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The Economic Consequences of the East Palestine Train Derailment

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The Center for Economic Development
at Cleveland State University

W.E. Upjohn Institute for
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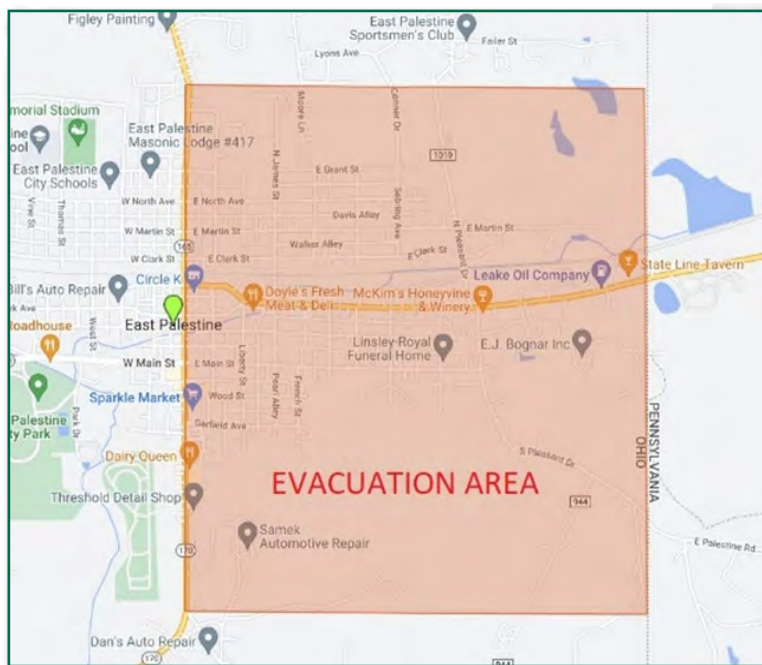
The Center for Economic Development at Cleveland State University, in partnership with the Upjohn Institute for Employment Research, is engaged in an ongoing effort to track the economic consequences of the Norfolk Southern train derailment in East Palestine, Ohio, on the evening of February 3, 2023 (Figure 1). This initial report focuses strictly on effects felt throughout the city of East Palestine, with special attention paid to the evacuation area, and covers the period from the date of the derailment until two weeks afterward (through February 17, 2023). This period coincides with the mandatory evacuation time ordered by the office of Governor Mike DeWine and serves to frame the early economic impacts on the community.

The results will show conservative estimations and act as a starting point for understanding the extent of the economic impact of the derailment on the people of East Palestine. This will be the first in a series of reports examining the immediate economic impact of the train derailment and mitigation of derailment consequences using public and private assistance. This report aims to bring attention to the magnitude of economic losses suffered by the community and the response needed from the government, first responders, and the company to compensate for those damages and provide the appropriate remediation services.

A search for reports and economic analyses on other derailments yielded little information or insight into the economic costs to the communities impacted by these disasters, outside of the costs to the rail companies themselves. No comprehensive explanation of economic costs to communities in either the immediate response or long-term economic consequences could be located in published material.

Incidents of this kind are not unusual. The U.S. Department of Transportation's Federal Railroad Administration has reported an average of 1,475 train derailments per year between 2005 and 2021. However, studies on the economic impact of these events are much less common, and they seldom focus on the community impact. For instance, in May of 2022, Norfolk Southern reported an incident in Harmar, Pa., involving four cars carrying petroleum. The incident cost the company about \$30 million, yet the full extent of the economic consequences to the community has not been calculated.¹ To gather the information and evidence presented in this report, we relied heavily on secondary sources, including online news sites and newspapers which were readily available to the public. We did so because only limited reports and official documentation were made public during the period

Figure 1. East Palestine Evacuation Area



SOURCE: American Red Cross, Northern Ohio Region

¹ Source: U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Office of Hazardous Material Safety. [Incident Statistics](#). Accessed on March 2, 2023.

immediately following the derailment. Furthermore, while methodological practice would require the research team to contact and collect information from primary sources, we refrained from contacting or engaging in direct outreach to the city of East Palestine, local businesses, or residents, out of respect for the community and an understanding that the primary concern was the health and safety of the residents in the affected communities.

