstate 40 (I-40) at mile marker 2.6, about 50 miles west of Asheville, North Carolina, near the Tennessee border. The second rockslide occurred on November 10th in Polk County, TN. This rockslide closed a section of U.S. Route 64 (US-64). Figure 1 shows the location of these rockslides and the associated detours.

Figure 1: I-40 and US-64 Rockslides and Detours



The objective of this study for the Appalachian Regional Commission (ARC) is to estimate the economic impacts of these rockslides and the resulting road closures. To expedite the study, the analysis focused on two categories of economic and transportation impacts:

- **Local and Regional Economic Impacts** – the loss in business sales, visitors, tourism spending, and jobs for areas directly impacted by road closures and loss of transportation access and traffic volumes.
- **Transportation Costs** – extended road closures of key highways in Appalachia can result in significant detours leading to longer trips (more miles traveled), less direct trips, and additional congestion on the detour routes. Transportation costs impact both auto travel (personal, commuting, tourism) as well as longer distance freight shipments.

Approach

HDR|Decision Economics was engaged by the Appalachian Regional Commission (ARC) to study the economic and transportation costs of the two rock slides and road closures connecting eastern Tennessee and western North Carolina.

Local and Regional Economic Impacts. To gauge the extent of the local and regional economic impact on the areas around the rockslides, HDR:

- Obtained information from and observations of Local Development Districts (LDD) directors;
- Conducted phone interviews of businesses in the region;
- Collected historical and current economic data for the counties most likely impacted by the rockslides; and
- Compiled articles and other materials related to the rockslides.

HDR worked with the ARC and selected local development districts (LDDs) in Tennessee and North Carolina to help determine the extent of the economic impact on the rockslide areas. LDDs provided their observations and information related to the rockslide areas. The purpose of the interviews was to determine recent business trends and to isolate the economic and transportation effects of the closure from the broader economic recession.

The LDDs included in the study were chosen by ARC because they are closest to the rockslide impacted areas. Several of the LDDs provided contacts for businesses they believed to be potentially impacted by the rockslides. In some cases, the LDD director reported that the district had not been significantly impacted by the rockslides and associated detours. The LDDs indicating significant economic impacts from the road closures include:

- Southeast Tennessee Development District – affected by the US-64 rockslide
- Southwestern Commission – affected by both US-64 and I-40 rockslides
- East Tennessee Development District – affected by the I-40 rockslide

Through a series of phone interviews with businesses and local economic development experts, HDR collected information on the economic impacts of the rock slides on business sales, jobs, access to markets, and shipping cost premiums. The results of these interviews are a combination of qualitative and quantitative findings based on contacting 54 businesses and receiving input or feedback from 32 local business organizations. The economic impacts represent changes in economic activity during the road closure compared to the prior year.

Transportation Costs of Road Closures. The US-64 and I-40 rockslides have closed sections of these routes for nearly six months resulting in a significant loss of transportation mobility, connectivity and access in the region. Tourists, residents, and businesses that rely on these roadways are being diverted to alternate routes. For most of these diverted travelers, the alternate routes are longer distances and more time-consuming. These factors increase costs on: the diverted traveler; the traveler who had been using the alternate routes prior to the rockslides; and the region as a whole.

HDR applied standard traffic modeling equations and analysis to estimate the costs to autos and trucks for each road closure and the diverted routes. The transportation costs are measurable, based on traffic counts on the affected roadways before and after the rockslides. When combined with other data related to speed of travel and route length, estimates of the change in vehicle hours traveled (VHT) and vehicle miles traveled (VMT) can be made.

The Tennessee Department of Transportation (TDOT) and the North Carolina Department of Transportation (NCDOT) conduct annual counts of traffic on the states' roadways. The DOTs provided traffic count data for 2008, which was adjusted to reflect the 2009 pre-rockslide levels of traffic on the affected roadways. They also provided traffic count data that was collected post-rockslide. This information was then used to estimate the change in traffic and miles traveled attributable to the rockslides and associated detours.

Combined with Federal Highway Administration (FHWA) and other industry-accepted data, HDR estimated the most relevant transportation costs:

- Vehicle operating costs – fuel and other expenses related to increased VMT;
- Diversion travel time costs – additional VHT for diverted trips caused by the road closures;
- Emissions costs – air emissions such as greenhouse gasses due to VMT;
- Congestion travel time costs – increases in delay on the detour routes; and
- Pavement maintenance costs – increases due to extra VMT.

Summary of Findings

The negative economic effect of the rockslides is measurable for the communities in closest proximity to the rockslide site. Business revenue has decreased, employees have been laid off, and businesses are experiencing transportation cost increases. Whether the rockslide impacts are substantial enough to influence the countywide unemployment rates is uncertain; sufficient data are not yet available to make this determination.