This preliminary economic-impact analysis does not account for, and cannot at this time include, the following considerations:

1. The long-term health impacts that residents may experience could lead to increased health-care costs, long-term loss of employment, reduced employment, or other job-related economic losses resulting from health issues.
2. Long-term housing impacts such as abandonment of contaminated homes and structures, added housing costs such as extensive remediation or renovation of properties near the derailment site, added home buyers' needs experienced because of loss of income, inability to pay mortgages and the resulting penalties and fees, eventual foreclosure or property abandonment, negative impacts to individuals' credit ratings, decline in home values/home sales as a result of East Palestine becoming a less attractive community for homebuyers, the need for demolition of contaminated or abandoned properties, and the impacts on the rental market.
3. Long-term government support to the community from state, county, and local governments; hazard pay and the health-related costs to first responders, or possible impacts on tax revenue.
4. Long-term loss of business, business closures, or damage to the commercial property market.
5. The long-term impact to city and county attributed to forgone tax collection due to loss of residents and businesses in the city.

The research team intends to conduct further analysis of the effects on the economy of East Palestine and surrounding communities as more information becomes available, the situation in the community evolves, and impacts become clearer. The future assessments will include further economic estimates of losses and the value of the assistance spent on mitigating these losses.

KNOWN FACTS ON THE DERAILMENT

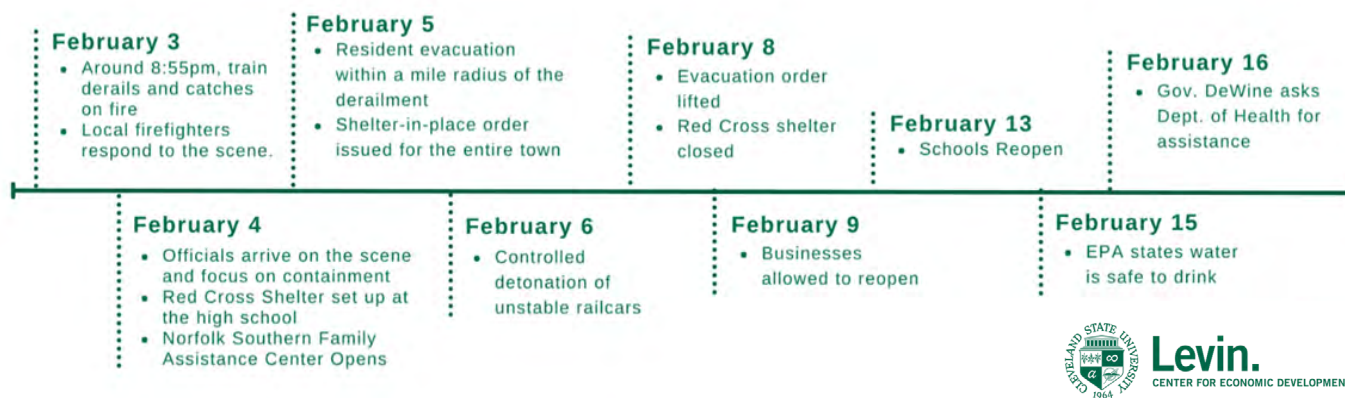
On the evening of February 3, 2023, a Norfolk Southern general merchandise freight train traveling from Madison, Illinois, to Conway, Pennsylvania, derailed roughly 1,000 feet from the Pennsylvania border. According to the preliminary report from the National Transportation Safety Board, the train comprised 149 railcars, of which 38 derailed. It is reported that 20 tank cars were carrying hazardous materials: combustible liquids, flammable liquids, and flammable gas, including five cars carrying vinyl chloride.² Eleven of the cars containing hazardous materials were involved in the derailment, and they soon after caught fire and subsequently damaged an additional 12 railcars.³

By February 4, members of the Environmental Protection Agency (EPA) and first responders were on the scene to conduct environmental testing and to control the fires and flow of contaminated material

² Vinyl chloride is of particular note, as it has been found to be carcinogenic to humans. Short-term exposure can lead to dizziness, headaches, and even passing out. Long-term exposure can lead to liver damage and different types of cancer. Source: Ohio Department of Health: [Vinyl Chloride. Answers to Frequently Asked Questions](#). Informational flyer retrieved on March 8, 2023.

³ National Transportation Safety Board (NTSB) (2023) report: [Norfolk Southern Railway Train Derailment with Subsequent Hazardous Material Release and Fires](#).

Figure 2. Timeline of Events (Feb 3 – Feb 16)



into local waterways (Figure 2). On February 5, Mike DeWine, governor of Ohio, activated the Ohio National Guard and together with local officials issued a shelter-in-place order for the entire town. An evacuation order was issued for the area within a one-mile radius of the train crash site due to the risk of an explosion from the inventory of volatile gases.⁴ Between 1,500 and 2,000 people were evacuated from the site.

The American Red Cross, Northern Ohio Region, was in charge of establishing a temporary shelter at East Palestine High School for evacuees. This shelter served more than 100 people,⁵ and all those in need were also invited to visit the Norfolk Family Assistance Center, which provided reimbursement for travel expenses and other evacuation costs, as well as other monetary help.⁶ On February 6, in order to avoid a deadly explosion of vinyl chloride, crews conducted a controlled detonation of the railcars containing the substance.⁷ The evacuation order was lifted on February 8, when residents were permitted to go back to their homes, but schools remained closed and did not resume activities until February 13.⁸ Businesses were also told it was safe to reopen; some of those that did reported “strong chemical” smells lingering at their premises despite their effort to clean. Many other business owners decided to wait before reopening in order to avoid putting their employees at risk, although they cited concerns about losing inventory.⁹

On February 13, the chief executive officer of Norfolk Southern announced that the company had established a \$1 million community support fund as a “down payment” on their commitment to help rebuild the village.¹⁰ On February 16, Governor DeWine formally requested assistance and resources from the U.S. Department of Health and the Centers for Disease Control and Prevention (CDC).¹¹ On the same day, the head of the EPA issued an order for Norfolk Southern to handle and pay for all necessary cleanup.¹² In the meantime, EPA screenings continued and officials reported that, other

4 According to our estimation, the one-mile area encompasses roughly 30 percent of the city, about 1,300 people and 590 households.

5 American Red Cross, Northern Region of Ohio (2023). [Longest-standing shelter in years closes after evacuation order is lifted.](#)

6 Yorgey, Tori (2023, Feb 6). [East Palestine evacuated residents: 'It's terrifying' as train derailment site worsens.](#) WTAE-ABC News.

7 Ebrahijni, Alisha, Holly Yan (March 4, 2023). [It's been one month since a freight train carrying hazardous chemicals derailed in Ohio. Here's what's happened since.](#) CNN.

8 Ibid.

9 Yorgey, Tori (Feb. 9, 2023). [Businesses able to open as evacuation order lifts.](#) WTAE-ABC News.

10 Norfolk Southern (2023). [Open letter to East Palestine, Ohio, from Alan Shaw.](#)

11 [Letter to the Center for Disease Control and Prevention \(CDC\) from Governor DeWine.](#)

12 Mizelle, Shawna (Feb. 21, 2023). [Who Is Michael Regan, the Head of the Environmental Protection Agency?](#) CNN.

than contamination in the sulfur run stream, the air and water was safe for residents. Many residents, however, continue to express doubt and concern about whether the environment is truly safe.¹³

PAULSBORO, NJ, INCIDENT

Incidences of toxic spills, let alone train derailments, are not new for the United States rail system. On November 30, 2012, a Conrail train derailment spilled approximately 23,000 gallons of vinyl chloride gas, one of the major contaminants in the Norfolk Southern derailment, directly into Mantua Creek near Paulsboro, New Jersey. This caused a large-scale evacuation over a 12-mile radius of the small city, with more than 70 residents seeking medical attention following exposure to the chemical.¹⁴

The chaos that ensued from this incident engulfed the community, and many residents cited mismanagement and poor communication from governing bodies, as well as distrust of Conrail.¹⁵ Despite an attempt by residents in the community to hold Conrail accountable for the damages, a judge declined the class-action lawsuit.¹⁶ Residents received compensation from the corporation, though many equated this gesture to “hush money” meant to paper over the potential long-term impacts.¹⁷