Communities located farther away from the rockslide area have noticed more vehicles on roads, likely due to the detoured traffic. Businesses located in those areas where traffic has increased may actually be temporarily benefiting from the rockslides.

The focus of this analysis is on the net effects due to the road closures and loss of access to markets. It also facilitates an understanding of the negative local effects. It is worth noting that the combination of the economic recession and the rockslides makes the impact to the area all the more significant. Because of the start-up costs required to open a business, it is much more difficult to reopen a business than it is to close one. As a result, businesses that are forced to close are not likely to reopen, even after the rockslides are cleared.

Based on findings from interviews with individual businesses, economic activity has decreased by as much as 25 to 30 percent in the areas most impacted by the rockslides. More specifically:

- Transportation costs have increased \$3,000 to \$60,000 per month, generally dependent upon the size of the transportation-reliant business.
- Revenue has decreased by 50 to 80 percent for hotels, motels and inns.
- Restaurant and retail business is down 30 to 90 percent.
- Gas stations are pumping 25 percent less fuel.
- A local hospital is losing \$200,000 per month in revenue.

Throughout the interview process, businesses made a point of saying how thankful they were that the rockslides occurred during their typically slower season. US-64 is expected to be reopened in mid-April, and the road affected by the I-40 rockslide is anticipated to be opened by the end of April. Businesses involved in tourism indicated numerous times that an extended road closure, much beyond March, would impact their revenue. They also indicated that they

were concerned about the lag between the reopening of the roads and the public's perception that the road, and their business, was open. There was a real sense that these businesses were going to get by, but barely.

Several businesses and organizations that were interviewed suggest that the rockslides and road closures are reasons that alternate routes need to be considered.¹ Specifically, the November rockslides may strengthen the case for completing Corridor K, which would connect Cherokee County to Cleveland, Tennessee.²

Total Transportation Cost Impacts. Significant transportation costs have been imposed on the region, including the transportation costs to businesses already cited, due to the transportation system disruption that the rockslides caused. Because sections of US-64 and I-40 have closed, traffic has been diverted. This has increased the vehicles miles traveled, and the congestion and travel time for users of the region's roadways. It's estimated that during the course of the road closures, \$197 million in transportation costs have been imposed on the region based on an increase of 132.9 million miles of travel and 2.6 million additional hours of travel.

Total transportation costs imposed on the region as a result of the I-40 and US-64 rockslides are shown in Table 1. As a result of the rockslides and associated detours, \$197 million in costs have been imposed on the region. These transportation costs are based on an increase of 132.9 million miles of travel and 2.6 million additional hours of travel. Nearly 90 percent of these costs are associated with the I-40 rockslide and detour routes. The costs imposed on the more rural US-64 rockslide-impacted area are not insignificant, however. More than \$22 million in costs are attributable to the rockslide in that area and the diversion of traffic to alternate routes.

Of note, 28% of the VHT impacts are to truck travel but 47% of the economic value of costs are estimated to be borne by trucks. This is an indication of the impact to trade and the important role these Appalachian highway facilities play in connecting markets regional and national markets. The higher costs are due to higher values of time for business travel plus higher per miles costs in terms of fuel consumption, emissions and pavement damage.

Table 1: Total Transportation Costs of I-40 and US-64 Rock Slides

| | I-40 Rockslide | US-64 Rockslide | TOTAL |
|------------------------------|----------------|-----------------|----------------|
| Vehicle Operating Costs | \$56.9 | \$7.2 | \$64.1 |
| Diversion Travel Time Costs | \$65.2 | \$10.7 | \$75.9 |
| Emissions Costs | \$4.5 | \$0.5 | \$5.0 |
| Congestion Travel Time Costs | \$43.8 | \$3.5 | \$47.2 |
| Pavement Maintenance Costs | \$4.6 | \$0.3 | \$4.9 |
| TOTAL | \$174.9 | \$22.1 | \$197.0 |

¹ Officials seeking help for stores on U.S. 64 West, Business owners say rockslide is causing hardships, by Dwight Otwell, February 23, 2010, Cherokee Scout, [CSThttp://cherokeescout.com/articles/2010/02/26/news/doc4b8447195860d291659023.txt](http://cherokeescout.com/articles/2010/02/26/news/doc4b8447195860d291659023.txt)

² Rock slides shut down gorge, U.S. 64 West through Ocoee Gorge closed for at least 8 weeks, by Scott Wallace, November 18, 2009, Cherokee Scout, <http://www.cherokeescout.com/articles/2009/11/19/news/doc4b031fe9280ef374408117.txt>