Following the East Palestine derailment, the media have pointed to the Paulsboro derailment as comparable. In that incident, the long-term impacts on the economy came as a surprise. Visitors stayed away from the community, and the economic downturn caused local businesses and restaurants to close.¹⁸ In response to the East Palestine derailment, the mayor of Paulsboro predicted that “the stigma will stay around. People say, ‘It’s still in the air, it’s still in the water, it’s still in the ground.’ Believe me, that stigma will stick around for quite a few years, I know that for a fact.” This indicates concern over long-term impacts despite remediation efforts.¹⁹

No comprehensive economic impact exists for the derailment in Paulsboro, yet the impacts are well documented. In the short term, residents’ lives were massively disrupted by the loss of productivity and place. In the long term, the identity of the city, its residents, and its economy fundamentally changed.

ABOUT EAST PALESTINE

East Palestine is a village located in Columbiana County, Ohio, along the state border with Pennsylvania. It is part of the Salem, Ohio, Micropolitan Statistical Area, as well as part of the southern region of the greater Mahoning Valley. Founded in 1828 as Mechanicsburg and incorporated as a city in 1875 (when it was renamed East Palestine), the city grew around the nearby clay pits, which supported

13 Associated Press (Feb. 8, 2023). [Residents can return home after crews burned chemicals in derailed tanker cars](#). *National Public Radio (NPR)*.

14 Office of Response and Restoration (Dec. 17, 2012). [A Train Derails in Paulsboro, N.J., Releasing 23,000 Gallons of Toxic Vinyl Chloride Gas](#).

15 Nurin, Tara (Dec. 17, 2012). [Official Response to Paulsboro Chemical Spill Outrages Some Residents](#). *Spotlight News*.

16 [The National Transportation Safety Board Has Released Its Final Report on Systemic Flaws Leading Up to a 2012 Train Derailment That Leaked a Dangerous Gas in Southern New Jersey](#) (Aug. 26, 2014). New Jersey 101.5 FM.

17 Fenton, Reuven, and Emily Crane (Feb. 22, 2023). [2012 NJ Toxic Train Wreck Victims Warn East Palestine, Ohio to Lawyer Up](#). *New York Post*.

18 Garcia, Irene (March 2, 2023). [The 2012 New Jersey Derailment Offers a Glimpse into the Future of Eastern Palestine](#). *Local Today News*.

19 Fenton, Reuven and Emily Crane (Feb. 22, 2023). [2012 NJ Toxic Train Wreck Victims Warn East Palestine, Ohio, to Lawyer Up](#). *New York Post*.

a pottery industry until the 1950s. According to the U.S. Census, East Palestine is home to about 4,700 people, of whom 93 percent identify as white. The median household income is \$58,400, and the median property value in East Palestine is \$89,900, with a 69.5 percent ownership rate.²⁰

The workforce in East Palestine includes 1,987 employees, and the most common employment sectors for residents (in order) were manufacturing, retail trade, and health care. Employment data show that there are 1,106 people employed in the city, but only about 20 percent (226 people) are city residents. At the same time, 89 percent of the 1,987 employed residents from East Palestine work outside the city. In total, the number of workers affected by the derailment includes all those who work or live in East Palestine (1,987 + 1,106 - 226 = 2,867 people).²¹

ECONOMIC CONSEQUENCES

To better understand the total economic impact on East Palestine, this report analyzes three areas that are expected to experience an impact from the Norfolk Southern train derailment. These three areas include government costs, business and commercial costs, and household costs. (See Appendix for Methodology.)

GOVERNMENT COSTS AND IMPACT

Government costs include expenditures for overtime pay to public administrators, police, and firefighters. Police worked 12-hour days for each of the 14 days following the accident, and it is assumed that the other city employees worked the same amount.²² The table below shows the total economic impact of government costs during this time period. The total estimated annualized loss is approximately \$1.8 million.

Table 1. Government Impact

Impact	Employment	Labor Income	Value Added	Output
Direct	3	\$281,522	\$430,145	\$1,096,870
Indirect	3	\$133,836	\$216,044	\$510,005
Induced	1	\$40,047	\$79,379	\$151,392
TOTAL	7	\$455,404	\$725,568	\$1,758,267

HOUSEHOLD COSTS AND IMPACT

Household costs include the loss of income generated from the economic shutdown following the derailment. It does not include a loss of productivity in the local government sector, because these employees continued to work throughout this time frame. Calculating this type of impact also captures expenditures related to evacuation, such as lodging and food. The total annualized household loss during this time is estimated at \$10.3 million. In addition, this incident amounted to an estimated loss of \$3.6 million in labor income, which would have supported 88 jobs in Columbiana County.

20 U.S. Census Bureau. American Community Survey (ACS) Five-Year Estimates (2016-2021).

21 U.S. Census Bureau (2023). Longitudinal Employer Household Dynamics (LEHD) Origin-Destination Employment Statistics (2002-2019). Washington, DC: U.S. Census Bureau, Longitudinal Employer-Household Dynamics program.

22 Greier, Mary (2023, February 11). [East Palestine police chief describes past week as 'Chaos.'](#) Review Online.

Table 2. Household Impact

Impact	Employment	Labor Income	Value Added	Output
Direct	60	\$2,440,511	\$2,945,268	\$5,968,741
Indirect	9	\$402,191	\$655,859	\$1,545,889
Induced	19	\$734,919	\$1,455,544	\$2,786,061
TOTAL	88	\$3,577,622	\$5,056,672	\$10,300,691

NORFOLK SOUTHERN FINANCIAL ASSISTANCE AND REIMBURSEMENT

As part of its early response to the derailment, Norfolk Southern pledged funds and set up a family assistance center where residents could apply for a “\$1,000 inconvenience check and reimbursement for meals, lodging and other expenses.”²³ Of the \$5.6 million committed to East Palestine as of February 20, \$3.4 million was earmarked directly for households, and \$220,000 was earmarked to reimburse the government for its first-response costs.²⁴ Of the remaining \$2 million, half was dedicated to establish a community fund and to fund a community liaison position to oversee the distribution of dollars in the community, and half to the local government. There remains a high degree of confusion in the community surrounding the qualification to receive assistance. News reports have documented residents claiming to have been denied assistance, to have received some support and subsequently been denied, or to have applied for but not yet received assistance.

NORFOLK SOUTHERN RESPONSE

Though not all of the payments had been dispersed as of February 17, the funds committed during the initial period will have an annual impact on East Palestine. Of the \$5.6 million committed by the company, \$4.6 million is captured in this analysis. The \$1 million community fund and accompanying position established to serve the community during the remediation process is discounted because of a lack of clarity as to how those funds will be allocated.²⁵ Table 3 shows the estimated annualized economic impact of the immediate response efforts by Norfolk Southern. The total impact for the output of this response amounts to approximately \$4 million. A multitude of additional funds have been announced by Norfolk Southern in the weeks following the derailment, including dedications to the school system as well as to residents; these are not accounted for, as they fall outside the initial 14-day period.

Table 3. Immediate Response Impact Output

Impact	Employment	Labor Income	Value Added	Output
Direct	4	\$313,125	\$478,431	\$1,220,000
Indirect	3	\$148,859	\$240,297	\$567,256
Induced	15	\$585,491	\$1,158,805	\$2,222,093
TOTAL	22	\$1,047,475	\$1,877,533	\$4,009,349

23 Ashworth, Alan (2023, February 18). [East Palestine: 2 weeks after train derailment, many residents dissatisfied with response](#). *Akron Beacon Journal*.

24 Norfolk Southern Corporation (Feb. 20, 2023). [Norfolk Southern Furthers East Palestine Community Engagement and Recovery](#). CISION PR Newswire.

25 Without knowing how this money will be spent, it would be irresponsible to estimate the impact, especially considering indirect and induced effects.

LOOKING FORWARD

The future of East Palestine and its residents remains uncertain; a lack of information on the response adds to the limited understanding of the economic impact and the consequences of that impact. Returning to the Paulsboro, N.J., example grants some insight. The Paulsboro derailment was followed by residents fleeing the region, leaving a bloat of houses on the market to languish for long periods of time at diminished prices.²⁶ Early media reports detailing consequences to the housing market in East Palestine suggest that changes in demand and diminished sales are likely to result.

SURVEY

The Center for Economic Development has created a survey to record the economic experiences of residents of East Palestine and the surrounding area. To participate in this brief survey, please click on the link below:

https://urbancsu.co1.qualtrics.com/jfe/form/SV_bqgujeIVL3NPSNU

26 Forand, Rebecca (March 16, 2014). [Paulsboro's 'Toxic' Real Estate Market Suffering from Environmental Woes](#). NJ.com.



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APPENDIX - METHODOLOGY

The research team separated this economic impact into three independent sections: 1) government, 2) business, and 3) household costs. Economic impact was calculated using the IMPLAN online application model²⁷ and is presented in annualized estimates²⁸ of four impact measures, including 1) employment, 2) labor income, 3) value added, and 4) output.

- **Employment impact** measures the number of annual jobs lost as a result of the loss of economic activity in Columbiana County.
- **Labor income impact** measures the decrease of labor earnings due to the loss of economic activity in Columbiana County.
- **Value-added impact** measures the lost value in the region due to the loss of economic activity in Columbiana County, which is calculated as the output less the cost of intermediate goods.
- **Output impact** measures the value of all lost goods and services in Columbiana County due to the loss of economic activity.

Each indicator illustrates direct, indirect, and induced economic impact. Direct impact reflects initial economic changes demonstrated by the activities of companies and organizations: direct employment of people, paying them income, and producing certain products and services. Indirect effects are the business-to-business purchases in the supply chain taking place in the region that stem from the initial industry input purchases. The induced effects are generated by the spending of the employees within the business's supply chain. Government costs include expenditures for overtime pay to public administrators, police, and firefighters. Police worked 12-hour days for each of the 14 days following the accident, and it is assumed that the other city employees worked the same amount.²⁹ Average wages were estimated using the U.S. Bureau of Labor Statistics Quarterly Census of Employment and Wages data for public administrators, police protection, and fire protection in Columbiana County.³⁰

Household costs include the loss of income generated from the economic shutdown following the derailment, as estimated through the loss of sales over the 14-day study period. Annual sales data was gathered from the Mergent Intellect³¹ platform, filtering for registered businesses with an East Palestine address. Calculating this type of impact also captures expenditures related to evacuation, such as lodging and food, with these costs to households being estimated using the per diem rates for Columbiana County.

Because of lack of data, the research team did not include the estimated costs of security and policing that may have been needed (and continue to be needed) as elected officials, high-profile visitors, and possibly “disaster tourists” visit the community. The analysis does not account for spending associated with activities, such as local purchases of food, gas, and overnight stays.

Costs associated with this derailment in the long term will incorporate the cost of remediation, response, and property damage. These data are made available through NTSB incident reports which, because of the scale of this incident, have not been completed yet. As such, we are not addressing any environmental impacts of the incident in this report.

27 For more information on the IMPLAN modeling process, visit IMPLAN.com.

28 These estimates illustrate the extent of economic losses over a one-year span.

29 Greier, Mary (Feb. 11, 2023). [East Palestine Police Chief Describes Past Week as 'Chaos.'](#) Review Online.

30 Quarterly Census of Employment and Wages (QCEW) data retrieved from <https://data.bls.gov/cgi-bin/dsrv?en>.

31 Mergent Intellect (2023). List of businesses containing an East Palestine mailing address. Retrieved on February 28, 2023.

The initial geography chosen for this study was East Palestine proper. In order to account for a broader impact beyond the town's small size, Columbiana County was chosen as the study region, but only costs incurred for East Palestine proper were counted.

Loss of sales was calculated for the entirety of the two-week span of this study. News reports suggest that business closures occurred over variable amounts of time; some were announcing “closed until the evacuation zone is cleared,” and others posted on their Facebook pages that they “are closed until further notice.”³² The numbers of individuals and households were estimated using ACS 2017–2021 Five-Year Data and visualized using ArcMap 10.8.1.³³

³² Gountner, Mike (Feb. 6, 2023). [East Palestine Derailment Closes Businesses in Evacuation Area](#). 21 WFMJ Online News.

³³ ESRI (2022). Desktop ArcMap: Release 10.8.1. Redlands, CA: Environmental Systems Research Institute.